



SUSTAINABLE RURAL DEVELOPMENT AND INNOVATION

Report on the State of the Alps

ALPINE CONVENTION
Alpine Signals - Special Edition 3

IMPRINT

Editor:

Permanent Secretariat of the Alpine Convention

www.alpconv.org

info@alpconv.org

Office:

Herzog-Friedrich-Strasse 15

A-6020 Innsbruck

Austria

Branch office:

Viale Druso-Drususallee 1

I-39100 Bolzano-Bozen

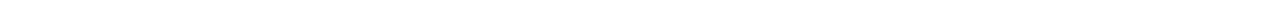
Italy

Cover Photo:

© Hanspeter Schiess

SUSTAINABLE RURAL
DEVELOPMENT
AND INNOVATION
REPORT ON THE STATE OF THE ALPS

ALPINE CONVENTION
Alpine Signals – Special edition 3



The present report has been approved by the XIth Alpine Conference, held in Brdo pri Kranju (Slovenia) 8th March 2011. The preparation of this report has been coordinated by the Permanent Secretariat of the Alpine Convention in coordination with the French Presidency of the Alpine Conference.

The text of the summary was drafted by the French Presidency of the ad-hoc expert group, in coordination with the Permanent Secretariat and the members of the ad-hoc expert group.

Members of the ad-hoc expert group:

Presidency

France

Jean Pierre Chomienne, DATAR France, Délégation interministérielle à l'aménagement du territoire et à l'attractivité régionale
(The interior ministerial delegation for regional development and appearance)

Supported by:

Charlotte Penel, CIPRA France, Comité français de la Commission Internationale pour la Protection des Alpes
(French Committee of the International Commission for the Protection of the Alps)

Members

Austria

Elisabeth Süssenbacher, Umweltbundesamt
(Environment Agency Austria, Landuse & Biosafety)
Bettina Schwarzl, Umweltbundesamt
(Environment Agency Austria, Landuse & Biosafety)

European Commission

Lukas Visek
(General Director for agriculture and rural development)

France

Jean Pierre Chomienne, DATAR France
(The interior ministerial delegation for regional development and appearance)
Charlotte Penel, CIPRA France
(French Committee of the International Commission for the Protection of the Alps)

Germany

Dr. Florian Ballnus, Bayerisches Staatsministerium für Umwelt und Gesundheit
(Bavarian State Ministry of the Environment and Public Health)

Italy

Francesco Tagliaferro, IPLA Istituto per le Piante da Legno e l'Ambiente
(Institute for Woods and the Environment)
Luca Cetara, Unità di Coordinamento Convenzione delle Alpi-IMA, EURAC Bolzano
(EURAC research, Bolzano/Bozen)
Andrea Bianchini, Unità di Coordinamento Convenzione delle Alpi-IMA, EURAC Bolzano
(EURAC research, Bolzano/Bozen)

Liechtenstein

Michael Fasel, Amt für Wald, Natur und Landschaft (Office of Forests, Nature and Land Management)

Slovenia

Blanka Bartol, Ministrstvo za okolje in prostor, Direktorat za prostor
(Ministry of the Environment and Spatial Planning, Spatial Planning Directorate)

Switzerland

Jonas Schmid, ARE Bundesamt für Raumentwicklung
(Federal Department of the Environment, Transport, Energy and Communications DETEC, Federal Office for Spatial Development ARE)

Observers that contributed to the drafting of the report

AEM, European Association of Elected representatives from mountain regions, Nicolas Evrard

Euromontana, Thomas Egger

ISCAR, International Scientific Committee on Research in the Alps, Jean-Jacques Brun

Focal Points of the Alpine Convention

Austria

Ewald Galle, Lebensministerium
(Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management; International Environmental Affairs)

France

Marie-Joëlle Couturier, Ministère de l'Ecologie, du Développement Durable, des Transports et du Logement
(Ministry of Ecology, Sustainable Development, Transport and Housing)

Germany

Silvia Reppe, Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit
(Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)
Dr. Peter Eggensberger, Bayerisches Staatsministerium für Umwelt und Gesundheit
(Bavarian State Ministry of the Environment and Public Health)

Italy

Paolo Angelini, Ministero dell'Ambiente e della Tutela del Territorio e del Mare
(Ministry of Environment, Land and Sea)

Liechtenstein

Felix Näscher, Amt für Wald, Natur und Landschaft
(Office of Forests, Nature and Land Management)

Monaco

Patrick Van Klaveren, Ministère d'Etat, (State Ministry), Délégué Permanent auprès des Organismes Internationaux à caractère scientifique, environnemental et humanitaire
(Permanent representative of scientific, environmental and humanitarian International Bodies)

Slovenia

Tanja Bogataj, Ministrstvo za okolje in prostor
(Ministry of the Environment and Spatial Planning)

Switzerland

Silvia Jost, ARE Bundesamt für Raumentwicklung
(Federal Department of the Environment, Transport, Energy and Communications DETEC, Federal Office for Spatial Development ARE)

Permanent Secretariat of the Alpine Convention

Marco Onida, Secretary General
Regula Imhof, Vice-Secretary General (main coordinator of RSA3 report)
Marcella Macaluso
Barbara Polajnar

Institutions that contributed to the report

For the drafting of the Report, the data, good practices, case studies and consultations were provided by public and private institutions. Special thanks go to:

International institution

EEA, European Environment Agency

National institutions**Austria**

Lebensministerium - Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft
(Federal Ministry of Agriculture, Forestry, Environment and Water Management)
Bundesanstalt für Bergbauernfragen
(Federal Institute for Less Favoured and Mountainous areas)
Umweltbundesamt
(Environment Agency Austria, departments of "Air Quality & Energy", "Surface Waters", "Environmental Impact Assessment & Climate Change", "Biodiversity & Nature Conservation")

France

ADEME, Agence de l'Environnement et de la Maîtrise de l'Energie
(French Environmental and Energy Management Agency)
ADRETS, Association pour le Développement en Réseau des Territoires et des Services
(Association for the Network Development of territories and Services)
Cemagref, l'institut de recherche en sciences et technologies pour l'environnement
(Research institute of Science and Technologies for Environment)
Chambre de commerce et d'industrie de Haute Savoie
(Chamber of commerce and industry of Haute-Savoie)
Ministère de l'Ecologie, du Développement durable, des Transports et du Logement, Conseil général de l'environnement et du développement durable, Commission permanente des ressources naturelles
(Ministry of Ecology, Sustainable Development, Transport and Housing, General Council of Environment and Sustainable development, Permanent Commission of natural resources)
Suaci Alpes du Nord - GIS Alpes-Jura
(Mountain Department of the Chambers of Agriculture of Savoie, Haute Savoie and Isère)

Germany

Bayerisches Staatsministerium für Arbeit und Sozialordnung, Familie und Frauen

(Bavarian State Ministry of Labour and Social Affairs, Family and Women)

Bayerisches Staatsministerium für Ernährung, Landwirtschaft und Forsten

(Bavarian State Ministry of Food, Agriculture and Forestry)

Bayerisches Staatsministerium des Innern

(Bavarian State Interior Ministry)

Bayerisches Staatsministerium für Unterricht und Kultus

(Bavarian State Ministry of Education)

Bayerisches Staatsministerium für Wirtschaft, Infrastruktur, Verkehr und Technologie

(Bavarian State Ministry of Economic Affairs, Infrastructure, Transport and Technology)

Italy

EURAC Research

IPLA, Istituto per le Pianta da Legno e l'Ambiente

(Institute for forestry and the Environment)

Ministero dell'Ambiente e della Tutela del Territorio e del Mare

(Ministry of Environment, and Territory and Sea)

Liechtenstein

Liechtenstein Tourism

Resort environment, spatial planning, agriculture and forestry

Slovenia

Ministrstvo za gospodarstvo, Direktorat za podjetništvo in konkurenčnost, Direktorat za turizem, Direktorat za energijo

(Ministry of Economy, Directorate for Entrepreneurship and Competitiveness, Directorate for Tourism, Directorate for Energy)

Ministrstvo za kmetijstvo, gozdarstvo in prehrano

(Ministry of Agriculture, Forestry and Food)

Ministrstvo za okolje in prostor, Direktorat za prostor

(Ministry of Environment and Spatial Planning, Spatial Planning Directorate)

Služba Vlade RS za lokalno samoupravo in regionalni razvoj

(Government Office for Local Self-Government and Regional Policy)

Statistični urad Republike Slovenije

(Statistical Office of the Republic of Slovenia)

Univerza v Ljubljani, Filozofska fakulteta, Oddelek za geografijo

(University of Ljubljana, Faculty of Arts, Department of Geography)

Univerza v Ljubljani, Biotehniška fakulteta, Oddelek za agronomijo

(University of Ljubljana, Biotechnical Faculty, Agronomy Department)

Univerza v Ljubljani, Fakulteta za gradbeništvo in geodezijo

(University of Ljubljana, Faculty of Civil and Geodetic Engineering)

Switzerland

Bundesamt für Energie

(Federal Office of Energy)

Bundesamt für Landwirtschaft

(Federal Office of Agriculture)

Bundesamt für Raumentwicklung

(Federal Office for Spatial Development)

Bundesamt für Statistik

(Federal Statistical Office)

Bundesamt für Umwelt

(Federal Office for the Environment)

Staatssekretariat für Wirtschaft

(State Secretariat for Economic Affairs)

TABLE OF CONTENTS

TABLE OF CONTENTS	6
FIGURES	7
MAPS	7
TABLES	8
GOOD PRACTICES	8
ABBREVIATIONS	9
GLOSSARY	10
FOREWORDS	11
EXECUTIVE SUMMARY	13
A Introduction	14
A.1 ALPINE CONVENTION: GUIDING PRINCIPLES	14
A.1.1 A platform and instrument for a coherent joint development of the alpine arc	14
A.2 Understanding of terms	18
A.3 Rural development for territorial competitiveness and attractiveness	24
B Driving forces and pressures on sustainable rural development in the Alps	26
B.1 Policy background: tools of rural development policies	26
B.1.1 The legislative and policy framework for Europe's rural mountain areas	26
B.1.2 National levels	27
B.1.3 Local and mountain specific policies	29
B.1.4 Governance	32
B.1.5 The Alps: various governance levels for a combined territory	32
B.2 The role of innovation for sustainable rural development in the Alps	39
B.2.1 Supporting innovation in mountain areas	39
B.2.2 Regional competitiveness and attractiveness	46
B.3 Socio – economic trends	73
B.3.1 Population dynamics focused on rural development	73
B.3.2 Evolution of farming and forest activities	87
B.3.3 Tertiary sector: tourism and leisure	96
B.3.4 Industry and secondary sector	102
B.3.5 Marginalization and urbanization – key trends in the Alps	105
B.3.6 Compositional changes in population	108
B.4 Climate Change as a driver for sustainable rural development	113
B.4.1 Impacts and consequences of climate change and the need for adaptation and mitigation	114
B.4.2 Rural development in the light of climate change impacts (risks and opportunities)	116
C State of rural development: natural resources, human assets and energy management in the Alps	122
C.1 Definition and discussion on natural resources and human assets in the Alps	122
C.2 Natural and environmental resources	125
C.2.1 Climate	132
C.2.2 Land cover / land use	134
C.2.3 Biodiversity in the Alps	137
C.2.4 Alpine protected areas	139
C.2.5 Water	144
C.3 Human assets	146
C.3.1 Heritage and landscape	148
C.3.2 Cultural heritage and facilities	150
C.3.3 Science & technology	153
C.4 Energy and sustainable rural development	155
C.4.1 Introduction: Energy (r)evolution in the alpine Space	155
C.4.2 Energy sources allocation in the Alpine space: how is the situation today ?	156
C.4.3 Renewable energies in rural areas in the Alpine Space: Chances, qualitative potentials, threats, weaknesses	158
C.4.4 Frame conditions to enhance renewable local energies	170
C.4.5 Conclusion: sustainable renewable energies strategy for the alpine space	175
C.5 Energy saving, energy management and rural development	178
C.5.1 Introduction	178
C.5.2 Energy saving objectives in international and national approaches on energy management	179
C.5.3 Approaches of energy saving and energy management	184
C.6 Innovation and sustainable valorisation of the resources	188
C.6.1 Creation of economic added value through the cooperation of research centers and alpine stakeholders	188
D Conclusions and main issues of sustainable rural development for the future	190
D.1 Rural development and innovation are key tools for the Alps	190
D.2 Risks in future rural development in the Alps	191
D.3 Opportunities and chances for rural development strategies	191
D.4 Main challenges for rural development	192
D.4.1 Coordination of public policies in the Alpine area and the emergence of new territorial governances	192
D.4.2 Improvement of the functional relationship between mountain areas and urban centres	193
D.4.3 Mobilization of research for innovation in mountain areas	193
D.4.4 Reinforcement of economic activities specific to the Alps	194
D.4.5 Networking of sustainable development experiences in the Alps	194
D.4.6 Promotion of energy saving and the use of renewable energies	194

FIGURES

Figure 1:	An open system model of innovation	21
Figure 2:	Percentage distribution of the last period budget in Austria (Leader+ 2000-2006)	42
Figure 3:	Village of Robidišče	50
Figure 4:	inoVagri and its partners	54
Figure 5:	Performance of operators and surfaces of organic farming in Italy from 1990 to 2008	55
Figure 6:	Location of the plant in the mountain pasture	57
Figure 7:	Logo km Zero	58
Figure 8:	ARVE industries, at the heart of an euro-region	61
Figure 9:	Bibliobus, Slovenia	69
Figure 10:	The farm called "Stane" welcomes mentally disabled people for farming and gardening activities	70
Figure 11:	The agglomeration Werdenberg-Liechtenstein	82
Figure 12:	Vineyards in the Autonomous Province of Bolzano – Castel Marengo (Foto: Francesco Geri)	91
Figure 13:	The Dolomitis fleet in the province of Belluno	119
Figure 14:	Schematic model of current economic cycles	123
Figure 15:	Strengthening inner-economic relationships of the future economic cycles	123
Figure 16:	Contemporary Wood-Processing in Upper Savinja Valley	128
Figure 17:	Revenues from Swiss forested surfaces (1980-2008), in CHF (Bafu, 2009)	128
Figure 18:	Swiss foreign trade in timber (1980-2008), in Millions CHF (Bafu, 2009)	129
Figure 19:	Figures on Swiss alpine agriculture (Swiss delegation to the Alpine Convention, 2010)	134
Figure 20:	Sums of plant and animal species within the Austrian alpine region	137
Figure 21:	The Antersasc Valley, Autonomous Province of Bolzano, Italy, (Source: FAI – I Luoghi del Cuore)	147
Figure 22:	Outdoor museum Zaprikraj	151
Figure 23:	Yearly energy consumption per inhabitant	157
Figure 24:	Reservoir in Arc-Isere transfer system	159
Figure 25:	The Bavarian village of Wildpoldried	165
Figure 26:	Frame conditions and parameters influencing the regional boost of renewable energies	176
Figure 27:	The Austrian municipalities, members of the e5 program	184
Figure 28:	The new Energy Bridge across the Rhine, between St. Gallen and Liechtenstein	187
Figure 29:	Part of the restored stretch of the Inland Canal	187

MAPS

Map 1:	Metropolises and their agglomerations in the Alpine arc	19
Map 2:	Alpine Convention Perimeter	33
Map 3:	Alpine Space	33
Map 4:	South East Europe	34
Map 5:	Central Europe	34
Map 6:	North West Europe	34
Map 7:	Mediterranean area	34
Map 8:	The exceptional position and future of the Alps defined by their relations to the surrounding areas	35
Map 9:	Alpine agglomerations and perialpine metro-regions	36
Map 10:	Gender integration: Map showing the extent of female integration into the labour market (DIAMONT)	45
Map 11:	Road distance to regional capital (DIAMONT)	63
Map 12:	Road distance to the nearest hospital (DIAMONT)	64
Map 13:	Total population growth between the last two censuses	74
Map 14:	Population density per available settlement area (DIAMONT)	77
Map 15:	Old to young age dependency ratio (DIAMONT)	84
Map 16:	Land demand	86
Map 17:	Type of farming (DIAMONT)	88
Map 18:	Change in used Agricultural area (DIAMONT)	89
Map 19:	Farms run as a part-time concern (DIAMONT)	90
Map 20:	Private service sector jobs (DIAMONT)	97
Map 21:	Public sector jobs (DIAMONT)	98
Map 22:	Tourism intensity in alpine municipalities	101
Map 23:	Secondary sector jobs (DIAMONT)	104
Map 24:	Regions of similar development (DIAMONT)	106
Map 25:	Development of labour market regions (DIAMONT)	107
Map 26:	Labour market centres and travel-to-work time (DIAMONT)	109
Map 27:	Large protected areas in the Alps	140
Map 28:	Protected areas in Slovenia	143
Map 29:	Other ecologically important areas in Slovenia	143
Map 30:	Outstanding landscapes in Slovenia	149
Map 31:	Main language in Swiss municipalities in 2000	152
Map 32:	Average wind power according to the different zones, W.m ² for a vertical section taken at 50 m above ground	168
Map 33:	Share of energy production from Renewable Energy Resources by Regions out of the total energy production from Renewable Energy Resources in Italy in 2008	169

TABLES

Table 1: Different administrative levels of rural development policies in the alpine countries	31
Table 2: Population in the Alpine Convention area	73
Table 3: Overview of municipality types and the population structure	75

GOOD PRACTICES

Good practice 1:	Activity of societies and associations at a local level, Slovenia	21
Good practice 2:	Process innovation for sustainable planning, Italy	22
Good practice 3:	The social concept Ausserfern, Austria	40
Good practice 4:	The Ark: promoting innovation in the Valais, Switzerland	43
Good practice 5:	Social innovation in Austria: Women's network Lungau	43
Good practice 6:	Cooperation between municipalities: Micro-région of Haute-Sorne, Switzerland	44
Good practice 7:	Service innovation in support of tourism in the Alps	46
Good practice 8:	Alpine pearls; international project	47
Good practice 9:	Pilot projects: "mobiles Entlebuch" - soft mobilities in Entlebuch, Switzerland	47
Good practice 10:	Biosphere Park Grosses Walsertal, Austria	49
Good practice 11:	Bregenzerwald cheesestreet, Austria	49
Good practice 12:	Development program Soča 2002-2006 and 2007-2013, Slovenia	49
Good practice 13:	Service integration, Liechtenstein	51
Good practice 14:	inoVagri: Promoting innovation in agriculture, Switzerland	54
Good practice 15:	The organic hay-making region of the Trumer Seenland, Austria	56
Good practice 16:	Organic farming of Eco-village in Čadrg, Slovenia	56
Good practice 17:	Nature park Almenland Teichalm Sommeralm, Austria	56
Good practice 18:	Purification by vermicomposting in an Alpine Cheese Factory, France	57
Good practice 19:	Chilometro zero project, Italy	58
Good practice 20:	SuperAlp! 4, a sustainable crossing of the Alps, international project	59
Good practice 21:	The center of competitiveness: ARVE Industries, international project	61
Good practice 22:	Micro Center Central Switzerland (Micro Center Central Switzerland)	61
Good practice 23:	The scheme of services of the "Pays Sisteronais Buëch", France	68
Good practice 24:	Village services in Upper Carinthia, Austria	69
Good practice 25:	The mobile library BIBLIOBUS, Slovenia	69
Good practice 26:	Social care of mentally disabled people in the Municipality of Črna, Slovenia	70
Good practice 27:	Research program "My featured space", Alpe Adria Region	78
Good practice 28:	Vision Rheintal: 29 municipalities - one living space, Austria	79
Good practice 29:	Agglomeration Werdenberg-Liechtenstein Association	82
Good practice 30:	Protection and promotion of mountain vineyards and mountain wines' production: the cases of CERVIM and UNCEM, Italy	91
Good practice 31:	Adaptive management strategies of the Austrian Federal Forests, Austria	94
Good practice 32:	INTERREG projects in the field of forestry, Germany	94
Good practice 33:	Development of an approach for constructing wood: the certification "Bois des Alpes" ("Alpin Woods"), France	95
Good practice 34:	Good practices in sustainable mobility, Italy	119
Good practice 35:	Economic cycles and rural development in Europe, with special reference to the Alpine sites	123
Good practice 36:	Payments to farmers for quality tap water in the city of Munich, Germany	129
Good practice 37:	Specialization in Wine-Production in Goriška Brda, Slovenia	135
Good practice 38:	Towns and lands of art and history, France	146
Good practice 39:	The case of the Italian Fund for the Environment's "Heart's Places", Italy	147
Good practice 40:	Landscape management in the spatial development strategy of Slovenia	148
Good practice 41:	Walk of peace in the Soča region foundation, Slovenia	151
Good practice 42:	The Glentleiten Open Air Museum in Upper-Bavaria, Germany	153
Good practice 43:	Education excellence for mountain assets' management in the Alps, in Germany and Italy	154
Good practice 44:	Social dimension and economic performance in Austria	154
Good practice 45:	The SHARE Project, international project	159
Good practice 46:	Wildpoldsried in 2009, Germany	165
Good practice 47:	Program e5 for efficient energy usage in municipalities, Austria	184
Good practice 48:	Bioenergy region Goms 2030; Project "Gleichstrom" 2007 - 2010, Switzerland	185
Good practice 49:	Steam piping project between the Swiss Waste Incineration Plant in Buchs (KVA) and Liechtenstein enterprises	187
Good practice 50:	The Swiss Innovation Promotion Agency CTI, Switzerland	189

ABBREVIATIONS

AC	Alpine Convention
ACCESS	Alpine Space project to improve accessibility and connectivity in the Alps
ADSL	Asymmetric Digital Subscriber Line (internet line, data communication technology)
AGRIDEA	Organization for development of agriculture and rural areas, Switzerland
CAP	Common Agricultural Policy of the EU
CAPACities	Competitiveness Actions and Policies for Alpine Cities
CIPRA	International Commission for the Protection of the Alps
ClimAlpTour	Climate Change and its impact on tourism in the Alpine space
DG	Directorate General (of the European Commission)
DIAMONT	Interreg IIIB Project
EAFRD	European Agricultural Fund for Rural Development
EEA	European Environmental Agency
EIT	European Institute of Innovation and Technology
ESDS	European Sustainable Development Strategy
ETC	European Territorial Cooperation
FP 7	Seventh Framework Programme 2007-2013
GAR	Greater Alpine Region
GHG	Greenhouse Gas
INTERREG	Interregional Cooperation Programme
IPCC	Intergovernmental Panel on Climate Change
ISCAR	International Scientific Committee on Research in the Alps
LEADER	Liaison Entre les Actions de Développement de l'Economie Rurale
LFAs	Less favoured areas
MAP	Multiannual Work Programme of the Alpine Conference
OcCC	Organe consultatif sur les changements climatiques (Advisory Body on Climate Change) – Switzerland
OECD	Organisation for Economic Co-operation and Development
ÖPUL	Österreichisches Programm einer umweltgerechten Landwirtschaft (Austrian Agri-Environmental Programme)
PLANALP	Platform for Natural Hazards of the Alpine Convention
PPP	Public Private Partnership
PUSEMOR	Alpine Space project aims at developing sustainable strategies and innovative solutions for improving the provision of sparsely populated mountain regions with public services
REGALP	Research project funded by the European Commission under the 5 th Framework Programme for Sustainable development of rural and other relevant areas
R&D	Research and development
RSA 1	First Report on the state of the Alps
RSA 2	Second Report on the state of the Alps
RSA 3	Third Report on the state of the Alps
SGI	Services of General Interest
SOIA	System for Observation and Information on the Alps
UN-ECE	United Nations Economic Commission for Europe

GLOSSARY

The **Alpine Convention** is a multilateral framework treaty signed in 1991 by the eight states of the Alpine arc as well as the European Union. Its main objectives are the sustainable development of the Alpine territory and the safeguarding of the interests of the people living within it, embracing environmental, social and economic dimensions and enhancing the quality of life in the Alps in the broadest sense.

For RSA3, the experts have agreed on the following definitions:

- **Mountain area:** defined as the area demarcated by the Alpine Convention perimeter.
- **Rural area:** defined as the entire area within the territory demarcated by the Alpine Convention perimeter excluding the main conurbations with more than 125.000 inhabitants, such as Maribor, Bolzano, Trento, Salzburg, Rosenheim, Innsbruck, Luzern, Annecy, Chambéry, Grenoble.
- **Sustainable rural development:** generally recognised as the product of those human activities that, using resources in rural territories, aim at increasing the well-being. 'Sustainable' development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It also includes investment in basic infrastructures and social services, together with necessary regulatory, financial and technical tools, all of which contribute to improving the standard of living of the local population.
- **Innovation:** "the successful production, assimilation and exploitation of novelty in the economic and social spheres".
Territorial innovation is associated with the reorganisation and development of administration and services within territories, with the networks of interested parties and avenues of communication, all with the aim of increasing territorial competitiveness, attractiveness and sound economic development.
- **Natural resources:** are available in the natural environment but are scarce. Consequently, they can be considered as economic resources. Typically they include products that are naturally available and which can be sold on the market, such as coal, copper, crude oil, zinc, etc. Generally, a recognisable and variable price is assigned to these resources through a market mechanism based on demand and supply curves. Clean air, freshwater, forests, landscapes, heat from the sun, the climate, etc., are often considered environmental resources. Typically, these resources are not traded on the markets and their value is underestimated by citizens and decision makers.
- **Human assets:** are generally considered to indirectly produce economic value. They have been developed over time and can be seen as representing the heritage of a given territory. Even though heritage is usually formed from material goods, the value of these assets largely depends on human intervention, culture and perceptions.
- **Renewable energy source:** based on non-fossil energy sources (wind, solar, geothermal, wave and tidal energies, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases) (According to the EU Directive 2001/77/EC[22]) and are constantly renewed through natural processes. This renewal occurs at a specific rate allowing the stock of resources to be conserved over time. This implies that renewable energy sources will not be exhausted in the foreseeable future.

FOREWORDS

With this report the Alpine Convention wishes to draw attention to the development potential which may be offered by the Alps, both for the inhabitants in this territory and for the entire European region. Not only the natural resources, but also its people are one of the most important sources of development in the Alps. With their creative and innovative approach, they adapt to the characteristics of the Alpine space, know how to use advantages and create new opportunities and at the same time also ensure that the Alps do not become confined but stay in dynamic relation to its broader hinterland.

It is our wish to create a recognizable brand for the Alps, which is at present known for winter tourism, but which should represent and reflect a sustainable development and a quality of life in the mountain area throughout the year.

The Report on the State of the Alps brings forward answers on how to overcome the problems detected and take better advantage of the development potential of the Alpine arc in connection with its natural hinterland. Proposals are given with regards to what should be done and it is our hope that these will find their way into the political arena.

*Blanka Bartol
Slovenian Presidency of the Alpine Convention*

The Alps are not just beautiful natural areas but a complex reality where 14 million people live: two third of the alpine population lives in middle and small-sized cities, one third in rural areas. Industry, agriculture and services co-exist and characterize the development opportunities. Sustainable rural development in the Alps is not independent on this complexity and the multiple challenges which vary across the local and regional situations. Still, certain common aspects can be identified across the Alps, such as a functional interdependence of rural areas with urban areas as well as demographic change.

The alpine region is a "living space in change". Interestingly, adaptation, cooperation and the ability to look beyond customary borders is necessary for the people living in the Alps, but was also necessary for the experts which drafted this report, since the topic of "Sustainable rural development and innovation", cuts across all administrative, political and economic sectors, not to forget that also the topic of energy and climate change had to be considered.

The Permanent Secretariat of the Alpine Convention wishes therefore to thank all the experts and representatives of the Contracting Parties and the Observers of the Alpine Convention for their efforts and valuable contributions. Special thanks go to the Presidency and the members of the ad-hoc expert group set up in order to produce this Report.

Marco Onida, Secretary General of the Alpine Convention

*Regula Imhof, Vice-Secretary General of the Alpine Convention,
Responsible for the System for Observation and Information on the Alps*

The mandate given by Ministers to the working group that I had the pleasure of leading emphasized the contribution of innovation to the development of mountain territories.

Analyses of experts converged very quickly in establishing the fact that, rather than taking account technological innovations, the organization form of the territorial stakeholders was the main source of innovation in mountain areas - henceforth raised the question of approaching these types of innovations.

Our reflection has been structured around topics which give an important area of action to innovation in our mountain regions: agriculture, energy, tourism ... and to the necessary need of optimization of their human potential.

Finally, we compared our reflections with those of local stakeholders (elected officials, economic and associative representatives...) at the workshop held September 21, 2010 at l'Argètière la Bessée which associated the services of the European Commission and brings together over 100 participants.

I wish to thank the members of the working group and the focal points of the Contracting Parties for the quality of their collaboration.

*Jean-Pierre Chomienne
Interministerial Agency for Spatial Planning and Regional Attractiveness,
President of the working-group of the Third Report on the State of the Alps*

EXECUTIVE SUMMARY

From a European point of view the Alps are surely portrayed with a rural character which does not connote backwardness and a lack of opportunities. On the contrary, an efficient and sustainable use of various Alpine potentials is important both for inhabitants in this territory and for the entire European region. Because of this the Alpine Convention wishes to draw attention to the development potential which may be offered by the Alps. The Alps are by the Alpine Convention not treated as a remote mountain area which needs assistance to survive but are encouraged to make creative use of their own resources and to take advantage of the opportunities which they offer as a link between the Mediterranean and continental Europe.

The Alps are not just beautiful natural areas but a complex reality where 14 million people live. Two thirds of the alpine population live in middle to small-scale cities, one third in rural areas. Industry, agriculture and services co-exist and characterize the development opportunities. Sustainable rural development in the Alps is not independent of this complexity nor are the multiple challenges which vary across the local and regional situations. Still, certain common aspects can be identified across the Alps, such as a functional interdependence of rural areas with urban areas as well as demographic change. The alpine region is a "living space in change".

Adaptation, cooperation and the ability to look beyond customary borders is necessary for the people living in the Alps. People of the Alps, with their creative and innovative approach, have adapted to the characteristics of the Alpine space, know how to use advantages and create new opportunities.

In this regard innovations play a particular role. Rather than taking into account technological innovations, the organizational form of the territorial stakeholders was the main source of innovation for mountain areas. Although in the past a great deal of resourcefulness was needed for life in the mountains, today it is not only a matter of survival but primarily the preservation of the attractiveness of the Alpine space as it faces new challenges, for example, climate and demographic changes, changes in the energy supply, global economic and financial crises and globalisation.

The report provides information about rural development policies relevant for the Alps, about natural resources and human assets, energy management, describes mountains as strategic areas in Europe, discusses the crucial role of innovation, identifies the main drivers for sustainable rural development e.g. socio-economic trends and climate change. Numerous cases of good practice and innovative methods to further sustain rural development in the Alps are included.

Finally the Report on the State of the Alps brings forward future challenges e.g. the coordination of public policies in the Alpine area and the emergence of new territorial governances, the improvement of functional relationships between mountain areas and urban centres, the mobilization of research for innovation in mountain areas, the reinforcement of economic activities specific to the Alps, the networking of sustainable development experiences in the Alps and finally the promotion of energy saving and the use of renewable energies. And last but not least, the report proposes answers on how to overcome the problems detected and take better advantage of the development potential of the Alpine arc in connection with its natural hinterland.

A INTRODUCTION

A.1 ALPINE CONVENTION: GUIDING PRINCIPLES

A.1.1 A platform and instrument for a coherent joint development of the alpine arc

The Alpine Convention is a multilateral framework treaty signed in 1991 by the eight states of the alpine bow as well as the European Union. Its main objectives are the sustainable development of the alpine territory and the safeguarding of interests of the people living within it, embracing environmental, social and economic dimensions and enhance the quality of life in the Alps in the broadest sense. In order to achieve its objectives, over the years the Framework Convention has been equipped with eight thematic protocols. Almost all of these deal with issues of sustainable rural development, energy and innovation directly or indirectly as the protocols on energy, land planning and sustainable development, mountain agriculture and forests, soil conservation and tourism¹.

The Alps are one of the largest natural spaces of Europe, which is characterized by its specific and multiple nature, culture and history. Furthermore the Alps are living space, economic region, cultural environment and room for recreation in the centre of Europe to which contribute several countries and different cultures. Moreover the Alps provide goods and natural services to their surrounding regions (supply of drinking water and electricity, recreation possibilities, habitats for species, etc.).

In particular, natural and environmental resources stored in the alpine territory including, for instance: soil, air, water, plants and animals as well as energy – provide to

people living outside the Alps ecosystem services as clean drinking water, decomposition of waste, production of food or recreational benefits. Ensuring the delivery of such services allows maintaining ecological processes and meeting demand from human settlements, agriculture and industry (EEA, 2010). Key challenges to enable sustainable management of natural resources are the natural disadvantages of mountain territories, the nature of services of general interest common to most of them, the limitations of use of resources and their price, which should correspond to their real value.

Development of rural areas in mountainous regions is highly relevant for achieving a sustainable balance between the environmental needs of the territory and its demand for goods, services and economic development. In order to promote competitiveness and attractiveness of rural areas (by providing vocational and technical skills and improving access to information, resources and innovative technologies for the local population), integrated measures should be taken. Rural development actions in the EU mostly aim at social and economic development of the areas, complement and concern several sectors such as tourism, agriculture, forestry and energy.

The Alps base their economic development on regional specifics and each region uses a set of methodologies and innovation in its own possible approach. Some municipalities are tourist centers as in Western Austria (Tyrol, Salzburg, and Carinthia) or in Switzerland (Grisons, Valais). In the French Alps especially public administration is traditionally quite significant. In the Slovene and Italian Alps as well as in Eastern Austria the secondary sector plays a more important role. In large parts of Italian, French and Slovene Alps, but also in the Swiss Alps the significance of the agricultural sector is sharply declining (Tappeiner, Borsdorf, Tasser, 2008).

¹ Energy protocol: Art. 1, 2, 5, 6; Tourism protocol: Art. 17, 19, 20; Spatial planning protocol: Art. 1, 3, 5, 9; Conservation of nature and the countryside: Art. 1, 8, 10; Mountain farming: Art. 7, 8, 13; Mountain Forest protocol: Art. 7

Nevertheless, historically mountain farming has been very important in the Alpine region. The relevance of agricultural activities in rural areas is also recognized by the CAP regulations in which agriculture and the related land uses are recognized as multifunctional in order to achieve sustainability in rural development.

Rural development measures, both agricultural and non-agricultural, aim at reversing the trend towards the economic and social decline and depopulation of the countryside (Regulation No. EC 1257/1999), food supply, especially related to typical high quality products, conservation and maintenance of the countryside and its environmental and ecological characteristics, particularly for tourism and finally protection of the soil against erosion, avalanches and floods.

The supplies of wood and forestry products are typical economic activities of rural mountain zones. They are promoted at the European and also lower administrative levels, considering the importance of a growing but sustainable usage of wood in the economy (Regulation No. EC 1257/1999). In this line mountain forest economy is expected to develop even further and provide employment as well as income to the local communities.

Besides, the rural alpine territories are likely to become a primary source of energy production and are expected to provide a long-term contribution to meeting Europe's energy needs.

The Alps provide Europe with water for different uses, one of the most relevant of them being energy production from hydropower. Moreover, the Alps are an important transit route in the north-south transit of electricity. Since the end of the 19th century, hydropower is an important source of economic revenue and thus one of the positive assets of alpine mountain territories. The conflict among different uses of water is a delicate issue in the Alps, due to the relative abundant availability of this resource in the area and the importance of water also for the surrounding territories. In the field of energy, the policies adopted at different

administrative levels in the alpine countries tend to enhance traditional use of resources, an efficient energy production, and the sustainable use of natural resources like water, wood, biomass and sun. Among the goals of these policies some can be reported, like reducing energy needs through the use of more efficient technologies, making wider use of renewable energy sources and optimizing existing power plants which produce energy from non-renewable sources. A more environmentally friendly usage of energy shall as a priority encourage energy saving and rational energy use particularly concerning production processes, public services and, for instance, large hotel complexes as well as facilities for transport, sports and leisure activities. Therefore improved insulation of buildings and the efficiency of heating systems as well as planning and promoting new buildings which use low energy technologies are important measures not only for energy saving but also for development in mountain regions.

The Alps are one of the main areas for tourism and leisure in Europe due to the extensive range of leisure activities they offer, the rich variety of landscapes and the diversity of ecosystems. Tourism in the Alps is therefore one of the main sources of economic revenues for the local population, to the extent that it is considered to be a public interest for the alpine region. One of the reasons for this is that tourism helps maintaining permanent population by bringing income to local population. It induces economic growth and development. Remote areas could become more attractive as business locations. Indeed, most of tourism concentrates in the non-urban areas of the Alps. Considering that specific natural and cultural heritage as well as the countryside constitute an essential asset of tourism in the Alps, it is recommendable to develop environmentally friendly tourist destinations as a way to recognize the importance of landscape and the environment as economic assets for the territory, and to involve local population to develop their own social, cultural and economic development plans. Priority shall

be given to measures promoting innovation and diversity in the regional tourist offers.

Incentives to encourage innovative tourist initiatives and products are quite common and play an important role. The topic of tourism is dealt with a thematic Protocol of the Alpine Convention, that for instance foresees in this respect the tourism prize "the best sustainable tourism initiatives in the Alpine arc" which is awarded at the Alpine Conference by the Presidency of the Alpine Convention for innovative and sustainable tourism projects, products or programs carried out in the Alps. Liechtenstein for example has created the foundation "Pro Natura pro Ski" and awards ski resorts for their special efforts to make their stations more environmentally friendly. A special benefit for rural development derives also from the cooperation between tourism, agriculture, forestry and handicrafts activities which generate employment.

In line with the general approach of the Alpine Convention, the wide set of policies for sustainable rural development should base on an integrated approach that encompasses at the same time agricultural development, economic diversification, management of natural resources, and enhancement of interactions among sectors such as tourism, agriculture as well as the preservation and promotion of culture.

A macro-region approach which encompasses at the same time specific geographic characteristics and socio-economic and environmental dynamics addressing mountain zones as a single coherent area beyond national borders is an option for further strengthen the position of the Alps within Europe. In this context the Alpine Convention already recognizes the specificity of one of the most important European mountainous regions, providing a platform and instruments for a coherent joint development over national borders. In addition, the European Territorial Cooperation Alpine Space Programme is an important tool to strengthen transnational cooperation in the alpine arc. It contributes to innovative approaches. Structure and key issues of the Report on the State of the Alps

"Sustainable rural development and innovation"

The decision of the Xth Alpine Conference declared "sustainable rural development" and "innovation" as the two main issues for the third Report on the state of the Alps. As a primary step in the elaboration of the report the ministers asked to identify the subthemes of the report. They wanted that especially the important topic of energy in the frame of the challenge of climate change in connection with sustainable rural development has to be taken into consideration. The objective was to provide a sound basis for reflecting upon rural development in the Alps and the related requirements and policy measures.

Key issues of the third Report on the state of the Alps in hand are the overview of rural development policies, socio-economic trends, population dynamics focused on rural development and other drivers for sustainable rural development, such as energy, innovation and sustainable promotion of resources. Conclusions are then drawn as appropriate for regional differences, risks, opportunities, chances and successful policy instruments for sustainable rural development. Perspectives and recommendations for the ministers of the Alpine Conference complete the report. National contributions, key studies and examples of good practices accomplish the chapters.

In particular, with regard to two important issues, water management and demography, the following is also to be noted:

Even though hydropower has the main share of renewable energies in the alpine space this third Report on the state of the Alps does not specifically look at hydropower production and use of it in the Alps because several additional activities in this field are carried out in the framework of a platform set up in March 2009 by the Alpine Conference as a follow up to the second Report on the state of the Alps on the topic of "Water and water management issues in the Alps". Among other things, this Platform has been mandated with the drafting of

guidelines for the environmentally friendly use of hydropower.

Similar considerations apply to the topic demography. A newly established working group "Demography" has the aim to draft a report analyzing the changes in structure and composition of population as well as

employment dynamics. Therefore the third Report on the state of the Alps deals with demography issues only as far as it is necessary for the better understanding of sustainable rural development in the Alps.

BIBLIOGRAPHY

EEA.

10 messages for 2010, Mountain ecosystems, 2010

Tappeiner, Borsdorf, Tasser,

Ulrike Tappeiner, Axel Borsdorf, Erich Tasser: Mapping the Alps, Society – Economy – Environment

A.2 Understanding of terms

This third Report on the State of the Alps deals with rural areas, their sustainable development and the role of innovation in such development. A common understanding about the terms used in the report is a prerequisite for discussion of the texts and draft conclusions. Thus, a brief definition of each of the principal terms used is presented below.

The remarkable amount of possible interpretations of the term "rural area" was resolved, for the purposes of this report, primarily as an area which is not urban – i.e. that lays outside urban areas. Most recognised definitions classify areas into four types: based on population density, predominant features of the landscape, adequacy of urban facilities and size of settlements.

Rural areas can also be *understood as networks* (Jan Douwe van der Ploeg and Terry Marsden, 2008).

Non-urban areas are often further classified into two types: for example, according to an OECD definition, into *predominantly rural regions* (if more than 50% of the population live in rural communities - with less than 150 inhabitants/km²) and *intermediate regions* (if from 15% to 50% of the population do so); or, as defined in the Slovenian Spatial Development Strategy, into *urbanized rural areas* and *less-urbanized rural areas*. On the basis of the OECD definition (as used by the European Commission), more than 91% of the territory of the EU is defined as rural, and in this area live more than 56% of the EU's population².

In Switzerland, three categories of rural space are recognised: *Peri-urban rural space* (maximum of 30 mins driving time to the closest regional center), *alpine tourist centers* (in mountain areas, at least 100.000 hotel overnight stays per year) and *peripheral rural space* (driving time of at least 30 mins to the closest center).

² European Commission, Rural Development Policy 2007-2013



With regard to the Alps, a distinction can be made between rural areas in the flatland and rural areas in mountain regions.

Many definitions of **mountains** have been developed in the frame of national and European legislation.

European Council regulation 1257/1999 defines mountain areas in relation to limitations on farming (art. 18(1)). In particular, the regulation focuses on the limits to possible uses of land and higher working costs, including a shorter growing season due to mountain climatic conditions, steepness of slopes increasing the operational costs, or a combination of the steepness and harder climate.

Also national laws generally define mountain areas in order to delineate the scope of the law. The definition criteria varies between alpine countries, for example: altitude (all countries), slope, climatic conditions (D, CH) as well as accessibility (CH).

The concept of "mountains" goes beyond mere altitudinal and slope measurement. Mountain areas (not necessarily at high altitude) not directly touched by major economic developments (such as tourism) and where depopulation trends undermine socio-economic life, need specific instruments and policies to address their needs. The geomorphology of mountains strongly impacts on land use and land care, on construction, the provision of services and transport costs. Providing services in mountain areas is, of course, more expensive than on the flatland. Maintaining a mountain zone that is settled and cultivated also plays an important and beneficial for surrounding urban areas.

Sustainable rural development is generally recognized as "the product of those human activities that, using rural resources, aim at increasing welfare" (Errington, 2003). It is the key tool for encouraging diversification and innovation in rural areas with the aim of reversing depopulation, stimulating employment, realizing equality of opportunity and bringing about a general improvement in the quality of life.

Sustainable rural development in the Alps first of all has to contend with **structural change in mountain areas**. "Structural change" is understood as a long-term change of fundamental economic structures. For instance: a subsistence economy is transformed into a manufacturing economy, or a regulated mixed economy is liberalized. Under the phenomenon of globalization, remarkable structural change has occurred worldwide; its direct impact on the Alps is difficult to assess, however it seems likely to have socio-economic effects, including on demographics, and to lead to some changes in land use.

Structural change can be influenced by policy decisions or permanent shifts in resources, population or the social make-up.

A precise description of **innovation** is "the successful production, assimilation and exploitation of novelty in the economic and social spheres". In more general terms, innovation can be defined as a new way of doing something. It can refer to changes in various fields and activities such as thinking, organizing and managing, and also in production processes. The main goal of innovation is a positive change.

The evolution of the innovation concept - from the linear model having research and development as the starting point to the systemic model in which innovation arises from complex interactions between individuals, organisations and their operating environment - demonstrates that innovation policies must extend their focus beyond the link with research.

Social capital has an important role for rural development, it comprises different local or regional forms initially based on general socioeconomic development and it is comprised of networks of cooperation, based on regular "face-to-face" meetings, norms and trust.

The research indicated that local associations are an important factor for local development and a useful measuring tool for the development of social capital. The survey in Slovenian rural areas emphasises the varying levels of social capital development: good established and active networking in Goriška Brda (the winegrowing region bordering Italy) and Upper Savinja Valley (a remote mountainous rural area with huge natural amenities) with huge local community capacity for social capital development.

Source: Irma Potočnik Slavič, *Socialni kapital na slovenskem podeželju*, DELA 31, 2009

Good practice 2: Process innovation for sustainable planning, Italy

In Italy, at a national level, the Water Basin District Planning has been created, expressly to avoid the unilateral uses of water.

In Italy again, the Autonomous Province of Bolzano has carried out planning procedures of basin management plans and valley basin plans for the interdisciplinary coordination of the planning activities. The Regional Resources Management Plan⁴ requires the participation of all the interested parties in the development of guidelines for the future development of the regional territorial units.

Within this participative planning process, the public authorities appointed to territorial planning, water resources management, natural hazards management, forestry and agriculture, economic development and others, elaborate a plan for the coordination of the planning activities in the various planning sectors, together with other interested members such as, for instance, local groups for the environmental protection, fishermen's associations, farmers, local industries, and hydroelectric energy suppliers.

This coordination plan consists of a framework of commonly developed guidelines, and a list of possible solutions for facing the deficits and creating and using synergies of inter-sectorial coordination. The coordination plan has no direct legal effect. Though, the involvement of all the members participating in the elaboration of

guidelines appears to be a viable procedure for several actions, such as:

- Identifying conflicts for natural resources use;
- Solving interest conflicts in management of resources;
- Eliminating conflicts between planning objectives in different sectors;
- Identifying and using synergies;
- Enhancing the awareness of the need for inter-sectorial coordination;
- Eliminating the opposition against the selected measures;
- Supporting the implementation of the social component, within the concept of "sustainable development";
- Enhancing awareness and sensitiveness for a sustainable use of resources.

The plans elaborated so far have generally shown a higher predisposition to realize such plans on the behalf of the interested members, within the framework of a planning procedure that requires debate and coordination of issues from several planning sectors.⁵

⁴ See Deliberazione della Giunta provinciale n. 704, 26th april 2010; www.provincia.bz.it/acque-energia/download/DELIBERA-PGUAP-26-04-2010.pdf

⁵ For a brief overview of the planning procedure, some documents describing it can be found at the following links: www.etschdialog.it ; www.stadtlandfluss.it .

Bibliography

Jan Douwe van der Ploeg and Terry Marsden, 2008

Unfolding webs, The dynamics of regional rural development.

Errington, A., 2003

Elaborare strumenti per lo sviluppo rurale: un'agenda di ricerche multidisciplinari. In A. Arzeni, R. Esposti & F. Sotte (Eds.), Politiche di sviluppo rurale tra programmazione e valutazione (pp. 91-113). Milano: Franco Angeli.

Tappeiner, Borsdorf, Tasser, 2008

Ulrike Tappeiner, Axel Borsdorf, Erich Tasser: Mapping the Alps, Society – Economy – Environment.

Potočnik Slavič, 2008

Endogeni razvojni potenciali podeželja. Doktorska disertacija. Oddelek za geografijo, Filozofska fakulteta Univerze v Ljubljani.

A.3 Rural development for territorial competitiveness and attractiveness

According to the General Assembly of the United Nations, "a growing network of Governments, organizations, major groups and individuals around the world recognize the importance of the sustainable development of mountain regions for poverty eradication, and recognizes the global importance of mountains as the source of most of the Earth's freshwater, as repositories of rich biological diversity and other natural resources, including timber and minerals, as providers of some sources of renewable energy, as popular destinations for recreation and tourism and as areas of important cultural diversity, knowledge and heritage, all of which generate positive, unaccounted economic benefits".⁶

The Alps are a territory of high natural and patrimonial richness. It is also a living territory, home to 14 million people who speak a variety of languages and dialects, and keep alive centuries of tradition. Such diversity, while being an asset, does of course bring its problems and a complex relationship exists between humans and their fragile territory. Alpine people not only face natural hazards particular to their mountain environment, but are also subject to global challenges and their economic, social and environmental consequences.

In this context, rural development has become a vitally important policy area, while farming and forestry remain crucial for land use and the management of natural resources.

Rural development must proceed on three main tracks:

- development of economic activities and promotion of local assets,
- pursuit of social and territorial cohesion in order to promote an area's attractiveness,
- finding a method to promote cooperation between local stakeholders (developing social capital) and between the

institutions and representatives of rural and urban areas.

Rural areas and rural communities are increasingly seen as a platform and for economic diversification and sustainable development. Maintaining viable communities is a key objective of rural policies throughout the Alps. Some more remote rural areas have very low population densities. Often rural areas are not considered solely as producing territories any more but also as recreation areas, giving added value to their natural assets, such as landscape.

In this context, making rural areas more attractive requires promoting sustainable growth and generating new employment opportunities as well as facilitating access to up-to-date information and communication technologies. Innovation is likely to play a central role in this respect and based on collective capacity new development visions for rural areas can be conceived. In this line it becomes important to promote the collective capacity to imagine and choose new development trajectories for rural areas from the economic and social point of view (Knickel, Tisenkopfs and Peter, 2009).

The considerable potential for the development of renewable energies is of great importance. Generally, there is a high degree of correlation between energy use, economic growth, and the level of development. In the context of rural development, the traditional use of energy has been associated primarily with the provision of motive power for agriculture, industry or commerce. It was believed that the motive power made possible by electricity would result in tremendous productivity gains and economic growth, thus transforming the under-developed rural landscape. In other words, the emphasis has been on the direct income-generating uses of energy (Anil Cabraal, Barnes and Agarwal, 2005). Taking this forward with the new dimension of climate change, the Alps have many assets for developing green energies, such as biomass from wood and agriculture, abundant water and the ability to exploit slope inclination.

⁶ Agenda item 53, resolution adopted by the General Assembly of the United Nations A/64/222

Bibliography

Anil Cabraal, Barnes, Agarwal, 2005

Productive uses of energy for rural development, Annual Review of Environment, resources 2005. p. 30, p. 117-44.

Knickel K., Tisenkopfs T. and Peter S., 2009

Innovation processes in agriculture and rural development, results of a cross-national analysis of the situation in seven countries, research gaps and recommendations Sixth framework programme.

Conclusion 1:

The Alps are undergoing change (climate change, globalization, decrease in agricultural activities, ageing of the population, brain drain, etc.), and this has an influence on economic liabilities and modifies the living conditions in rural areas.

To face these challenges, rural development policies have to take into account societal and environmental developments, in particular by promoting and enhancing Alpine natural resources and human assets.

B DRIVING FORCES AND PRESSURES ON SUSTAINABLE RURAL DEVELOPMENT IN THE ALPS

B.1 Policy background: tools of rural development policies

B.1.1 The legislative and policy framework for Europe's rural mountain areas

At European Union level, Directive 75/268/EEC on mountain and hill farming in **less favoured areas** (LFAs), published by the European Economic Commission in 1975, was the first policy to specifically address mountain regions. This was successively replaced by further regulations. One of the most recent is Council Regulation (EC) No. 1698/2005 on support for rural development by the **European Agricultural Fund for Rural Development** (EAFRD), the equivalent of the single fund for the **second pillar of the Common Agricultural Policy (CAP)**.

In the 2007-2013 financial perspectives, spending under **cohesion policy** amounts to 35,7% (308 billion €) of the total EU budget, 62% of which should finance projects linked to the **Lisbon agenda** for growth and employment. At a time of severe budgetary constraints, the cohesion policy is important in restoring confidence in the EU's economy and plays a key part of the European Economic Recovery Plan. By supporting investment in infrastructure, business and jobs, it can help Europe's regions and Member States tackle the challenges brought on by the global economic crisis. The report of Dr. Barca (Director General, Ministry of Economy & Finance, Italy) contains an assessment of the effectiveness of cohesion policy to date as well as a series of proposals how to reform cohesion policy for the period post 2013⁷.

In addition to the 2007-2013 financial framework, Council Decision 2006/144/EC set out the Community strategic guidelines for rural development in the new

programme period (Decision 2006/144/EC, OJ L 55 of 25.2.2006).

Four new strands are set out:

- improving the competitiveness of the agricultural and forestry sectors (strand 1);
- improving the environment and countryside (strand 2);
- improving the quality of life in rural areas and encouraging diversification of the rural economy (strand 3);
- building local capacity for employment and diversification (strand 4 – LEADER).

These various policies have provided a basis for compensatory allowances in mountain areas, recognising their "permanent natural handicaps". They aim to maintain farming and rural communities in such areas and to prevent environmental damage due to the abandonment of agricultural land. Each member state was required to designate the areas within which these policies were to be applied, within these areas, they are authorised to make direct income payments to farmers, and to provide grants for farm development, diversification into the tourist or craft industries, and vocational training. Thus, at the European level, the second pillar of the CAP, has efficiently supported the general effort of modernisation of farms and the entry of new farmers. Indeed the second pillar has allowed for the payment of subsidies usually higher than standard rates and has promoted regional subsidies that favour mountain areas (Morel-a-l'Huissier, 2008).

A further requirement is that some of the funding must support projects based on experience with the **Leader Community Initiatives**. The "Leader approach" to rural development involves highly individual projects designed and executed by local partnerships to address specific local problems. Encouraging the implementation of integrated, high-quality and original strategies for sustainable development, it has a strong focus on partnership and networks

⁷ ec.europa.eu/regional_policy/policy/future/barca_en.htm

of exchange of experience.⁸ Under this perspective, the European Union has strongly favoured public-private partnerships, transnational networks, innovation-oriented procurement policies and innovation incubators. Linked with that is a more active involvement in the building of more effective relations between innovation agencies, private enterprises, research organizations and public institutions.

The "European Territorial Cooperation Alpine (ETC) Space Programme 2007-2013"⁹ refers to the Alps, however not exactly as drawn by the perimeter of the Alpine Convention. The programme's overall aim is to increase the competitiveness and the economic attractiveness of an area in a sustainable way through cooperation. Thus it supports transnational projects in the Alpine area fostering territorial development and cohesion. These projects involve key actors of the cooperation area and develop joint actions for shared solutions on specific Alpine issues as laid down in the programme "priorities":

- Priority 1: Competitiveness and attractiveness
- Priority 2: Accessibility and connectivity
- Priority 3: Environment and risk prevention

B.1.2 National levels

First steps of the implementation of a rural policy in the European states are in accordance with the three main objectives of EARFRD strategy and the LEADER programme. The rural development policies of the alpine countries have to subscribe to the same goals as the ones of the second pillar of the CAP. They are thus main objectives of the national rural development programs of many alpine countries.

National contributions: rural development programs in the alpine countries

France

France focuses on farm investments, forestry policy, agro-food industry, knowledge transfer, biodiversity, water quality, job creation, micro-enterprises, diversification, cultural heritage and rural tourism. The programme maintains the pattern of the previous programme period. Key priorities are decentralisation, simplification and co-ordination.

The Hexagonal Rural Development Programme aims to enhance rural areas' economic, social and environmental strengths, by making good use of their diversity and supporting sustainable development. Funding for the programme for the period 2007-2013 totals 10.8bn€, of which 5.7bn€ comes from the EU and 5.1bn€ from France.

Slovenia

Chosen strategy covers:

- improvement of the competitiveness of agriculture, food industry and forestry (by investments in human capital, physical capital, innovation and in quality of agricultural products);
- sustainable management of natural resources, maintenance of the cultural landscape, environmental protection, preservation of the settlement character and identity of rural areas;
- diversification, entrepreneurship, improvement of quality of life.

Funding of 1.159 million € (of which 900 million € is from the EU) has been allocated to the Rural Development Programme for Slovenia. It's overall objective is Sustainable Rural Development, with the following main strands:

- to improve competitiveness of agricultural, food and forestry sector;
- to enhance environment friendly farming;
- to improve economic and social status in the countryside;
- to enhance local development initiatives.

Austria

The overall objectives chosen in accordance with the Community Strategic Guidelines (CSG) and the National Strategy Plan are:

- to strengthen the competitiveness of the agricultural and forestry sector;
- sustainable use of natural resources and landscape conservation, conservation and development of attractive and vigorous rural

⁸ ec.europa.eu/agriculture/rurdev

⁹ www.alpine-space.eu/

- areas, complemented by,
 - setting-up integrated regional networks.

Strong emphasis is placed on the environment, nature protection and landscape conservation, taking into account its impact on agriculture and forestry, and the demands of society. Strand 2 of the EAFRD is the most important in financial terms.

In addition, a series of activities under strand 3 and the leader strand are highly relevant for the Alpine area in Austria. For example, support is given to measures for raising public sensitivity to the importance of environmental protection and the potential of the Alpine region through projects such as the Via Alpina and Mountaineering Villages, both designed to consolidate soft tourism).

In a more comprehensive analysis of rural regions (particularly of peripheral areas of Austria, see Dax, 2008) the following aspects emerge as main elements:

Rural development can be assessed as a part of more general regional development concept, and thus is influenced by a wide variety of policies (that are either explicitly or implicitly addressing rural features).

The great diversity of "rural" regions suggests increased care in any definitional work. In particular, the geographical level of comparison has to be selected carefully to allow meaningful analysis and interpretation of spatial development trends.

Rural regions are increasingly seen as areas with considerable innovation potential, a view that is very different to perceptions of these areas only a decade ago.

In order to harness this innovation potential, consideration should be given to: fostering regional centres within rural and mountain areas, increasing urban-rural cooperation, raising female employment rate, improving the local quality of life, support actors to open up their activities towards outside regions, assessing the scope for immigration as an option for boosting development, recognising mobility as a core development ingredient through support for public transport, preserving natural areas and the wide array of functions provided by sustainable management in mountain areas.

Germany

The National strategy plan for rural development 2007-2013 pursues the 4 strands of the European rural development strategic guidelines and establishes a link between these and the development programmes of the Federal Länder.

Switzerland

At a federal level, a set of policy instruments exert influence on the rural development across several sectors. Different levers and policy tools can be used: promotion of innovation, transfers and establishing exemplar or experimental projects; financial equilibration between rich and poor regions involving the federal administration; a new regional policy implemented by the State Secretariat for Economic Affairs (SECO) to improve the competitiveness of each region, particularly peripheral ones, by increasing their value, coordinating their different policies and spreading knowledge.

Italy

The **National Strategy plan** (NSP) is arranged in line with the Community regulations. To the 4 strands of the European strategic guidelines is added a fifth strand, "The National Rural Network".

However, the most interesting and innovative elements in the strategy lie not in the articulation of the objectives but rather in the establishment of territorial priorities and the strong attention paid to implementation of methodologies aimed at the integration of interventions. As regards methodologies, the aim is to concentrate and create a critical mass of resources around a certain number of strategic priorities while also adapting the different types of intervention to the different territorial requirements. As for the decision to rely on a greater integration of interventions, this aims at ensuring greater internal consistency within each strand and, above all, at creating the background to promote the development of synergistic effects (Cionco, Monteleone, 2006).

By fostering relationships and information exchange between farmers and other stakeholders within rural areas and the circulation of good practices and knowledge, the **national rural network** (strand 5 of the NSP) is a prime instrument for better implementation and success for the rural development programmes at regional level.

The national rural network has a financial allocation of €82.9m, of which 50% is contributed by the European Union and the rest covered by the Italian government.

In the programme period 2000-2006, the "rural development system" in Italy showed a high complexity, highlighted by the fact that 49 different programmes were implemented, with some negative repercussions on both the organising capacities at regional authority level, and in the scope of national coordination activities.

B.1.3 Local and mountain specific policies

In the Alps, only France, Italy and Switzerland have enacted integrated legislation specific to mountain areas (Price, 2008). France has implemented an original institutional system (definition of "Massifs") which has contributed to the emergence of development strategies ("Massif scheme"). Local actors, whether elected representatives or not, are involved in these strategies.

National contributions: local and mountain specific policies in alpine countries

France

The Mountain Law of 1985 recognises the specificity of an area, its development and its protection. The law defines mountains as an area where living conditions are more difficult, penalising the exercise of certain economic activities due, particularly, to altitude, climatic conditions and steep slopes. Each zone is bounded by a ministerial decree.

The law on development and urban planning aims to give mountain population good conditions to live and work in their regions by overcoming natural, economic and social handicaps by:

- facilitating the development of complementary activities;
- developing the diversity of tourism;
- protecting and enhancing the natural and cultural heritage.

Various provisions of the Mountain law aim at protecting the natural and cultural heritage:

- by defining a natural and cultural specificity to each "Massif" and by enhancing it;
- by controlling urban planning;
- by controlling and monitoring the development of tourism through the creation of NTU (New Tourist Unit).

Specific institutions have been established by this Act: the National Council of mountain areas and the "Committees of Massifs" (69 members in the Committee of the Alps Massif)¹⁰. In 2005 the Committee of Massif of the Alps defined the Interregional Scheme for the Settlement and Development of the Alps. It aims at building a model of development for the next 15 to 20 years. This "Massif scheme" will be proposed as a

framework for action and intervention to all actors of the territory and marks a significant milestone in the organisation and structuring of the French Alps. It's four main themes towards 2020 are:

- assuring the quality of the natural and patrimonial resources;
- consolidating and diversify the specific activities of the Massif;
- organising and structuring the territory;
- positioning the French Alps at the regional, cross-boarding and European scales.¹¹

The governments will in the future focus contracts with local stakeholders on the objectives of competitiveness, sustainable development and territorial cohesion. The Massif interregional agreements for 2007-2013 focused on defining major projects addressing the specific problems of these territories: e.g. the adaptation of tourism investment in the new customer demand and predictable climate changes, energy saving and development of renewable energies and materials, development of the timber industry, pastoralism and mountain agro-food, management of natural hazards and land restoration in mountain and finally the conservation of biodiversity in the highlands.

Switzerland

A wide range of policy areas need to be involved to achieve sustainable development in mountain regions. Switzerland does not have a single explicit and coordinated policy for mountain areas.

From the various policy areas emerge general lines of action. For example, it is clear that in the economic field, a stronger emphasis on competitiveness and individual initiative is needed. This can be seen very clearly in policies, such as the New Regional Policy, the AP 2011, the tourism policy and also the revised Forest Act. The economy in mountain areas has to become competitive. This also requires a significant structural change, which will be systematically promoted through the various sectoral policies. In parallel, are instruments targeted on reducing territorial disparities. The main one is the new financial equilibration; but the basic supply policy ("Grundversorgungspolitik") has a balancing effect by creating similar conditions for all parts of the country. Almost as a counterpart to the economics-based approach, the environmental part of the strategy is concerned with protection of areas left to nature (e.g. forest reserves, nature parks, etc.). However the environment policy also

¹⁰ www.vie-publique.fr/documents-vp/loimontagne.pdf

¹¹ www.datar.gouv.fr/IMG/File/Schema_massif_Alpes.pdf

contributes to the strengthening of the competitiveness of mountain regions, for example by the valorisation of a sustainable economy in certain areas such as regional nature parks.

A modern, systematically coordinated policy for mountain areas in Switzerland is lacking. At the federal level, various efforts are made to achieve a better coordination of sectoral policies. The federal conference on spatial planning (Raumordnungskonferenz des Bundes) is an administrative approach in this direction. From this conference an internal administrative "Network for Rural Areas" has also emerged. The "Demonstration Projects of Rural Areas" of this network has generated a welcome initiative covering many sectors, which may possibly pave the way for further similar initiatives. Regrettably, although some internal administrative coordination takes place, there is no institutionalised dialogue with stakeholders in mountain areas. This is one of the reasons why there is still no clear federal strategy clarifying the direction of future development in mountain areas. This strategy is part of the Swiss territorial concept, which is currently (in 2007) in preparation at the Federal Office for Spatial Development (Egger, Parvex, 2007).¹²

¹² www.sab.ch/SAB-Verlag.399.0.html?&L=0

State	European level	National level	Regional level	Local level
AT	Common Agricultural Policy (CAP), and in particular its second pillar. - the EAFRD (European Agricultural Fund for Rural Development), financial instrument and programme 2007-2013 for rural development. Objective 2 areas (new), particularly those parts focusing on problem of rural areas - Rural Development Plans, according to Reg. (EC) 1257/1999.13 - LEADER+ programmes (large scope for innovative actions, networking activities and, what is essential for the future perspectives, relying on a structure which allows an experimental character in its measures.). LEADER + programs are linked to the Rural Development Plans since they cover their fourth priority line of action.	General task is the coordination of territorial policies. Development and implementation of rural development strategy plan and programme 2007-2013 (RDP) as horizontal scheme. Planning issues in the fields of e.g. trade and industry, water and forests and mining. Coordination of territorial policies. Funds and information services are jointly carried out by the federal state, the Länder and the municipalities.	The 9 Länder have a high autonomy in legislative matters and policy implementation and some financial autonomy and support regional performance of rural areas (spatial planning, regional development, protection of nature, environment and cultural heritage, agriculture and forestry (in the national framework), tourism and settlements and housing). Funds and information services are jointly carried out by the federal state, the Länder and the municipalities.	The "Regionalmanagements" are in charge of regional cooperation and development. Furthermore, many municipalities in the mountains have engaged in thematic networks to enhance collaboration across the Alpine range on important issues of mountain development. Municipalities are responsible for local development planning.
FR		General task is the coordination of territorial policies. Hexagonal Rural Development Program (PDRH) draws the general frame of actions and measures, according to the European level	The Regions are in charge of spatial planning and the implementation of rural development. Declination of the PDRH through 21 DRDR (Regional Document for Rural Development)	Implementation of the LEADER actions. Coordination at intermunicipal level through regional parks, pays and departments.
DE		National strategy plan for rural development 2007-2013	Operational programs of the Bundesländer. Implementation of the LEADER actions	Certain competencies for special planning procedures (urban land use planning, Landscape planning). Intermunicipal cooperation through the "Regionalplanungsverbände".
IT		National Strategy plan, general framework in line with the European policy.	21 Rural Development Plans (for each region and the 2 autonomous provinces)	Implementation of the LEADER actions by Leader action groups. Intermunicipal coordination through the "comunità montana".
SI		Rural development programme 2007-2013. preparation of strategies, policies, national plans, programme, and priorities, including rural development	12 development regions implement regional development plans which present the basis for project applications at the local level.	Spatial planning and development policy at local level. Rural development is not specifically distinguished in those policies.
LI		General frame for development + nature relevant fields (forest, water, agriculture...)		Main competences for land use planning
CH		General frame for spatial planning and regional policy. Direct competency in rural development in the field of agriculture.	The cantons are in charge of spatial planning. The cantons are also the key actors for the regional policy through their multiannual application programmes	The regional policy is implemented by the regions (intermunicipal level). Spatial planning is implemented by the municipalities.

Table 1: Different administrative levels of rural development policies in the alpine countries

B.1.4 Governance

The table shows that the competences for many policy subjects in the framework of rural development are already assigned to the regional level either because of the federal structure of these countries (Austria, Swiss or Germany) or because of a trend in recent years towards more regionalisation in centralised states (Italy and France). The national level maintains legislative power over important policy fields (agriculture, transport, even rural development itself) and draws up a framework legislation that is fine-tuned at the regional level (e.g. Austria and Germany). Thus, whereas political programmes and policies are usually developed at the national level, they are often implemented at the regional level.

From the European level via the national to the regional and local level, a logical implementation chain and corresponding cooperation is comprehensible. Good examples for horizontal cooperation at national level are the inter-administrative spatial planning conferences in Switzerland and Austria (ROK and ÖROK, "Raumordnungskonferenz") (Atmanagara, Egli, Zajc, 2005). The ÖROK plays a key role in coordinating regional policies within a wider national framework under the development for the coordination of spatial economic and regional policy.

B.1.5 The Alps: various governance levels for a combined territory

The alpine territory borders different areas and forms with them many intermediate geographical types. From the alpine perspective, lowland areas represent its natural hinterland, while from the perspectives of the lowland areas it is quite reverse: the alpine area is understood as their natural hinterland. Nevertheless, there are strong interconnections among different

types of areas, so instead of trying to address problems of a specific area, the functional approach would be more appropriate, encompassing the area in which the detected problems can be efficiently solved with a support of a multilevel governance system.

Harmonized territorial management plays a great role in the development of territories. Especially important are, horizontal and vertical cooperation among different levels of administration and different stakeholders in preparation of policy objectives for specific areas. In the case of the Alps, the various governance levels exist, from local, regional, national, cross boarder to transnational, which offer great opportunity for addressing problems at appropriate governance levels.

A functional territorial approach also characterizes the territorial cooperation programmes, where the alpine area is included in different territorial cooperation programmes, each of them dealing with similar problems but in a specific territorial setting.

The Alpine Space territorial cooperation programme also includes lowland urban areas as functional connections to the alpine territory. In the case of South East Europe the alpine territory forms a functional hinterland to part of a very diverse area, while with Central Europe, the territorial view encompasses the area amongst the Mediterranean and Baltic sea, part of Alps being its integral part.

Representing one of the most important mountainous regions in Europe, the Alpine Convention has an advantage of providing a platform and instruments for the development of a joint framework of mountain policy for the Alps which goes beyond national borders considering population, employment and business dynamics, climate change and territorial governance.

Map 2: Alpine Convention Perimeter¹⁴Maps 3 to 7: European Regions for regional policies¹⁵Map 3: Alpine Space¹⁶

¹⁴ Alpine Convention, Alpine Signals 1, second edition, Permanent Secretariat of the Alpine Convention, Innsbruck, 2010

¹⁵ ec.europa.eu/regional_policy/images/map/cooperat2007/transnational/transnat_mosaic.pdf

¹⁶ www.ec.europa.eu/regional_policy/atlas2007/transnational/index_en.htm

Map 4: South East Europe¹⁷

Map 5: Central Europe



Map 6: North West Europe



Map 7: Mediterranean area

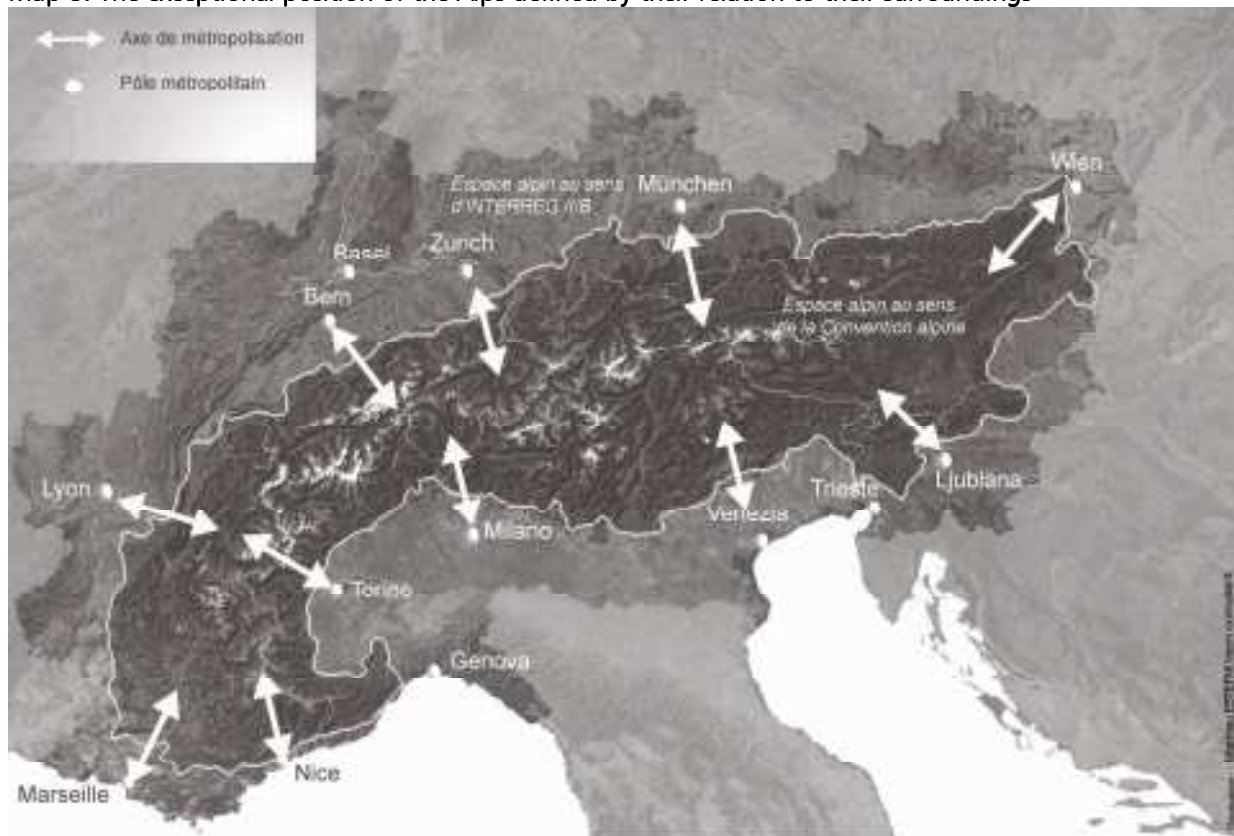


¹⁷ www.ec.europa.eu/regional_policy/atlas2007/transnational/index_en.htm

Beyond the territorial view a rather "functional" view on the Alps is used in scientific analysis, which may be very attractive for future consideration and development of the Alpine Arc: the work done on the Regional Environmental Governance¹⁸ and by the International Scientific Committee on Research in the Alps (ISCAR)¹⁹ on the metropolises and "their" Alps are challenging smart perspectives for the future of the Alpine Convention and for the Alpine arc regarding the key issues on multilevel governance and urban-rural links. Regarding, these questions, the 5th report on Cohesion recently published by the EU, also gives us some interesting orientations on how the Alpine arc could participate actively in the process of multilevel governance. The example of the Baltic sea

strategy gives the Alps an initial interesting approach on how to focus main EU and national policies on identified objectives such as; environment and climate change, transport, competitiveness of SMEs, and to increase the coordination between transversal and sectoral policies. Some other elements should be mentioned on the specific opportunity that specific territories could have adapted in order to approach at a different level of intervention, strengthening the solidarities between urban and rural areas.

Map 8: The exceptional position of the Alps defined by their relation to their surroundings



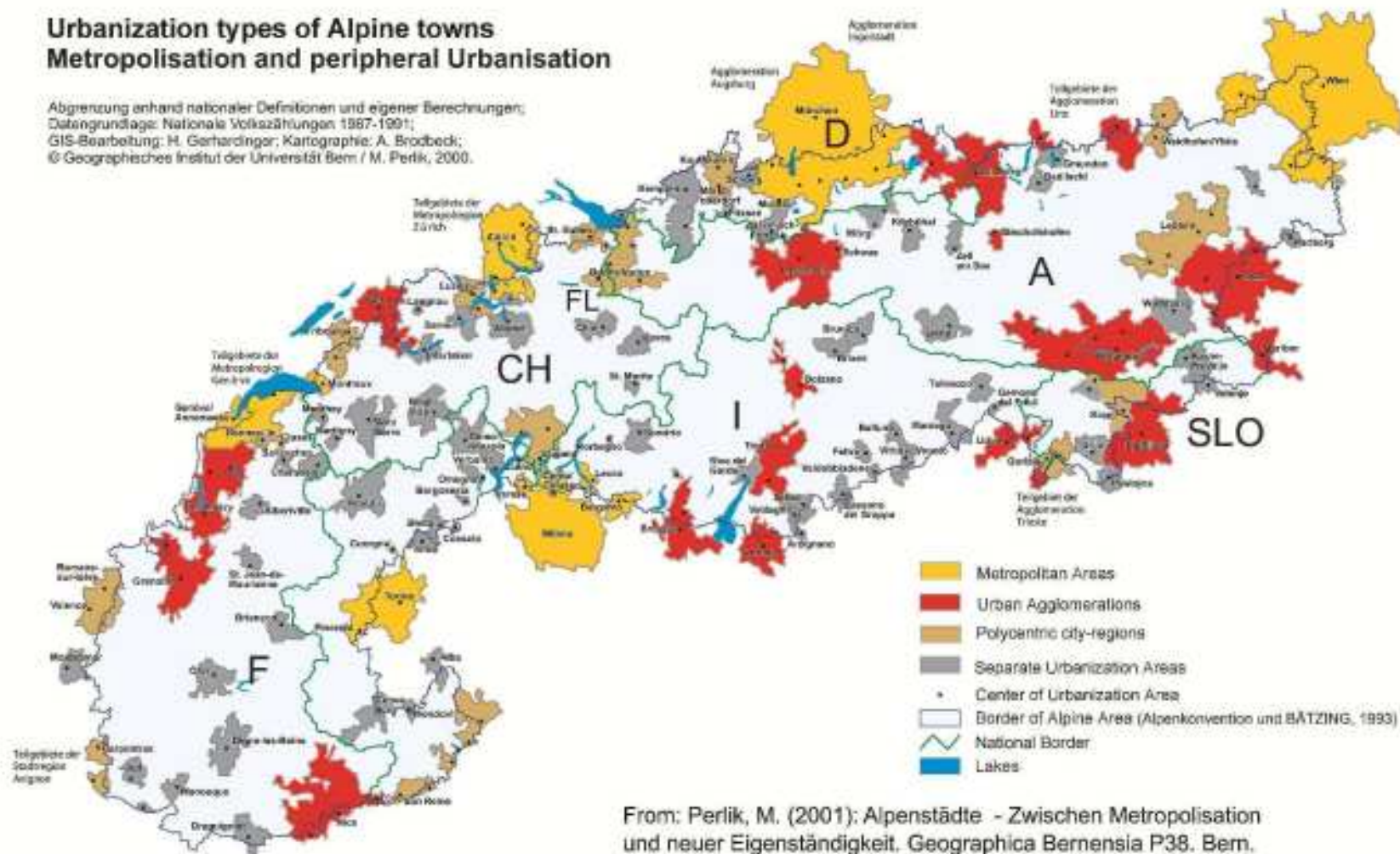
Revue de Géographie alpine 2006, Tome 94 Nr. 2, "Visions alpines au service de la coopération transnationale", Martin Vanier, p. 86

¹⁸ www.reg-observatory.org/

¹⁹ www.iscar-alpinresearch.org/

Urbanization types of Alpine towns Metropolisation and peripheral Urbanisation

Abgrenzung anhand nationaler Definitionen und eigener Berechnungen;
Datengrundlage: Nationale Volkszählungen 1987-1991;
GIS-Bearbeitung: H. Gerhardtner; Kartographie: A. Brodbeck;
© Geographisches Institut der Universität Bern / M. Perlik, 2000.



From: Perlik, M. (2001): Alpenstädte - Zwischen Metropolisation und neuer Eigenständigkeit, Geographica Bernensia P38. Bern.

Map 9: Alpine agglomerations and perialpine metro-regions

Conclusion 2:

For rural areas, innovation is widely regarded as one of the key factors able to increase competitiveness. For companies in rural areas, access to research and development institutes, which tend to be located in urban areas, is difficult. Given the particular situation of rural areas, public intervention to encourage innovation is justifiable.

Conclusion 3:

Small and Medium-sized Enterprises can benefit from cooperation between Research & Development institutions and public and private sectors. Organizational and territorial innovation can strengthen them further.

Conclusion 4:

By addressing the problems of a specific area, such as the Alps, a functional approach appears to be the most suitable type of approach, encompassing the area in which the problems detected can be efficiently solved and supported by suitable governance levels.

Conclusion 5:

Generally, rural development can be assessed as part of a more general regional development concept, and thus it is influenced by a wide variety of policies.

Conclusion 6:

The Alps represent one of the most important mountainous regions in Europe. A territorial framework has been developed through the Alpine Convention in order to set up common approaches, transnational instruments and regional cooperation in the Alps beyond national borders.

Conclusion 7:

Mountains are strategic areas in Europe because of their useful natural resources and human assets and their function as an early warning system in times of climate change. They should not be seen as "least-advantaged areas" but as areas with different types of potential that require a territory-specific approach and specific instruments.

Bibliography

Atmanagara, Egli, Zajc, 2005

The role of landscape in current European and national policies. In: Pfefferkorn (coord.). Regional development and cultural landscape change in the Alps, Geographica Bernensia G74, Bern. University of Berne, Institute of Geography, 2005.

Morel-a-l'huissier, 2008

Rapport sur le bilan de la politique agricole et forestière en faveur de la montagne.

Dax et al. 2008

Dax, T. (2008), Leader: das Programm der ländlichen Entwicklungspolitik zur Initiierung regionaler Entwicklungsimpulse, in: Österreichische Gesellschaft für Raumplanung (ed.), Erosionsprozesse im Siedlungsgefüge Österreichs, FORUM Raumplanung Band 16, LIT Verlag, Wien und Münster, S. 53-65.

Cionco, Monteleone, 2006

Rural development in Italy and its evolution, Istituto Nazionale de Economia Agraria, Options Méditerranéennes, Sér. A / n°71, 2006.

Price, 2008

Regional and territorial developments of mountain areas; integrated assessment of Europe's mountain areas.

Egger, Parvex, 2007

Bericht zur Motion der Kommission für Umwelt, Raumplanung und Energie des Ständerates vom 25. Mai 2004 Alpenkonvention und Bergebiet, SAB and SEREC.

B.2 The role of innovation for sustainable rural development in the Alps

B.2.1 Supporting innovation in mountain areas

a. The Alps: territory of innovation

The alpine space is a "living space in change". In order to follow and be a participant of these changes, creativity is requested, which is close to the mentality of the alpine mountain people, spontaneity, intuition, imagination, aesthetic – going beyond science and research.

The challenge is to use innovation and synergies to turn drawbacks, disadvantages, risks and vulnerabilities and the challenge of change in general into sustainable development. Solidarity, mountain resources, readiness to take risk, political will as well as embed actions, are important assets with which to formulate regional strategies. Some methods are public - private partnerships and the concept of pilot regions as vehicles for development. Changing views and attitudes are essential.

Moreover, innovations within the secondary sector and the development of tourism activities can often stabilize the rural regions in a sustainable manner. In recent years projects on social innovation (social integration, promotion of female needs and development) and development of energy visions as well as agricultural innovations e.g. new market opportunities in alpine regions, have been evolving.

Appropriate frame conditions on national and regional levels as well as local initiatives are important factors for tourism development, understood as "local economy".

b. Implementing innovation

The evolution of the innovation concept - from the linear model having R&D as the starting point to the systemic model in which innovation arises from complex interactions

between individuals, organisations and their operating environment - demonstrates that innovation policies must extend their focus beyond the link with research.

Agriculture is one of the fields where a system approach to innovation has been less applied, for several reasons. Institutional barriers and the "distance" between research and practice meant that, in many countries, farmers' knowledge has insufficiently been taken into consideration as a possible source of innovation (Scoones and Thompson, 2009). The support frameworks that predominated before the reforms of the Common Agricultural Policy during the past 15 years had encouraged a pattern of innovation and innovation systems that focused above all, on an efficient production of primary agricultural commodities and on commercial in-puts subject to patent laws; all of this was guided primarily by economic considerations and a particular image of a "modern" agricultural sector (Knickel, Tisenkopfs, Peter, 2009).

The current transformation of the European agriculture and farming sector towards multifunctionality (Van Huylenbroeck and Durand, 2003), the growing importance of sustainable technologies that rely on a more efficient use of natural resources, and the reorientation of agricultural production towards non-food markets (such as energy crops) and service provision (Mahroum et al., 2007) involve "vision creation" and strategic choices on the part of farmers and rural inhabitants at large. These choices are made in the context of social transformations that restructure rural areas, such as the counter-urbanization movement, the transmission of certain knowledge-based industries from cities to rural areas or more global trends such as climate change or the increasing scarcity of fossil fuels.

Due to their endemic characteristics – harsh climate, slope, restricted access, etc., mountain areas have always been territories of innovation. Many plans have first been implemented in mountain regions and then become common practices. That is mostly true for social and organisational innovation

but also for more technical ones. For example, from 1985 on, the French Mountain law aimed at "enabling local people and their elected representatives to acquire the assets and control of their development in order to establish, in respect of cultural mountain identity, parity concerning incomes and living conditions between mountain and other regions". This law gave the framework for high social innovation, which also took the form of processes adaptation on mountain territories.

The role of public policies aiming at supporting innovation could be to:

- Launch and maintain a broad public process: organization of cooperative processes on local and regional levels and to take the "risk" of not knowing the outcomes - financing must not be a question of success for an innovative process;
- Secure financing for innovative processes and the outcomes;
- Motivate communities and regions to participate in networks and processes
- Support existing approaches and good practices;
- Embed innovative elements effectively in regional and national strategies
- Support the creation of local and regional economic benefit from sustainable strategies;
- Increase public awareness about the importance of innovation and possible financing.

Good practice 3: The social concept Ausserfern, Austria

The Social Concept Außerfern provides a basis for developing rural regions, of improving quality of life in rural regions and of encouraging regional social co-operation (which is stated e.g. in the LEADER+ programme). It is a typical bottom-up-project, emerging from the problems of a region and was developed by the regional management organisation, the "Regionalentwicklung Außerfern".

The district of Reutte in the Northwest of Tyrol is a remote area and struggles against movement of labour, migration of young people and brain

drain. Especially in rural, sparsely populated areas the successful management of social problems and challenges needs special concepts, like the social concept Ausserfern that was implemented by 37 municipalities of the Political district of Reutte to face these problems. Five working groups concerning the following issues have been created: alcohol/drugs/mental disorders, old people, integration of migrants, children/youth/family and handicapped people. More than 150 interested participants have taken part in these working groups.

The Außerfern is the first district in Austria with a social concept that was developed under broad participation of the population, policy makers and social institutions. The success factors of the project implementation are related to this process on a broad basis: the authors of the Social Concept are also the ones who implement the measures. Another success factor has been the great political support, as the concept offers answers to pressing regional problems.

More information:

www.allesausserfern.at/rea/sozialesleitbild/

Numerous instruments exist on European and national levels to encourage innovation. Moreover, rural regions are increasingly experienced areas with considerable innovation potential, a view that is drastically different to perceptions on these areas only a decade ago. This innovation takes place by the implementation of many programs; some of them are of particular interest for rural areas:

- The measures of the **second pillar of the CAP**, particularly those dealing with innovation.
- The measures of the cohesion policy, especially the **European territorial cooperation** (previously known as Interreg). Between 2007 and 2013, EU Cohesion Policy instruments are to provide some 86.4 billion € (almost 25% of the total) to R&D and innovation, including the mainstreaming of innovative actions and experimentation.
- The **Seventh Framework Programme 2007-2013** (FP7), which has a budget of €50.5 billion. There are four strands to FP7: (1) Cooperation (involving amongst others health, food, agriculture, fisheries, biotechnology, information and communication technologies, energy, the environment, transport, socioeconomic

sciences); (2) Ideas; (3) People and (4) Capacities (including support to SME's).

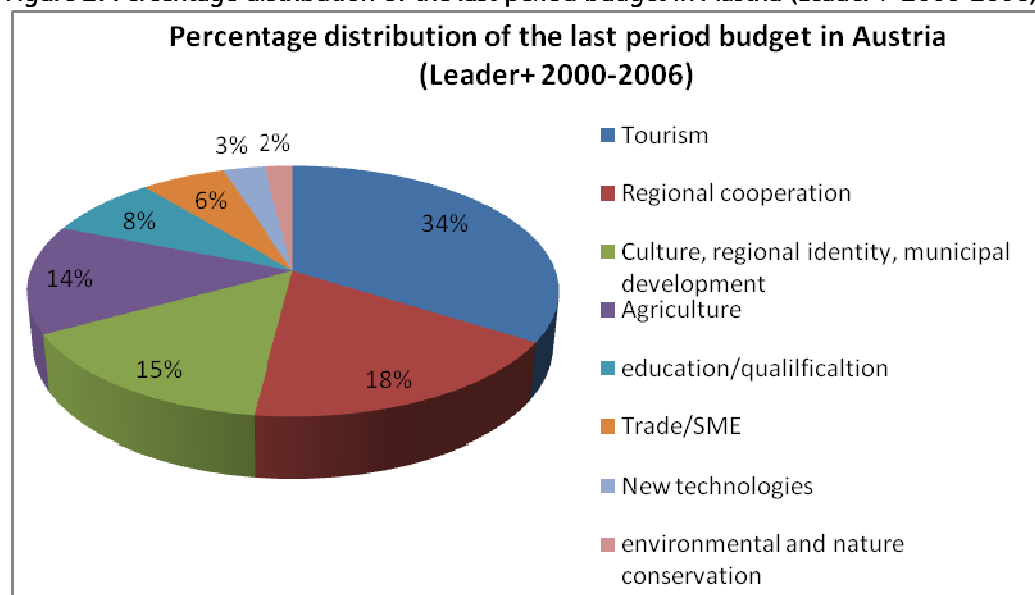
- The **European Institute of Innovation and Technology** (EIT), which was recently set up to address Europe's innovation gap. The EIT aims to emerge as a key driver of EU sustainable growth and competitiveness through the stimulation of world-leading innovation and by bundling European innovation activities.
- The program **LIFE** of DG Environment aims at introducing sustainable practices of land cultivation. In 2010, €243 million were available for the co-financing of projects.
- The program **Catalysts for change** of GD Employment and Social Affairs supports measures for innovation through the European Social Fund (ESF).
- The strategy **i2010** aimed at promoting the information society with a special focus on rural areas. Amongst others, E-Skills and E-services were to be encouraged. i2010 is terminated and actually superseded by the Digital agenda for Europe (COM(2010) 245). The Digital agenda wants to further increase the use of digital services and the provision of respective infrastructures, including Fiber to the home (FTTH). With the European Economic Recovery Plan, a European broadband initiative was launched. The aim is to achieve 100% coverage by the year 2013. The European initiative is supplemented by national broadband initiatives.
- The **Regional Innovation Monitor** was launched in the autumn of 2010²⁰. It gives an overview of regional innovation support measures, provides a benchmarking tool to compare regional innovation and constitutes a platform for knowledge sharing and practice dissemination.
- The program **LEADER** (acts as a link between actions of development of the rural economy) aims at helping inhabitants consider the long-term

potential of their local region. It encourages the implementation of integrated, high-quality and original strategies for sustainable development, and has a strong focus on partnership and networks of exchange of experience.

In Austria for example, 86 regions (86 local action groups) are involved in a LEADER action; the whole program is managed by the State and federal states. According to the current budget of the Austrian Rural Development Programme 2007-2013 the amount of public expenditure allocated to LEADER actions is 423,120.058 €, together with private spending the total costs of the initiative LEADER are coming to 731,768.023€.

²⁰ www.rim-europa.eu

Figure 2: Percentage distribution of the last period budget in Austria (Leader+ 2000-2006)



The list above shows that numerous instruments exist on a European level. Further instruments and measures to encourage innovation exist at national and regional levels.

National contributions: national initiatives and instruments to develop innovation

France

At the French national level, the Centres of Rural Excellency have been in operation since 2005. They aim at supporting innovative projects and creating jobs in rural territories. The projects of the "Centres of Rural Excellency" should be linked to one of the following priorities:

- promotion of the natural, cultural and tourist resources;
- promotion and management of bio-resources;
- provision of services and attraction of new populations;
- technology centers, for industrial, handcraft and services productions.

The overall participation of the State amounted to 236 M€ from 11 Ministries (agriculture, tourism, equipment, culture, overseas, ecology, employment, small and medium enterprises, health, industry, land settlement) and specific funds from the state. The local group of actions, which necessarily involve a public partner (local authorities, public establishments of intercommunal cooperation, public institutions) with a private partner (companies and associations) getting involved in these projects

can found co-financing by regional and departmental councils. Altogether, 31 out of the 379 Centres of Rural Excellency created in 2006 are located in the French Alps.

Italy

Contrary to most cases where existing innovation systems have been designed around the paradigm of productivist agriculture, the emphasis here is on quality, and locally entrenched products are seen as a strength. Consequently, an agricultural and rural innovation policy is oriented towards quality and sustainability, emphasis being on locally entrenched products.

The Italian "National mountain fund" established under Act 97 of 1994 is funded by contributions from the state and the municipalities; the funds are distributed between the regions and the autonomous provinces. It aims at a global mountain development by preservation and promotion of environmental qualities and indigenous potentialities typical of mountain habitats.

Many topics are handled:

- territorial; environmental, - for the safeguard of natural resources in a development frame, including transport development;
- economic, - to develop economic activities in mountain depressed areas;
- social, - to offer adequate welfare to the society;
- cultural and local traditions.

In 2004, 11,25 M€ out of a total of 37,5 M€ were allocated to alpine regions.

Switzerland

The notion of innovation is "trendy" and also central to agricultural policy. Agriculture on the whole has a positive image and the population is ready to support the multifunctionality of rural areas. Public and private sectors are sharing common paradigms of multifunctionality and competitiveness. In Switzerland, one of the objectives of the New Regional Development policy is to bridge the gap between knowledge organizations (university, research institutes), mostly in urban centers, and the enterprises in rural areas. These endeavours are supported by the polycentric structure of the country facilitating networking and clustering, and the access to innovation centres. The Innovation Promotion Agency (CTI) is the Confederation's Innovation Promotion Agency. For the past sixty years, it has fostered knowledge and technology transfer between companies and universities by bringing them together as partners on applied research and development projects. CTI also provides assistance to start-up companies²¹.

Germany

The tendency to prioritize internationally competitive high-technology sectors draws attention away from less spectacular fields of innovation like agriculture and the rural sphere.

For enterprises it is sometimes difficult to get an overview of all these measures and to choose the right approach. Providing guidance and assistance for enterprises must therefore be an important activity of public authorities.

Good practice 4: The Ark: promoting innovation in the Valais, Switzerland

The Ark is a cantonal cluster strategy, which aims at turning the industrial sector of this mountain canton into a modern high-tech sector. Six thematic clusters based at the major urban centres are the core of this cluster strategy. The strategy is put into practice by The Ark Foundation.



The Foundation organises and coordinates various activities to help both new (start-up) and existing companies become established and

expand in the Valais. It creates the appropriate framework conditions for the canton's economic players to develop their creativity and innovation. To achieve this, The Ark promotes the development of new knowledge originating from Switzerland's universities of applied sciences and from cantonal and national research organisations. It also draws together different networks of excellence at local, national and international levels.

The Ark was created in 2004 by the local economic development body, the "Departement de l'Economie et du Territoire du canton du Valais". The particular features of this cluster "park" are that it is spread across six different sites, and focuses on three specific areas: Information and communication sciences, Life sciences and Engineering sciences.

More information: www.theark.ch

Good practice 5: Social innovation in Austria: Women's network Lungau

The women's network Lungau, which was created in 2003, aims at improving the position of girls and women within society in the Austrian region of Lungau through many activities: lobbying for female participation in the region, working on regional development, asserting measures for improvement of equal positions for men and women as well as setting pulses / motivating women to be politically active.

The working team of the network which comprises 6 women and is financed by means of the Province of Salzburg and the EU, develops many projects concerning education (Project "adventure world wide web": blended-learning course for women on computers and social knowledge in connection with world wide web; Project "single educating women in Lungau": contact café, the valorization of natural resources (Project "herbs initiative Lungau": school of herbs on different farms) or social integration (Working Group "Social integration": Female immigrants meet Lungauer women).

More information:

www.lungauerfrauennetzwerk.at/

In many countries, it seems that innovation systems lack - greater flexibility in organizations and institutions. Capacities to assess the potential of emerging innovations are not always present in support organizations instead they are embedded in their institutional culture. Institutions tend to conceive innovations as projects with strict deadlines that are often incompatible with

²¹ www.bbt.admin.ch/kti/index.html?lang=de

the experimental, or creative nature of new endeavours and their dynamic. Long-run planning and investment decisions could allow a more profitable and effective implementation of innovation in the territory. This means not only public finance systems, but also dynamic private markets where innovation is considered as a key to success.

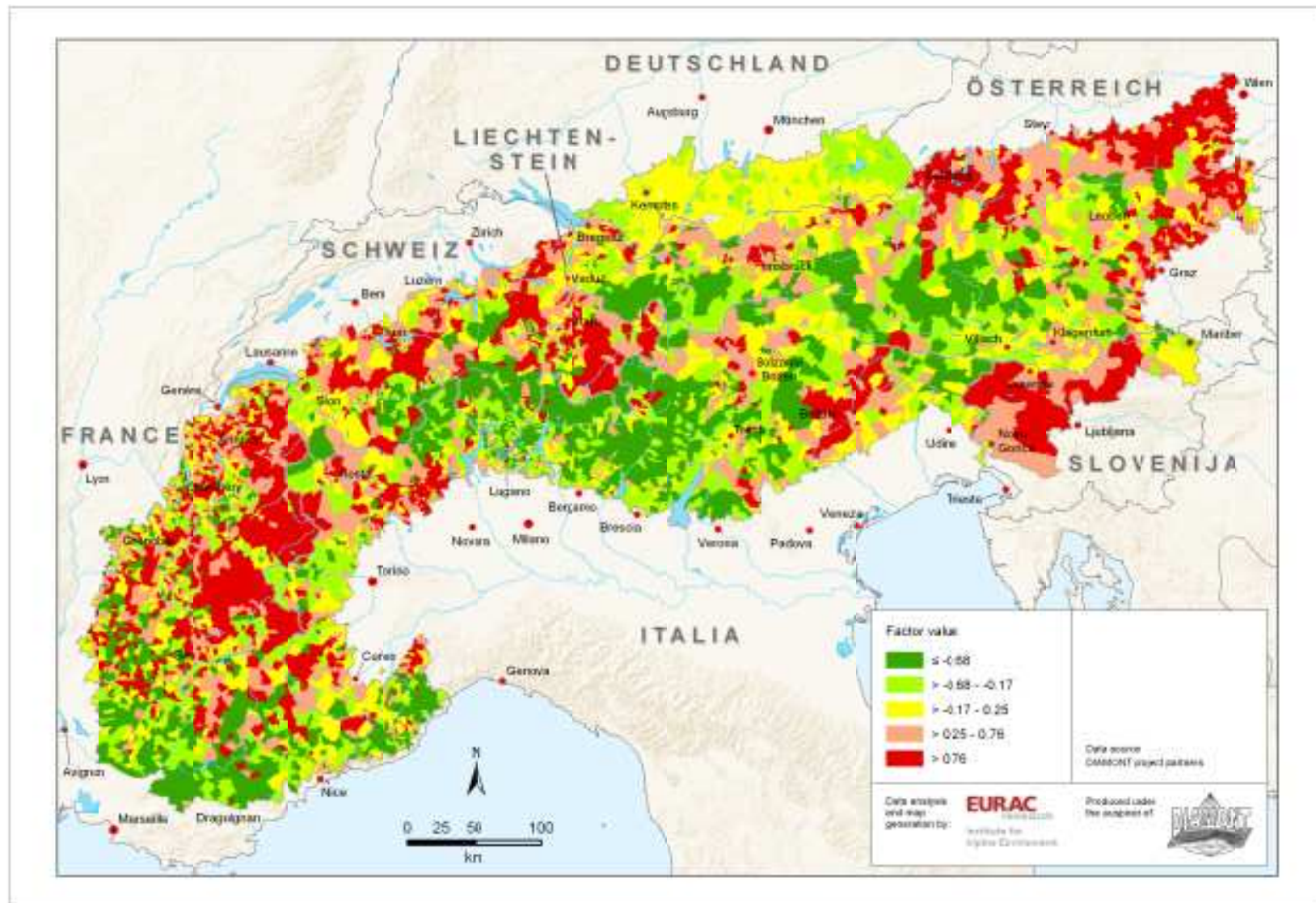
Giving time to the processes and being able to qualify them better are two main points in which institutions should support innovations more actively (Knickel, Tisenkopfs, Peter, 2009).

Good practice 6: Cooperation between municipalities: Micro-région of Haute-Sorne, Switzerland

Constituted in June 2003 as a cantonal pilot project, the Micro-region of Haute Sorne (canton of Jura, Switzerland) constitutes an institutionalization of inter-municipal cooperation focusing on spatial development. Seven municipalities of the canton of Jura (Bassecourt, Boécourt, Courfaivre ((back in the project since 2009), Glovelier-Sceut, Saulcy, Soulce, Undervelier) populated by 6200 inhabitants, have signed an agreement bringing them to work together implementing technical, administrative and financial tools, leading them to work as a micro-region as defined in the "Cantonal Plan Directeur". It is part of a collective, participatory and flexible approach, focusing on concrete projects for the sustainable development of the whole territory of the High-Sorne, and open to the process of the mergence of municipalities. In 2009 municipal councils decided to go a big step forward and to establish a committee aimed at preparing a pre-project for the merging of the municipalities. Its results will be presented to the public in January 2011. The public voting on the merger is expected at the end of 2011. The major impact of the project was the development towards the unification of municipalities as logical consequences of the project since its inception. Further visible impacts for the local population were the improvement of public transport connections, the realization of the activity-district in Glovier, and so on.



More information: www.haute-sorne.ch



Map 10: Gender integration: Map showing the extent of female integration into the labour market (DIAMONT)

©Tappeiner, Borsdorf, Tasser (Herausgeber) Alpenatlas, Spektrum Akademischer Verlag, Heidelberg 2008

B.2.2 Regional competitiveness and attractiveness

a. Innovation in production processes

Tourism

Related to alpine rural development, tourism is a very important economic field where there seems to be some potential for innovation. A point which needs to be clarified, is whether innovation in mountain tourism is likely to be profitable and attractive for private investment in new initiatives. A trend exists in investment choices both at the private and public level, which focuses on a classical approach to mountain tourism, as a consequence of the strong attraction exerted by winter tourism and winter sports on the majority of visitors in the Alps. The initiatives where a certain amount of innovation is recognizable in tourism mostly refers to territorial and social types of innovation, and focuses on diversification of tourism offered and the development of new products. A relevant case is represented by "soft tourism", which is sometimes oversupplied, if one considers the expectations of customers. Innovation is much more transverse. First of all, innovation concerns practices and their developments: how new practices, however diverse, appear on the market? It also covers the creation of new tourism products: how are they created? How to ensure their diffusion between territories?

Good practice 7: Service innovation in support of tourism in the Alps

Service innovation is instrumental in turning tourism in the Alps more competitive and sustainable both environmentally and economically.

In fact innovative companies highlight the path for tourism businesses to go innovative in shifting from passive, internet-based access to tourism information and booking to a true mobile real-time informative and ticketing, fully customised, service for the customer. With development of 'apps.', innovative businesses across the Alps are offering compelling tourism propositions. Including virtual and augmented reality, web-

crowding services, real-time and fully customised mobile services innovative businesses in Alps are moving from e-commerce to the so called m-commerce (through the new generation of mobile phones). Physical mobility, and indeed smart inter-modal transportation, together with environmental sustainability services and information are also instrumental for service innovation in the Alps.

The role of stakeholders in fostering service innovation for tourism in the Alps was appreciated to be one of providing integrated system market conditions for businesses to further explore this potential and organise and support the value chain partners be it with training, access to seed-capital and credit, branding collectively the particular tourist venues, acting as catalysts for culture and creative industries including on local Feasts, Festivals, and other support. Public private partnerships are believed to better address the potential for a renewed approach to customer tourists all the more based on wide customisation of service, extensive use of customised m-commerce and integration of support. In a nutshell, both businesses and authorities appear to acknowledge and indeed engage in a new era for tourism in the Alps for which a new appreciation of service innovation is probably the fundamental building block.

Source: this text was written by José Freitas, from the European Commission, Enterprise and Industry Directorate-General

Some common aims have been identified in new tourist offers in alpine regions:

- initiatives directed at diversifying the rural mountain tourism offer - aiming at overcoming the seasonal or bi-seasonal tourism;
- initiatives to promote woods and forests tourism in rural mountain areas by means of improving woods and forest landscapes and infrastructures, such as restoring refuges and alpine huts;
- initiatives to promote "diverse tourism" by means of - encouraging sustainable, educational and eco-friendly tourism in rural mountain areas (sustainable mobility; holiday packages in low tourism seasons and in marginal areas; tourism in natural

parks and reserves; sport and recreational tourism initiatives; restoring and establishing - areas of natural and cultural interest; support of agro-tourism activities).

In Italy, some initiatives characterized by the provision of economic and other forms of support exist. There are also contributions in the fields of agro-tourism activities, areas of natural tourist interest, rural areas and craft production. Their aim is the promotion of economic diversification of rural mountain areas and engagement in tourism. The tourist potential linked to the quality of natural and historical landscapes has to be integrated (e.g. Rural Development programmes of Friuli, Valle d'Aosta).

Good practice 8: Alpine pearls; international project



The Alpine Pearls is a network of 20 communities that offer environmentally-friendly holidays. Climate protection and nature conservation via soft mobility are part and parcel of the Alpine Pearl association's focus. Yet, it also tries to achieve cultural variety. Every Alpine Pearl has to fulfill the criteria catalogue. This catalogue is the basis for an environmentally-friendly holiday. Basic requirements for the membership are in the field of mobility:

- Basic mobility: journey logistics, mobility in the region, mobility in the pearls;
- Fun mobility;
- Service quality for mobility: information and service.

Other requirements are nature, environment, culinary art, folk culture, architecture, and education.

More information: www.alpine-pearls.com

Good practice 9: Pilot projects: "mobiles Entlebuch" - soft mobilities in Entlebuch, Switzerland

In cooperation with mobility services, UNESCO Biosphere, tourism services and chosen municipalities, several offers were developed and promoted for excursion traffic to Entlebuch region in the period July 2008-November 2009.

These offers used the existing cultural and scenic potential and capitalized on it for excursion mobility. The target group was in particular the population of the agglomerations of Luzern, Zug, Zürich, Bern and Nord-east Switzerland as well as holiday guests in the destination of Entlebuch Luzern.

The principle to create simple booking offers was followed by combining services of arrival, mobility within Entlebuch and particular points of interest. These offers were to motivate guests to use trains, buses and different types of soft mobility options.

Positive results were: increased amount of daily excursion to Entlebuch, increased use of public transport, energy saving and reduction of CO₂ emissions (in the short term of 14 tonnes per year), positive effects on added values in the Entlebuch as secondary impact of the newly created mobility offers, intensifying cooperation between key stakeholders in tourism/leisure and mobility services as fundamental for continuity of cooperation going beyond the project.

This pilot project has shown good results but in the mean time the number of offers was too large. They should now focus on demand-orientated and comparatively effective offers, generating regional added values.

In Austria, most measures for promoting sustainable tourism have been adopted in response to trend developments or tourist requirements, with the result that only a few activities fulfill more than one, let alone all of the criteria of sustainable development.

Sustainable measures have mostly been undertaken in the **transport sector** to reduce the impact of large transport volumes, and because action is required under the Kyoto Protocol. Examples include the "klima:aktiv mobil programme" (supported by EU funds), or outstanding individual projects to **promote soft mobility solutions** at regional level²², which have contributed to the development of **larger sustainable networks**, particularly in the Alps, as "Alliance in the Alps" or the Alpine pearls network.

In the field of ecological management, which is partially linked to the tourism sector and certainly a part of the large set of rural development policies, the **ecolabel** is used as an incentive which has been awarded to a

²² www.mobilito.at

large number of Austrian businesses in the tourist sector. More and more businesses in higher categories are certified with the ecolabel (VKI, 2009). More specifically, with reference to tourism, since its creation in 2008, the "travel offer" ecolabel has been used as an award for ecologically sound holiday packages (Österreichisches Umweltzeichen, 2008). Sustainable tourist activities, which capitalize on regional traditions and agriculture, include: the promotion of **farm holidays** and marketing of **traditional crafts and industries** for tourism.

In Switzerland, the Tourism sector of the State Secretariat for Economic Affairs has created "**Innotour**" which works as the federal government's instrument for the promotion of innovation and cooperation in tourism. It aims at modernizing the supply structure in tourism accompanied with as little administrative effort as possible.

Projects, which comply with legal and financial requirements and fulfill different choice criteria, receive financial support. Information and exchange of knowledge and experience in the field of innovation and cooperation in tourism is an important target aspired by the Federal decision on the promotion of innovation and cooperation in tourism from February 1998 onwards. The Federal State Secretariat for Economic Affairs is responsible for the management of Innotour.

Legal requirements for projects:

- priority for innovative and cooperative projects;
- limitation on key sectors in tourism supplied to eliminate weak points;
- consideration of principals of sustainable development;
- contribution to the improvement of the employment situation;
- projects serving as exemplary for regions, promotion of imitation of good practices;
- internal contribution and contribution of third parties;
- corporate implementation.²³

Switzerland also takes part in the Alpine-Space Programme of the transnational European territorial cooperation (INTERREG IVb).

Indeed, tourism is often regarded as a main stay of the economy in the alpine region. It treads a fine path between a narrow budget and - pressure to innovate. The cooperation between tourist regions seems to be a possible solution in order to face these difficulties, support the emergence of new ideas and create a successful marketing.

Within the Alpine-Space Programme one can point out two currently running projects with Swiss participation in the field of tourism:

- The project: **ClimAlpTour** "Climate Change and its Impact on Tourism in the Alpine Space" deals with the relation between climate change and tourism. The principal target of the project is the development and implementation of adapted strategies for a balanced tourism development. Swiss partners contribute to the project in realizing the following activities:
 - organization of workshops together with pilot regions, respectively economic partnerships in the cantons of Grisons, St. Gall and Wallis;
 - development of useful adaptation strategies for different touristic partners and destinations;
 - conduction of an alps-wide Delphi-expert questioning about adaptation strategies in alpine tourism in the light of climate change.²⁴
- **CAPACities**: The Project CapaCities – "Competitiveness Actions and Policy for Alpine Cities" aims at capitalizing the potential of small alpine villages. Networks integrating important proximate cities together with small alpine cities should be created and established in the project.

²³ www.inno-tour.ch

²⁴ www.climalptour.eu/

Good practice 10: Biosphere Park Grosses Walsertal, Austria



"Making use of nature without causing harm" – this is the philosophy of the Biosphere Park Grosses Walsertal (Vorarlberg).

According to the Seville Strategy, one of the main functions of biosphere parks, alongside the conservation of biodiversity and research, is a contribution to sustainable development in the region. In the past five years numerous projects in this field have been carried out in the valley "Grosses Walsertal". Examples of these projects include, - the production and marketing of agricultural products like mountain herb tea, "Walserstolz" cheese, the "köstliche Kiste" (box of regional delights) and the cookery book "Pleasure – the taste of the Biosphere Park"; in trades "Bergholz" (mountain timber) and in the hotel and catering field the "Biosphere Park Partners" label.

More information: www.grosseswalsertal.at/; www.walserstolz.at/; www.bergholz.at

from among the regional elite regarding cheese and regional specialties. Only those who meet the highest quality standards are allowed to become members of the Cheese Street. 44 inns and restaurants of the Bregenzerwald region, marked uniformly, are members of the Cheese Street. Most of them are situated close to each other. Many cheese chefs serve their specialties in cosy parlours with low ceilings and a view of the facades with wooden shingles.

All in all it can be said that the project is bringing traditional agricultural processes and products closer to customers and tourists and that it raises knowledge in courses at agricultural schools and museums. The Cheese route distinguishes itself through the integration of a great variety of professional categories. As a consequence of the innovative touristic example "Bregenzerwald Cheese Street" in 2008 the trend of declining overnight stays in the region could have been stopped.

More information:

www.bregenzerwald.at/xxl/en/839983/_season/at1/index.html

Good practice 11: Bregenzerwald cheesestreet, Austria



The farmers of Bregenzerwald, western part of Austria, are largely responsible for the maintenance and upkeep of the cultivated landscape. The area is known for its alpine cheese and in addition to that, offers other local specialties produced by farmers. As a promotion for these delicacies the Cheese Route was initiated.

The "Bregenzerwald Cheese Street" is a cooperation of experts in different fields, a network of stations worth seeing in the entire Bregenzerwald region. The members of this network offer tasting sessions throughout the year and reveal some secrets on cheese production. The project was drawn up within the framework of an EU program for rural development (LEADER II). The businesses integrated in the Cheese Street network range

Good practice 12: Development program Soča 2002-2006 and 2007-2013, Slovenia

Negative demographic trends, difficult accessibility, lack of highly qualified jobs and several natural disasters, such as earthquakes (1976, 1998 and 2004) were the main characteristics of Posočje municipalities (Bovec, Kobarid, Tolmin). After the last earthquake a special law on after- earthquake renovation and development was accepted by the Slovenian government which has foreseen a development program with a financial background. Three main priorities within the program were defined: economic infrastructure (business zones, new jobs, small tourism investments), Human assets / potentials development (offering scholarships) and promotion of business investments, development and employment. The program is based on yearly public requests for projects and will continue to run from 2007 to 2013.

Each year more than 10 new private investors decide to propose rooms, apartments or small family-run hotels. Besides tourism infrastructures on which that area strongly depends, - other business have also opened, such as the small high tech industry. Several highly qualified positions were established. Scholarships present additional long-term stimulations for young people to stay in the area and not to leave for bigger centres. One of the conditions of success was a focused program, which assured financial

sources; however this is not enough to save the region from further lagging behind.

Figure 3: A Co-financing possibility of 15.000 € has stimulated the owners of an old stone house in a remote village of Robidišče with only four permanent inhabitants, to renovate the building and to offer it to tourists that search for peaceful and quiet holidays.



More information:

www.cilj3.mop.gov.si/index.php?id=12&lang=en&record=26

Liechtenstein Tourism – sophisticated integration

Good tourism knows the secret behind filling guests with fresh inspiration, time after time. This only works if services are integrated in such a way that appropriate new products and services can emerge for tourists. So the challenge is to harness available local potential and create attractive products from the careful use of major resources in Liechtenstein and the surrounding region.

For short-stay as well as long-term visitors to the region, intelligent marketing strategies are starting to create an overall experience consisting of a blend of individual services provided by different partners. Close local and regional cooperation is required in order to integrate these parties in the tourism industry and to develop products and services pitched at specific target groups. The resources and entire diversity of a region are assembled into leisure packages which can be offered more efficiently on the tourism market. So the idea is to bundle services into an overall experience and make better use of marketing and distribution channels.

Gains in efficiency for visitors and the environment

In other words, cooperation and the integration of tourist partners at home and abroad enable individual tourism solutions to be positioned more effectively as part of an overall concept. This conserves natural resources and boosts efficiency on the part of the service providers. Visitors are among the stakeholders who derive the greatest benefits because they are able to save time and money through the availability of useful and readily accessible information. They can also benefit from discounts and, last but not least, they get to know a completely new side of public transport as an important factor contributing to their rest and recreation.

Recognising changed requirements

The industry has adjusted well to globalised competition between tourism providers and the changed requirements of visitors. In Liechtenstein, such providers are working closely together and they concentrate on their core competencies in order to maintain the competitive edge of individual tourism establishments. The result of all this cooperation is the emergence of tourism supply chains, which are perceived by the visitor as a single product, even though they are - de facto - the outcome of a shared effort involving several parties.

Regionalisation has a sustainable effect

The counter-trend to economic and cultural globalisation resides in the adoption of an intelligent approach towards regionalisation with the creation of networks used for tourism purposes. A tourist region has poor commercial prospects unless its products and services cover the various requirements of its visitors in a holistic way. By amalgamating their services, cooperation partners can combine to produce an overall, commercially viable product in a value creation chain. Use of local and regional synergies adds to the competitive strength of destinations in this regard. It also strengthens regional anchoring and the sustainability of tourist activities in which the scenic and cultural

identity of an area encapsulate important values.

Good practice 13: Service integration, Liechtenstein

Marketing combined products and services in the form of an overall solution enhances the attractiveness and popularity of destinations among visitors. In tourism terms, Liechtenstein is not only well integrated at the level of service providers – it also works as a partner with other destinations and tourism organisations such as Schweiz Tourismus, Ostschweiz Tourismus, Internationaler Bodensee Tourismus or SchweizMobil. The philosophy behind Liechtenstein Tourismus is to promote the business initiatives of its partners and service providers, and to bolster the sustainable use of local and regional resources.

Example 1: Adventure pass

The "Liechtenstein all inclusive" adventure pass features benefits offered by 27 providers whose products and services are coordinated by



Liechtenstein Tourismus and made available in the form of a 2-day-pass or 6-day version. It includes travel on all bus services

operated by the Liechtenstein bus authority. The "Liechtenstein all inclusive" adventure pass is used by visitors as well as local residents.

More information: www.erlebnisspass.li.

Example 2: Hiking network linked to public transport

Liechtenstein has over 400 kilometres of well-developed and signposted hiking trails. All the start and end points on the hiking trails can be



easily reached by public transportation.

Liechtenstein Tourismus attaches great importance to making foreign

visitors and local residents aware of this by encouraging the use of public transport. The inclusive hiking packages include guided tours from one alpine hut to another and also overnight stays. At the same time, participants receive comprehensive information about the flora and fauna of the Liechtenstein mountains.

More information: www.wanderbar.li.

Example 3: E-Bike Park Eastern Switzerland and Liechtenstein

Liechtenstein is part of the new "e-Bike Park Eastern Switzerland and Principality of Liechtenstein".



This has been realised in collaboration with the bicycle hire company "Rent a Bike". Ten bike hire and

battery replacement stations in Vaduz, Schellenberg, Ruggell, Triesenberg, Malbun, Mauren and Balzers have e-bikes for hire.

More information: www.ostschweiz.e-bike-park.ch, www.tourismus.li

Example 4: "Families welcome" quality seal

The Swiss tourist board's "Families welcome" is a quality seal awarded to holiday resorts and destinations which base their products and services on the requirements and wishes of families including small children. Stringent criteria



in the fields of infrastructure, services, and summer and winter experiences have to be met for the quality seal to be

awarded. Among the 23 destinations that have received the award in the current period from 2009 to 2012 is "Malbun-Steg", a mountain resort located in the Principality of Liechtenstein. Liechtenstein Tourismus is offering package deals especially for families in the summer as well as in winter season.

More information: www.familienpackung.li.

Example 5: Part of the Via Alpina

The Principality of Liechtenstein is part of the Via Alpina, the international trekking route that winds its way through eight states, encompassing



a total route of approx. 5.000 km. Around 30 km of the well-marked, signposted route with the Via Alpina logo pass

through Liechtenstein. Along the three Liechtenstein stages, hikers enjoy unique panoramic views of the Principality as well as insights into its culture and history.

More information: www.via-alpina.org.

In Italy, the measures and programmes concerning technical solutions for the promotion of tourism in rural mountain areas are generally undertaken at the regional and local levels. Technical solutions are provided to improve the economic viability of sustainable tourism in rural mountain areas and to integrate them into a field of central economic relevance for mountain areas. In the Italian part of the Alps - growing attention is also devoted to the adaptation of the mountain tourism sector to climate change and its consequences, as demonstrated by the participation of Italian partners in specific projects and studies in the field of tourism and climate change with specific reference to the alpine area (e.g. OECD Report, 2007; ASP Climalptour project).

Among those reckoned, it is worth mentioning a partial list:

- actions for the promotion of the ski tourism offer and the related infrastructures (e.g. Friuli Venezia Giulia);
- initiatives for the promotion of sport and leisure activities in rural mountain areas, through the creation of mountaineering and hiking infrastructures, fishing centres (e.g. Provincia Autonoma di Trento);
- restoration, conservation, adaptation and development of mountain footpaths, with the aim of developing the sustainable fruition of their tourism potential and to enhance their networks. Development of rural alpine footpaths'cadastres (e.g. Piemonte);
- restoration and conversion to tourism of alpine huts and houses, in order to adapt and diversify the offer to meet the "diverse tourism" requirements and to improve the value and attractiveness of marginal areas. Often these measures also aim to improve energy efficiency of buildings and to promote the usage of renewable energy sources in remote areas;
- restoration, conservation and tourist promotion of rural mountain villages, areas of historical and natural interest, tours and routes of historic interest, also in coordination with European and international programmes (e.g. Iron Route, Lombardy; I. World War historical routes, Veneto);
- promotion of food and wine tourism through the implementation of the offer of local typical products;
- development of alternative, soft mobility options and sustainable forms of transport in the rural mountain areas impacted by touristic flows. These measures also entail energy efficiency and mitigation of GHG emissions;
- creation of Eco-museums and didactic farms to create an eco-friendly and educational form of tourism for schools, families and other public and private sectors.

In Germany, holidays at mountain farms are an important segment of Bavarian tourism. Approximately 3.600 farms in the southern counties (Rosenheim, Berchtesgadener Land, Bad Tölz-Wolfratshausen, Garmisch-Partenkirchen, Miesbach, Traunstein, Weilheim-Schongau, Lindau, Ostallgäu and Oberallgäu) offer this type of holiday and illustrate a success story. Due to the location of the tourist accommodation it can be assumed that the accommodation in 2008 amounted - to about 6 million overnight stays. The number of overnight stays has increased by around 25% in the last 10 years. The rental of holiday apartments and rooms has always been an important contribution to the income of families in rural mountain regions. In the Oberallgäu approximately 25% and in the Berchtesgadener Land around 40% of farms are taking part in the agricultural tourism market. Mountain farmers are thus making an important contribution to - Bavarian tourism as a whole. Moreover the Bavarian State Offices for Nutrition, Agriculture and Forestry are supporting the agricultural enterprises by offering a system of qualification measures for the creation and - development of farm holidays. Under the consideration of the individual personal, operational and regional situation, tailored development concepts are elaborated.

Agriculture and wood sector

The Alps are a large natural and recreational area in Europe. This area has numerous economic activities. The main activity amongst them in the mountains is

agriculture. Almost 500.000 farmers use 4,5 million hectares, that is to say one quarter of the whole surface of the Alps.

In the Alps, as elsewhere in Europe, the number of agricultural workers is decreasing. Despite this decline, agriculture in the Alps remains very dynamic. It continues to play an essential role in the natural and cultural identity of the Alps. Planning its future is a challenge for farmers and for the whole society.

Agriculture maintains close links with other economic activities. The pluriactivity is very developed in this field: it varies from 55% to 75% of farm households in four analysed sites located in different alpine regions²⁵. Agriculture can provide additional income for farmers and provide labor seasonally or permanently to other sectors.

To maintain a dynamic agriculture, alpine farmers have relied on different strategies:

- collective organization for the processing and marketing of products;
- maintenance of local knowledge and production of local products as well as protection by a quality label: Beaufort cheese, Grana Trentino, Raclette for Valais, fruit, wine, etc. These labels provide better value for farmers and consumers to ensure product quality;
- modernization and expansion of farms to improve working conditions and productivity of the workforce. This is often accompanied by the specialization of farms: dairy farming in Moyenne-Tarentaise, arboriculture in Val di Sole, Italy.

But these tendencies have environmental consequences: abandonment of sectors with deepest slope, intensification of some flat areas. This has a negative impact on water quality, landscape and biodiversity.

More recently, new complementary ways have been emerging and are already being implemented in some places:

- the development of direct marketing and agritourism;
- certain types of production, including, in their specifications environmentally friendly practices;
- diversification of services and agricultural productions: clearing and gardening, composting of green wastes, production of renewable energy from wood, etc.;
- improved work constraints: for example, establishment of collective support for employment (groups of employers, pastoral groups);
- incentives for young farmers' settlements in rural mountain areas which are considered as being a fundamental instrument to ensure innovation and the transfer of knowledge in rural mountain areas, to favour the role of man as a positive factor for environmental sustainability, to tackle economic problems related to depopulation in rural mountain areas;
- management of environment or landscape through a contracting with state or local authorities (agri-environmental measures);
- usage of local resources: e.g. by instituting partnerships with the tourism sector in order to develop holiday offers involving sports activities, visits to farms, tasting and sale of local products, cultural events.

The perspectives are numerous, but for many, ideas still have to be found. Indeed, ideas for projects which imply the whole society, and which are not built among farmers would be necessary to support mountain farming.

²⁵ Imalp (Implementation of Sustainable Agriculture and rural Development in Alpine Mountains), 2003 to 2006, Moyenne-Tarentaise, France, Val d'Hérens, Switzerland; Murau, Austria and Val di Sole, Italy

Good practice 14: inoVagri: Promoting innovation in agriculture, Switzerland

inoVagri was a common project of AGRIDEA - the Swiss Association for the Development of

Figure 4: inoVagri and its partners



Agriculture and Rural Areas, the Swiss federal institute for technology ETH in Zürich and the Swiss Centre for mountain regions SAB.

The project aimed at:

- increasing the capacity and readiness for innovation of Swiss mountain farmers;
- identifying the factors of success of non-technical innovation in farming;
- developing methods and tools for innovation;
- encouraging the cooperation between agricultural research and practise;
- improving the climate for innovation (legal bases, education, state aids etc.).

The project directly addressed farmers but also gave - highly valuable input for counselling services and researchers.

The main outputs of the project are:

- a common website (www.inovagri.ch) with the most important findings;
- a guideline for innovation in agriculture;
- user orientated worksheets on the feasibility of innovation including business plans;
- a collection of the relevant legal bases;
- an overview of institutions liable to financially support innovation in agriculture.

More information: www.inovagri.ch

National contributions: organic farming in mountainous areas

Austria

Organic farming is described as an essential element of farming and regional development in mountainous areas of Austria. In mountainous areas the proportion of organic farms is higher compared to the situation in the valleys, where an increasing intensification is taking place. Indeed, the greatest share (74%) of organic

farmers is concentrated within mountain regions. It shows a great potential for the assessment of sustainable agriculture and regional development for the future.

Austria is number one in Europe as far as percentage of conversion to organic farming is concerned; so far 15% of the Austrian farms are managed in an organic way. The main factors of conversion are the level of organic subsidies, quality of advice, marketing structures and product prices. A crucial instrument for supporting the conversion to organic farming is the Agri Environmental Programme of Austria (ÖPUL).

Critical factors behind the rapid development of organic agriculture in Austria since 1991 were (BMFLUW 2009):

- idealism and commitment among organic farmers;
- foundation and professionalization of organic farming associations cooperating in a network;
- organic agriculture payment scheme;
- creation of reliable organic labels;
- participation of large trade-chains (starting marketing activities in 1995);
- increased ecological awareness of consumers.

The initial payments for organic farming have become a core instrument of the overall Agri-Environmental Programme (AEP) within the framework of the Rural Development Programme in Austria (Hovorka & Dax, 2010). The AEP accounts for a significant contribution to the total agricultural income of organic farms (33%) as well as mountain farms (24%). Agricultural policy makers in Austria are aware of the strategic role of organic farming for sustainable development in mountain regions. Their tasks are linked to the development of cultural landscapes, which represent important rural development assets and are a key part of the mountain regions' capital stock (Dax and Hovorka 2004).

Developing strategies to enhance high quality regional production creates significant opportunities for mountain farming. Organic farming can be seen as part of such an orientation complementing an integrated regional development strategy (Groier and Hovorka 2007), and to this end the recently developed concept of an Eco-Region might underpin regional focussing (Groier et al. 2008). The active participation of local actors from different sectors can be linked to organic farmers, creating increased cross-sectoral cooperation at the regional level. This would enhance the impact of organic farming subsidies and would

strengthen local institutions, support groups and other (e.g. marketing) initiatives.

Italy

In the Italian Rural Development Programs (PSR 2007-2013), the measures concerning the "improvement of the quality of agriculture production and products", "the participation of farmers to systems of quality certification" and the "information and promotion activities concerning products belonging to systems of quality certification", stress the role of implementation of organic farming as a tool for rural mountain economic development, considering actions to support the development of the various contexts' high-quality typical products (e.g. PSR Lombardia, Piemonte, Province Autonome of Trento and Bolzano, Friuli Venezia Giulia, Veneto, Valle d'Aosta).

At the national level, 7,89% of the Utilised Agriculture Area is cultivated under organic practices. That represents 1,002.414 ha, out of which 190.275 ha are in conversion.

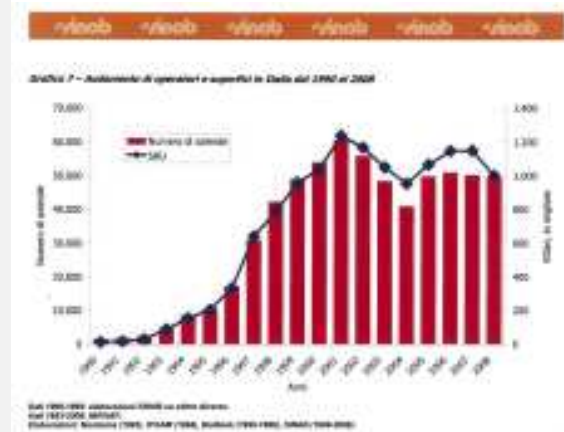
As shown in the graph below, there is currently a conservative trend regarding conversion. At national level, 18,98% of the total surface of organic production, was in conversion in 2008, but it is balanced with the retreat of equal amounts of biological surfaces. According to a survey run by the Region of Piemonte and included in the PSR 2007-13 and based on interviews with organic farmers, 47% of them voiced problems about the unprofitable prices and the lack of market outlets. Among the problems they pointed out were the high production costs, technical difficulties in farming and breeding, difficulties in finding outlets for products, low selling prices, high complexity and fastidiousness of certification and control systems.

Concerning the marketing strategies, as the market of organic products is expected to grow in the coming years, entrepreneurs have to face - new marketing strategies to meet the potential buyers, as biological products are no longer niche market characters. Labels, packaging, and communication strategies are becoming more important. E-marketing is also increasing.

Recently, even some school canteens have started using biological products; this represents a new interesting branch of the market. It may be interesting to consider that, if the main market is currently in the cities and not in the rural areas, it may favour a more open economy for mountain areas. There are also merchants specialised in providing restaurants, hotels, catering, import/export buyers, super and hyper-markets

with organic and biological products.

Figure 5: Performance of operators and surfaces of organic farming in Italy from 1990 to 2008



Legend :

Numero di aziende = number of enterprises

SAU = Utilised Agriculture Area (Ha) where also included, is surface turn-over not cultivated during the year, and - conversion areas.

Ettari = hectares

Germany

In the mountainous area, the focus on organic farming is almost exclusively to be found in (dairy) cattle and grassland. Organic farming in the mountain area represents appr. 25.000 ha out of 217.000 ha of overall agriculture area (i.e. 11,8% of the mountain agriculture area). when considering the region - of Bavaria, the average size of organic farms (31 ha of agricultural area utilized for farming per farm) is larger than an average - conventional farm (28 ha of agricultural area utilized for farming per farm), as well as a bigger added value (in 2008/2009 for professional farms in Bavaria, the added value from organic farms was 26.375 €/labour force and 20.917 €/labour force for conventional farms). Due to favourable economic situations for organic farms (e.g. good price surcharge for eco-milk) and favourable political frame conditions, the rate of conversion is really high in Bavaria and the share of organic farming has been raised by 17% in the last two years. This tendency is supported by the State of Bavaria, in particular through rewards for the environmental performance of agricultural organic farms (more financial means in the two-year transition period) by the Bavarian Cultural landscape programme and further supportive measures such as:

- its own school for organic farming;
- Independent Institute "agroecology, organic farming and soil conservation" at the Bavarian State Institute of Agriculture;
- extensive activities in the areas of marketing, sales promotion and public relations;
- state grants for technical consulting -

establishments by the four organic farmers rings;

- state support of the national association for organic agriculture in Bavaria, such as the umbrella organization of organic farming associations.

In conclusion, it can be said that organic farming has an important role in the Bavarian agricultural policy. Bavaria will continue to support the organic farming, not only in the mountainous area, but in all areas.

Good practice 15: The organic hay-making region of the Trumer Seenland, Austria

There are currently about 240 farmers from 27 municipalities who are engaged in organic hay-making in the Trumer Seenland region, with the common objective of using their own initiative for long-term future developments of the region.



The upkeep of traditional hay-making and the promotion of organic farming, with its positive effects on soil,

water and climate, form the basis of this initiative. With active public relations the idea of "thinking and acting in material cycles" is brought closer to the community. In a wide range of projects and activities, tourist offices as well as cultural events, businesses and the catering industry are brought together in close cooperation. The region is particularly active in raising awareness, within the area and beyond, in the fields of ecology, nutrition and health care as well as in the marketing of high-quality products. More information: www.bioheuregion.at/

Good practice 16: Organic farming of Eco-village in Čadrg, Slovenia

Čadrg is a small alpine village in the hills of Tolmin on the outskirts of Triglav National Park, seven hundred meters above the sea level. There are 26 villagers, half of them younger than thirty (Štupar, 2009). There are five farms in the village; and since 1999 four of them have been operating as organic farms. This has led to the recognition of Čadrg as an "eco-village". The initiative of transition to organic farming came from the administration of Triglav National Park, which prepared a project for the village, and was awarded the Henry Ford prize.

The transition from conventional to organic farming was almost taken for granted for Čadrg since breeding cattle and making cheese and

cottage cheese has always been based on traditional experience and procedures. Thus, the transition did not pose any major problems, except, that the stables had to be adapted to organic farming standards. The revenues from organic cheese production stimulate the younger people to stay in the village.

The four organic farms (Pri Lovrču, Pri Križarju, Pri Kumru, Pri Seljanu) together produce a local cheese named Tolminc and a cottage cheese in the village cheese dairy, which was restored in 2001 (Domevšek, 2006). In 1999 the village community accepted the first Don Pierino community in Slovenia, in order to offer treatments to former drug addicts. Moreover, Čadrg has become recognizable in Slovenia and also abroad as an ecological village (since the reconstruction of the village cheese dairy it is often promoted in exhibitions and fairs). In August 2003 - the seismic observatory was also established in Čadrg and provides data through broadband ADSL internet access over IP/MPLS network.

More information:

www.cipra.org/alpknowhow/bestpractice/Cadrg

Good practice 17: Nature park Almenland Teichalm Sommeralm, Austria

The region Almenland Teichalm-Sommerlam, which counts as the biggest connected pasture area (Almenland) in Europe, is characterized by its agriculture (valorization of meat specialities),



forestry and tourism. At the starting point of the LEADER II-project the region was characterized by

a decreasing numbers of overnight stays in tourism, by high commuter and emigration rates as well as by the predominant small agriculture (approximately 60% of each firm has about 10 hectare agricultural useable land), which is mostly used for additional earnings (approx. 68%, 83,7% are mining firms). It was also characterized as having bad access as far as infrastructure was concerned.

The region was indeed a popular tourist destination for a greater area, but there was no added value, which would have led to a sustainable improvement of the situation. After years of a downward movement there can now be seen a notable improvement particularly in tourism. The emigration has also been stopped to a large extent, and the number of overnight stays has increased by about 11% because of the

tourist leader project.

The achievement has been based on the cross industry co-operation and strategic partnerships (PPP-Modelle, private public partnership). After the first good results, from the LEADER II-project they started the Leader plus phase. The main goal remained the same, which was to sustain and - develop the Almenland as a living, recreational area as well as a working space -.

The consequent implementation of the LEADER-plus, Almenland-the ALmo-gusto-region (genetically unmodified beef region) concept with the professional setup and merchandising lead to developing meat as the main product of the region (help from styrian meat and sausage product specialist Schirnhofner, establishment of the Almenland Marketing GmbH, on-line sale of products).

So far, 240 new jobs have been created and the emigration of labour forces could well - be stopped. Almenland Marketing GmbH and essential enterprises have designed a concept to strengthen the process of innovation and develop common undertakings of the Almenland in 2006.

More information: www.almenland.at

Good practice 18: Purification by vermicomposting in an Alpine Cheese Factory, France

The manufacture of cooked cheeses such as Beaufort, produces waste, including white water (wash water) and whey, rich in organic substance. The pollution load of a liter of whey is equivalent to the effluent of a person per day. The effluent is discharged into streams or groundwater systems, fuelling microbial growth or algae, which are harmful to water quality, or is provided to pig farms, also leading to an indirect impact on the environment.

At the communal mountain pasture named "Plan du sel", at Champagny-en-Vanoise, in the heart of the National park of Vanoise (at an altitude of 2.200 m), the manufacture of Beaufort in the processing plant results in the daily production of up to 2.500 liters of whey, from milk supplied by 180 dairy cows.

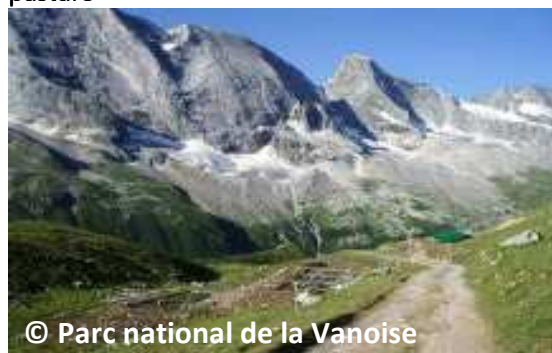
In 2006, a culture device fixed on compost for purifying whey, harbouring an important and specific biomass (aerobic and anaerobic bacteria, mushrooms, micro-invertebrates) feeding on whey was established. Red worms of manure maintain a good functioning aerobic biomass. Whey is spilled by regular watering onto compost, which digests, quickly, most of the organic substances.

Purification of white-water is ensured, by a device, also exclusive, based on a rhizosphere

made of Rumex of the Alps (*Rumex alpinus* L. German: Alpen-Ampfer / UK: Monk's-rhubarb / IT: Lavazzi) every nitrophile has three levels of pools planted.

Vermicomposting has shown very effective results for the treatment of whey. The purification rate varies between 90 and 94,5% for the studied indicators (COD, BOD5, MEST).

Figure 6: Location of the plant in the mountain pasture



The purification by the pools planted with Monk's-rhubarb is not as efficient as expected. The extremely low pollution load of these effluents makes it possible to diffuse them in the local environment without major impact, the subsoil being sufficiently filtering.

This plant has proved its efficiency, however - regular maintenance and proper monitoring are needed daily to ensure the proper functioning of such equipment. It can thus be transferred to any manufacturing dairy plants in mountain pastures with a high milk production provided it is adapted to the local situation.

In Italy, measures and programmes regarding financial and technical solutions for the promotion of mountain agriculture are taken at the regional level and are organised into the various regional rural development programmes (with differences between them depending on the spending capabilities and priority ordering in the legal financial asset of Italian Alpine regions), primarily in accordance with the European Commission regulation. Among these measures, it is worth mentioning the following:

Actions in the field of education and knowledge dissemination, and use of advisory services with the aim of improving the scientific and technical skills and in general, human assets in the fields of agriculture and forestry to enhance the entrepreneurs' competitiveness and the sustainable use of resources.

Measures for the modernization of farming enterprises in rural mountain areas, and for the physical capital restructuring and innovation, with the aim of increasing agricultural competitiveness in terms of employment, sustainable development, innovation and economic growth (the measures include public funding for new technologies, innovative production processes, intervention towards energy efficiency and sustainable use of resources, diversification of production, growth of the added value through innovation and vertical and horizontal integration of the producers in the organization and management of production and distribution chain, etc.

Measures for young farmers such as financial, technical, educational support and promotion of young farmers who want to run new enterprises in agriculture and forestry fields in rural mountain areas, with the aim of tackling problems connected with depopulation and ageing trends on the rise in mountain areas and to provide human assets to innovation and economic growth in these areas.

Measures for the economic improvement of forests, to increase their economic value through the development of their: economic, ecological, environmental, energetic, and productive multi-functionality, and to promote the infrastructural innovation in forests.

Measures aimed at boosting the added value of agriculture and forestry products in rural mountain areas (aimed at fighting high production costs and decreasing income) and measures to improve agricultural products' quality (the participation of farmers to systems of quality certification and actions for the promotion and information on high-quality agro and food products).

Measures to promote cooperation by the establishment of new products, processes and technologies development in rural mountain agriculture and forestry, with the aim of boosting cooperation between the producers, the other market players and the research sector, in order to promote innovation and the related advantages of competitiveness, environmental sustainability and economic growth.

Good practice 19: Chilometro zero project, Italy

Figure 7: Logo km Zero
(Source: Coldiretti Veneto)



"Km zero project" is a project born on the initiative of "Coldiretti", an important Italian farmers association. The idea is that transport costs contribute up to

1/3 of the final price for fruits and vegetables. This project facilitates, not only a cost saving but also reduces the environmental impact (less CO₂ emissions). It has been estimated that a family may avoid 1 ton of CO₂ emissions per year. Shops and markets may expose the "Km 0" label to distinguish these kinds of goods. There is, at present, a legal national project that clearly defines what kind of product may be considered "Km 0". Approval would be granted to local producers selling their own products, and perhaps also for markets selling at least a fixed percentage of "Km 0" compared to the total.

More information: www.coldiretti.it/

Good practice 20: SuperAlp! 4, a sustainable crossing of the Alps, international project



In September 2010 - the transnational initiative "SuperAlp! 4" was held, a sustainable voyage around the Alpine Arch organized by the Permanent Secretariat of the Alpine Convention, in cooperation with Slow Food and the University of Food Science of Pollenzo (Cuneo, Italy).²⁶

During the 4th edition of SuperAlp!, a group of international journalists traveled the Alpine Arch for 1700 kilometers from Munich (Germany) to Slovenia, using various modes of transport-alternative to cars. This edition's focus was on food traditions and cultures in the Alps, and the key-role of food in the different economies, landscapes, and cultural values of the Alpine regions.

"SuperAlp! 4" made its lap in Italy on September 5th 2010, in Pollenzo (Cuneo), where the 15 participants were introduced to the local specialities and in particular to the Slow Food activities in the Italian Alpine areas. On that occasion, - the experience and activity of the so-called "Slow Food Presidiums" was presented. A project, aimed at the constitution of concrete and virtuous examples of - innovative agriculture, based on the principles of quality, animal welfare, sustainability, connection with the territory, consumer's health and satisfaction. The "Slow Food Presidiums" in the Alpine Arch are located in Italy, Switzerland, Germany, Austria and France and they share the objective of preserving pastures and plant varieties, of protecting mountain landscapes and of fostering endangered typical products. In particular, many "Slow Food Presidiums" have focused on the safeguard of those native species that have adapted to life in the mountains, thus facilitating the production of typical cheeses and dairy products and in turn the conservation of the territory. In this line, the participants in Pollenzo were given the opportunity to sample some of the Italian Alpine quality dairy products that have

been involved in the "Slow Food Presidiums" protection schemes.

The cooperation between the "SuperAlp! 4" project, the Slow Food Foundation for Biodiversity and the Alpine Convention has proved the importance of taking common action over the shared objective of sustaining small producers as a tool to prevent the Alpine regions from risk of abandonment and degradation. In this line, the action for supporting the Alpine regional knowledge and quality products emerged as a central issue from the experience of the 4th edition of "SuperAlp!".

More information:

www.alpconv.org/themes/superalp10_en.htm

In Germany, initiatives have been taken for the development of operational programs for products of mountain farming. The farmers not only cultivate the unique alpine region and conserve its natural resources, but also generate a variety of food specialties. To strengthen the marketing of those products, Bavaria has launched an initiative to develop so-called Operational Programmes for the products of mountain agriculture on EU level, which has been joined by the Federal Government. The aim of this measure is to improve the food specialties of the mountain farming region, for example by the promotion of market surveys, development of brands, investments in processing and logistics, as well as marketing activities and thus to increase the added value of the farming enterprises. This requires farmers and processors to cooperate and set up an operational fund to be cofinanced by the EU Commission. It remains to be seen whether the EU Commission will take up this idea and - account for it in the legislative proposals for the Common Agricultural Policy (CAP) after 2013.

Local products are also promoted, for example via events, such as the "Allgäuer Herbstmilchwochen" (Allgäu Autumn Milk weeks) (Counties Lindau, Oberallgäu, Ostallgäu, Unterallgäu). It consists of a successful series of events, which was launched in 2009 and through 120 single events informs the general public about the importance and significance of Allgäu dairy products and the family farms. The event will

²⁶www.slowfood.it/slowweb/ita/dettaglio.lasso?cod=C2744B88160c62AD5CWXX1EAFCD

be continued in 2010 in the frame of the Allgäuer Festwoche²⁷.

Forestry

The multifunctional approach by the use of forests is also one of the objectives of many rural development programs. It aims at linking the exploitation of forest resources with a global strategy for product commercialization and the sustainable use of forests. Among the initiatives aiming at multi-functionality, the following are to be mentioned: production of high-quality forest products (wood, mushrooms, etc.), introduction and use of new technologies to promote modernization and efficiency, creation of new road and storage infrastructures, incentives for micro-enterprises and first-transformation factories and the integration of the productive chain, production and use of sustainable energy through biomass sources, construction of sports, mountain huts and other leisure infrastructure for the tourist's use of forests in order to promote a "green form of tourism", to increase the added value of forests and to promote biodiversity as well as natural protection as a global interest.

In Germany, the Bavarian State Ministry of Nutrition, Agriculture, and Forestry has implemented a funding programme for the period 2008-2011 called "Bergwaldoffensive" ("Mountain Forest Offensive"). It aims at the adaptation of mountain forests (in particular protection forests) to climate change by strengthening the long-term care and restoration, participation of forest owners and various stakeholders and the improvement of the seed stock distribution. The total funds of 7,5 M€ are used for integrated measures of planting trees, forest maintenance, infrastructure (forest road building) and aligned measures in defined project areas. The integrated approach leads to promising project results, participation raises awareness and acceptance of forest owners, the Mountain Forest Forum raises awareness of involved stakeholders. So far,

the Mountain Forest Offensive is considered as a success.²⁸

Industry and commerce

The industrial tradition of the alpine area begins with the first industrial revolution, in the 18th century, when the industrial firms settled close to the natural resources of coal. But the second industrial revolution, based on the exploitation of hydraulic power, mountain territories were propelled into the forefront for hydropower production and the industry associated with it. Indeed, the transport of electricity resulted in heavy losses and it was natural that the first industrial producers of electrometallurgy settled near the sources of production. The hydroelectric sites promoted the establishment of plants along the valleys. Then later, in the 1980's, an industrial restructuring occurred that led to the relocation of the plants, leading to an economic crisis in the industrial valleys.

In the French department of Savoy, for example, a high electrometallurgy activity was developed. Nowadays, it still represents 23.000 jobs, that is to say 21% of the paid jobs of the private sector. Metallurgy and metal transformation are still one of the highlights of the Savoy industry, even if this sector was hardly hit by the industrial restructuring of the 80's. The mechanical equipment industry, second industrial strength of the department, represents 15% of the industrial jobs. The sector of electrical and electronic components, third part, employs 13,6% of the active workforce. To these three main key areas, should be added the agri-food industry, the industry of mineral products, chemicals, and the industries of wood and paper.

Increased international competition has become the main concern of business owners. The rising cost of raw materials also remains a concern. The maintenance of competitive industrial activities seems to be linked to the development of modern technology.

The industrial activity of the department of Haute-Savoie is characterized by a high

²⁷ www.herbstmilchwochen.de

²⁸ www.bergwald-offensive.de/

concentration of firms in the field of mechatronics and bar turning and is even the leading center in this field of activity²⁹. This industrial activity, mainly located in the valley of Arve, has created its own tools of technologic support via:

"CT Dec - Technical Centre" of bar turning established in Cluses³⁰. Its missions are anticipating, innovating and spreading. It promotes technical progress, contributes to the improvement of the productivity and to the innovation in the - industry of bar turning.

More recently a center of competitiveness, gathering together research centers and education centers associated with local stakeholders in the same territory in order to promote cooperation and synergies, has been created.

Good practice 21: The center of competitiveness: ARVE Industries, international project

The pole ARVE INDUSTRIES is specialized in complex machining operations and precision engineering. Bar turning and manufacture of mechanical precision pieces and is an international project incorporating France, Switzerland and Italy.

Figure 8: ARVE industries, at the heart of an euro-region



The theme of the center covers processes, mechatronics and organization. The cluster aims at making companies evolve from subcontracting towards new organizational forms and towards the integration of new skills to design, produce and sell more complex products.

The Arve Valley is the first national center in the field of industrial subcontracting. The Technic Valley, born from a skill that dates back to 1720 in the field of watch making and turning, is an industrial fabric gathering more than 800 SMEs and SMIs, representing 10.000 jobs and contributing to 65% of the French bar turning.

This industrial territory, both dense and dynamic, acts on a very wide range of markets involving - know-how passed down from generation to generation for over 150 years. The center of

competitiveness counts 258 member companies (with 90% of SMEs) representing more than 29.000 jobs, 120 projects in action, 1.500 researchers, 250 patents / year, 28 public and 30 private laboratories, 12 training centers (13.000 students at the University of Savoie), 14 local stakeholders and 12 municipalities.

More information: www.arve-industries.fr

Good practice 22: Micro Center Central Switzerland (Micro Center Central Switzerland)

In central Switzerland, a technology management company promotes networking of existing expertise in the field of microtechnology. The Center plans to support the establishment of new businesses and encourage spin-offs and start-ups. The Industry is more reliant than ever and in close contact with universities, colleges and other R&D institutions. Project leaders wished to fill the gap by developing the Micro Center Central Switzerland (Micro Center Central Switzerland) a company which was founded in April 2000 and constitutes, together with the research partner "Centre Suisse d'Electronique et de Microtechnique SA (CSEM)" in Alpnach, a center of competences for microsystems technology.

The aim of the project was to establish a competence center for microsystems technology, focused on "micro-robotics". The know-how from local companies and educational institutions has been combined. The aim of the project is a differentiation of the economic structure in the region, since alternatives to agriculture and tourism needed to be identified. Results are: creation of new jobs, young, highly qualified professionals coming to the region, attraction of further investors, a better image of the region (known for entrepreneurship and innovation not only agriculture), good networking among companies, and better inter-cantonal cooperation in Central Switzerland.

More information: www.mccs.ch

In Italy, programmes and measures regarding financial and technical solutions for the promotion or maintenance of industrial activities are generally taken into account at the regional level, according to the various regional Rural Development Plans and various European, national and regional legal provisions for financial responsibility. This implementation can thus take into account the differences and peculiarities in the socio-economic structures of the various Italian alpine areas.

²⁹ www.univ-savoie.fr for more information

³⁰ www.ctdec.com

Many of the measures concern the food and primary processing industry of farming products (initiatives towards modernization, rationalization and integration of the food-agrarian chains, initiatives aimed at supporting short distribution chains and direct sales), and in particular the milk and dairy industry which is one of the main industries in the secondary sector in many Italian rural mountain areas.

There are numerous innovative poolings and concepts in the secondary sector of rural mountain areas and they are often related to private initiatives and local contexts. It is worth mentioning some actions undertaken at the regional level:

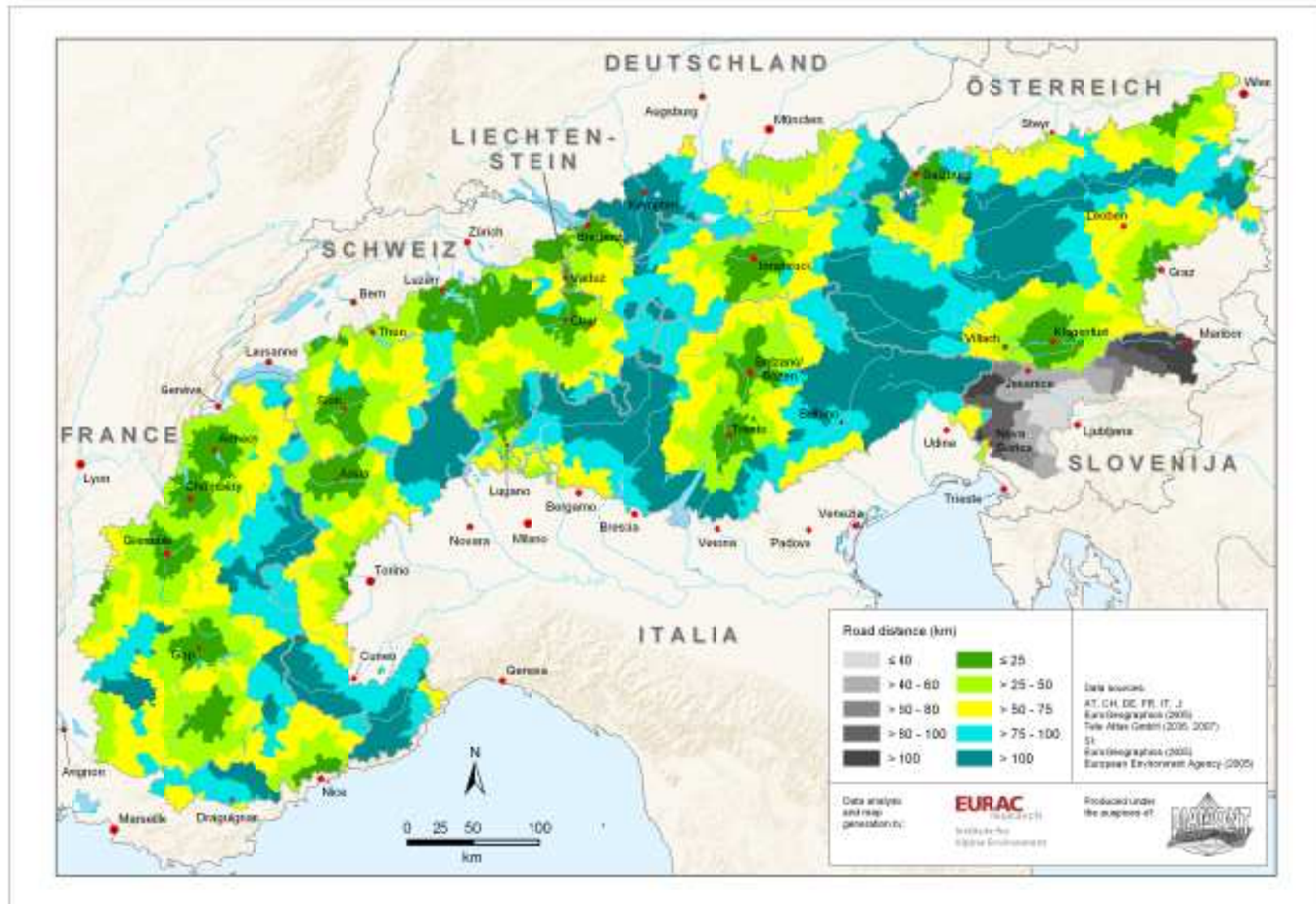
- Project directed at the specification of craft products ("Disciplinari di produzioni specifiche"), opened to the craft enterprises, to promote the "Craft Excellence" ("Eccellenze Artigiane"), aimed at the revitalization of rural mountain areas³¹.
- The transformation of existing commercial business, also by using innovative methods such as ICT or the so called "multi-service shops" (mailing, phone and informatics, delivery of externally bought goods, etc.) to promote the specialization of typical wine, food or craft products, biological or high-quality products, in the perspective of increasing "multi-functionality" of small secondary sector and commerce enterprises in rural mountain areas.

Innovation and rural services of general interest (SGI)

Services of general interest (sometimes also called public services, basic services, services of general economic interest, etc.) are a necessary pre-condition for the competitiveness and attractiveness of territories. They are equally important for private households as well as for enterprises. A new enterprise searching to install itself in a rural area will expect to have - broad band access, access to the road network, public transport, etc. Equally, private households rely on the daily delivery of their postal

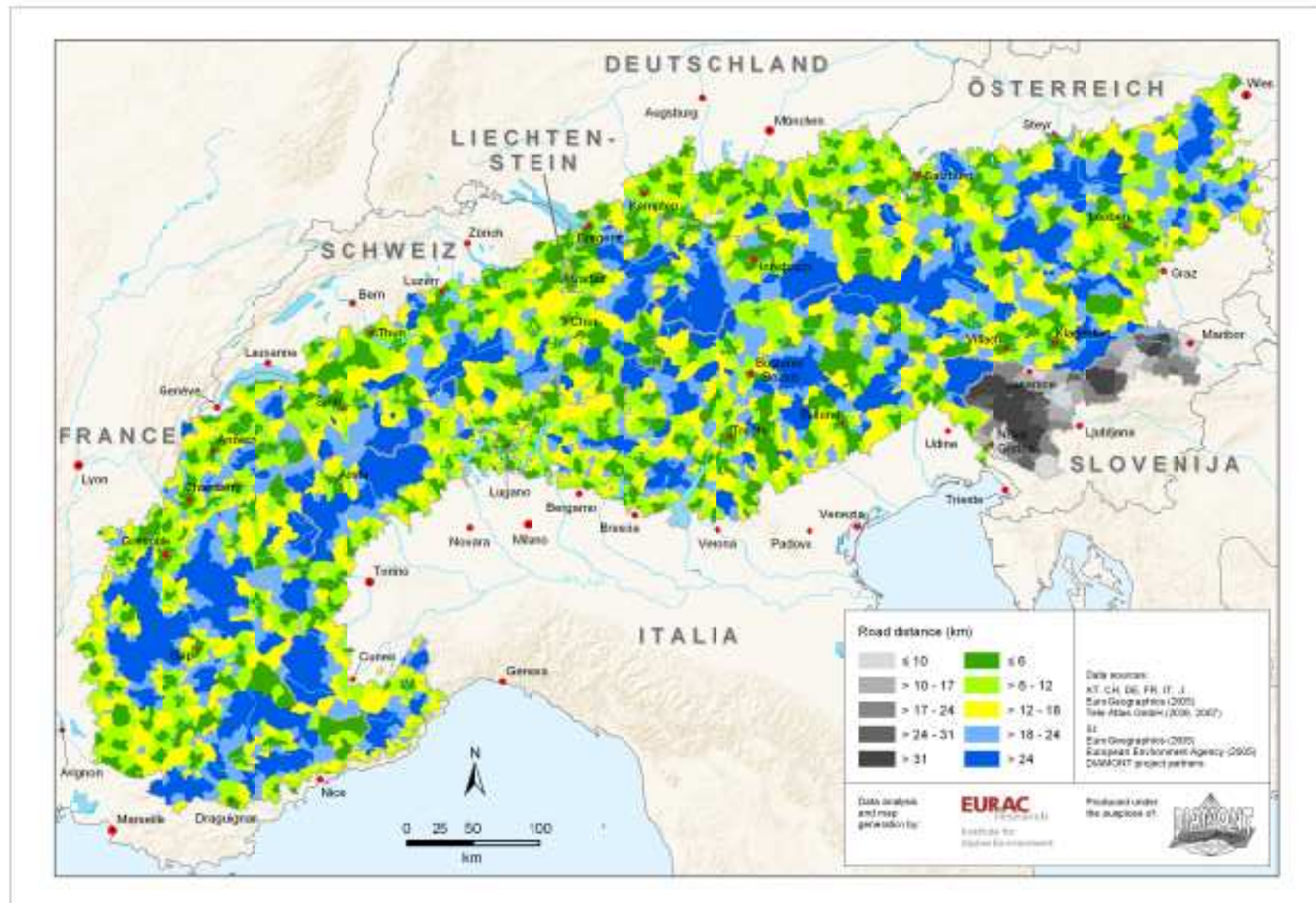
services, the availability of food shops, of educational services and access to hospitals. The lack of those services might inhibit the localisation of new enterprises or force people to leave a certain territory.

³¹ Rural Development Plan of Piemonte, p. 169



Map 11: Road distance to regional capital (DIAMONT)

©Tappeiner, Borsdorf, Tasser (Herausgeber) Alpenatlas, Spektrum Akademischer Verlag, Heidelberg 2008



Map 12: Road distance to the nearest hospital (DIAMONT)

©Tappeiner, Borsdorf, Tasser (Herausgeber) Alpenatlas, Spektrum Akademischer Verlag, Heidelberg 2008

The provision of SGI is the responsibility of different public authorities. Postal services are usually regulated at a national level. Public transport is mainly a domain of regional and local authorities. Daily needs like groceries come under the authority of municipalities. Thus, the provision of SGI requires a vertical coordination on different levels.

The actual situation of SGI in the alpine arc is very different from region to region. Evidence from the Alpine Space projects PUSEMOR and ACCESS show that e.g. the coverage of broad-band services is very different. While in some regions up to 98% of all households have the possibility to use broad-band services, other regions have a penetration rate of less than 50%. While the penetration rate gives only some indications as to the availability of those services, it says nothing about their actual use. In Tirol e.g., 94% of all households could have -broad-band access, but only 75% use it. This leads us to the conclusion, that SGI does not only have to be assessed from the pure side of infrastructure, but also from the side of usage of those infrastructures. Rural policies should encourage usage of those services. The combination of different services could be an important step towards better use and better temporal accessibility of SGI. Combining a postal office with the ticketing office of a public transport provider and a municipal office is an opportunity that guarantees the persistence of all the services and makes them available to costumers all day long - not only for a limited time during the day.

In PUSEMOR and ACCESS some major challenges for the provision of SGI were identified:

- equipment with infrastructure;
- economic viability of those infrastructures and sometimes heavy dependence on public subsidies;
- lack of a user-orientated approach;
- lack of cooperation between authorities, users and service providers;
- social disparities (e.g. elderly people);

- legal frameworks / regulations.

Those challenges, amongst others can be overcome, by:

- taking into respect SGI's in spatial development policies and strategies;
- setting up the right legal / regulatory framework (e.g. inscription of broad-band services into the universal services provision);
- pushing the equipment with infrastructure like it was accomplished in Austria with the "Breitbandinitiative" carried out by the federal government and the "Länder";
- supporting of the demand-orientated approaches through rural / mountain policies;
- encouraging the exchange of experiences throughout the alpine arc;
- installing local platforms for the dialogue between public authorities – users – providers.

National Contributions: implementation of Services of General Interest

France³²

The public services are crucial factors for the quality of life and the maintenance of social cohesion. Public services in general, following the logic of management and performance, apply more and more policies of concentration and specialization of tasks. Because of the remoteness and low population density in rural mountain areas, these logics of concentration lead to a de facto inequality of access to services for rural communities and businesses. These difficulties impede the demographic recovery of these territories which are struggling to attract and stabilize new populations.

The experience of the EREF (Regional Center for Employment and Training), in the French Region of Provence Alpes Cote d'Azur, shows that a sense of sharing, cross-disciplinary work and network proximity can be a reliable alternative to the dominant logic of concentration and specialization, and can provide a better overall quality of service by modernizing those above.

Given the quantitative and qualitative evolution

³² www.adrets-asso.fr: Association for the Development in Network of Territories and Services

of the needs and the increasing urban concentration of services, rural areas must, on the one hand, be innovative and organized in collective alternatives and on the other hand, be transversal. Due to their high costs, it seems, nowadays, inappropriate to develop services individually. A global approach through solutions of mutualisation of services seems preferable as a thematic approach.

Thus "houses of utilities" have been developed in France since 1994. They bring together at the same place public services from the state or its public institutions, from local authorities, from the agencies of social security, ect. From the users point of view these institutions have improved and made the access to public services in rural areas much easier. Their activities can also be strengthened by relays of public services, which aim to inform and help the local population in their administrative steps, in particular by developing teleservices and video-conferencing.

Twenty-five "houses of utilities" have already been implemented in the Southern French Alps, ten of them in the Northern French Alps.

The idea of a transversal approach for the development of services of general interests has also lead to the realisation of schemes of services. This approach aims at diagnosing all the public services available in a territory. For example, the "Pays Gapençais" in 2008, the "Pays Sud" in 2005 and more recently the "Pays Büech Sisteronnais" have realized this analysis and thus define priority actions to improve the access to SGI in their territory. (see: good practice example for more details on the scheme of services of the Pays Büech-Sisteronnais).

The development of services and the improvement of their functioning have to be a part of a territorial global action. Indeed, in order to avoid the transmission from housing in a context where jobs and services become more concentrated, a transversal approach is necessary. The mutualisation of services and the analysis of the different needs (linking transport and access to public services for example) must be anticipated, on a long- term approach, from the spatial planning and settlement of the territory on.

Another aspect concerning the access to SGI in rural areas is to communicate - the already existing processes. Indeed, the local population must be aware of the services available in their territory. Innovation also takes place concerning the governance of the services and the partnership between private and public sectors aimed at presenting, through innovative

technical tools (internet for example) services, which are out of their individual competences.

In this context, two examples can be presented:

- geolocation of the child care structures in the department of the Alpes Maritimes³³
- globalisation of the public transport offers in the department of Isère³⁴

Switzerland

The major target is to guarantee, also for the future, public services of high quality all over the country. Public services should not to be recognised as static, but rather dynamic. They have to be constantly adapted to new needs and to changes in technological and economic circumstances. The most important services provided to the public are in the field of energy, mail, television, telecommunication and transport. One example is the promotion of sustainable mobility.

The Federal Department of the Environment for Transport, Energy and Communications is promoting sustainability in their transport policy. One of the measures is the development of new ideas for trend-setting mobility forms and offers. The Service center for innovative and sustainable mobility (Federal Office for spatial development) supports new and innovative mobility projects as a complement to the federal transport infrastructure policy. Moreover, the center functions as a common communication center for interested parties.

Supported projects have to fulfill different criteria. Projects are currently running in the fields of carpooling, bike rental systems at railway stations and the provision of tourism services for the first and last mile³⁵. The first or in another cases the last mile means the first mile a tourist travels from his departure venue and the last mile before he arrives at his desired destination. It is mostly then, that public transport is scarcely competitive to private transport.

Germany

In the field of housing, pilot projects in Kaufbeuren-Neugablonz, Oberammergau and Rosenheim have been implemented. Initiated and supported by the Supreme Building Authority within the Bavarian Interior State Ministry - they aim at developing housing for different demands, for all stages of life and for all generations.

In **Oberammergau** "Am Rainenbichl", the

³³ www.assistantsmaternels-cg06.fr/

³⁴ www.itinisere.fr/

³⁵ www.are.admin.ch/dienstleistungen/00908/index.html?lang=de

Bavarian experimental housing programme implements an innovative project in the framework of the model initiative "WAL - Wohnen in allen Lebenslagen" (Housing in all life phases). In 2010, the construction of the first part of the housing estate will start, which matches the wide range of innovative housing types to the needs of different age groups and life situations.

The approximately one hundred new housing units create the basis for cross-generation residents with a sustainable dweller- and social structure.

The Experimental housing supported the competition with a funding of appr. 62.000 € from public funds.

In the field of education, the State vocational training school Ostallgäu has developed the school Project "Sustainable development of tourism in the southern Bavarian Alps tourism locations" with recommendations for further development of tourism resorts and companies. The state vocational training school Immenstadt carries out a school project called "**mountain and protection forest 2010**" for - education and raising awareness - of the importance of sustainable cultivation and planning of the mountain forests. It also works at strengthening the mobility of the labour force in the Alpine Space through the project "**xchange**" which aims at exchanging apprentices from the various alpine states. . The school project "Allgäuer Hochalpen" of the state education Authority Oberallgäu in cooperation with the Landesbund für Vogelschutz (State Association for the protection of birds) in Bayern e.g. aims at strengthening environmental education with activities offered for school classes (tours, guided walks, information material, etc).

In the field of employment, the project VERAH (supplies assistants for primary care), with 200 educational units and a total of eight modules, it enables individuals to acquire a recognized additional qualification (certification of the German Medical Association - deutscher Hausärzteverband). With the newly acquired knowledge, the participants improve their future professional - opportunities both in the respective medical practices and in the labour market in general. The trained assistants and medical practices will benefit from the training equally. There are five Bavarian model sites, including Passau.

In the field of the access to information technologies, in the frame of the Bavarian

broadband funding programme, establishment of broadband infrastructure in rural areas is supported. The Bavarian funding guidelines include the implementation of a demand analysis, a market survey and a transparent selection process.

Applicants may be municipalities and municipalities' organizations in rural areas. These are municipalities that have less than 10.000 inhabitants.

The Bavarian broadband funding program was launched in 2008 and ends in 2011 in accordance with a decision taken by the Bavarian Council of Ministers. The funding programme is equipped with a total of approx. 47 million € from various sources of money and is running very successfully. Meanwhile, 404 Bavarian municipalities received a funding decision for investments in fast internet. 30 projects have already been implemented and provide internet access to citizens and companies, especially in the rural regions. In addition, 862 municipalities have now received a grant for feasibility studies and planning. In Bavaria 26,6 million € is already committed for broadband projects³⁶.

³⁶ www.berufsschule-immenstadt.de/newsletter, www.berufsschule-immenstadt.de and www.xchange-info.net, www.allgaeuer-hochalpen.de/umweltbildung, www.beta-institut.de/fort_verah.php

Good practice 23: The scheme of services of the "Pays Sisteronais Buëch", France

The "Pays du Sisteronais-Buëch", association of nine federations of municipalities (a total of 83 municipalities), is involved in a LEADER program 2007-2013. The project is based on the access to services of general interest and on the optimisation and diversification of the local economy. In 2009, the "Pays" started a study on this topic by developing the scheme of services. This work aims to assess the state of the services of general interest available in the territory, by identifying and supporting its assets and elaborating a decision-making tool in order to help and to promote a development strategy by supporting innovative projects.

So far, a diagnosis on eighteen services has been realized (health, transport, education, housing, justice, culture, sport and leisure) on the basis of a participative approach including surveys with local inhabitants (450 interviews to understand better the satisfaction and needs with regards to SGI) and an inventory of every service available in the territory.

On this basis, eight topics, most useful for the territory and on which the local inhabitants can have a direct influence have been kept: transport, health, early childhood, youth, public services (energy, telecom, postal services), convenience stores, employment, professional training and services at home.

Working groups have been created in order to continue the work and develop plans of action.

In November 2010, at the end of the project, an implementation of concrete actions based on local inhabitants and existing services allowing the mutualization or duplexing of the offers of services on the scale of the "Pays Sisteronais-Buëch" is planned.

A total budget of 60.000 € is allocated to realize this scheme of services.

More information:

www.pays-sisteronais-buech.fr/fr/leconomie-et-services-a-la-population/schema-de-services/index.html

Good practice 24: Village services in Upper Carinthia, Austria

Demographic development in twelve villages in the upper Carinthian area is facing a significant ageing of the population, which is especially notable in the rural areas. The problem is also a migration of young active people and an increase in the number of commuters. Furthermore the assistance amongst neighbours is altering due to the change of women's role models, their professional life and the change in family structures.

Therefore the aim of the "Village Service" is to strengthen the community based social structures, by mobilizing voluntary social work, and by setting up a platform for social concerns in the villages, by building up social networks in the districts and also by creating jobs for returning women.

Since 2007, the "Village Service" has provided services in exceptional circumstances, like help in housekeeping or child-care while mothers are staying in hospital. Furthermore it offers driving services for elderly people (to go to medical consultations or shopping) and acts as a platform, where people can get different information about social and health matters on the spot. The "Village Service" organizes all the help needed (for example nurse services, meals on wheels, driving services) all inclusive which is usually provided by different social services, so people don't need to approach the different social services. In order to be able to provide this service, networking and relationship building is also one of the main activities of the "Village Service". The staff members, mainly recently returned women, are continuously trained and instructed both technically and in soft-skills.

More information: www.dorfservice.at



Good practice 25: The mobile library BIBLIOBUS, Slovenia

The mobile library has more than thirty-five years tradition in Slovenia. With this public service people in remote or less populated areas, far from urban centres, are able to reach information, knowledge and cultural assets. In urban areas bibliobus also provides services for specific institutions (prisons, rehabilitation centres etc.). The Bibliobus operates with twelve public libraries, covering a large part of the Alpine territory.



Figure 9: Bibliobus: total length of the book shelves is 90 metres, with 7300 units

The mobile library with its branches in Bovec and Kobarid (that are in the alpine area), covers a region of 20.000 inhabitants. The mobile library service dates back to 1977, when in the Upper Soča Region, bibliobus began to drive around once a month to the remote rural alpine villages and hamlets.

In 2001 Ciril Kosmač Library in Tolmin got a new, modern bibliobus (the fourth in turn since 1977), which is financed by local Communities. Once or twice a month it visits 59 stations in all three communities and thus offers the possibility to access the Internet and to rent books, DVDs, CDs, ect. from 7.300 different units.

More information:

www.tol.sik.si/potujoca_knjiznica.html

Good practice 26: Social care of mentally disabled people in the Municipality of Črna, Slovenia

Since 1995, the municipality of Črna, local farmers and the centre for training, occupation and care for mentally disabled of Črna have implemented green social care programs. These

Figure 10: the farm called "Stane" welcomes mentally disabled people for farming and gardening activities



programs allow mentally disabled people to work on local farms, which improve their quality of life and their social integration. The main goals are diversification of activities for these people, as well as enriching and upgrading the existing methods and ideas in the field of social care.

Production is a precondition for the provision of social services, combining the best of agriculture and the wellbeing of the potential users. Therefore, there is a technical and economic link between these two sets of outputs: agricultural products and the wellbeing of people with special needs.

Green care is based on participatory decision-making, intrinsic to a culture of collaboration, networking, listening and tolerance between quite different stakeholder groups. It represents community-based and community-oriented development approaches.

The green programmes have diverse impacts: first of all, there are positive effects on personal and social wellbeing of the participating users. They also improve the reputation of the farmer and the farm. Through them the general public learns that mentally disabled people are capable of performing much more than what is expected. Therefore they are important promoters of the inclusion philosophy.

The evaluation of the project from the all three

relevant stakeholders – the professionals and managers of the institution, the users and the farmers – is favourable, proving that if properly prepared, planned, executed and monitored social farming can be a realistic scenario on behalf of all involved.

More information: Centre for training, occupation and care Črna, www.cudvcrna.si/

Outcomes of the "Innovation in the Alps" seminar 21st September 2010, l'Argentière la Bessée (France)

Approach to the innovation process:

- **Reflect complexity:** Innovation in tourism and sustainable development in general has to integrate different expectations, sectors and views reflecting the context and complexity of Alpine reality. This means that contradictory concepts such as "global and territorial", "consensus and social change", "risk and feasibility" and "social, economic and environmental", have to be brought together.
- **Build cooperation:** Cooperation must be fostered from beginning to end. Different actors are important to create and successfully implement innovation. They may belong to the local population and enterprises, or be workers, financiers, social institutions, researchers and teachers. The better cooperation is between the different actors the more successfully innovation will be sustained. Each specialist can contribute their special knowledge and experience.
- **Identify priorities:** Innovation is a tool to respond to certain needs and solve problems. It is not an objective in itself. The overall value of innovation implies other values such as "economic autonomy", "solidarity", "the fight against climate change", "democracy", "participation", "a territorial approach" or "a bottom-up approach". While diversity is important, it must be remembered that certain activities may contradict each other. Decisions about priorities must therefore be taken according to the assets of the different regions. This means that the priority-setting process must be organized seriously and involve the population at large. It must also lead to the long-term education and training of people to enable them to analyze and manage change.
- **Evaluate innovation:** Measuring the impact of innovation is important for policy development and so that framework conditions can be adjusted. Innovation has to be measured, especially with respect to its impact on sustainable development, society and the territory concerned. It is also important to assess the transferability of innovation based on identified values.
- **Capitalize on successful experience:** There are already many successful innovation processes. The institutional and financial means, together with the necessary competences, have to be mobilized. Finally, successful innovation experience can be transferred into policy and framework conditions.

The role of public policies aiming to support innovation could be to:

- a) Launch and maintain a far-reaching public process: organization of cooperative processes on local and regional levels and shared acceptance of the "risk" of not knowing the outcomes - financing must not be based on the success of an innovative process
- b) Secure financing for innovative processes and their outcomes
- c) Motivate communities and regions to participate in networks and processes
- d) Support existing approaches and good practices
- e) Embed innovative elements effectively in regional and national strategies
- f) Support the creation of local and regional economic benefits stemming from sustainable strategies
- g) Increase public awareness about the importance of innovation and possible financing

Bibliography

BMLFUW, 2009

Organic Farming in Austria. Report. Vienna.

Dax, T. and Hovorka, G., 2004

Integrated rural development in mountain areas. In: Brouwer, F. (ed.) Sustaining Agriculture and the Rural Environment. Governance, Policy and Multifunctionality. p. 124-143, Cheltenham.

Domevšek, P., 2006

Ponudniki kmetijskih pridelkov in izdelkov Zgornjega Posočja
(www.bovec.si/mma/Ponudniki%20kmet.%20pridelkov%20in%20izdelkov/20100423121916/, 12.7. 2010).

Hovorka, G. & Dax, T., 2010

Enhancing Environmental Services from Farmland in Austria. Mountain Forum Bulletin, January, p. 66-68.

Groier, M. and Hovorka, G., 2007

Innovativ bergauf oder traditionell bergab? Politik für das österreichische Berggebiet am Beginn der 21. Jahrhunderts. Bundesanstalt für Bergbauernfragen. Research Report no. 59. Vienna.

Groier, M., Kirchengast, C. and Schermer, M. (eds), 2008

Auf dem Weg zur Bioregion. Ergebnisse, Erfahrungen und Reflexionen aus einem Aktionsforschungsprojekt. Bundesanstalt für Bergbauernfragen. Research Report no. 61., Vienna.

Knickel K., Tisenkopfs T. and Peter S., 2009

Innovation processes in agriculture and rural development, results of a cross-national analysis of the situation in seven countries, research gaps and recommendations Sixth framework programme.

Scoones, I. and Thompson, J., 2009

Farmer first revisited: innovation for agricultural research and development, Bourton on Dunsmore/UK: Practical Action Publishing.

Van Huylenbroeck and Durand, 2003

Huylenbroeck, G. van and Durand, G. (2003): Multifunctional agriculture – a new paradigm for European agriculture and rural development. Aldershot: Ashgate.

Mahroum et al., 2007

Mahroum, S., Atterton, J., Ward, N., Williams, A. M., Naylor, R., Hindle, R. and Rowe, F. (2007): Rural innovation. NESTA Exploration Report, December 2007.

Österreichisches Umweltzeichen, 2008

UZ RA Reiseangebote. www.umweltzeichen.at.

Štupar, B., 2009

Čadrg – ekološka vas nad sotesko Tolminke (online: www.gore-ljudje.net/novosti/46927/, 12.7.2010).

Vki – Verein für Konsumenteninformation, 2009

Statistik der mit dem Österreichischen Umweltzeichen für Tourismusbetriebe ausgezeichneten Betriebe. (unveröffentlicht)

B.3 Socio – economic trends

B.3.1 Population dynamics focused on rural development

The Alpine Convention area comprises 190,558 km² (Ruffini et al. 2004), which includes 5,954 municipalities. In 2004, around 14 million people were living in this area. Today the population in the Alpine Convention area is twice as much as it was at the end of the 19th century. Austria and Italy together with 55.5% represent the largest share in the Alpine Convention area. More than half of the Alpine population (53.5%) is concentrated in these areas of the Alps.

population. Also, several municipalities in the provinces of Belluno and Udine have recorded a decline in population. The same tendency is observed in the Slovenian alpine region and in large parts of the Austrian Alps in Styria, Lower Austria and Carinthia. Even in the Swiss Cantons of Uri, Bern and in the northern part of Ticino, the population has decreased.

In contrast, population growth is noted in the central alpine regions. The provinces of Oberbayern, Salzburg, Tirol, Vorarlberg, Alto Adige, Trentino, the majority of cantons in the western part of Switzerland and in Liechtenstein have all recorded an increase in population.

In these prospering regions of the Alps an

Country 1	Area[km ²] 2	Municipalities 3	Inhabitants 4
Austria	54,620	1,148	3,255,201
France	40,804	1,749	2,453,605
Germany	11,072	285	1,473,881
Italy	51,184	1,756	4,210,256
Liechtenstein	160	11	34,600
Monaco	2	1	32,020
Slovenia	7,864	60	661,135
Switzerland	24,862	944	1,827,754
Alps	190,567	5,954	13,948,452

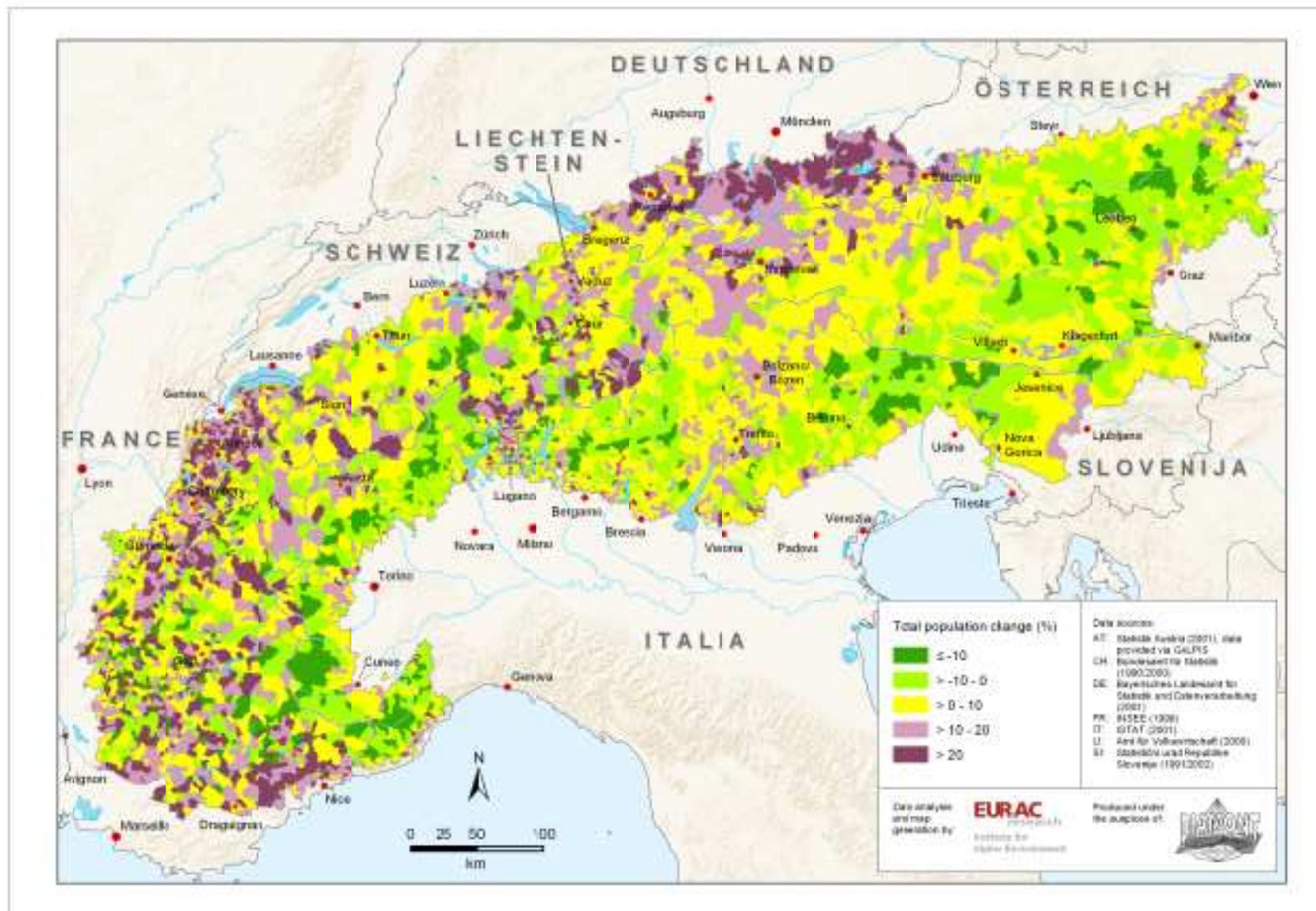
Table 2: Population in the Alpine Convention area

Source: Zanolla, Ruffini, Streifeneder, 2007

During the 1990s the population in the Alpine Convention area increased by 7,8%. The demographic process is not homogeneously spread across the Alpine regions. Areas with growth and decline are located closely together. The highest population growth was registered in Germany and in Liechtenstein. In contrast, the lowest was recorded in the Slovenian Alps.

It has to be noted that a cluster of municipalities along the Italian alpine area, which includes the area from Liguria to Lago di Garda, is facing a steady decrease in

increase in urbanisation of the valleys' centres has been registered. Due to the influence of booming tourism, the population has even increased in remote municipalities that are not easily accessible, e.g. touristic centres in the Swiss Alps, French Alps etc. (StMWIVT 2004, Hornung & Röthlisberger, 2005). In fact the French Alps show a heterogeneous demographical pattern, where depopulated regions and dynamic regions alternate within a narrow space. A large number of municipalities have achieved a relatively high population growth of more than 25%. In contrast, the south Alpine areas and the regions close to the main alpine ridge are characterised by a distinctive population decrease.



Map 13: Total population growth between the last two censuses

©Tappeiner, Borsdorf, Tasser (Herausgeber) Alpenatlas, Spektrum Akademischer Verlag, Heidelberg 2008

a. Population development of the Alpine Convention municipalities

The trends of the Alpine-wide population change at municipality level between years 1990 and 2000 can be summed up as follows:

- 25,7% (1.535) of municipalities suffer a population decrease of more than 1%,
- 6,6% (395) are stagnating as their population change ranged between $\pm 1\%$,
- 57,8% (3.448) had a population growth between 1% and 25%, whereas for 9,6% (574) an even higher increase was recorded.

A high percentage of the alpine population (20,1%) is concentrated in municipalities with 2.500 to 5.000 people. About 35,7% of the people live in urban centres with between 5.000 and 25.000 inhabitants. And another 17,1% live in cities with more than 25.000 inhabitants.

However the analysis of the population decrease in the 1990s shows that the smallest and the largest municipalities in terms of population are more often affected by a reduction in the number of inhabitants. In other words, those municipalities with between 2.500 and 25.000 inhabitants are less affected by a population decrease.

Table 3: Overview of municipality types and the population structure
(availability of the reference year varies between 1987 and 2004)

Population classes ¹	Number of municipalities	Share on total number of municipalities [%]	Number of inhabitants ¹	Share on total population [%]	Number of municipalities with decreasing inhabitants during the 1990s ²	Share of municipalities with decreasing inhabitants during the 1990s ² on relative municipalities of population class [%]
1	2	3	4	5	6	7
< 500	1.876	31.5	445.588	3.2	684	36.5
500 – < 1.000	1.099	18.5	797.585	5.7	309	28.2
1.000 – < 2.500	1.572	26.4	2.551.301	18.2	419	26.5
2.500 – < 5.000	816	13.7	2.810.900	20.1	168	20.5
5.000 – < 10.000	367	6.2	2.476.149	17.7	67	18.6
10.000 – < 25.000	175	2.9	2.522.397	18.0	42	23.6
25.000 – < 50.000	35	0.6	1.166.367	8.3	13	38.2
≥ 50.000	14	0.2	1.228.738	8.8	5	35.7
Total Alps	5,954	100.0	13,989,025	100.0	1,707	28.7

Source: AT (UBA), FR (IFEN), DE (LfStatD), IT (ISTAT), LI (AVW), SI (Statistical Office of the Republic of Slovenia), CH (FSO)].

1) Date of survey: AT: 2005, DE, IT, LI, SI and CH: 2004, MC: 2000, FR: 1999.

Does not include the ten German municipality-free areas.

2) Due to data availability the reference year varies between 1987 and 2001: MC: 1990/2000, AT: 1991/2001, FR: 1990/1999, DE: 1987/2000, IT: 1990/2000, LI: 1990/2000, SI: 1991/2000, CH: 1990/2000.

Source: First Report on the State of the Alps, Transport and mobility in the Alps.

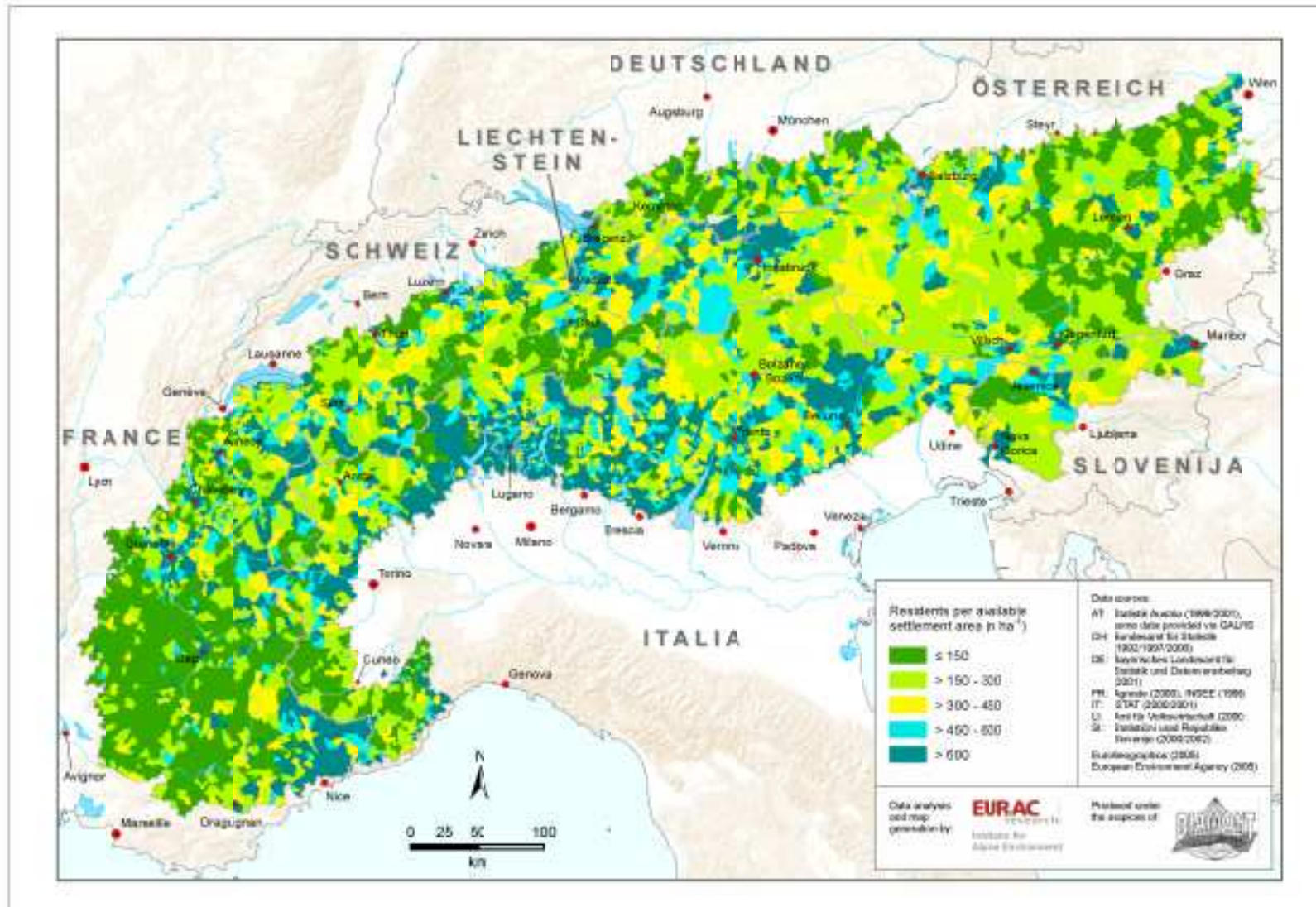
In 2000, 4.547 (76,4%) of all municipalities counted fewer than 2.500 inhabitants. These municipalities cover only 27,1% of the Alpine population. One third of all Alpine municipalities were inhabited by fewer than 500 people. In less than 0,2% of all municipalities more than 5.000 inhabitants were registered.

Population density and area of permanent settlement

Population density is a basic indicator in evaluating the human pressure on space and in distinguishing between rural and urban areas (OECD 1994). By using this indicator it is possible to depict processes of agglomeration and urbanisation. Throughout the whole Alpine Convention

area, the average density is 73 people per km². Compared to the national values (e.g. Germany: 231.1 Inh./km², Italy: 197.1 Inh./km²; EUROSTAT 2004), the Alps are one of the least populated regions in Europe. In

this analysis the Principality of Monaco was not considered as this city-state has the highest population density worldwide, which is not representative of the situation in the Alps.



Map 14: Population density per available settlement area (DIAMONT)

©Tappeiner, Borsdorf, Tasser (Herausgeber) Alpenatlas, Spektrum Akademischer Verlag, Heidelberg 2008

The distribution of the population density in the Alpine Convention area significantly reflects the topographical situation. Higher population densities occur along the alpine fringe and the foothills of the Alps. Numerous small centres have developed there. Due to the favorable site conditions the settlement comes into conflict with agricultural land use.

In contrast to the large intra-alpine valleys the peripheral alpine areas with poor accessibility are characterised by municipalities with low population density. These were found in areas close to the central mountain chain. This population pattern was observed in particular in the western parts of the Alps: Maritime Alps, Provencal Alps, Cottian Alps, Southern Dauphiné and Ticino Alps (Permanent Secretary of the Alpine Convention, 2007).

As has already been mentioned, topography plays a key role in analysing the reasons for the observed population density pattern in mountainous regions. Many parts of the Alps must be considered as unsuitable for human settlements. In Austria, for example, only 40% of the cadastral area can be considered as an area of permanent settlement (BMVIT 2002). To give a more realistic and comparable picture of the population density, the area of permanent settlement, as the most appropriate indicator, should be taken into account. If the area of permanent settlement is the basis of the calculation, this reflects, in higher values for the population density of the Alpine regions. Some valleys even reach values similar to those in densely populated urban centres.

Attractiveness of the urban centres

Generally, the rural areas located close to the large cities at the alpine fringe, especially in Switzerland and Bavaria at the northern border and all southern borders of the alpine arc, have the highest positive migration balance. These locations are very attractive for working people (commuters). Moreover, these alpine landscapes (Tirol, Oberbayern and surroundings of Alpine lakes) also attract older people, who have chosen these locations for their retirement (StMWIVT 2004, INSEE 2001). In contrast to these

attractive areas, certain peripheral Alpine regions close to the main Alpine chain with low population density and far from the large valleys, suffer from population decrease (e.g. Italian Alps) (Varotto, 2004, Permanent Secretary of the Alpine Convention, 2007).

Attractiveness of rural areas

Good practice 27: Research program "My featured space", Alpe Adria Region

"My featured space" is an interdisciplinary and transdisciplinary research project. It focuses on quality of life in rural regions in the future. Together with researchers, teachers and stakeholders, pupils from the Alpe Adria region develop scenarios for rural living spaces in 2025. The main question is what pupils will need in the future to live and work in attractive rural regions. In the first step, the pupils documented their present living space through the question "What do I appreciate most in my rural living space today?" with short videos referring to the methods of qualitative social research. The pupils defined parameters for the quality of life in the rural spaces analysing these videos. In the next step, mutual effects between these parameters were described, following the method of the sensitivity-model by Frederic Vester. The relevance and completeness of the parameters were also checked. The goal of the third working step is to identify some highly active parameters in the system.

Using this model pupils learn to understand interactions in the complex system of "rural region".

Finally, the model has been implemented in the computer simulation game "My featured space 2025" that has been developed together with the Institute of Information Systems, Alpe-Adria University of Klagenfurt. The project results will be presented as final reports, dissertations, as well as project presentations for various events.

The project results in videos and communication supports. The project was held by ep&b Umweltbüro Klagenfurt with a budget of 180.000 €.

More information: www.myfeaturedspace.info,
www.umweltbuero-klagenfurt.at,
www.sparklingscience.at

The urban – rural context: structures, programs and impulses for cooperation of centres and their surroundings

Rural and urban areas are in fact highly interdependent, especially through their mutual interest in the complementary services they provide each other. This applies to smaller centres in the Alpine Perimeter but also to larger centres at the border of the Alps. Urban areas are more likely to supply services for public transport, health or education, whereas rural areas are good at providing ecosystem services and energy resources and offer high quality services in terms of recreation, landscape and nature. However, general interest services such as postal services, child care, food shops, education, health care, broad band access, and access to road networks and public transport are important in the 21st century and they cannot be concentrated in centres alone. Public services are also critical factors for quality of life and continued social cohesion in rural areas. It is a challenge to find a balanced approach to the organization and accessibility of services, on the one hand, and to the fair use and management of rural resources, on the other. The second can be provided through benefit/support mechanisms in the regions where the resources are available, bearing in mind that the availability of infrastructures for use of the resources is not enough alone. For efficient and successful general interest services a user-oriented approach is crucial and must be backed up by good cooperation between authorities, users and service providers.

Therefore, the objectives underlying the joint development of centres and their surroundings are to enhance services for mountain areas and generally safeguard accessibility to services of general interest as well as the transfer of economic power. In order to reach these crucial objectives, legal, organizational, strategic, infrastructural and financial measures need to be implemented. Different approaches can be used to transfer know-how and economic power and ultimately secure attractive and manifold leisure offers for tourists but also for the local population. Combined offers allow users to increase their area of action. Often

such offers are also «more comprehensive and understandable» as well as cheaper for users, hence increasing the quality of recreation.

The sustainability of cooperation between towns and their surroundings can be enhanced through networking, the structuring of various processes, the definition of strategic bases and long-term objectives, awareness building, support from key personalities, as well as through legal and organizational framework conditions.

Good practice 28: Vision Rheintal: 29 municipalities - one living space, Austria

vision rheintal

29 Gemeinden. Ein Lebensraum.

"Vision Rheintal" started in 2004, as a joint project of Vorarlberg's twenty-nine Rhine Valley municipalities and the state of Vorarlberg. The central goal of "Vision Rheintal" is to recognize the Rhine Valley as one living space and turn it into a collective planning and design space. The further sustainable development of the region is an important concern of the project. Key topics are settlement and mobility, with the central objective being the optimal coordination of the development between residential or industrial areas and the transport system.

From 2004 to 2006, a mission statement for regional planning and cooperation of the Rhine Valley was defined. Altogether more than 800 citizens, experts, municipal and state politicians have actively participated in this open planning process (Rhine Valley forums, planning workshops, think tanks, field trips, information events, etc.). In 2007, after a one-year interim phase, the implementation phase was launched. Important objectives of the project are, for instance, the expansion of public transport and by this means an improvement of accessibility. Municipality centres are stimulated as important areas of local supply and the cooperation between the municipalities is thereby strengthened.

An important concern from the outset was that "Vision Rheintal" had to be a project which was part of the state and the municipalities. It seemed to be essential to break the existing hierarchical structures. Things needed to be worked out together on an equal footing.

The signing of the "Rhine Valley Contract" (5th

Rhine Valley Conference, May 2007) marked a big milestone in the overall process – it showed how the state of Vorarlberg and the twenty-nine Rhine Valley municipalities strengthened their joint responsibility for the valley and showed their willingness to cooperate. They committed themselves to lead the project together as an open process. Since the "Rhine Valley Contract", the budget of the project "Vision Rheintal" has amounted to 2 € per habitant a year, which is funded in equal parts by the state and municipalities.

Looking at interim results to date, it can be seen that people living within this region are becoming increasingly aware of their responsibility for this living space. Various interlinked municipality border projects are to be launched. Most certainly there will be many challenges in the future to be jointly resolved on the way towards "29 municipalities – one living space".

More information: www.vision-rheintal.at

**Outcomes of the "Towns and rural areas in dialogue" seminar
October 2009, Bad Reichenhall (Germany)
Organized by Alliance in the Alps, the "Alpine town of the year" Alliance and the Permanent
Secretariat of the Alpine Convention**

The following statements summarize the results of the workshop and the presentations it included:

- Towns and their surrounding rural areas are complementary spaces, which, through cooperation, are able to create added value and new quality for both.
- To maximize cooperation between towns and rural areas there is already a broad array of instruments available.
- Legal structures bring stability and enhance the long-term achievement of goals.
- Special programmes and subsidies allow for additional impetus and added value.
- The connection of infrastructures is an important base for cooperation.
- Common projects and strategy development are necessary starting points for long-term cooperation and sustainable solutions.
- The tendency towards "regionality" stimulates cooperation between towns and their surroundings.
- Common educational projects play a key role in joint development.
- Planning areas have to be adapted in order to integrate both spaces into one common planning area (horizontal financial organization).

Possible examples of cooperation between centres and their surroundings are listed below:

- One example of a legal measure is the **Innsbruck Tourism agency** that brings together the 25 tourism agencies of the surrounding region into a larger association hence increasing the power and impact of their communication and marketing campaigns. Together they improve the attractiveness of the entire region by combining offers; with special impact on smaller communities.
- An organizational measure example is the **"Easttirol Card"**, which includes different leisure activities and transport offers in an all-inclusive package (museums, swimming pools, mountain railways etc.). It involves the town of Lienz and 32 communities.
- A strategic measure example is the **"Rheintal Vision"**. This establishes common spatial development in the Rhine valley by consolidating the spatial planning of the Land of Vorarlberg with the planning of the 29 communities in the Vorarlberg Rhine valley. The main objectives are to connect "free spaces", to secure an overall spatial balance and, finally, to establish a compact region through synergy-driven connectivity.
- The **"Tyrolian Lech Nature Park"** uses subsidies to strengthen the management of the protected area, mainly for improving communication and tightening cooperation between all partners to create added value from tourism activities in the nature park.
- The **Vorarlberg region** has **harmonized its public transport system time-table** as well as introducing a single tariff system for the entire region, which includes 5 towns and 96 communities. This measure offers optimal connectivity and mobility for the rural and urban areas.
- Finally, various events are used to give impetus to both towns and their surrounding communities. One is the **"Schubertiade"**, which takes place in the town of Hohenems and involves the "Bregenzerwald" – a region with different offers for overnight and leisure activities.

Good practice 29: Agglomeration Werdenberg-Liechtenstein Association

In 2009, all municipalities in the Principality of Liechtenstein and the Swiss region of Werdenberg as well as the governments of Liechtenstein and the canton of St. Gallen decided to establish the Agglomeration Werdenberg-Liechtenstein Association, which took up its work on 1 January 2010.

The goal of the program is to counter the growing pressure exerted by the urbanization process of agglomerations, which thereby diminishes their economic attractiveness and quality of life for the population.

These regions are the source of significant economic, social, cultural and political drive. Accordingly, the resulting disadvantages – such as increased traffic and environmental pollution, social problems, and the difficult public financial situation – have to be reduced. These problems can no longer be solved by cities or communities on their own, so they have had to unite their forces.

This is especially true for Liechtenstein, which has a comparatively small territory of merely 160 km², but whose external impact and economic attractiveness as a business location link it closely to the neighbouring regions of Switzerland and the Austrian state of Vorarlberg. Liechtenstein is thus part of the functional area of the "Alpine Rhine Valley", which embeds it in the settlement and infrastructure developments of the overall region.

Figure 11: The agglomeration Werdenberg-Liechtenstein



The focus of the program is currently on harmonization of settlement and transportation development, with the goal of eliminating existing and future transportation problems – including the impact on society and the

environment – or at least reducing such problems to a reasonable level.

The agglomeration Werdenberg-Liechtenstein, which covers approximately 150 km², is home to about 70.000 inhabitants and approximately 50.000 jobs. This means that the agglomeration has considerably more jobs than workers, resulting in major commuter flows from the surrounding regions. In particular the economically dynamic country of Liechtenstein, which has a similar number of jobs to inhabitants (approximately 35.000), is a major driver of these flows.

There is accordingly a great need to work towards a regionally harmonized settlement and transportation policy across sovereign borders.

Before the end of 2011, the results generated by the program will be submitted for preliminary evaluation by the Federal Office for Spatial Development (ARE) in Bern, and the first measures can be implemented starting in 2013.

Ageing of the population

In all alpine regions, with the exception of Austria and France, the percentage of senior citizens is higher than the national average. In Austria alpine regions have been places with a particularly young population for a long time, given its considerably high birth rates and positive natural balance. With the decrease in births and the emergence of smaller families within these regions too, the trend towards higher quantities of an older population have started here as well. Scenario calculations for the Austrian regions highlight that this trend affects all regions and will pose a considerable problem for future social and economic development (ÖROK 2004 und 2007). For this reason even the provision of public services might be endangered in the future.

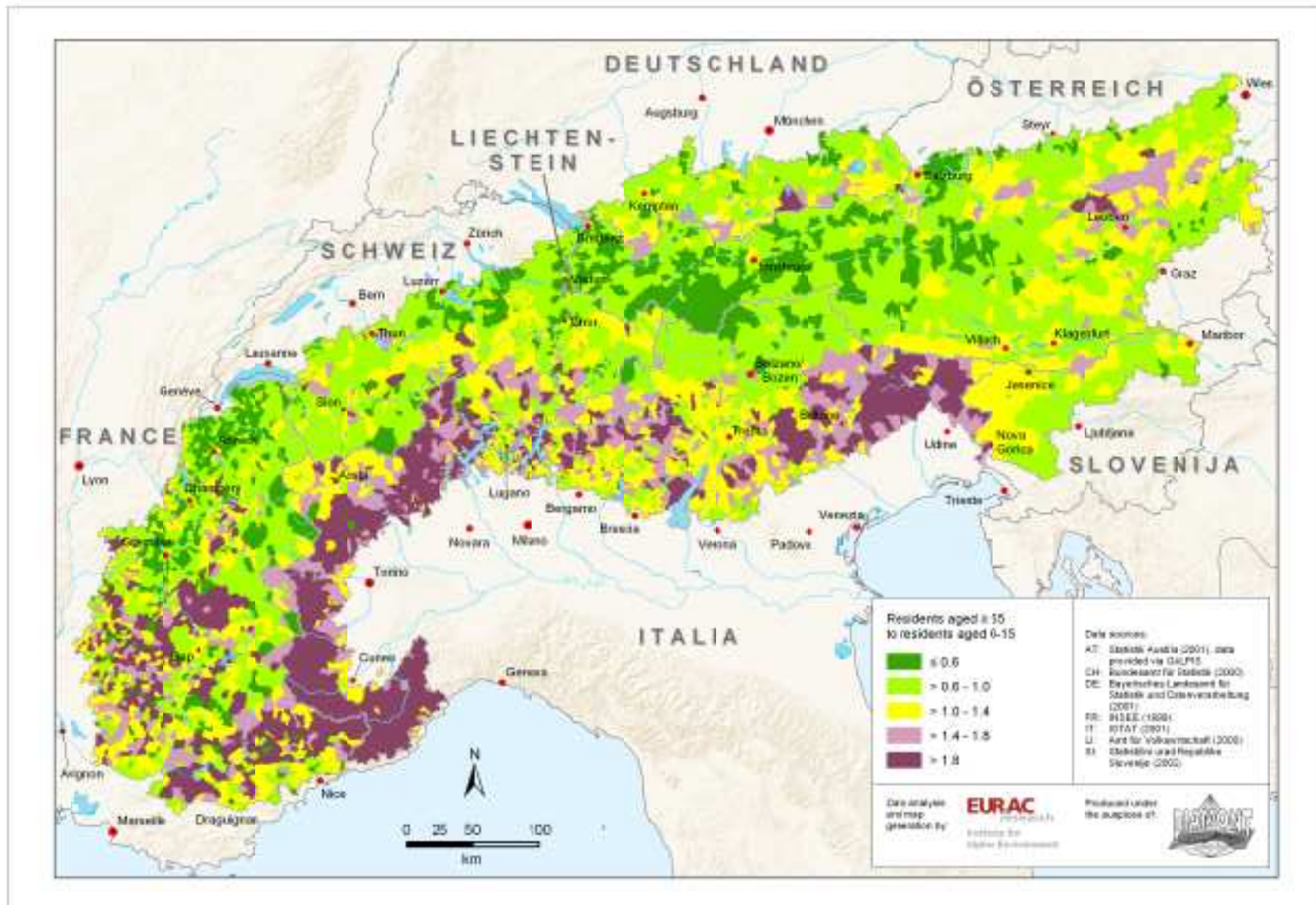
The greater "remoteness" that marks small peripheral alpine municipalities with no consolidated tourism industry is the cause of a trend of marginalization that paves the way for the migration of young people, and the closing down of business activities and services, with consequent negative repercussions on the quality of life in the region. In such areas, where the percentage of senior populations is high, initiatives aimed at promoting the growth of micro-economies are often hampered by the lack of human assets. This is the so-called "emptied mountain area" (Uncem-Censis, 2002),

where the most noticeable, outperforming indicators are the ageing index, the addiction index, the average mortality rate and the deregistration rates (Zanolla, Ruffini & Streifeneder, 2007).

The percentage of an over-64 population is not evenly distributed across countries and roughly reflects the differences recorded at national level. It is very low in Liechtenstein (11,3%) and Slovenia (14%), very high in the Principality of Monaco (22,4%) and in the Italian Alps (19,1%). The Principality of Monaco is a special case, since it attracts senior and wealthy citizens on account of its privileged setting (tax scheme, climate, leisure facilities). In Styria (eastern part of alpine region in Austria) the rate of residents aged more than 65 years is already particularly high (above 30-35%). In

contrast, in large parts of Tyrol (western part of alpine region in Austria) the same indicator still shows a situation where less than 20% of the population is in this age group.

According to the observations above, 63% of Alpine municipalities are considered to be "over-aged". Such a percentage hits 87% in the Italian Alps, proving the precarious demographic situation of Italy that hosts 41% of the "over-aged" alpine municipalities. The old-age index is particularly high in the southern part of the Alps, especially in Liguria, Friuli-Venezia Giulia and Piemonte. The so called "young population regions" are Liechtenstein, Rhône-Alpes in France and the Austrian federal regions of Vorarlberg, Tyrol and Salzburg.



Map 15: Old to young age dependency ratio (DIAMONT)

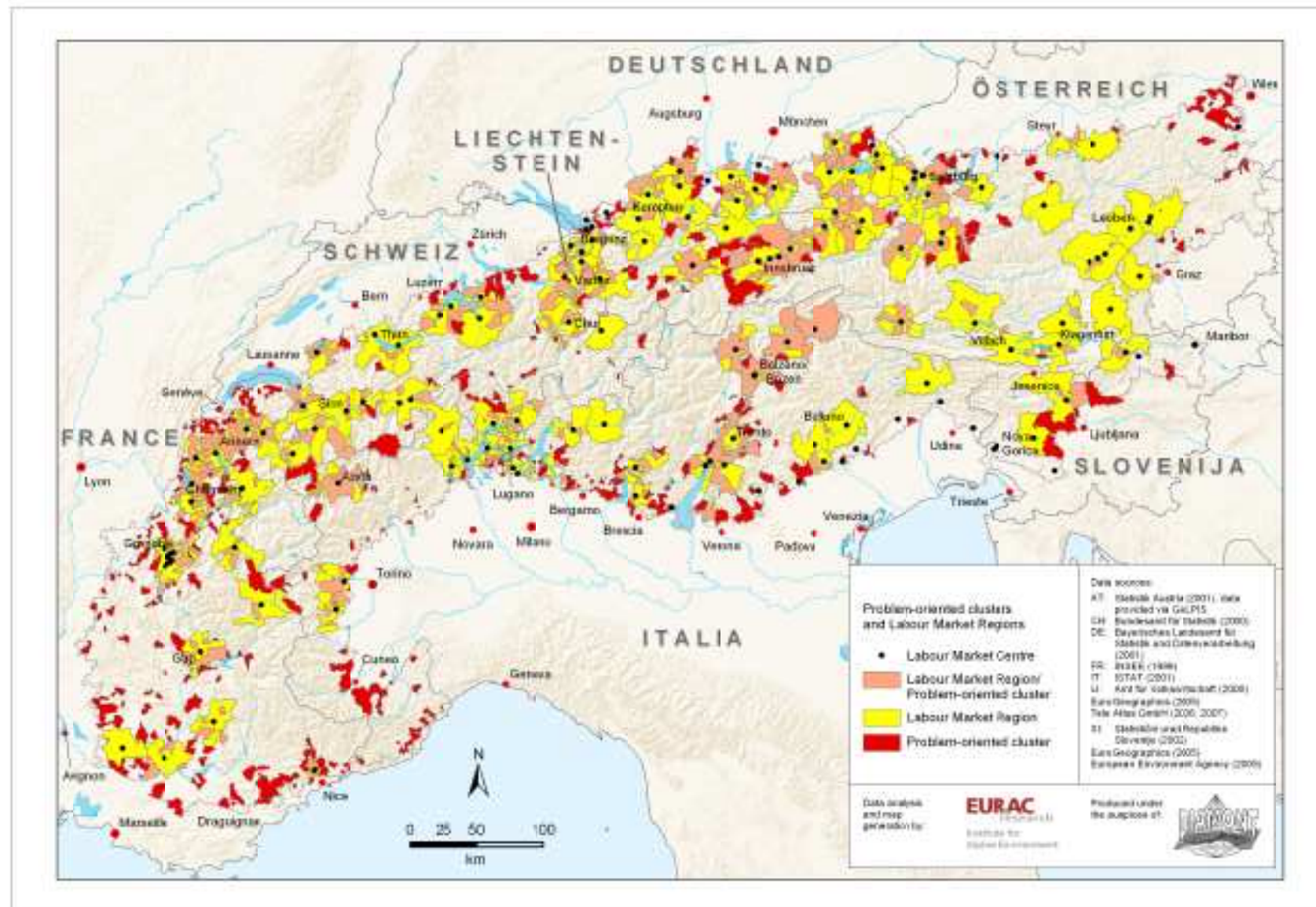
©Tappeiner, Borsdorf, Tasser (Herausgeber) Alpenatlas, Spektrum Akademischer Verlag, Heidelberg 2008

Not unlike the demographic reduction, population ageing is particularly evident in small municipalities with less than 500 inhabitants and urban settlements with more than 25.000 inhabitants: almost 60% of the former and approximately 70% of the latter (and almost 90% of municipalities with over 50.000 inhabitants) have an old-age index higher than 100.

With regard to settlements with less than 500 inhabitants, in many of them there are not enough people to keep convenience stores, pharmacies, post offices and associations open. Also public transport services are cut to a minimum, since operation costs are too high for the local government's budget. As a result citizens have to rely on private cars, and for those who cannot drive (many senior citizens, for instance) the access to basic services can

become rather difficult. The disappearance of basic services triggers a vicious cycle because the declining quality of life encourages residents to move to less peripheral areas, where access to services is better, while at the same time preventing the arrival of new dwellers.

With regard to the mountain regions an uneven development of regions can be seen. It is essential to realise that, in contrast to the assumption of economic decline in peripheral areas, the general dynamic of business and employment in the alpine area is subject to the same tendency as in the "non-alpine area". The number of people employed in agriculture and forestry has dropped drastically, industry and manufacturing still account for a large (but decreasing) proportion of total employment, and the shift of jobs towards the tertiary economy is quite marked.

Map 16: Land demand¹

©Tappeiner, Borsdorf, Tasser (Herausgeber) Alpenatlas, Spektrum Akademischer Verlag, Heidelberg 2008

B.3.2 Evolution of farming and forest activities

a. Agriculture

In the last years, major changes in the organization of agricultural production and in the perception of rural space have taken place. Important determinants of these changes are the liberalization of agricultural markets, the increasing consideration of environmental concerns, a far-reaching move towards a recognition of the multifunctionality of rural space and towards supporting a diversification of agricultural and, more widely, rural activities (Knickel, Tisenkopfs and Peter, 2008). Mountain agriculture cannot compete in national and international markets any more.

Despite structural changes, mountain farms tend to be quite small structured and they normally have a higher cost level than farms in the valley areas. Thus, from the 1950s onwards, marginal land with low yields has successively been taken out of agricultural use. However, this development varies greatly in intensity between regions: while in the South Tyrol, one of the most productive regions of the Alps, only about 6% of farming land has been abandoned within the last 150 years, the figure stands at 33% for the Tyrolean uphill areas, 37% in the region around Innsbruck and reaches 67% in the Carnia region (Frioul region) (Knickel, Tisenkopfs and Peter, 2008).

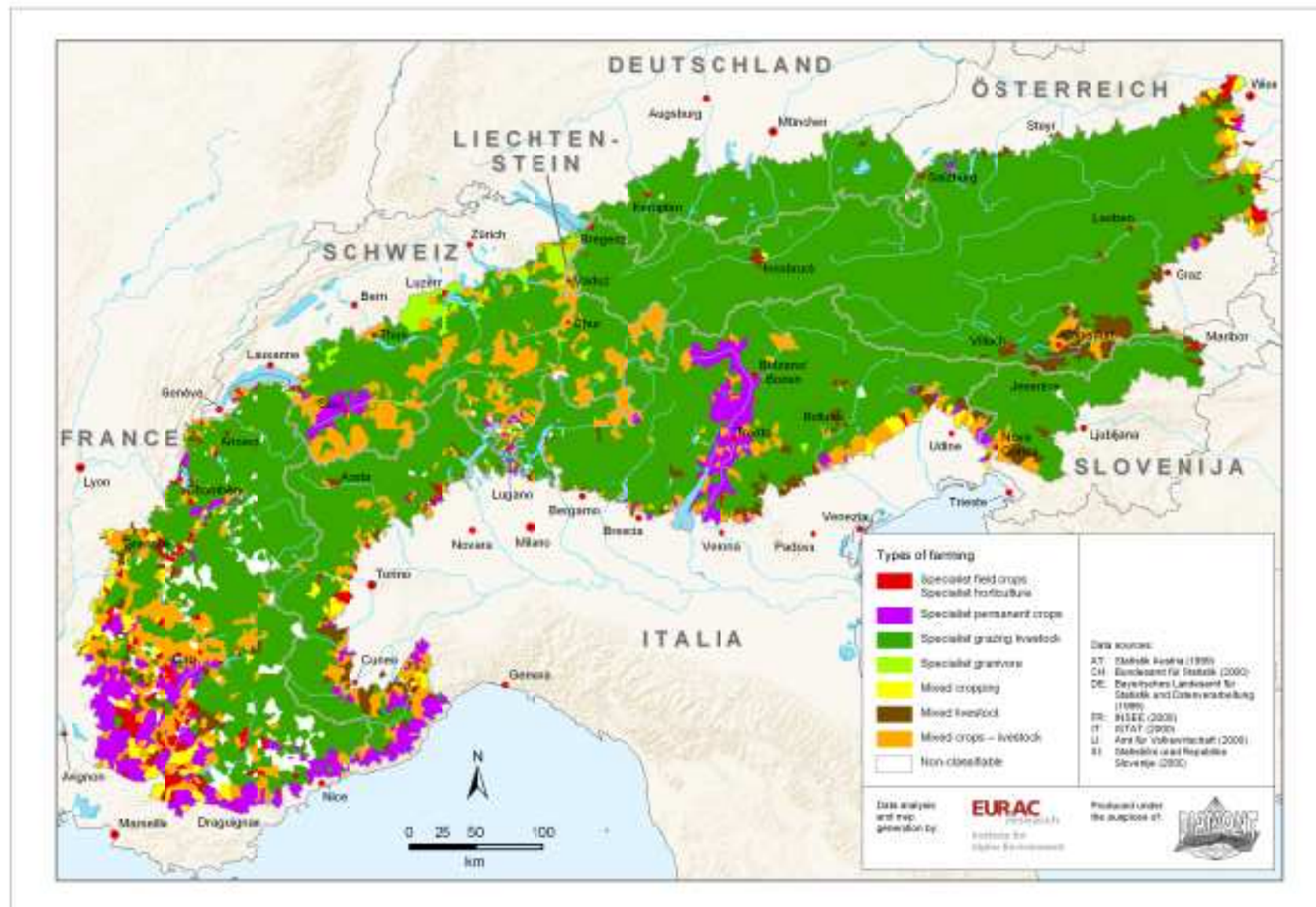
Between 1990 and 2000, Slovenia, Italy and Germany have shown particularly severe reductions of their area used for agriculture. Small reductions have occurred in Austria and Switzerland. In Switzerland, calculations in the framework of the national research programme (NFP 48) predicts that until 2015 ca. 20% of active farms in the year 2002 will

not continue their activity due to generation change. Some areas, however, show a reversal trend. For example, a slight increase can be noted mainly in the west Austrian and in the French Maritime Alps (Knickel, Tisenkopfs and Peter, 2008).

This tendency matches a drastic drop of people employed in the agricultural sector. But as agriculture has been recognized for its major role as a multifunctional activity (strong impact on landscapes, economic structure, local society and culture, and environment), public funds have been developed specifically for mountain areas. The different rural development programs of every alpine country all aim at promoting the competitiveness of mountain farming. But, beyond this public support, a more market-oriented approach should be developed.

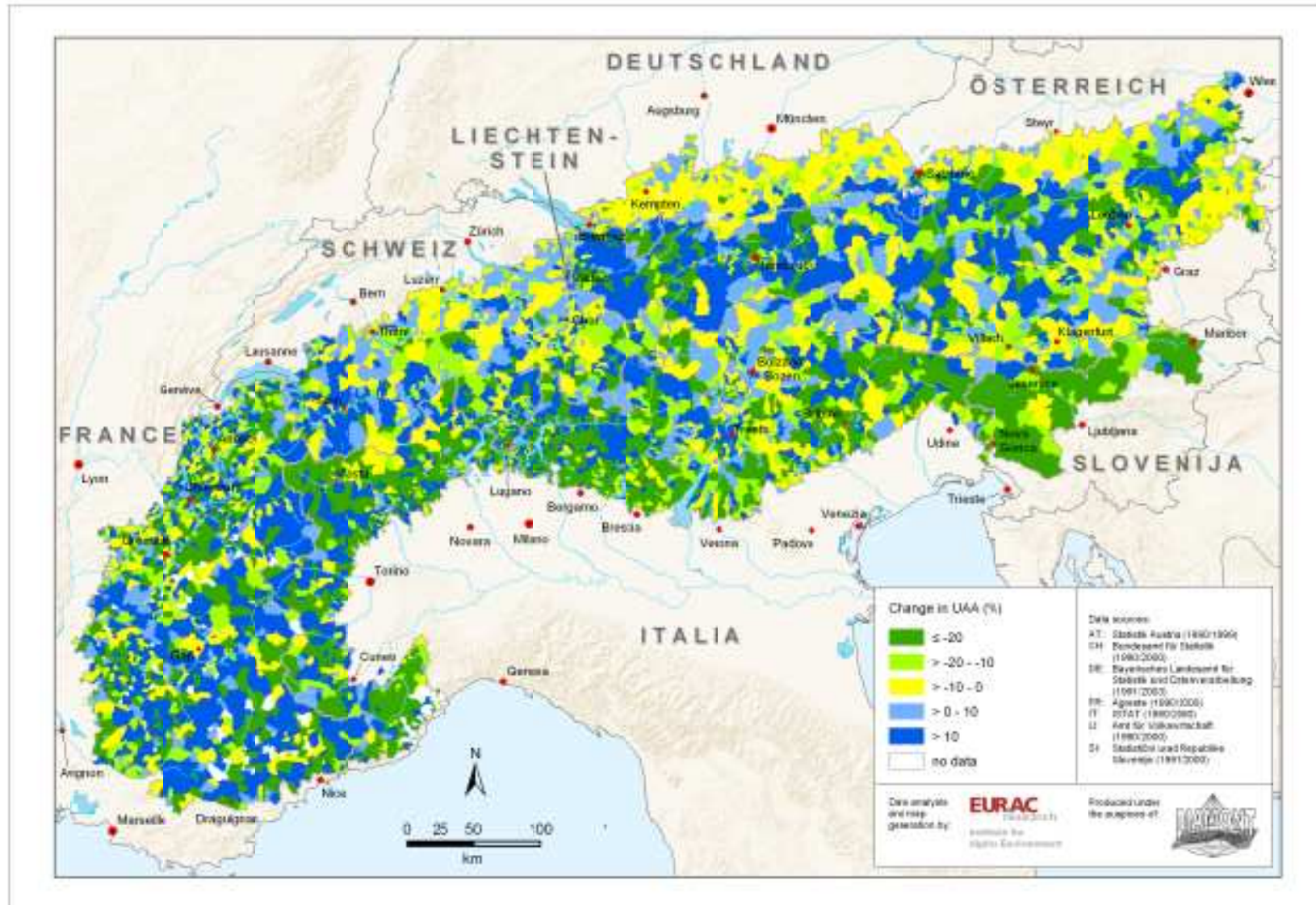
In this context, the sustainable improvement of the incomes will come from the capacity of the mountain dwellers, farmers and woodmen to develop collective approaches towards progress, leading to the organisation of quality supply-chains. These approaches must be developed with the local stakeholders (Morel-a-l'huissier, 2008).

Maintaining mountain farming could be achieved by focusing on quality products, developing quality labels, completing the already existing ones, and structuring the supply-chains. Links with tourism activities also represent a new resource for mountain farmers. Capitalizing on regional traditions and agriculture is part of a sustainable tourism and includes promotion of farm holidays as well as marketing of traditional crafts. Land preservation is also a crucial point and a collective management of land could improve the installation of mountain farmers.



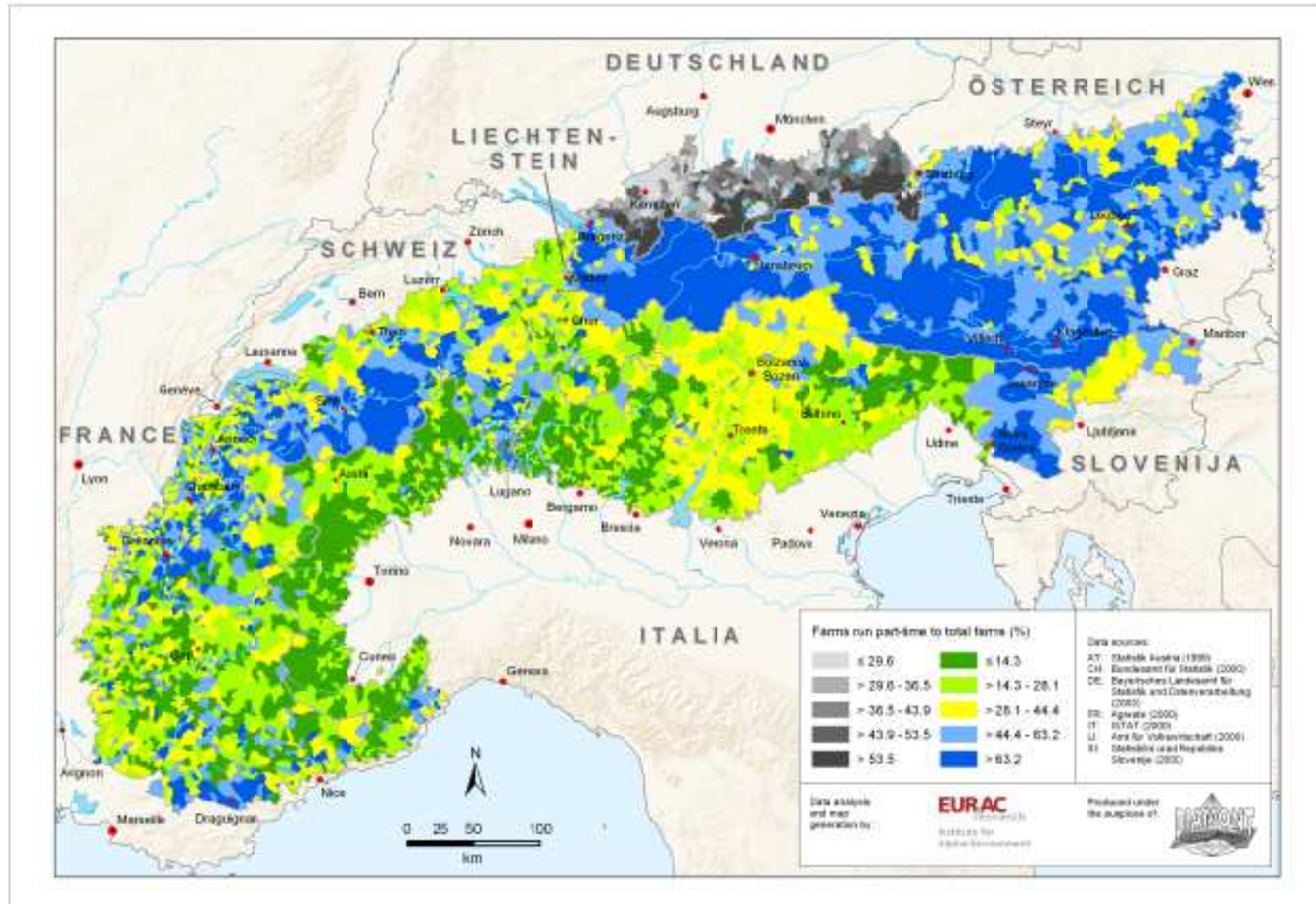
Map 17: Type of farming (DIAMONT)

©Tappeiner, Borsdorf, Tasser (Herausgeber) Alpenatlas, Spektrum Akademischer Verlag, Heidelberg 2008



Map 18: Change in used Agricultural area (DIAMONT)

©Tappeiner, Borsdorf, Tasser (Herausgeber) Alpenatlas, Spektrum Akademischer Verlag, Heidelberg 2008



Map 19: Farms run as a part-time concern (DIAMONT)

©Tappeiner, Borsdorf, Tasser (Herausgeber) Alpenatlas, Spektrum Akademischer Verlag, Heidelberg 2008

Good practice 30: Protection and promotion of mountain vineyards and mountain wines' production: the cases of CERVIM and UNCEM, Italy

CERVIM (Centre for Research, Studies and Valorization of Mountain Viticulture) is an international organization based in Valle d'Aosta, which was founded in 1987 under the auspices of the OIV – Organization Internationale de la Vigne et du Vin. The centre aims at promoting studies, research and conferences concerning issues related to viticulture as well as participating in the wine industry and institutions in order to support the "Mountain Viticulture's" interests.

CERVIM's objective is to protect, enhance and

Figure 12: Vineyards in the Autonomous Province of Bolzano – Castel Marengo (Foto: Francesco Geri)



wine production representing a niche market; vineyards generally located in highly valued landscape and tourist areas. These areas have been referred to by CERVIM as "Heroic Vineyards". CERVIM's activities include developing and carrying out research studies and experimental tests in order to propose scientific and technical solutions for the protection of the land dedicated to mountain viticulture, for the reduction of costs and to enhance the quality of grape processing and wine products. Moreover, CERVIM acts to coordinate and to support the mountain winemakers' interests in the institutions defining the rules of wine production (EU, OIV, AREV, Ministry of Agriculture), and to promote mountain vineyards quality products. Finally, CERVIM operates in order to organize the coordination of innovation in mountain

support areas sharing those specific features that are typical to mountain viticulture: a territory with morphological conditions (steep slopes, terraces) causing obstacles to the mechanization of work, high costs and threats of abandonment; difficult climate conditions; a

viticulture by facilitating the sharing of experience between technicians and experts in mountain viticulture in conferences of international relevance (e.g. : the yearly International Congress on Mountain Viticulture).

Initiatives aiming at the valorization of the wine production in mountain areas at the Italian level can also be recognized in the action of the Piedmont's section of UNCEM (National Union of Mountain Communities and Organization). UNCEM Piedmont also produced an "atlas of mountain vineyards" to describe the regional distribution of vineyards cultivated in mountain areas. In Piedmont there are currently 971 ha of vineyards cultivated on slopes with more than 30% gradient, 300 ha in areas at more than 500 meters above sea level and 548 ha cultivated in terraces.

More information: www.cervim.org/en/cervim-presentation.aspx,
www.uncem.piemonte.it/index.php?IDpage=532&IDcontenuto=383&lang=ita

The use of pastures has to be seen as an integral part of mountain farming. Nevertheless in recent years it is noticeable that pasture land is used less and less. Pastures are diminishing and over former pasture-land forests are expanding, not to mention that the quality of pasture-land is deteriorating. These changed influences result in different pasture use and also have an effect on biodiversity. The exceptional biodiversity of mountain pastures depends on the selective grazing of the animals and the various combinations of different species. Animals are generally an asset in the use of mountain pastures, but new breeds are often inappropriate for pasture use as they are selected for high production of milk and meat and have therefore, a high request for fodder. This development as well as technical changes in agriculture, disturbs the sophisticated, traditional system of mountain agriculture that relies on mountain pastures and transhumance. Nevertheless economic reasons (fodder and high quality mountain products), tradition and ultimately the positive impact of pastures on health of animals and humans still motivate some farmers to use pastures. Contemporary infrastructure, training of farmers and shepherds and accessibility are nevertheless

preconditions for successful pasture use. The difficulties of pasture use for example: strict rules, milk quotas, high investments, sales of pastures for non-traditional use, inappropriate animal species and others are tackled by different approaches such as subsidy systems, INTERREG projects (e.g. ALPINET GHEEP: alpine network for sheep and goat promotion for a sustainable territory development) or initiatives like regional or local projects and associations. Examples are the project Eco Region Alpe Adria or the organization AGRIDEA (organisation for the development of agriculture and rural areas in Switzerland), which try to strengthen the multi functional use of pastures. Cooperation, production of alternative products with labels, and the combination of mountain farming with tourism have been identified as key issues to ensure and enhance the motivation and success of pasture use in the system of mountain farming.

In the framework of the INTERREG project "Activate mountain pastures - new ways to diversity" (Project "Almen aktivieren – neue Wege für die Vielfalt") the pasturing on five formerly abandoned pastures in the German-Austrian border area in order to protect the biological diversity and to strengthen regional identity, was started again. The goal of the project is to develop an optimal form of grazing from the perspective of nature conservation. The grazing shall ensure the conservation and development of the specific habitats for animal and plant species in an efficient way.

Various methods of activating the dormant pastures are tested and optimized. Experiences from other areas are incorporated into planning. Primary attention is given to the resumption of grazing and working with indigenous, rare and therefore location-bound breeds. By keeping the landscape open, diversification of vegetation structure and the preservation of rare breeds of farm animals, an active contribution to landscape and biotic resource protection is provided. Good practice recommendations for the valorisation of these aspects for regional development shall be developed.

The project is based on three pillars, which are linked together:

- nature and biological resource protection;
- socioeconomic aspects;
- environmental education and public relations.

The Swiss project AlpFUTUR also focus on the management of pastures; its priority is to open perspectives for the holding of Swiss mountain pastures at mid and long terms (10 to 40 years)³⁷.

Forestry

Forests are one of the formative landscape elements in the Alps where almost half of the area (45,5%) is covered by woodland (Tappeiner, Borsdorf, Tasser, 2008). In the alpine scale, forest areas are greatly increasing. Between 1993/1995 and 2004/2007, forest area increased to 9,1% of the alpine space. This increase is even higher in the Southern Alps (9,8%). Because of this expansion, deposit wood stock is increasing by about 2 million m³ per year.

Wood is one of the rare natural resources of mountain areas. But mountain forests are nowadays under-exploited, with a general tendency towards ageing which can endanger the planting durability and the soil stability. Barriers and obstacles for better exploitation of the mountain forest include: restricted accessibility, lack of skilled manpower, lack of dynamism in the regional sector, fragmentation of the area in private forests, and difficulties concentrating supply in public forests (Morel-a-l'huissier, 2008). Establishing a functioning timber industry is particularly important in places with difficult access or on steep slopes to ensure that the woods continue to fulfil their protective function. The need for better cooperation along the supplychain has been recognized in several alpine areas. The wood cluster of Salzburg is a good example. Within this cluster, 1.300 enterprises stemming from forestry, sawmills, paper-industry, building and housing work together. Tourism has been recognised as a main sector for

³⁷ www.alpfutur.ch

commercialisation of wood products, thereby creating a synergy between forestry and tourism. The cluster works in close cooperation with numerous research institutes specialized in the wood sector and thus enables innovation. The transfer of knowledge is done via information and vocational training, which are also important elements of the work of this cluster initiative³⁸.

Forests and the use of wood offer attractive job opportunities for mountain dwellers. The combination with an employment in agriculture or other activities is also possible. In Switzerland, 82.000 people (3% of all employees) are employed along the value chain from forestry to the wood-transformation industry. Forests offer an important opportunity for the use of wood as carbon-neutral, renewable energy as well. Forests provide numerous ecosystem services. The recreational aspect is one of the most important³⁹.

Additional to the economic function of forests and their role in storing CO₂, they serve as a natural protection against natural disasters. Large parts of mountain forests are protective forests, which safeguard settlements and communication lines (roads and railways). These protective forests need to be exploited in order to maintain their functions. A protective forest without intervention will lose its functions, then trees will get too old and weak. As protection against natural hazards like landslides, avalanches etc. they are a public benefit, the maintenance of protective forests requires public subsidies.

The different aspects cited within this paragraph, ranging from landscape, economy, and leisure to protection against natural hazards, clearly underlines the multifunctionality of mountain forests.

³⁸ www.holzcluster.at

³⁹ www.bafu.admin.ch/

Good practice 31: Adaptive management strategies of the Austrian Federal Forests, Austria

On the basis of the question of how current and future site management can work, drafts for adaptive management strategies have been developed by the Institute of Silviculture (University of Natural Resources and Applied Life Sciences, Vienna) for selected types of stands of the Austrian Federal Forests, within the framework of the ADAPT project. To ensure high practical relevance of the results, practical knowledge from forest planners and relevant employees of the Austrian Federal Forests was included from the beginning of the project by means of a participatory process. The results have already allowed conclusions to be made about the development of trees and tree species under different climatic conditions. At a strategic level the findings help to assess the extent and urgency of necessary adaptation measures. According to the findings of ADAPT, the silvicultural guidelines of the Austrian Federal Forests have been adapted. Moreover, the Austrian Federal Forests organise regular workshops for in-house training with forest district employees in order to pass on the knowledge gained from ADAPT. The project underlines the importance of sustainable forest management, especially in the light of climate change.

- Interreg IV B Alpine Space: Baden-Württemberg and Bavaria are involved in the project MANFRED to develop management strategies for the protection of mountain forest ecosystems and risk prevention in the light of climate change.

b) Further Projects:

- "Network Mountain Forest" (Interreg III C): development of a multinational network to develop and support a common mountain forest policy.

- Digital delimitation and evaluation of FFH-habitats in mountain forests.

Good practice 32: INTERREG projects in the field of forestry, Germany

a) Interreg IV A and IV B:

The Free State of Bavaria develops the basis for an improved management of the mountain and protected forest jointly with Tyrol and Salzburg and thus contributes to the development of rural areas with the following R&D projects:

- Forest Information system Northern Alps - WINALP: detailed information about location factors and growth conditions for appr. 300.000 ha of mountain forest, digital maps of forest types, guidelines for a location-targeted cultivation of mountain forests and adaptation scenarios for climate change.

- "Standortsicherung Kalkalpin – SicAlp": the aim of the project is the development of cross-border strategies to maintain or restore the protective function of mountain forest sites in the Bavarian and Austrian Alps.

Good practice 33: Development of an approach for constructing wood: the certification "Bois des Alpes" ("Alpin Woods"), France

The members of the alpine wood sector have realized that the woods of the French Alps were undervalued in the building activities, particularly because of increasing competition with imported wood (in 2005, 71,6 M€ of imported timber mainly from Germany and Finland), and because of extra costs from operating constraints. In parallel, the construction market in France, particularly in the two regions Rhone-Alpes and Provence Alpes Cote d'Azur experiences a rising share of wood use, but often the wood materials used have travelled thousands of miles.

Moreover, it is necessary to say that beyond the lack of competitiveness, the stakes in the field of alpine wood are economic, social and environmental.

To meet these challenges, the Association "Bois des Alpes" was founded in July 2008, whose main objective was to develop an approach to better value the alpine forests and meet market expectations. It aims at creating a supply of quality products and exemplary services in terms of sustainable development called "Bois des Alpes".

The approach relies on a tool, the certification of products and services to ensure:

- The origin of the wood from the French Alps defined by decree;
- specifications and compliance with standards (eco-certified wood in terms of sustainable management PEFC, structurally classified, dried, CE marked);
- local processing of timber products.

To enter a phase of launch operations, the certification "Bois des Alpes" needs to be tested in pilot operations of wood construction. The developers have at their disposal a tool to integrate local wood into their construction projects, and that is why many projects emerge and integrate with the aim of achieving the certification "Bois des Alpes". The first one is the multipurpose building with a low energy consumption rate in Saint Jean d'Arvey (Savoy).

Altogether, nearly 16 projects are part of this experimental stage.

A network consisting of ten "best buildings" is to be put in place to promote these exemplary local alpine wood constructions.

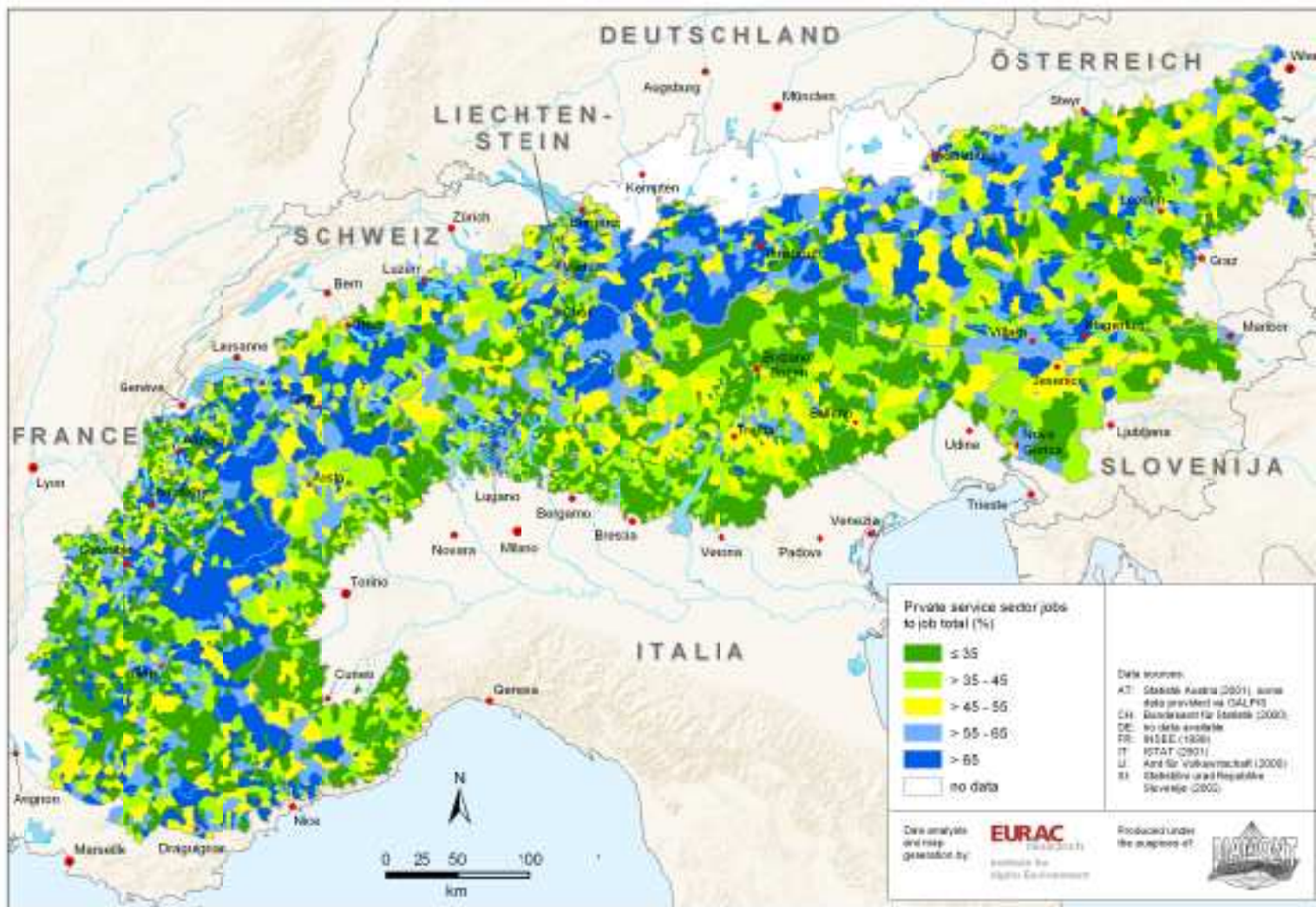
More information: www.boisdesalpes.net



B.3.3 Tertiary sector: tourism and leisure

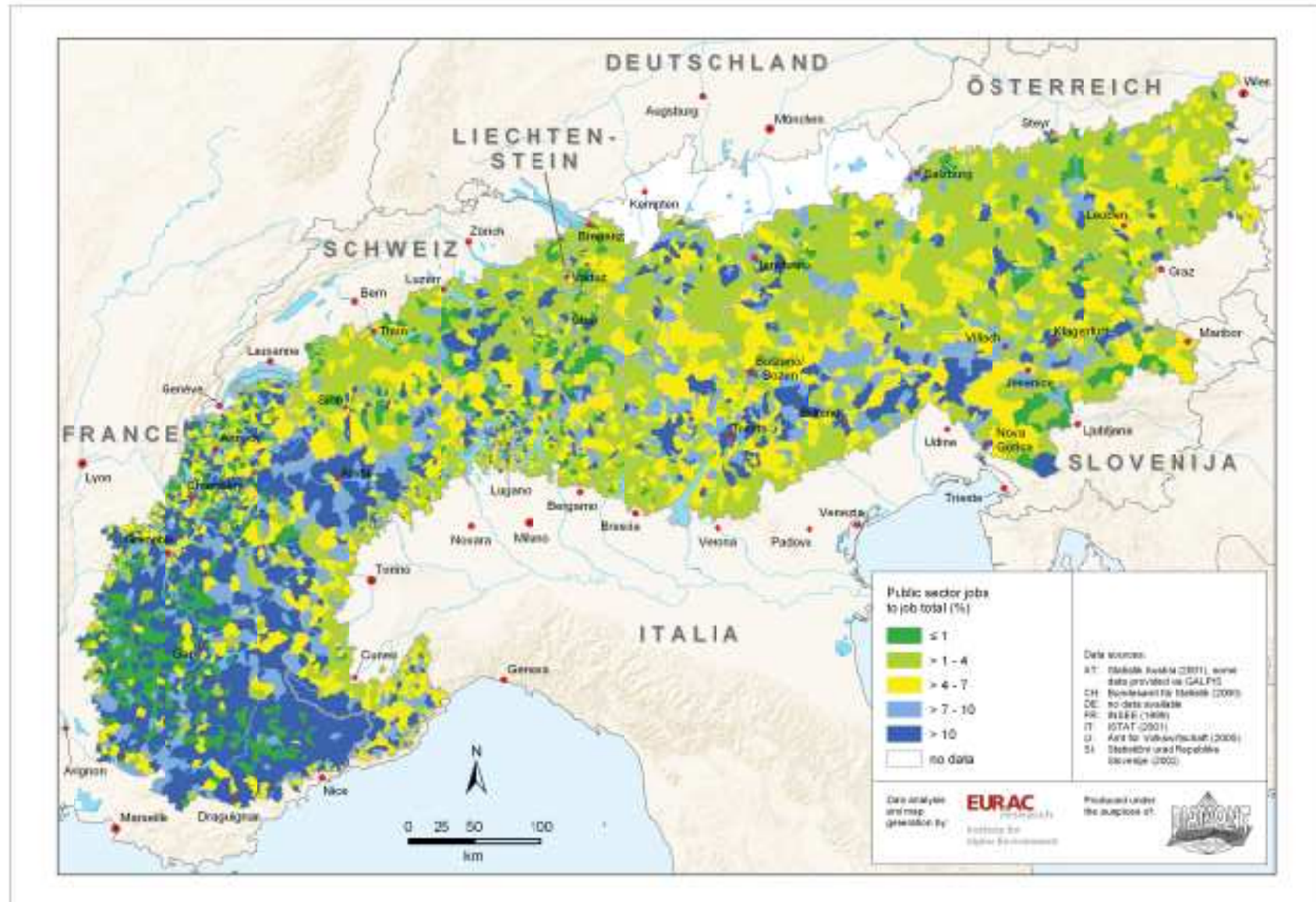
Today, the Alps are one of the most popular recreation spaces in Europe (Fleming, 2004). At first, this activity complemented other economic branches but gradually it developed to the extent that it became indispensable and the most important economic sector for many alpine areas. Nowadays, many rural mountain regions are characterised by well-developed tourist industries. Two types of tourism accommodation can be distinguished: the first type of accommodation is based on

smaller family-run hotels and farm tourism, while the second type refers to large centres almost exclusively focused on tourism and extensive hotel complexes that often drastically change the appearance of the alpine landscape. A classification of intensive and less-intensive mountainous and non-mountainous municipalities shows the tremendous differences in intensity levels. Moreover it reveals that the regional processes in tourism development have run for a long time towards further concentration.



Map 20: Private service sector jobs (DIAMONT)

©Tappeiner, Borsdorf, Tasser (Herausgeber) Alpenatlas, Spektrum Akademischer Verlag, Heidelberg 2008



Map 21: Public sector jobs (DIAMONT)

©Tappeiner, Borsdorf, Tasser (Herausgeber) Alpenatlas, Spektrum Akademischer Verlag, Heidelberg 2008

Tourism plays an important role in the Bavarian Alps, which in some municipalities results in a mono-structured economy. In Austria, tourism is a core element of the service sector in the mountain area, in particular in the western part of the Alpine area. In 2004, tourism generated 9% of the total Austrian GDP (Gross domestic product), and a wider concept of tourism-related activities, combining accommodation and services with the leisure economy accounts for more than 16% of national GDP. Many rural areas – mostly in mountain regions – are characterized by well-developed tourist industries. 67% of all overnight stays were in western Austria.

In Switzerland, about 151.000 full time equivalent jobs are generated directly or indirectly by the tourism economy. It represents 4,2% of the overall employment. The share of tourism for the macroeconomic gross value between 2005 and 2008 was consistently 2,9% (Secrétariat d'Etat à l'économie Suisse, 2008). Tourism is very important for equilibrium between strong and weak economically developed regions. More than 60% of the whole tourism frequency is attributed to pre-alpine and alpine regions. Tourism brings in a large proportion of mountain valley labour and income and counteracts rural emigration trends. In many places, mountain agriculture can only be maintained, because tourism is bringing in additional salaries in the rural space.

Moreover, for least developed regions the expansion and re-focusing of tourism strategies was an attractive priority in regional programmes. In Slovenia for example, the plan and policies of Slovenian tourism (DPPST 2007–2011) sets out three quantitative objectives: raising the volume of the tourism infrastructure, raising the volume of arrivals and overnight stays, improving the visibility of Slovenian tourism and three qualitative objectives: decentralisation of tourism, reduction of seasonality, and promotion of changes. The basic measures and activities of the annual tourism policy

are focused on ensuring successful and sustainable development of tourism, promoting SMEs start-ups and implementation of the investment cycle within the planned scope, promoting the development of human assets in tourism and stimulating an increase in quality of tourist goods and services.

In France, until the beginning of the 21st century, the tourist activity benefited from a strong administrative support from the state. ODIT France (Observation, Développement et Ingénierie Touristiques) has been created and its Direction for studies and tourist planning in mountain areas has participated in the implementation of the policies concerning the mountain area of the Ministry of tourism.

During a period of strong development in the 80's, new resorts were established, nowadays these resorts have to be managed, promoted and commercialized.

The demand for mountain winter activities has also evolved. The consumers are not looking for a mere ski offer any longer, even if this activity remains the principal one. Thus, the resorts develop new facilities concerning relaxation, not only to satisfy their clients (a part of whom cannot afford these activities) but to stay competitive and to keep their market share. Since the demand for "ski winter holidays" is very high, the resorts still have an isolated approach without creation of cooperative and complementary offers with other resorts.

In this context, we can talk about the development of the product range more than of diversification.

Through these tendencies, tourism spreads in a larger territory than the resort itself. Ski resorts remain the attractive point of the territory. Many tourists prefer looking for accommodation in smaller and more authentic places than in bigger resorts and diversifying their activities within the surrounding territory.

This is dynamic, and more complex than the "resort-tourism", and needs to be structured: in the Alps it is called the tourism of valley territory (*espace valléen*).

Thus two tendencies concerning the evolution of winter tourism in the French Alps can be underlined:

- opening up of the territories: the winter tourism does not take place within the limited extent of the ski resort but diffuses towards a larger territory and has economic consequences at this larger scale.
- due to the influence of powerful economic parties (groups of ski lifts, group for the promotion of ski), the ski resort keeps its primary role but still structures the territory.

This tendency of opening up the tourism to a larger territory than the ski resort also finds support in the public policies. For example, in 1995, the region Rhône Alpes founded the **enterprise-resort contracts**, which had the positive effect of creating coordination between all the stakeholders of a tourist destination and thus aimed at creating a solid marketing offer.

These contracts evolved in 2003 towards the contracts of medium resort (medium sized and in medium altitude), which allowed an extension into the territories around the stations and the available resources, and more recently (2008-2013) towards the project of a sustainable resort.

With these projects, the region Rhône Alpes wants to support the mid-mountain resorts progression towards a new economic model that respects the principles of sustainable development and is less dependent on snow and the skiing offer. The mutual benefit for

different stations co-existing in the same territorial boundaries is taken into account. The territories of the regional natural parks correspond to this new scale.

Through these different generations of contracts, guidelines clearly emerge in the direction of recognizing the strategic role of the simultaneous and consistent recovery of a variety of resources rather than just skiing (François, 2009).

The prevalence of mono-structured economies misinterprets the actual economic structures and in some cases might endanger the future development and contribute to imbalances in the valuation of rural amenities. **Recently, the inter-relation of mountain agriculture, landscape and tourism has been used to raise the specific feature of land use in the mountain areas.** Whereas in some places the tourist intensity and/or economic structure implies acute forms of utilization this conflicts with, other areas which remain threatened by economic decline and a population exodus.

Tourism also has to face social and environmental changes. Thus, due to climate change, many alpine ski resorts are facing severe problems with the availability of snow. In most of the ski resorts artificial snow facilities were extended in past years. There are attempts to focus more on other forms of tourism like wellness, hiking, and cycling that are not dependant on snow, but in most cases, the traditional ski resorts are still concentrating on snow-tourism.

B.3.4 Industry and secondary sector

The importance of the secondary sector for the alpine areas tends to be overlooked – and thus underestimated. This is also due to the fact, that very few analytical studies are available on that topic for the whole alpine arc. Starting from the end of the 19th century, the Alps became largely industrialised. The alpine areas attracted industries because of the availability of energy (hydropower) and manpower. Some industries were also placed in the Alps for political, strategic and military reasons. The increased accessibility by train and road enabled long distance transport of raw materials into the Alps to be transformed and then re-transported out of the Alps. Together with the increasing tourism, the industrialisation of the Alps profoundly changed the economic and social situation of the Alps from a rural society based on agriculture to a modern society.

Today, the secondary sector still plays a major role in different areas of the alpine arc. The share of the secondary sector in the overall number of jobs exceeds 50% following the southern border of the Alpine Convention perimeter in Italy and Slovenia. The high influence from the industrial centres in Torino, Milano, Brescia, Verona as well as the high share of industry in Slovenia can be seen on the map. Also in numerous municipalities situated in inner alpine valleys the secondary sector represents more than 50% of the total number of jobs. Those industrial enterprises play a crucial role for the labour market not only for the municipalities where they are located but also for the surrounding municipalities.

Since the 1980's, the industrial sector in the Alps has undergone a period of crisis. Energy has become ubiquitous and is no longer a location factor in favour of the Alps. As for every other location in Europe, competitiveness is from the far-east which is able to rely on a cheaper workforce. Leading industries like aluminium forging in the inner alpine valleys, the heavy metal industry in

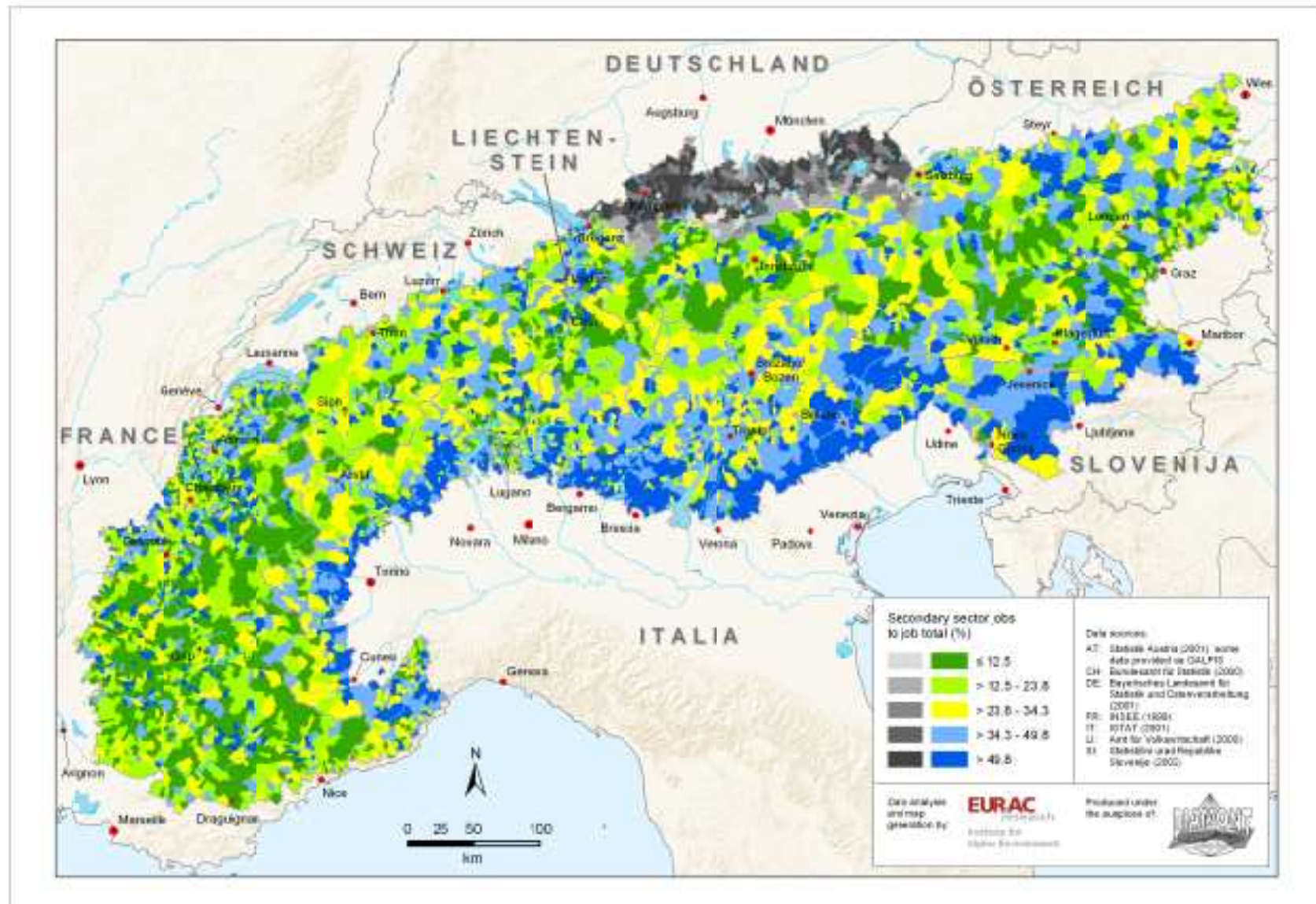
Styria and the textile industry in eastern Switzerland and Vorarlberg had to close down or diversify as production was transferred to other regions. The labour market in the respective sites was heavily affected and a loss in population was the consequence. Public intervention was often employed, mostly through promotional economic activities, to encourage a process of transformation for the industrial sector. This process is still ongoing -. Some success has been achieved, such as: from Styria, Valais, Central Switzerland and other regions. As an example, the former VÖEST steel forging enterprise, which previously relied on the defence sector and shipbuilding industry, has successfully diversified into other activities like mechatronics, automotive production and railway production.

One of the keys to mastering this transformation process is innovation. While bigger enterprises may have their own research and development departments (R&D), smaller enterprises rely on external input. Cooperation with universities and schools of applied sciences are very fruitful as can be seen from the cases of "The Ark" in Valais and the "Micro Center Central Switzerland" in Obwalden (see chapter II.2.1 and II.2.2). Public authorities can encourage this process of transformation by relieving the transfer of technology and knowledge, by reducing the administrative burden for the companies, by influencing the labour market, by providing an appropriate educational system, by promoting the economy etc. Mountain areas must be promoted as an attractive place for living and working so as to attract and maintain skilled workers.

Innovations are closely linked to technological and organizational developments. The success and competitiveness of enterprises and the future of workers depends crucially on them. To safeguard that the technological and organizational developments are successful, they must be understood, accepted and learnt by the workers. Lifetime learning plays an important role. The Bavarian State Government supports the professional

training of employees in particular from small and medium-sized enterprises with resources from the European Social Fund and its own funds. From 2007 to the end of May 2010 over 120 projects were funded with a total budget of 5,9 million €.

The industrial sector in the Alps is on the way towards becoming a high-tech-sector, which is more and more independent of alpine specific resources like water and energy.



Map 23: Secondary sector jobs (DIAMONT)

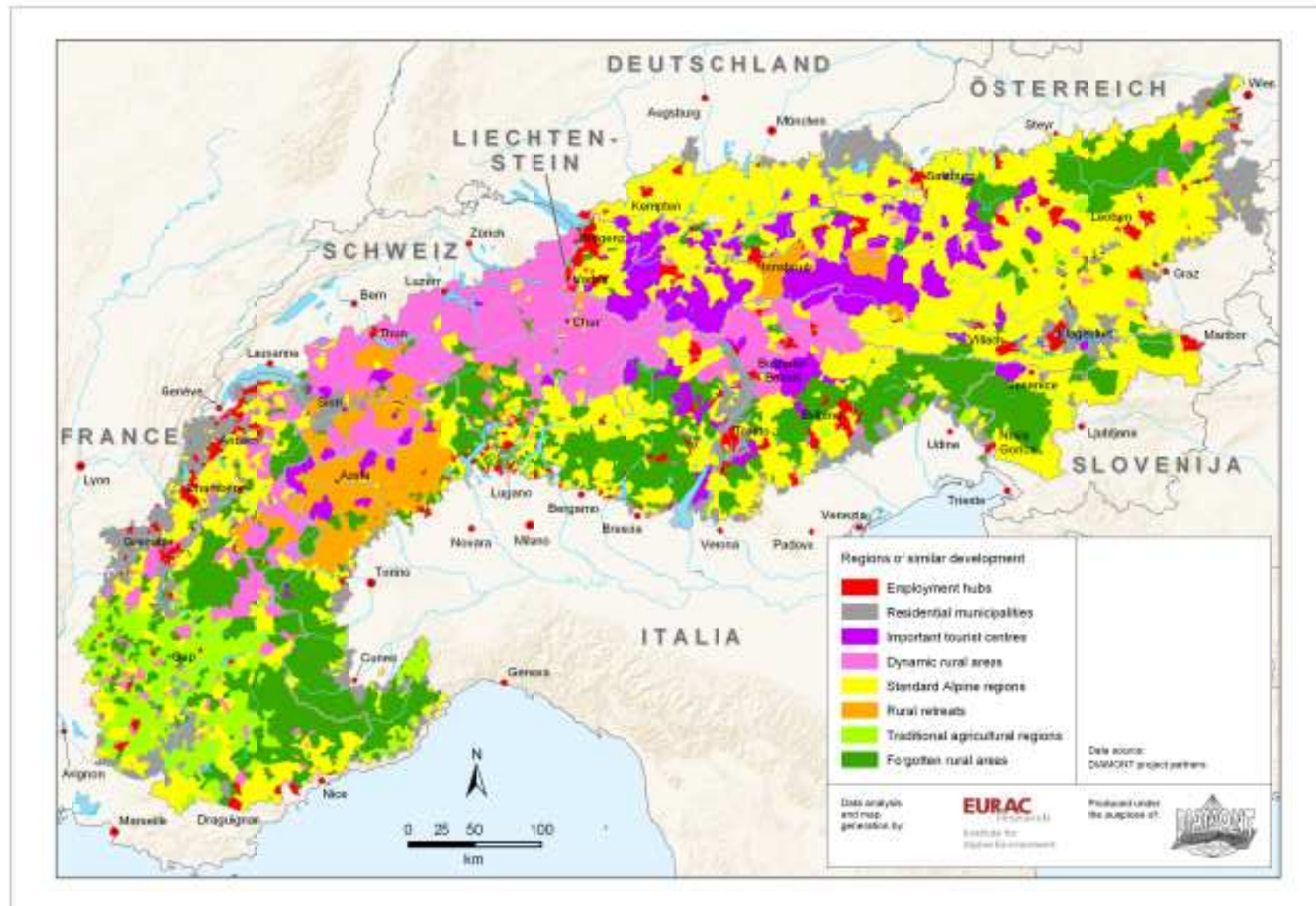
©Tappeiner, Borsdorf, Tasser (Herausgeber) Alpenatlas, Spektrum Akademischer Verlag, Heidelberg 2008

B.3.5 Marginalization and urbanization – key trends in the Alps

One of the most significant trends observed in the Alps is the polarization between marginalization and urbanization. Areas where agricultural land use has been abandoned, where neither tourism nor urbanization occurs are adjacent to more active ones, confronted with urbanization or intensive tourism. As a result of structural change, younger people tend to move away, so that the region faces ageing, depopulation and isolation. The EU tries to stave off these effects by providing subsidies, which seem to slow this process down, but

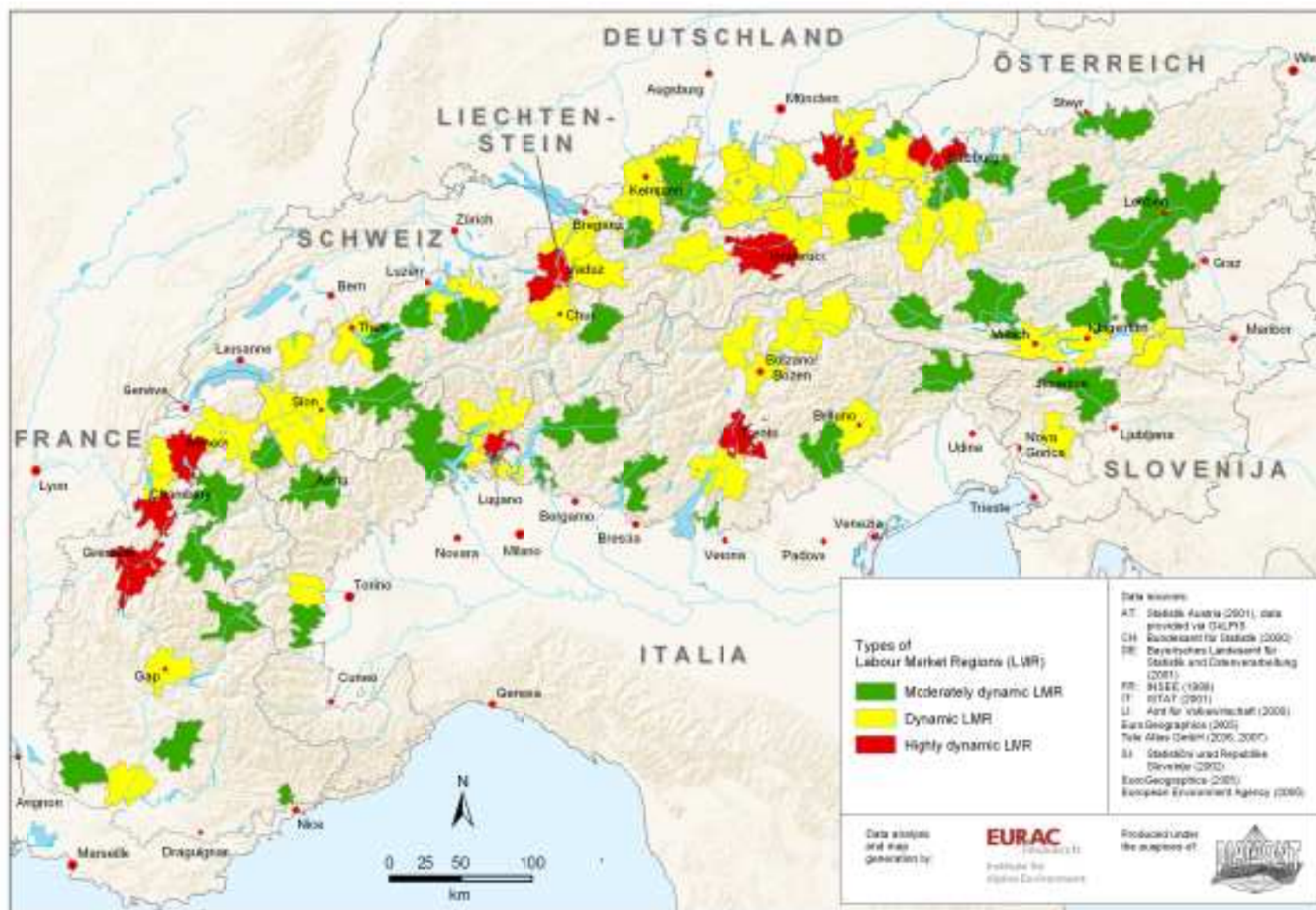
do not reverse or stop those peripheral areas from becoming more and more marginalized. Moreover, these subsidies are not a viable solution in the long term and only a more complex action can lead to a new role for mountain territories in the global market.

On the other hand, agglomeration processes in more favourable areas occur. This urbanization takes the form of a sprawl at the edge of the agglomerations; filling up the main valleys with peri-urbanization. The concentration of the population in the main valleys and near traditional urban centres, contrasts with the loss of population in remote locations.



Map 24: Regions of similar development (DIAMONT)¹

©Tappeiner, Borsdorf, Tasser (Herausgeber) Alpenatlas, Spektrum Akademischer Verlag, Heidelberg 2008



Map 25: Development of labour market regions (DIAMONT)¹

©Tapeiner, Borsdorf, Tasser (Herausgeber) Alpenatlas, Spektrum Akademischer Verlag, Heidelberg 2008

B.3.6 Compositional changes in population

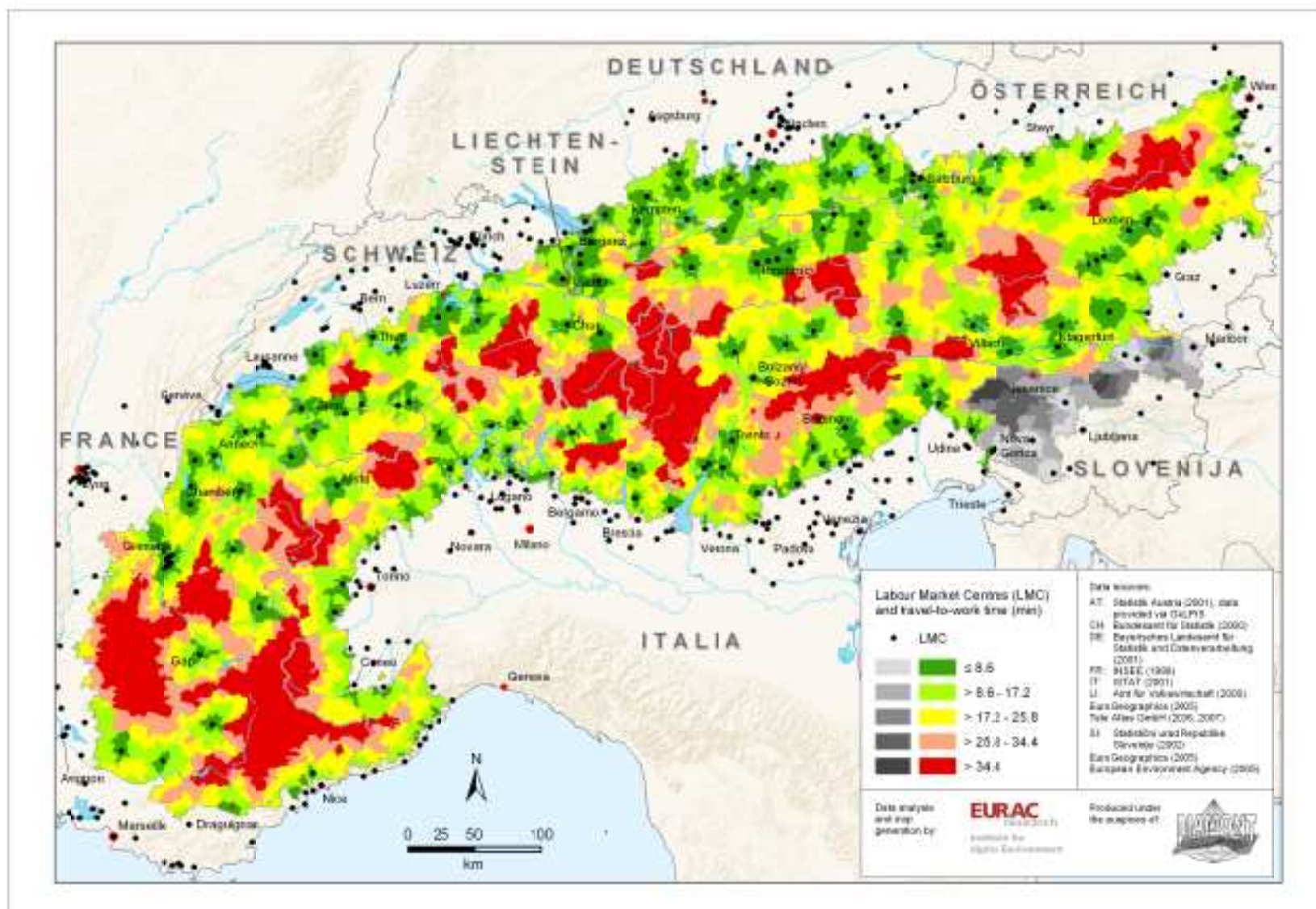
Behind the stark figures, which measure the declining or growing number of inhabitants or even the structural ageing of the Alpine population, lie compositional changes. An all-important issue is represented by this compositional change, which many upland communities are experiencing in their populations owing to the "immigration" of new inhabitants, generally younger than the majority of the local population, mostly coming from the lower reaches of the Alps or indeed from the cities in the plains, and quite often, also from afar. Needless to say, these compositional changes must be especially pronounced in those areas where the population is growing in spite of a negative or at best stationary natural balance of births and deaths. But even in those municipalities where the number of inhabitants is falling there are these flows of immigration⁴⁰.

Although studies are still few and far between, there seems to be evidence that quite often these "new highlanders" are those who are most active in finding ways to revamp local economies. Somewhat paradoxically, these newcomers may also be those who are keenest to defend and revitalise local traditions and cultures and to promote a revival of local craftsmanship as part of a more general attempt to preserve the cultural heritage and strengthen local identities. Quite often they are, in a word, those who try to devise and promote "good practices" from below, possibly blending tradition and creativity.

Unfortunately, this largely novel socio-demographic phenomenon is still under-researched: thus, little is known, both about its varying intensity in the various parts of the Alps, and its entrepreneurial potentialities and about the relations between "old" and "new" highlanders. The impression is that its volume has grown considerably and possibly at an accelerated rate, over the past few years. Therefore, this issue should be

mentioned as a still unknown-quantity, which is likely to play an important role in the rural development in the Alpine region.

⁴⁰ www.dislivelli.eu



Map 26: Labour market centres and travel-to-work time (DIAMONT)¹

©Tappeiner, Borsdorf, Tasser (Herausgeber) Alpenatlas, Spektrum Akademischer Verlag, Heidelberg 2008

Conclusion 8:

As topography plays a key role in the population density pattern of mountainous regions, most of the Alps (around 80%) are unsuitable for permanent human settlement. However, some valleys have reached population densities similar to those in densely populated urban centers.

Conclusion 9:

One of the most significant trends observed in the Alps is the polarization between marginalization and urbanization. As a result of structural change, younger people tend to move away, which means that the region is faced with ageing, depopulation and isolation (brain-drain).

To lessen demographic imbalances and polarization trends, which tend to undermine economic development, integrated strategies and better coordination of sectorial policies are required.

Conclusion 10:

In order to limit the brain-drain and facilitate job matching in rural areas,

- networking between cities and peripheral regions;
- promotion of traditional mountain products;
- collaboration between agriculture and other economic activities;

should be encouraged.

Conclusion 11:

Towns and their surrounding rural areas are complementary spaces. Through cooperation they are able to create added value and improve their quality of life, especially through accessibility to services of general interest and a proper balance of economic power.

Conclusion 12:

Planning areas have to be adapted in order to integrate urban and surrounding rural spaces into one common planning area (horizontal financial organization).

Conclusion 13:

Compositional change in upland communities of the Alps is a largely novel, and still under-researched, socio-demographic phenomenon. Thus, little is known about how this might vary in different parts of the Alps, what its entrepreneurial potential might be or the relations it entails between "old" and "new" highlanders. The impression is that there has been an increasing amount of compositional change, possibly at an accelerated pace, over the past few years. This phenomenon is still an unknown factor, but one which is likely to play an important role in Alpine rural development.

Bibliography

BMVIT – Bundesministerium für Verkehr, Innovation und Technologie, 2002

Verkehr in Zahlen – Österreich. Wien.

Hornung, D. & Röthlisberger, T., 2005

Eidgenössische Volkszählung 2000 – Die Bergregionen der Schweiz. HORNUNG Wirtschafts- und Sozialstudien (Bern), im Auftrag des Bundesamts für Statistik. Neuchâtel.

EUROSTAT, 2004

Table on Population Density.

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1996,45323734&_dad=portal&_schema=PORTAL&screen=welcomeref&open=/C/C1/C11&language=en&product=Yearlies_new_population&root=Yearlies_new_population&scrollto=0

Fleming, 2004

The Alps and the imagination, *Ambio* 13, p. 51-55.

François, 2009

"La diversification en station de moyenne montagne: entre impératif et déclaratif", in *Dur'Alps Attitude*, le réseau who's Alpes au coeur du développement durable.

www.duralpes.com/la-diversification-en-station-de-moyenne-montagne-entre-imperatif-et-declaratif/.

INSE – Institut National de la Statistique, 2001

Les migrations en France entre 1990 et 1999. INSEE Première N° 758.

Knickel K., Tisenkopfs T. and Peter S., 2008

Innovation processes in agriculture and rural development, results of a cross-national analysis of the situation in seven countries, research gaps and recommendations Sixth framework programme.

Morel-a-l'huissier, 2008

Rapport sur le bilan de la politique agricole et forestière en faveur de la montagne.

OECD, 1994

Creating Rural Indicators for Shaping Territorial Policy, Paris.

ÖROK 2004 and 2007

Austrian Conference on Spatial Planning

Permanent Secretary of the Alpine Convention (ed.), 2007

First Report on the state of the Alps "Transport and mobility in the Alps", Innsbruck.

Ruffini F.V., Streifeneder T., Eiselt, B., 2004

Definition des Perimeters des Alpenkonvention. Teilprodukt zum Forschungsvorhaben 203 13 225. Umweltbundesamtes, Berlin.

StMWIT, 2004

Bayerisches Staatsministerium für Wirtschaft, Infrastruktur, Verkehr und Technologie (ed.),
15. Raumordnungsbericht. München.

Uncem-Censis, 2002

"Il Valore della Montagna – Rapporto di Sintesi",
online: http://www.ilforestale.org/documenti/censis_uncem_-_il_valore_della_montagna.pdf.

Varotto, M., 2004

Montagna senza abitanti, abitanti senza montagna: le recenti tendenze demografiche e insediative nell'Arco Alpino italiano (1991-2000). In: E. C. Angelini, S. Giulietti, F. V. Ruffini (eds.): Il privilegio delle Alpi: moltitudine di popoli, culture e paesaggi, Accademia Europea Bolzano/Bozen.

Zanolla G., Ruffini F. & Streifeneder T., 2007

Demographic dynamics in the Alpine arch: trends and future developments with special focus on Italy. International conference on Regional and Urban Modeling. Brussels.

B.4 Climate Change as a driver for sustainable rural development

The Alps are particularly sensitive to climate change. According to temperature measurements over the past centuries, the warming in the Alps over the last century exceeded 1,5°C, which is more than twice that of the global warming average. By 2050 the temperature is expected to rise a further 1,0°C to 3,5°C.

As the OECD report "Climate Change in the European Alps – Adapting Winter Tourism and Natural Hazards Management" confirms, the effects of climate change in the Alps are three times higher than the world average due to its topography. Besides this significant rise of temperature, even the precipitation regimes will change. There will also be a variability of the precipitation and wind regimes.

Today, climate change is a fact in the Alpine space and its various impacts are already more visible than elsewhere: melting glaciers, rock instability due to permafrost melting, higher variability of wind and precipitation. These early occurrences make the alpine area a model region on how to cope with climate change.

The Alps are not only a natural space consisting of a sensitive ecosystem, but moreover a densely populated (14 million inhabitants in approximately 200.000 km²) area where numerous economic activities take place. Important economic sectors such as the tourism industry, energy production and agriculture are crucial for the rural development of the mountain areas. Besides other factors (lifestyle, financial crisis, new technologies, etc.) economic activities are directly and indirectly affected by climate change.

Climate change threatens winter sport destinations especially in low-altitude destinations, which strongly focus on winter tourism. Water scarcity as a consequence of climate change could reduce energy

production and thus create conflicts of interests between different end users like the energy industry, agriculture and private consumers. On the other hand, climate change also offers new potential and opportunities, for example in agriculture where due to new weather conditions new products could be cultivated. Therefore, besides the undisputed negative impacts, we should also take into consideration positive impacts, which could be expected for the future.

These already occurring challenges have made adaptation measurements necessary. Thus experiences on required adaptation measurements are already available and could be shared in the future even with other mountain areas. Nevertheless, there is a need for further studies as well. To face the challenge of climate change in an effective way, adaptation and mitigation measures should go hand in hand. The alpine space should be prepared for upcoming scenarios. But at the same time, all efforts should be made to reduce negative impacts of climate change in the future.

B.4.1 Impacts and consequences of climate change and the need for adaptation and mitigation

The five policy-sectors mentioned below, relevant to rural development, are expected to respond most sensibly to global warming.

a. Water management

The IPCC report predicts less precipitation in summer and more in winter time. Therefore water scarcity could occur most probably in the Southern Alps during the summer months July, August and September. Water scarcity could in the long term be intensified by the diminution of glaciers. New conflicts of interests could emerge especially between the principal water consumers, the energy industry and agriculture. In order to guarantee an efficient and fair water distribution, an integral water management system has to be put in place. There is also a need to find solutions for the prevention of upstream / downstream conflicts which could emerge as a consequence of water scarcity. Moreover, to avoid water waste new techniques in irrigation could be implemented and the capacity for water storage could be expanded. In order to avoid damages to the ecological system, any adaptation measures should take into account ecological criteria such as habitat characteristics, biodiversity or aquatic life quality. Generally, adaptation measures should satisfy the demands of sustainability. Not only is the water quantity a challenge, but so is the water quality.

b. Agriculture

Global warming is expected to affect agriculture very differently depending on the region. In general, the effects of climate change on agricultural production depend on the interactions between changes in temperature patterns, the length of the growing season, water availability, and pests and diseases. Still, information with regards to these aspects is scarce.

On the one hand, global warming is likely to increase the frequency and intensity of extreme events, like drought or heavy rain. The first will lead to an increased water demand. The latter will reinforce erosion. Adaptation measurements could be expanded, for instance, irrigation systems and an improved soil protection.

Impacts can also be expected from the likely increase in the spatial distribution and intensity of existing pests, diseases and weeds due to higher temperatures and humidity (European Communities, 2008). Furthermore, higher temperatures result in greater water consumption by livestock and more frequent heat stress for the animals (EEA, 2009).

On the other hand, rising temperatures will extend the vegetation period and consequently result in higher turnouts. Adaptations that have to be done are changes in the planting season and in cultivating new types of plants. Plants such as for example: cherry trees, vineyards or chestnuts will be able to grow in the future in certain areas of the alpine region as well. And new domestic species like the rainbow trout would survive in higher altitudes. Hence, new economic opportunities and perspectives could emerge for mountain farmers.

c. Tourism

Tourism as a cross-cutting sector is primarily affected by climate change, particularly because of decreasing snow availability in lower areas, increasing bad weather periods and heat periods, diminution of glaciers and melting of permafrost, possible landscape changes and more frequent natural hazards. Changing climate conditions are contributing a great deal to the attraction of tourist destinations. They have direct effects on traveller's behaviour and thus influence the demand in tourism.

On the one hand, in winter, higher temperatures lead to a significant rise of the snowline. This implicates a decrease in the number of ski resorts with reliable snow conditions. Therefore, reliable snow conditions in the future, allowing winter

sport activities even in lower altitudes, could only be guaranteed at very high costs. Furthermore, artificial snow-making results in significant environmental risks. It not only consumes huge amounts of water and energy, but there is a destruction of soil caused by the installation of water lines and other infrastructure.

On the other hand, as an effect of climate change, warmer and drier summers may increase the number of tourists choosing to holiday in the Alps instead of the Mediterranean regions and urban areas, which may experience less favorable temperatures (Müller and Weber, 2008). New tourist offers in the summer season could take advantage of this summer freshness.

Ongoing melting of permafrost increases the risk of damage to infrastructure and the emergence of natural risks. Natural hazards will increase the extent of losses and could also lead to challenges with regards to the image of Alpine tourist destinations.

d. Spatial planning and natural hazards

Global warming increases the risk of natural hazards:

- intensified precipitations favour the occurrence of land slides and slope instability;
- melting permafrost reduces the stability of mountain slopes;
- warmer summers provoke heat stress for people, animals and plants and have consequences on human and animal health;
- summer aridity influences forestry, agriculture and the availability of water resources.

Not only is the climate a threat to the society, but social developments play a crucial role too. As a consequence of increased settlement pressure in the past, areas with higher disaster risk have been settled. Additionally, because of increased social wealth, constant higher material assets are being exposed to risks. Disaster risk has increased and the alpine population has

become more sensitive to natural hazards. Depending on the future development of alpine societies, the impacts of climate change could be amplified or mitigated.

e. Energy

The energy sector is generally considered to be more strongly influenced by factors such as economic growth or technology development than by climate change. But climate change has a stronger impact on energy production than on other sectors of industry (Occc/ProClim, 2007; Wilbanks et al., 2007), since it alters both the energy demand and water availability.

In hotter winters the energy demand for heating will decrease substantially, whereas the demand for cooling will increase (EEA, 2009). In the long term, the latter might offset the reduction gained from less heating (EEA, 2009). This will later lead to a shift in demand of energy in the form of heat towards electricity (EEA, 2009) and to changes in the seasonality of energy demand.

Concerning the water availability, in the short term, hydropower production could benefit from additional water from the melting glaciers. In the long term, however, considerable changes for hydropower production are expected (BFE, 2007a; Occc/ProClim, 2007).

Rising water temperatures could have a negative impact on nuclear power (as for example in the summer 2003, when nuclear power plants in Switzerland had to be turned off during certain days) (EEA, 2009). Only modest information is available on the impacts of drought on biomass production for energy purposes (Eisenreich et al., 2005). On one hand, biomass production consumes large quantities of water and is thus negatively affected by drought events. On the other hand, the expected upward shift of vegetation belts, and higher CO₂ concentrations, could potentially lead to increased biomass production (BFE, 2007b).

Mitigation policies will create new opportunities for renewable energies. The

demand for CO₂-free energy will increase and it would possibly result in higher energy prices. At the same time technologies will be improved. Both developments together will favour the competitiveness of renewable energies.

f. Effects of climate change that could be considered as the most effective for rural development

As described above, global warming is challenging rural development in alpine regions in many ways: higher temperatures, precipitation variability, changes in landscape and an increased risk of natural hazards. To avoid damage to human lives and infrastructure, there is a need for an Alps-wide monitoring system and premature risk prevention. At the same time, occurring natural disasters have to be faced by implementing integral risk management strategies on national, regional and local levels.

With regards to tourism, existing attractions have to be examined and if necessary adapted to the new emerging conditions. Furthermore, there is a need for new tourist offers and further economic diversification.

In the energy sector, the increasing demand for CO₂-free energy sources as well as the current imperative for energy efficiency and renewable energies represents an interesting opportunity for rural development. Wood as an environmentally-friendly and regional resource is becoming more and more important for housing construction and as a resource for producing energy.

B.4.2 Rural development in the light of climate change impacts (risks and opportunities)

a. Existing activities and good practices in the Alps

The answer to climate change is twofold: mitigation and adaptation. To mitigate the climate change is considered to be a national, European or even global task, whereas adaptation strategies tend to be implemented on a macroregional, regional

or even local level. However, most of the adaptation strategies are implemented in a transregional or transnational cooperation. By this, regional and local situations can be taken into consideration without losing the interdependence and large scale interactions of the effects and impacts of climate change in the alpine space. The following three projects represent good practice examples of adaptation strategies. The initiatives are carried out by CIPRA (International Commission for the Protection of the Alps), the municipalities network "Alliance in the Alps" and by a transnational cooperation under the umbrella of the Interreg IV B Alpine Space Programme.

cc.Alps

The CIPRA-project "cc.alps" investigates climate measures in the Alps. CIPRA brings together climate

protection and climate adaptation activities in the Alps and analyses what effects these climate measures have on the environment, economy and society.

The "CIPRA compact" collection within cc.alps features various themed reports that deal critically with climate change and related topics and scopes of actions and measures in the Alps. The collection comprises the issues of energy, building and renovating, energy self-sufficient regions, spatial planning, traffic, tourism, nature hazards, nature protection, agriculture, forestry and water.

At the first stage cc.alps gathered and documented activities, which have already been implemented. As their impact was already visible it could be evaluated scientifically. A group of international experts defined fields of action and drew up a rating system to evaluate climate response measures objectively and systematically alongside the three dimensions of sustainability. The second stage was focussed on distribution of the scientific results to the general public in order to raise awareness of the impact of climate change within the alpine region. This research work was aimed at warning against those measures which do not comply with the principle of sustainability. But also – on a more positive note – by promotion of those measures which are considered sustainable and exemplary and therefore suitable for being transferred and to motivate other municipalities to develop and implement similar activities⁴¹.

Alliance in the Alps: dynalp² and dynalp-climate projects

The Alliance in the Alpine network fosters networking and an exchange of experience between municipalities in the Alps by

organizing different types of events at local, regional and international levels. The main purpose of the dynalp-climate project, which started in 2009, is to motivate the municipalities of the "Alliance in the Alps" for specific and concrete activities on a local level in the light of climate change. Moreover, policy positions for sustainable and environmentally sound adaption strategies for the municipalities should be formulated.

The municipal network aims to develop and implement a concrete action catalogue and to further strengthen a transregional exchange on efficient approaches and solutions. In the framework of dynalp-climate, the Alliance will distribute to its members information, consultancy and training, concerning the opportunities on how to cope with climate change. Dynalp-climate will also fund activities and projects, which contribute to mitigate the impacts of man-made climate change. By this means, the results and recommendations of the cc.alps project shall be put into concrete activities. The scope of activities is large, and ranges from technical measures (e.g. flood prevention), strategic aims (e.g. new tourism concepts) to awareness-raising activities.

The experience exchange among the member municipalities is a key element to achieve this aim. By this, a very direct exchange can take place, and in addition new projects shall be launched, including activities to protect the climate and to generate an added economic value for the municipalities at the same time, as protecting natural resources, cultural identity and strengthening the social integration.

In addition to this, the network will initialize a self-commitment of the municipalities.

⁴¹ www.cipra.org/en/cc.alps and www.cipra.org/en/cc.alps/about-the-project/about-the-project/?set_language=en

With this formulation of goals, the municipalities will be committed to engage themselves at local levels to improve climate protection. Specifically, municipality-specific target agreements will be developed based on a detailed catalogue of measures.

Dynalp², the predecessor of Dynalp-climate demonstrated the positive effects of targeted funding for regional development measures. Therefore, the municipality network aims, in the second phase of its project Dynalp-climate, at the financial support of selected climate protection and adaptation strategies⁴².

Interreg IV B Alpine Space: ClimAlpTour

The Interreg IV B Alpine Space project ClimAlpTour is dedicated to find suitable adaptation strategies for the tourism sector in the light of a changing climate. Tourism is one of the major economic driving forces in the alpine region; some municipalities are more or less dependent on tourism. As related activities are mainly outdoor ones, it is clear that a changing climate could have a heavy influence on them.

The main objective of ClimAlpTour therefore is to find ways of stabilizing and increasing the economic value derived from Alpine centres' potential, by developing visions and strategies specifically for traditional winter sport resorts in order to develop them into interesting and attractive tourist destinations all year round. The 18 project partners from Italy, Austria, Switzerland, Germany, France and Slovenia are jointly developing concrete adaptation strategies that will be used by civil services and stakeholders to face the new situation.

The partners are analyzing the possible effects of climate change on Alpine tourist areas, starting from model cases in different regions throughout the alpine area. Based on analysis, complementary to the typical ski- and winter sport attractions, other tourist products, which are not dependant on the

availability of snow, will be developed, with regards to new tourist strategies, e.g. wellness and spas, golf courses or nordic walking. However, it is clear that awareness rising campaigns for the local tourism boards and policy makers as well as for the population is quite important to pave the way out of the mono-structured winter tourism to other forms. Former ski-destinations need to think about new concepts and more integrative strategies as they may not be able to offer a "snow guarantee" in the near future.

By developing different tools and methods, ClimAlpTour will be able to provide to all interested parties, customized adaptation strategies based on information referring to every specific resort. The project will end in autumn 2011 and the results will make citizens, businesspeople and policy makers more aware of the changes to the climate and support them in identifying the most appropriate strategies to follow in the situation and to be able to act in a timely basis and on valid information⁴³.

b. Adaptation and mitigation activities are needed

Climate Change will affect the rural areas in the Alpine Space in a specific way. Compared to flatland areas in Europe, the mountainous rural areas face a stronger level of natural risks. Monostructured rural areas, based mainly on agriculture and tourism have no spatial and economic capability to compensate the foreseeable changes. Although from today's perspective the future impacts of climate change can hardly be predicted precisely, they certainly challenge rural development in the alpine region.

This pressure to act and react however also comprises development opportunities and promotes measures for sustainable rural development in the long term.

Only adaptation and mitigation measures based on sustainability can be successfully implemented in the long term. Energy, tourism and spatial development are areas

⁴² Montagna 12/2009, www.alpenallianz.org/en/projects/dynalp-climate-1/?set_language=en
www.alpenallianz.org/de/projekte/dynalp-climate/dynalp-climate-projektfoerderung/

⁴³ www.climalptour.eu/content/sites/default/files/ClimAlpTour%20_%20The%20Project.pdf

mainly affected by climate change, that's why in this field of action further effort is needed. Moreover, in the light of climate change, the relationship between agriculture, landscape and tourism would be interesting to analyse further.

Good practice 34: Good practices in sustainable mobility, Italy

Several cases of good practices in sustainable mobility can be considered in the Italian alpine areas. In order to give account of the various typologies, the cases analyzed within the following paragraphs are divided up in two main categories: a) Private mobility; b) Public mobility. Furthermore, in each of the above-mentioned categories, the analysis carried out follows a territorial criteria.

Private mobility

- *Car sharing*: car sharing is a system where a fleet of cars is jointly owned by users, in distinction from car rental or cars in private ownership. In Bolzano the users are organized as a no-profit cooperative, called "Carsharing BZ". The fleet is made available for use to members of the carshare group in different ways (in Bolzano: call center 24/7, website). The initiative is supported by: banks, local public transport companies, train operators (Trenitalia), the Bolzano municipality and the Bolzano Autonomous Province. Currently, there are more than 600 cities in the world where people can carshare.
- *Early warning SMS on traffic limitations and traffic stop due to atmospheric pollutants*: the so called "Early warning SMS on traffic limitation" is a service that informs the inhabitants of some towns in Alto Adige (Bolzano, Merano, Bressanone) directly on their mobile phones on traffic limitations due to atmospheric pollution. SMS service constitutes an advanced information system, which involves a broad public of car users.

Public mobility

Autonomous Province of Bolzano

- *Integrated Transport System (STI) for bus, trains (local and national) and cableway*: STI is a tariff system that allows the use of buses, cableways and local and national trains with a single ticket within the Province of Bolzano. STI has made it easier to use public transport.
- *Special tariff for travelling with bicycle on local trains*: The Province of Bolzano has issued a special ticket for people who travel with their bicycle on local trains. There is an economic advantage for frequent users who save more than 20% in comparison to the usual price. Each ticket allows you to carry the bicycle on local trains 10 times and costs 25 euro. This practice provides an incentive to use train and bicycle in combination. It can become an attraction for tourists who can visit the area by bicycle.

Friuli Venezia-Giulia

- *Service to call*: this service is run in some of the region's districts. The service to call concurs with the customers' reservation of a trip, at a specific hour and on a route in the days of his interest. This experiment has helped to reduce the number of buses and automobiles circulating in the territory because it becomes used as an "at home" service, similar to the one offered by a simple taxi.

Veneto

- *DolomitiBus*: DolomitiBus is a website active in the Province of Belluno where it is possible to plan a trip through the use of local transport. This project aims at improving the transport system and through this service, reducing the number of cars circulating in the Alpine territories.

Figure 13: The DolomitiBus fleet in the province of Belluno



- *Bike'n bus*: four daily bus runs have been activated on the Calalzo (railway station) – Cortina d'Ampezzo – Misurina – Auronzo – Calalzo circuit, from the 1st to the 31st of August and during the first weekend in September. These runs, which start in connection with the trains arriving from Treviso, Venice and Padua, are covered by buses equipped with a trailer for the transport of 30 bikes, which can be loaded and unloaded at special rest stops. This service aims at stimulating the use of bicycle travel within the Veneto Region. Through this service, the least fit trippers are assisted by bus over the longest and most strenuous stretches of the "Lunga via delle Dolomiti" bike track.

Lombardy

- *"Call and go" service*: is a free service experience where 'transport to call' is run by the Municipality of Sondrio. Such a practice aims at allowing the use of public buses as taxis and thus reduces the number of circulating cars in the city.

Valle d'Aosta

- *Public transport CARD in Valle d'Aosta*: the Valle d'Aosta (VDA) electronic card allows one to travel using public transport in the whole regional area. VDA card aims at facilitating the use of public transport for both residents and tourists. VDA tariffs benefit heavy users of public transport. The system is at a pilot stage.

Conclusion 14:

Climate change and different activities for mitigation and adaptation in the Alpine area can act as important drivers for sustainable rural development.

In this context, initiatives undertaken by communities, towns or regions play a crucial role.

Conclusion 15:

In the energy sector, the increasing interest in renewable energy sources and the current imperative for energy efficiency represent growing opportunities for sustainable rural development.

Bibliography

BFE — Bundesamt für Energie, 2007a.

Die Energieperspektiven 2035 — Band 4 Exkurse. Bundesamt für Energie, Bern, Switzerland.

BFE — Bundesamt für Energie, 2007b

Potentiale zur energetischen Nutzung von Biomasse in der Schweiz. Bundesamt für Energie, Bern, Switzerland.

European Communities, 2008

Climate change: the challenges for agriculture; European Commission, Directorate-General for Agriculture and Rural Development.

EEA, 2009

European Environment Agency Report No 8/2009

"Regional climate change and adaptation: The Alps facing the challenge of changing water resources".

Eisenreich, S. J.; Bernasconi, C.; Campostrini, P.; De Roo, A.; George, G.; Heiskanen, A.-S.; Hjorth, J.; Hoepffner, N.; Jones, K. C.; Noges, P.; Pirrone, N.; Runnalls, N.; Somma, F.; Stilanakis, N.; Umlauf, G.; van de Bund, W.; Viaroli, P.; Vogt, J. and Zaldivar, J.-M., 2005.

Climate Change and the European Water Dimension. A Report to the European Water Directors 2005. EU Report No. 21553, European Commission- Joint Research Centre, Ispra, Italy, p. 253.

Müller, H., Weber, F., 2008

Climate Change and tourism – scenario analysis for the Bernese Oberland in 2030, Tourism Review, Vol. 63 No. 3, p. 57-71.

OcCC/ProClim, 2007

Klimaänderung und die Schweiz 2050. Erwartete Auswirkungen auf Umwelt, Gesellschaft und Wirtschaft. Bern.

Wilbanks, T. J.; Romero Lankao, P.; Bao, M.; Berkhout, F.; Cairncross, S.; Ceron, J.-P.; Kapshe, M.; Muir-Wood, R. and Zapata-Marti, R., 2007

Industry, settlement and society'. In: Climate change 2007: impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Parry, M.L. Canziani, O.F. Palutikof, J.P., van der Linden, P.J. and Hanson, C.E. Eds., Cambridge University, UK.

C STATE OF RURAL DEVELOPMENT: NATURAL RESOURCES, HUMAN ASSETS AND ENERGY MANAGEMENT IN THE ALPS

C.1 Definition and discussion on natural resources and human assets in the Alps

Mountains are known to store a number of resources, which are considered as having remarkable economic and ecological value. Their ecosystems support approximately one quarter of terrestrial biological diversity, with nearly half of the world's biodiversity hot spots concentrated in these high altitudes, but they also play a substantial role in supplying a remarkable amount of food to humanity. Around 20 plants supply 80 percent of humanity's food. Six of them: maize, potatoes, barley, sorghum, apples and tomatoes, originated in mountain areas. Seven others, wheat, rice, beans, oats, grapes, oranges and rye found new homes in the mountains and evolve into many different varieties. Moreover, these ecosystems are a significant source of public good (positive externalities) such as clean air, biodiversity, quality products and landscapes, which are essential for mankind.

Most of the major European rivers have their headwaters in the Alps and their discharge is transported via river systems to lower lands. The Alps play a crucial role for water accumulation and supply. Therefore they are often referred to as natural "water towers". Moreover, the water system of the Alps is very important not only for the countries of the region, but also for large parts of Europe. In particular, the Alps contribute highly to the total discharge of the four major rivers (Danube, Rhine, Po and Rhone) flowing from the region, from 26 % (Danube) to 53 % (Po)⁴⁴.

In this perspective, mountains, though they often are marginal areas, should be kept in the world market so as to contribute to ensuring food security⁴⁵.

In common language, an asset (or, a resource) is defined as "a source of supply or support: an available means; a natural source of wealth or revenue; a natural feature or phenomenon that enhances the quality of human life"⁴⁶. Assets will be the main focus of this section of the report that will try to examine their characteristics, nature and contribution to human wellbeing and territorial development of the Alpine area.

Though the perception of the existence of specific mountain resources is common knowledge, in this report, taking into consideration its specific goals and the context in which it investigates, they will be divided into the two principal groups of natural resources and human assets. The proposed distinction is based on the consideration of some of the principal approaches of research and international practice towards the assets, which will be considered in the following sections.

According to this basic distinction, the characterizing elements of the mountain territory and environment are part of the group of natural resources, and are generally tangible goods. On the other hand, the elements, which can be found in mountain areas and are linked more to human behavior, perceptions and actual interventions on the territory, have been included in the group of human assets. Culture, landscape, public services (including health services, transportation services, social services, etc.) and innovation capacity are some examples of the second group's contents. Though human assets may also be tangible, their distinctive nature is determined by the intangible value, which is provided by human beings.

⁴⁴ Weingartner et al., 2007

⁴⁵ SARD-M Fao: www.fao.org/sard/en/sardm/home/index.html

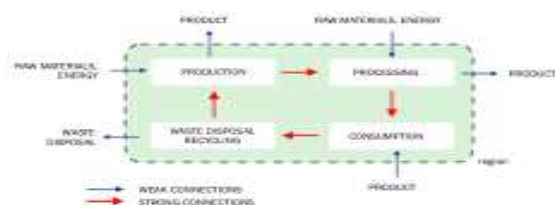
⁴⁶ Definition according to the Merriam-Webster Dictionary

A basic description of, and a brief discussion about, the most typical mountain based natural, environmental resources and human assets are provided within the following paragraphs.

Good practice 35: Economic cycles and rural development in Europe, with special reference to the Alpine sites

The focus of rural development policies has shifted over the past decades from the classical aim of attracting external investment, to the

Figure 14: Schematic model of current economic cycles



enhancement and exploitation of local, endogenous resources. This attitude has been called "endogenous development" (Woods 2005). In particular the endogenous nature of rural economies refers to the degree in which they are (1) built on local resources, (2) organized according to local models of resource-combination (implying local control over the use of resources), (3) strengthened through local distribution and re-investment of the produced wealth (van der Poley and Marsden 2008).

An economic cycle, according to mainstream economic theory, represents a set of economic relationships (production, processing, and consumption, recycling) between aggregated units (households, enterprises, state, foreign countries). It is seen as a result of division of labor (Figure 10). These flows of goods, services and capital are open to other regions and markets. At present, local economies largely rely on external trade and capacities. Thus, the worthiness of enhancing local assets (e.g. energy, raw materials) and processing capacities (know-how) should be analysed. Large amounts of raw materials & energy come from outside the region. Only small processing & marketing of intermediate products is made locally. Final products are to a large extent exported. At the same time, some intermediate and final products, which could be produced in the region, are often imported.

Strengthening the local economic cycles aims at reducing the external demand of raw materials, and waste quantity. More, it aims at meeting the regional demand, strengthening the regional identity, producing local added value. A primary goal is to reinforce the economic relationships

Figure 15: Strengthening inner-economic relationships of the future economic cycles



within a region (Figure 11). The available tools include regional co-operation, activation of regional production-, marketing-, processing. Regional economic cycles would reduce the transport costs, foster regional development, favour local labor markets. Local economy is expected to create more transparent production circles and closer participation of social groups (Maier 2001).

Long-lasting disputes exist over the worthiness of enhancing locally based and independent economies – that is criticized especially by neoclassical economists. Supporting local economies is interpreted as a public intervention on the market and a form of protectionism. Though, to some extent the new trend in rural development policy and the enhancement of endogenous development have been accepted even from liberal positions. EU rural development policy has been encouraging the valorization of local resources for the last 20 years, and especially in the 2007-2013 period.

Bibliography**Woods, M., 2005.**

Rural Geography. Processes, Responses and Experiences in Rural Restructuring. Sage Publications, 330 p.

Ploeg van der, J.D., Marsden, T. (eds.), 2008

Unfolding Webs: The Dynamics of Regional Rural Development. Van Gorcum, 262 p.

Maier, J., 2002

Regional Economic Cycles as an Instrument of a Sustainable Regional Development in Rural Areas. Dela 17, p. 72-84.

C.2 Natural and environmental resources

Although the resources available within the environment are commonly perceived as providing services to mankind, either directly (e.g. drinking water) or indirectly (e.g. through the soil, which allows farming activities, electricity production by hydropower), it is difficult to find a unique definition for this concept. Moreover, the peoples' and scholars' perception of these assets has changed over time.

A classical distinction has been proposed between **natural and environmental resources**, in a period when the environmental costs of economic development were identified for the first time (Boulding, 1966; Mishan, 1967).

Natural resources typically include goods available in nature, which can be sold on the market, such as coal, copper, crude oil, zinc, etc. Typically a recognisable and variable price is assigned to these assets through a market mechanism based on demand and supply curves. **Environmental assets** include (clean) air and (fresh) water, forests, landscape, sun heat, climate, etc. Typically these assets are not traded in markets and their value is underestimated by citizens and decision makers.

Both of these typologies of assets available in nature are scarce, as a consequence they can be properly considered as economic assets, in accordance with economic theory. Though, since environmental assets are usually not traded in actual markets, determining their economic value is an open challenge and the resulting values are rough estimates, whose dimension is questionable and subject to uncertainty.

Another distinction is usually made between **renewable and non-renewable assets**: the former can reproduce and their flow be harvested at a specific rate which allows the conservation of the stock over time; the

latter are available in a given amount which cannot be reproduced within an acceptable time, thus they need to be exploited over time in the best possible way (*optimal harvesting path*) (Baumol & Oates, 1988; Kneese & Sweeney, 1985; Pearce & Turner, 1989).

Policies for the sustainable use of resources usually aim at seeking a balance between the harvesting rate of renewable assets and the restoring capacity of specific local ecosystems. Regarding non-renewable assets the harvesting rate should be in line with a given stock of asset, which is supposed to be collected and used at current prices and technologies, and in the absence of shocks. Over a very long period of time, all assets are technically renewable (including coal, crude oil, etc.). Moreover, the introduction of a new technique or technology may make possible to collect resources that it was not possible to reach before (e.g. a new pump for oil extraction) and that it was not possible to account for in the stock. The introduction of a new technique, or the discovery of large stocks of resources formerly unknown (e.g. reservoirs) can be considered as shocks. A shock can modify in depth the actual availability of resources and the possible future harvesting path of them.

In order to be efficient, such policies should be supported by a deep knowledge of the dynamics of ecosystems, the relationship between the condition of an ecosystem and the services it provides, the thresholds whose transgression causes rapid and huge changes to ecosystems and their ability to provide services. As a matter of fact, at present the understanding of these delicate topics is generally still unsatisfactory.

Assets are generally scarce and thus can be properly considered as *economic resources*, which can be exploited to meet human needs, either directly or indirectly.

Natural resources are often considered as able to directly produce economic value. They can be harvested, collected, and used within industrial processes to deliver goods

and services, which can be sold on the market at a price. Usually their existence - especially in the case of renewable ones - depends on the quality of the environment and the functioning of the ecosystems. Moreover, natural resources can also indirectly produce economic value, or reduce economic costs. This is the case with ecosystem services, whose provision is assured by the health and safety of natural ecosystems.

National contribution: Forest related activities throughout the Alps

Silver Fir promotion in the region of The Black Forest (Germany)

Silver Fir is an indispensable ecological stabilizer in alpine forests in Germany. Used as construction timber, it has an amazing look and a remarkable versatility. Recently, the process of globalisation contributed to a reduced demand for this lumber concentrated in the central parts of Europe. The main reason for the "silver fir-crisis" is the very limited distribution of the species throughout Europe. In Germany as a whole, only 2% of trees are White Fir. In Baden-Württemberg, about 10% of forests are made up of Silver Firs, though in the Black Forest area White Fir is still an important species. In the past, Norway Spruce and Silver Fir were mixed in the saw-mills because of the similar technical quality of these species. Though, drying Silver Fir is much more difficult than drying Norway Spruce (the core wood can contain more than 200% water, whilst Norway spruce arrives to 40%). As a consequence, the price of Silver Fir timber has decreased dramatically, compared to Norway Spruce. Timber prices have a direct influence on the treatment of forests and on the choice of tree species by forest owners. However, Silver Fir ensures natural, stable and ecologically precious stands in all regions in the southern parts of Germany with subalpine forests. In order to support sustainable Silver Fir management, a group of specialists came together in 1997 and founded the "Arbeitskreis Weißtanne", a permanent Forum. In 2000 it was converted to a registered association ("Forum Weisstanne e.V.") managed by a committee made up of forest owners, managers of the wood industry, architects, academics, forest administrations and politicians, aimed at supporting and protecting the Silver Fir as the main tree species in the mentioned region. It is financially supported by its members and organizes events and publications dealing with the problems and advantages of Silver Fir timber in comparison to other tree species, like Norway spruce. The aim is to raise the public awareness and improve the knowledge of this type of timber⁴⁷.

Former and Contemporary Wood-Processing in Upper Savinja Valley (Slovenia)

Upper Savinja Valley (Zgornja Savinjska dolina in Slovene language), is a typical alpine valley,

whose upper part is scarcely accessible. Its vocation is tourism, it includes 7 municipalities and is covered (95%) by forests. In Slovenia, it is usually labeled as a fertility island. Local inhabitants are proud of their identity.

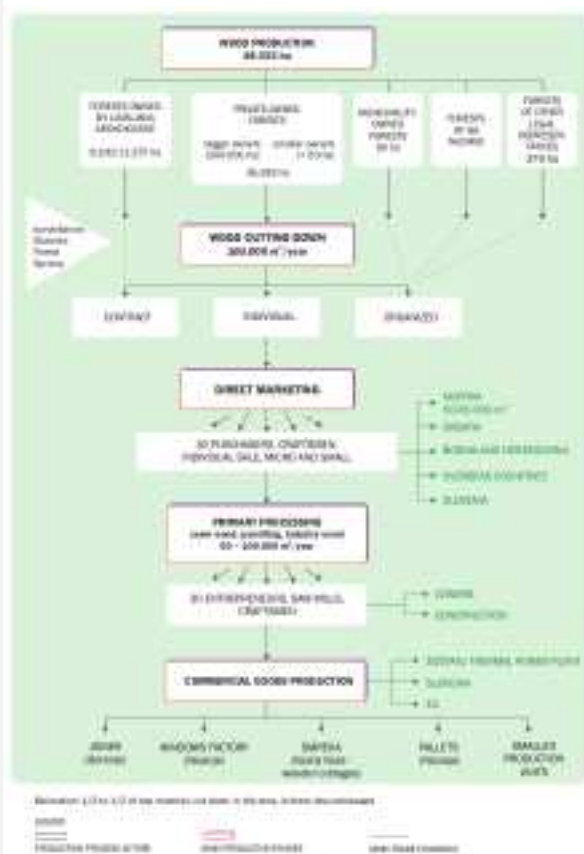
Two periods have been analysed with regards to the wood industry: before 1989 and the present situation. Before 1989 the wood was a common property. After WW2, specific firms were established (1953) – like The Wood Management Company in Nazarje, concentrating primary and secondary large scale wood-processing, hosting huge saw mills, a furniture industry, etc., accompanied by some smaller firms (wooden cottages, 2 saw mills, industrial wood for mine in Velenje, a few smaller craftsmen). More than 70 % of the raw material cut in the area was processed locally. Other products mostly went to the Yugoslavian market or were exported. Local forests formerly managed by the aforementioned company (16,5 ha) were nationalized from private owners and the Ljubljana Archdiocese. The firm took care of cut-off planning, reforestation, marketing & sales, and forest infrastructure (road, telephone, electricity in an area with dispersed settlements), for whose construction, jobs were created. The forest represented by itself a regular employment and income source in the region. With 380 (and up to 500) employees, mostly the local population, forests assumed besides economic and ecosystem, social and developmental functions. Transport growth was also connected to the management of wood and several farmers found this sector an important source of income, suitable to help with farm modernization and triggering the first local entrepreneurship experiences.

In 1989, a moratorium on wood-cutting in state owned forests was declared, with undesired effects on the wood-supply industry. Huge and new challenges, like an open market economy, crisis of the primary sector, de-nationalization, financial receivables, an over dimensioned wood-processing industry appeared, and the adaptation process was tough. The surface managed by the Wood Management Company declined (to only 300-500 ha), and so did the number of employees (to 50, before the company's liquidation in 2008). Nowadays, the wood-supply market is dispersed, as is the purchase and processing markets: 30 bigger purchasers operate in the market and setting up a stronger centre for wood management, able to compete on the EU market, does not seem feasible. As a consequence, the valley is more vulnerable to external competitors able to implement adaptable wood-systems locally (especially

⁴⁷ www.weisstanne.de

Austrian enterprises). Private owners consider forests only as an investment for the future. The administration mainly plays a role of supervision and does not ensure efficiency. As a consequence, private forest owners & Church authorities are cutting down the wood, which is then exported as raw material to Austria, Bosnia and other areas in Slovenia. Subsequently, Upper Savinja Valley faces a lack in final wood-processing services.

Figure 16: Contemporary Wood-Processing in Upper Savinja Valley



The wood stored in Upper Savinja Valley is considered as high quality and likely to support a long-term sustainable development of the wood sector, but this competitive advantage can be easily erased. Former employees in the wood industry found jobs in domestic appliances firms, but are not used to indoor jobs. The experiment with wood auctions, as an innovative market channel, did not affect the traditional market, still prevailing. Though biomass use is quite popular for public heating in some municipalities, dispersed settlements prevail – so smaller and

innovative systems should be introduced. The current potential exploitation of locally grown wood has been considered as regressive, in comparison to the former situation.

Forestry figures and trends in Switzerland

According to the Swiss national wood inventory (March 2010) a constantly strong increase of forest areas is to be observed. Between 1993/95 and 2004/07 the forest area increased nationwide by around 595 cubic metres. Forest area in

Figure 17: Revenues from Swiss forested surfaces (1980-2008), in CHF (Bafu, 2009)

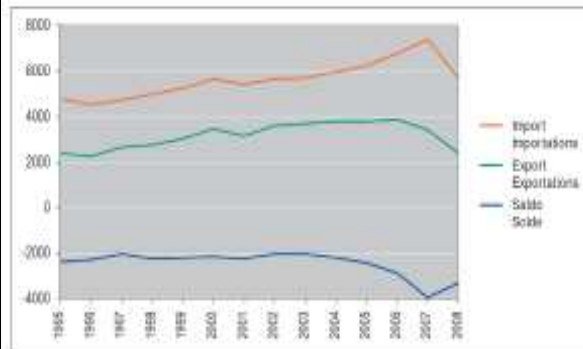


Source: BAFU, Swiss Forest Inventory 2000 and 1990-2000
Source: OFEJ, Annuaire La Forêt et le Bois 2009

the Swiss alpine region equals 4810 km² (data source: BfS: Arealstatistik NOAS04). The greatest part of this increase occurs in the alpine region. This change has relevant consequences including the economic point of view for Switzerland. Due to the extension of the forest area, the wood stock has increased (in the Swiss Alps, an annual increase of 2 Mio m³ has been calculated). Though, mountain forests are scarcely used, and below the average in Switzerland – where the total mass area is of about 24906.5 km². Out of the above mentioned Swiss increase in wood stock (2 Mio. M³ per annum), only 1.3 Mio. m³ were used, or died off in the country. A better performance is achieved in some more intensely exploited areas, located in easily accessible territories in the middle land and in the Jura. A few figures are also available concerning the timber export/import balance in Switzerland, which is negative. Also unsatisfactory is the economic Performance (revenues/ha) of the forested areas, the costs of whose management seem to be still higher than the benefits derived from their exploitation. In 2003, the wood in Switzerland was exploited as follows: mostly as stemwood (3.500.963 m³), then as fuelwood (1.106.801 m³) and, finally, as industrial wood (513.234 m³).

Figure 18: Swiss foreign trade in timber (1980-2008), in Millions CHF (Bafu, 2009)

Aussenhandel mit Holz in Millionen Franken
Commerce extérieur du bois en millions de francs



Quelle: BAFU, Jahrbuch Wald und Holz 2009
Source: OFEV, Annuaire La forêt et le bois 2009

Forest basic figures and policies in Austria

In Austria, where 47% of the country's surface is covered with woods, traditional use of wood biomass for heating purposes has always played an important role in the energy supply system. While the contribution of wood log has not changed significantly over the last two decades, the introduction of wood chips and wood pellets into the heat energy market has been a great success. In 2008 23 % of the final energy consumption for space heating came from biomass (72 PJ out of 314 PJ). The nationwide potential for exploitation of solid biomass from both forestry and agriculture for the year 2020 is specified by the Federal Ministry of Agriculture, Forestry, Environment and Water Management to be 148-212 PJ. In comparison solid biomass delivered 135 PJ of final energy consumption in 2008⁴⁸.

Recently the possibility has been acknowledged of assigning a monetary value to the ecosystem services, as a means of transferring the perception of the value expressed by ecosystems to decision makers. In turn, they may decide to use this information to redress market and policy failures, for instance by removing perverse incentives such as subsidies that encourage degradation and creating positive ones for achieving sustainable outcomes. A market failure occurs when a market left to itself does not allocate resources efficiently. A possible cause of market failures is the presence of externalities that are costs or benefits arising from an economic activity

that affect somebody other than the people engaged in the economic activity and are not reflected fully in prices. Because these costs and benefits do not form part of the calculations of the people deciding whether to go ahead with the economic activity they are a form of market failure, since the amount of the activity carried out if left to the free market will be an inefficient use of resources. If the externality is beneficial, the market will provide too little; if it is a cost, the market will supply too much.

Such a goal could be achieved by creating a new market for them or setting up appropriate payment schemes, known as Payment for Ecosystem Services, creating new markets for services, valorization of services and resources in the subjects involved in suitable businesses (e.g. tourism), or setting up appropriate incentives for sustainable resource management.

Good practice 36: Payments to farmers for quality tap water in the city of Munich, Germany

Since 1991, the city of Munich (1.3 M inhabitants) has encouraged farmers in the catchment area that provides water to the city, to convert to organic agriculture. The inhabitants of Munich now have pure, untreated tap water. In 1991, the water supply system of the town from the Mangfall Valley was introduced. 40 kilometres from the town, this valley (enjoying high annual rainfall, altitude, filtering capacity) provided over 80% of the city's tap water supply. The municipality bought 1,600 ha of agricultural land in the Mangfall catchment area, rich in woods and able to purify water, and managed them through the municipal department for woods and forests. Microbiological analyses and chemical tests proved the inhabitants of Munich and its 20 neighbouring communes have tap water (110 million cubic litres of water every year) of a quality similar to that of mineral water. As a consequence of the increase in pollutants of agricultural origin from the 1960-1990's, the water services decided to buy land around where the water was pumped and to plant more trees there. Moreover, the town started encouraging organic farming on all the upstream land in the Mangfall Valley, by directly operating at all levels in the chain, from production to marketing, and ensuring sales for organic products in its nurseries, canteens etc. The city initially set a zone of 6,000 ha (of which

⁴⁸ www.lebensministerium.at/filemanager/download/55304

2,250 ha of agricultural land to be "converted") to protect the springs, leaving the rest covered by forests. Organic producers' associations (Demeter, Bioland, Naturland) were involved in order to raise the awareness of the local farmers and help them to convert. The town covered the full cost of the advisory work, as well as the costs of the annual controls. The farmers paid the costs of joining the association of their choice. An additional sum was granted to the farmers for "honouring their contribution to the protection of water, compensating the reduced crop returns and investments made" (281 € per ha for the first 6 years, then reduced to 230 € per ha for the next 12 years). In 1993, 23 farmers signed a contract, representing a total surface area of 800 ha. In 1999, there were 92 farmers and 2,200 ha (1,600 of which inside the conversion zone). 15 farmers did not convert. This rapid conversion was encouraged by the fact that in this region, dominated by livestock farming, lands are essentially fields for grazing. For the local authorities, the cost of the programme supporting organic agriculture (0.83 million € per year, 0.01 € per cubic meter of tap water consumed) was not excessive, in as much as the town was simultaneously avoiding expensive chemical treatment of the water (the cost of nitrification alone in France is calculated at 0.3 € per cubic meter).

More information: www.swm.de/privatkunden/m-wasser/gewinnung.html%20 (in German), www.partagedeseaux.info/article226.html%20 (in English).

Though still highly questionable in absolute terms, the application of an economic approach to biological diversity seems to be rather effective in raising the awareness of the public, on a few, formerly undisclosed, aspects of ecosystems and the value of environmental resources.

Scientific studies identified specific sorts of assets, which are easily found in the mountain environment.

In particular, natural and environmental resources deeply characterise the Alpine territory. They represent an expression of the evolution of the planet during its history. At the same time, the availability and quantity of these assets may be modified by human intervention. Until the 19th century, these assets could be considered relatively stable at least over one generation, though in recent decades, observations and research have

shown that they may be subject to irreversible changes, and the issue of the possible use of such property has been brought into the centre of political attention.

Natural and environmental resources are not considered to originate from human interventions and, as already reported above, they may produce utility for consumers and citizens, which allows for an estimate of their economic value.

For example, some assets that are distinctive of the mountain environment may be recalled, such as the steepness of slopes - indirectly producing tourist opportunities (such as winter sports, climbing, hiking, a unique landscape), allowing energy production (e.g. hydropower), but also the presence of woods and forests, assuring *inter alia* stability of soils, protection of the territory from avalanches and landslides, water sanitation, carbon sequestration and storage, outdoor recreation and the availability of distinctive mineral resources.

Some of the above mentioned assets are also to be considered as services provided by mountain ecosystems. An ecosystem can help meet human needs, by providing services and performing a set of often competing functions, usually not included in any existing market. Below there is a list of some of the functions that humans use for their interest:

- source of goods for human consumption (food, air, landscape, timber, etc.);
- provider of absorption facility for polluting substances;
- provider of a physical location for human settlements;
- source of natural resources for industrial and handcraft production processes (raw material resources, hydro- or solar-power);
- provider of leisure activities.

Notwithstanding the current poor knowledge about the mechanisms lying behind the dynamics of ecosystems, the level of both environmental quality and the ecosystems' functioning appears to be generally high in mountain regions.

Moreover, mountain ecosystems are among the richest in biodiversity (Körner and Spehn, 2002)⁴⁹ and several research initiatives focus on them as hot spots of biological diversity⁵⁰. Some basic functions of mountain ecosystems to lowlands have been partially investigated. The goods and services they provide to lowlands have been classified as follows⁵¹.

Provision services	Regulating services	Cultural services	Supporting services
Freshwater, fresh air, timber, food, renewable energy supply, biodiversity.	Climate, water, air, erosion and natural hazard regulation, carbon sequestration.	Recreation/tourism, aesthetic values, cultural and spiritual heritage.	Ecosystem functions, including energy and material flow, such as primary production, water and nutrient cycling, soil accumulation, and provision of habitats.

⁴⁹ www.biodiversityhotspots.org/xp/Hotspots/hotspotsScience/Pages/default.aspx

⁵⁰ Global Mountain Biodiversity Assessment actively exploring and explaining the great biological richness of the mountains of the world.

⁵¹ Harrison et al., 2004; FAO, SARD-M, 2004; EEA, 10 messages for 2010 – Mountain Ecosystems, 2010

C.2.1 Climate

The climate of the Alps is complex and very diverse at the same time. Some authors have affirmed that even "each valley has its own climate" (Bätzing, 2005), considering the remarkable climate variations occurring also at a local level, which are caused by a wide range of factors. This specific position seems not to sufficiently take into consideration how much the differences in temperature and rainfall, even at microclimate levels (i.e. within a valley), may be marked, due to variables such as the exposure to the sun and altitude. In spite of these premises, defining the climate situation of the alpine region starting from reduced scales (that is, starting from a macroclimate level) seems to be more useful. In order to meet this purpose, four conditions were identified⁵² which concur to the determination of the alpine climate at a macro-regional level.

Hypsometric variation: the greater the height the more the average temperature as well as the duration of the vegetative period, decreases and, due to the reduction occurring in the thickness of the layer of the atmosphere above, as well as, the progressive rarefaction of the atmospheric gases, the temperature range increases from day to night and from sunny to shady areas; furthermore, higher areas are normally more affected by draughts as well as subject to greater rainfall than lower elevations (and the greater the height the more the rainfall is characterized by a nervous pattern) (Bätzing, 2005).

Placement in relation to the mountain range: as the Alps serve as a barrier which forces the cloud systems to rise up and to discharge the humidity as rain or snow, the peri-alpine zone is generally rainier and cooler. It is normally cooler as the heavier rainfall reduces the sun's strength and therefore the temperature. Heavy rainfall and lower temperatures determine a reduction in the altimetric limits of vegetation and the snow line. The internal areas instead, less attainable to cloud systems and rainfall (which persist on the peri-alpine zone), are

normally subject to lighter rainfall, to a strong sun and therefore higher temperatures, which are the cause of the rise in the vegetation altimetric limits; nevertheless these conditions (favourable to human settlement, mainly with regards to glacial valleys), determine the greater temperature range (daily, annual and sunny vs. shady areas) (Bätzing, 2005). We can easily appreciate this fact if we look at the rainfall map.

Latitude variation: the southern part of the Alps is hotter than the northern, both due to the natural differences in latitude (so the inclination of solar rays) and to the influence respectively of the Mediterranean climate in the south and the cooler climate of the north. In addition to a warmer climate, the Southern Alps show a less homogenous distribution of the rainfall (with summer and winter draughts) than the one affecting the Northern side (with rainfalls distributed during the whole year and maximum contributions in the summer) (Bätzing, 2005).

Longitudinal variation: for their rectilinear extension of about 800 km from the West to the East, within the Alps you can generally notice the transition (which involves the whole of Europe) from a humid-oceanic climate in the west, to a dry and continental climate in the East; in the southern part of the Eastern Alps (in particular within the Carnic and Julian Alps, from Friuli-Venezia Giulia and the Western Slovenia) this general tendency is locally contradicted in terms of the heavy rainfall occurring as a consequence of the rise towards the north which is characterized by the masses of humid air coming from the Po valley and from the Adriatic Sea (Bätzing, 2005). Considering the concurrence with the above-mentioned influential factors, drawing a brief image of the alpine climate could turn out to be a complex operation. To sum up what comes out of this, is that, more than height, different climatic typologies concur to the definition of the climate of the region. The contrast between pseudo-oceanic climate (cool and humid) of the peri-alpine area and the pseudo-continental one (Bätzing, 2005) (dry and characterized by major temperature range) of the inner areas can be noted. The

⁵² Classification developed by Bätzing (Bätzing, 2005, p.52-55)

contrast between the temperate-cool climate (temperate, affected by rainfall which is distributed throughout the year) of the centre-northern Europe and the Mediterranean (hot, characterized by dry summers and winters) can also be registered. There is a transition from a more oceanic climate (humid and cool) in the west to a more continental climate in the east (dry and affected by major temperature range).

- A more complex and variable climate can be registered according to micro-climate sites. Certain main tendencies for specific areas can be revealed: valley bottom results are generally hotter and drier than the surrounding mountains (with the exception of the cases of thermal inversion)⁵³;
- within the inner areas the rainfall is less than in the peri-alpine zone;
- at the same elevation, in the northern part temperatures are less than in the southern ones;
- at the same elevation, in the eastern part winters are more rigid than in the western part.

Passing over the general trends, the climate in the alpine region may sensibly vary even at a local level and between the opposite sides of the same valley. With this regard, the relevance of factors such as the orientation of the valleys, the sides' exposure and the thermal inversion has been stressed (Bätzing, 2005). The thermal inversion is a local phenomenon mostly characterizing the narrow valleys oriented towards east-west, especially in the cold season. In such situations indeed, the air at the bottom of the valley is often not reached by the rays of the sun during the day; thus, due to the fact that cold air cannot rise up it stagnates in the valley bottom, at minor elevations the temperature is much lower than at 200-300-meters above the sea level. In these occasions a cloudy blanket – of limited thickness – is persistent and covers the valley bottom (Bätzing, 2005). The orientation and the geomorphology of the valleys are fundamental in the determination of

phenomena such as the one described above. Due to the major exposure of the solar rays, the sides which face the south are hotter and less humid (and therefore more favourable to human settlement). Due to these reasons, on the sides with southern exposure the southern elevation of the snow and the altimetric limits of the vegetation may also result in 200-300 metres higher than the shady sides.

The wider glacial valleys are less subject to the thermal inversion phenomena, where the valley bottoms are reached by the solar rays and draughts. The problem of thermal inversion is almost non-existent in the valleys oriented towards north-south, generally hotter and less humid and exposed to solar rays during the central hours of the day. A strong (micro) climatic variability results throughout very close valleys or within the same valley, which naturally overlaps the macroclimate trends mentioned above.

Once delineated the general macroclimate and microclimate trends, are worth concluding in this short description of the alpine climate through listing some general data:

- average January temperature within the Alpine valleys are usually between the -5°C and +4°C (up to maximum temperature of +8°C in some low valleys open towards the Mediterranean);
- average July temperatures within the alpine valleys are usually between +15°C and +24°C (sometimes slightly higher in some wide valleys faced towards the south, such as the valley of Adige river);
- above 1.500 metres elevation all the rainfall of the winter season is snowy;
- above 2.000 metres elevation the snow coverage generally lasts from mid-November to mid-May (showing wide variations with respect to the exposure of mountain sides and relevant exceptions within the last decades)⁵⁴.

Different and specific features of the alpine climate can be found within the different countries. For instance Austria's climate is generally considered to be humid-temperate

⁵³ OECD, 2007, p.19

⁵⁴ OCSE, 2007, p.19

on the whole, but the country lies in a transitional zone where the western and northern parts are influenced by the Central European-oceanic climate; and continental influences are noticeable in the north-east and east parts of Austria. In the South there is a Mediterranean influence (ZAMG, Climate Atlas Austria⁵⁵). The Alps play a significant role as a weather divider (especially from north to south). The amount of precipitation decreases with increasing distance from the Atlantic Ocean from west to east. The inner alpine regions are dry and have sunny valleys. The precipitation is rather uniformly distributed over the year; valleys which are oriented from west to east receive considerably less precipitation, whereas the north south valleys may receive abundant rainfall due to hill effects with north westerly flow (European Database of Daylight and Solar Radiation).

C.2.2 Land cover / land use

The Alps have a complex geomorphology and composition of microclimates, which contribute to a large variety of habitats and high levels of biodiversity. Half of the Alps is covered by forests, being composed of a relatively low number of tree species. The conifer species are the main species forming the alpine forests. Furthermore, the Alpine region hosts about 40 species of deciduous trees. A few of these species however exist at altitudes above 600 m. Until the end of the 19th century, forests gradually decreased under the pressure of a growing human population. With a change in agricultural practices in the 20th century, forests are now increasing in area through natural re-growth and afforestation. The increasing forested areas in the Alps play an important role in preventing soil erosion, avalanches and landslides.

The proportion of land available for economic use is less than that in the lowlands. Only approximately 17% of the Alpine Convention area can be considered as appropriate for permanent settlement. With no specific reference to land use, available

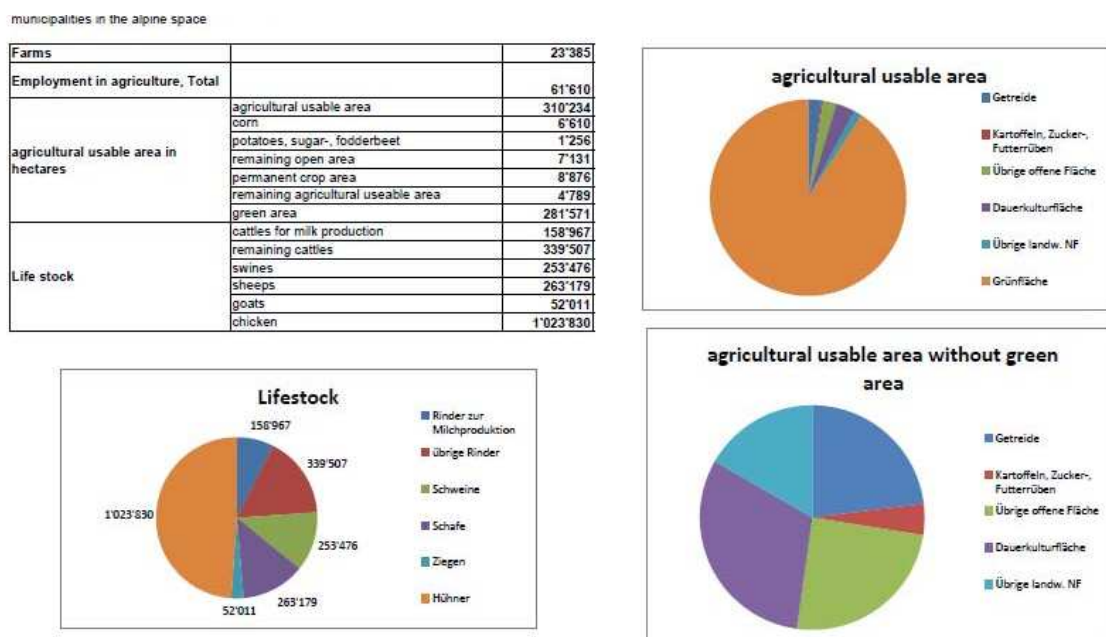
land is reducing, even if land is not permanently lost but converted from agricultural and forest land into built-up areas.

Traditional agricultural areas and their related settlements in the Alps have been abandoned in recent years, as a consequence of two main elements: the more attractive jobs available in services and industry sectors; and the increasing concentration of economic power, labour markets and public services in the main alpine cities. Other relevant factors include socioeconomic and technological changes, individual preferences, infrastructure policies and subsidies, spatial planning, municipal budgets and financing, land prices and availability of brownfield sites⁵⁶.

⁵⁵ www.zamg.ac.at/

⁵⁶ Hofmeister, 2005; EEA, 2010.

Figure 19: Figures on Swiss alpine agriculture (Swiss delegation to the Alpine Convention, 2010)



Often municipalities and regions compete to attract investors and related tax revenues, trying to provide higher private living standards combined with smaller households asking larger residential area, or the functional separation of residential and working places. This situation is likely to induce a growth in work-related mobility, demand for land to be used for the construction of transport infrastructure and urbanisation phenomena (Behring, K. & Helbrecht, I., 2002).

Forests and transitional woodlands of shrubs in the Alps cover 52% of the surface, pastures and mosaic farmlands 14,5%, natural grassland, heathland and sclerophyllous vegetation 14,1%, arable land and permanent crops 3,4%, open space with little or no vegetation 11,8%, wetlands 0,2%, water in different forms 0,5%. At the regional level in the Alps land cover change over the periods from 1990 – 2000 has been modest in comparison with other European mountains. Though, the most influential factors in this process are represented by three land cover flows: forest creation and management (65%), changes of land cover due to natural and multiple causes (14%), urban residential sprawl (7%) - according to common trends in European mountain

ranges⁵⁷. More recently, over the 2000-2006 period, the sprawl of economic sites and infrastructures has acted as a prime contributor to land cover change in the Alps (+10,5%).

National contribution: land use and agriculture in Austria and Switzerland

In Austria, while the Utilised Agricultural Area decreased in most parts of the Alpine areas, like in other regions of the Alps as well, over many decades, it remained almost stable (at the average) over the 1990s. Particularly in western Austria a reversal of previously negative trends could be seen in this period (Tappeiner et al. 2008). Together with the Slovenian part (63.6%) the Austrian part of the Alps shows the highest share of forest area (53.5%). It is particularly high in large parts of the eastern Austrian Alps (e.g. Lower Austria and Styria, Tappeiner et al. 2008). The share of abandoned land (or agricultural land used for non-farming activities) is highest in the main valleys (Inn Valley, Mur and Drau Valley) and at the edge of the Alpine area (Tappeiner et al. 2008). The more synthetic indicator of hemeroby provides a similar result, indicating the degree of anthropogenous influence on the environment (Tappeiner et al. 2008). Low values of hemeroby are found in areas with a high share of rocks and other non-economically used areas of high Alpine regions in western Austria.

⁵⁷ EEA 2010

Switzerland

Concerning the land use patterns, on a total surface of 41,285 km², more than a third (30,8%) is covered by forests, unproductive and agricultural areas almost have the same extension and each cover a quarter of the territory (respectively: 25,5 and 23,9%), alpine grazing (13,9%) and urban & settlement areas (6,8%) follow. Agricultural areas and alpine grazing areas make up more than a third of the whole national surface, thus they significantly influence the Swiss landscape. 830 towns or villages are located in the alpine area of Switzerland. Looking at the utilised agricultural areas, grassland remains the leading use covering more than 70% of the total agricultural surface. Cereals still represent a relevant cultivation (14,8%), however, the area used for growing potatoes is steadily falling. Furthermore, over a total usable farmland within the alpine region of 8.833 km², 2424km² are used as alpine pastures (data source: BfS: Arealstatistik NOAS92 15 Kategorien: Kat. 4,5,6). Between 2000 and 2008 the number of big farms increased (larger than 20 ha) and smaller ones decreased. At the same time the large majority of organic farms are concentrated in the Alps, due to the lower cost of becoming organic for livestock farms than for cropping or horticultural enterprises. Since 1996 stocks of pigs, goats, sheep and poultry have increased. A fall in cattle units happened until 2004, since then the trend has become positive again. National employment in agriculture has been decreasing since 2005: in 2008, 4,2% of jobs were in the primary sector – due to both a reduction of jobs in this sector and an increase in other sectors. Out of the 170.000 people working in agriculture in Switzerland, 55% are part-time workers.

Good practice 37: Specialization in Wine-Production in Goriška Brda, Slovenia

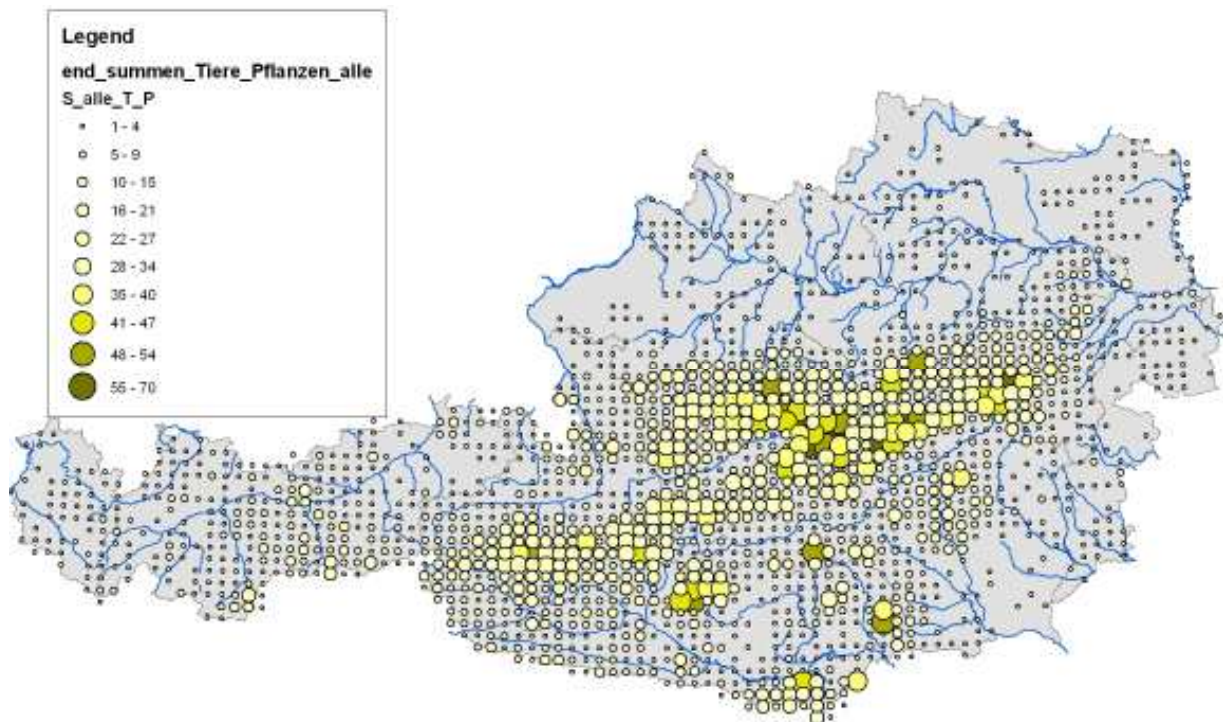
Goriška Brda is a typical rural border area (in a political, climatological, cultural sense). Hilly, up to 250 m, this is a wine-growing region, next to Italy, with approx. 5.800 inhabitants joined in a small municipality, with extraterritorial roads connected to Slovenia, but with a pronounced local identity and a strong link to the land. Goriška Brda hosts approx. 2000 ha of vineyards, 1400 of which are privately owned by 700 owners, in the framework of the local wine cooperative, established in 1957. Each member owns 2 ha on average (a big surface, in Slovenia), generally is a part-time farmer, holding a regular job, and grows vineyards, fruit, and olive-trees. Today a certain degree of specialization of

farmers prevails. Some 600 ha of vineyards are privately owned by approx. 100 farmers, (10-15 ha of property each). Property structure of land in the area changed after the agricultural reform, following a period of semi-feudal property management. Some wine makers, by wisely using public funds since the 1990s, shifted from fruit growing to high-quality wine production. Mostly they were individual owners who decided to internally manage processing, filling, labeling, marketing and sales.

Smaller owners joined the cooperative where they pay a contribution, deliver grapes and use a common trademark. The cooperative wine cellar processes only the grapes produced inside the Slovenian part of region Brda/Italian Collio (one third of the region is in Italy). 70 % of wine sales are domestic, 30 % go abroad (the biggest Slovenian wine exporter). The trading channels include an outlet in Goriška Brda (next to the wine cellar), a large outlet in Ljubljana, hypermarkets (Mercator, Tuš, Spar) and wine merchants. A lot of the innovative ideas that have been adopted came from Italy. Nowadays producers from Italy are keen to buy the grapes, due to the high quality found on the Slovenian side. All the processing phases of the grapes are done in the region. The local economic cycle of the industry seems to work effectively. Local trade channels exist, the regional image and local identity are strong and embedded in the product that is perceived as a quality one, innovation has been implemented, and agricultural and economic activities coexist in the area (wine & fruit growing, farm tourism, local cuisine, etc.). Moreover, huge potentials have been identified with regard to SPA construction, establishment of hotels in renovated castles, casinos approved by locals, etc.

The experience with wine production in Goriška Brda region is an example of activation of a local economic cycle. A form of stagnation exists in Upper Savinja Valley region (presented in another Box) with reference to wood-processing. Other rural areas activate and empower their development potentials, but do not get involved in economic cycles for various reasons (e. g. tiny product quantities, limited recognizability, fear of fast changes on world market, awareness of rural areas' fragility etc.). Slovene rural areas have great endogenous development potentials that should be developed through novel development approaches, enabling a sustainable use of the local assets. At the same time, institutions at all levels should be restructured, local population activated and stakeholders brought towards responsible actions.

Figure 20: Sums of plant and animal species within the Austrian alpine region



Biodiversity in the Alps

In Europe, most hot-spots of plant, bird and mammal diversity are in mountain areas. Notoriously, some of the main reasons for this situation are the compression of thermal and climatic zones over a relatively small area, the presence of steep slopes, the diversity of soils, the fragmentation of mountain terrain, and the generally observed isolation of many mountain areas, so that species have evolved separately. That is also one of the major reasons for the high levels of endemism in many mountains, the Alps included.

The Alps are a centre of biodiversity for the whole of Europe. They host about 4.500 plant species, of which almost 400 are endemic. The fauna of the Alps might reach 30.000 species. Today, artificial or semi-natural environments, and traditional land-uses represent a remarkable share of the present biodiversity in the Alps, including as a consequence of changes in society, tourism, and agricultural production methods. Both flora and fauna diversity is subject to threats, partially linked to human intervention in the area. On the global scale

climate change, air pollution, enrichment in CO₂ and nitrogen deposition, together with other economic, social and cultural processes originating outside the Alps (e.g. market forces, fluctuation in tourism, traffic and demographic change) represent the more dangerous external forces for the alpine environment. It has also been observed that, since local species have a great adaptation capacity as a consequence of typical climate heterogeneity resulting from topographical complexity, this feature of the alpine environment coupled with the ecological richness of the Alps could enable it to counterbalance a small temperature increase (1°C -2°C)⁵⁸.

⁵⁸ Chemini C., Rizzoli A. 2003

National contribution: Biodiversity in the Alps: an overview from Austria, Switzerland and Italy

Austria

Austria has, despite its relatively small size, an exceptionally diversified landscape and holds a high number of plant and animal species. Particularly the national parks can boast species richness. For example in the Kalkalpen National park with its area of 210 sqkm you can find 30 species of mammals, 80 species of breeding birds, 1,600 species of butterflies. 1,000 of the approximately 4,000 Austrian flowering plants, moss and fern species occur in the National park Kalkalpen⁵⁹. See in the graph below the concentration of plant and animal species within the Alpine region.

Moreover, most of the 488 Austrian biotope varieties are found in the Alpine region. The threat status of these biotope varieties is in general better than outside the Alps. Four biotope varieties are (sub)endemic. These include three forest biotope varieties, two of which are widespread in the Austrian Alps. Another biotope variety (Austrian pine forest of the eastern part of the Alps) is restricted to the north-eastern Calcareous Alps. The biotope variety serpentine rock wall with chasmophytic vegetation shows a localized distribution in the eastern Central Alps. In addition to that in Austria 748 (sub)endemic animal and plant species have been found, most of them in the Alps (Umweltbundesamt, 2010).

Switzerland

Switzerland is, within Europe, one of the countries with the highest biodiversity at a local scale. This is mainly due to large altitudinal differences and the complex relief. Some 50,000 species have been identified, including 3000 fern- and flowering plants, 40,000 animal species, and 1030 moss, 412 lichen and about 5000 mushroom species. In mountain areas, woods and on the permeable surfaces of human settlements, biodiversity is relatively high. Special ecosystems (alp pastures, rock areas, scree, wetlands, etc.) exist in the Alpine region. Despite the increasing intensive use from human beings, there is still a very astonishing diversity in species in the alpine space. Large altitude differences and a pronounced relief provide diverse habitats on a small scale, which allow a lot of animals and plants to live in. Important habitats with a very rich biodiversity are dry meadows and flood plain

forests. In 2004, in the Mattertal there were about 80 butterfly species recorded. Surprisingly, the average highest plant diversity was not found in the southern alps as previously expected, but on the northern alpine flank. Near Grindelwald, 372 plant species were found.

Biodiversity of flowering plants and associated species constantly rose until the 19th century, also because of diverse traditional land-use practices. At the same time, a particularly high genetic diversity of cultivated and domesticated species, split up into numerous local breeds and races, developed as a consequence of the many small-scale differences among habitats in Switzerland.

During the 20th century only, these trends turned into a substantial decline of biodiversity, especially in the most heavily populated regions of the Swiss plateau. Today, however, this decline is increasingly affecting the Alpine region too. The trend reversal in the course of time is paradoxically caused in part by intensive agriculture and in part by abandonment of land use, as well as by the destruction and fragmentation of biotopes. Agriculture, originally a positive regulation factor of biodiversity (and landscape diversity) has increasingly become a negative one. Biodiversity in forests hasn't been an issue until very recently. The reason for this is the unique and restrictive law that prevented a decrease in the total forest area in Switzerland. It has clearly demonstrated the overwhelming importance of this factor for the conservation of viable forest populations of species and therefore diversity.

However, in the other intensively exploited surfaces biodiversity levels are much lower, e.g. intensely cultivated agricultural land is very poor in species rates. Where the number of species is increasing, this phenomenon is mainly to be explained by the growth of already present species – which provokes a simplification of the habitats and reduces their distinctive features. According to the results of an assessment performed in Switzerland on the plant, animal and fungi species, a fifth of them resulted in being at risk. More than a third of these species is included in the IUCN Red List of threatened species. This quota varies from one category to another and is especially high in the case of reptiles (70 %) and amphibians (79 %).

Sources: «Biodiversität in der Schweiz / La biodiversité en Suisse». It includes a comprehensive analysis of status and trends of biodiversity in Switzerland as well as the need for action.

⁵⁹ www.nationalparks.at

Italy

Biodiversity's characteristics in the Italian Alpine area is heavily connected to the general conditions typical of the Alpine ecosystems. Flora: Alpine areas in Northern Italy, entirely located in the Mid-European Region, have climate conditions that imply the absence of the basal end of evergreen broad-leaved forests - typical of the Mediterranean climate -, and seriation starts at the deciduous broad-leaved forest level. The variety of biodiversity typical of the Alpine ecosystems can be found in Italy. 8 different landscape systems have been identified in Italy [Pignatti, 1994]. The protection of wildlife flora is enforced according to the dispositions of the Bern Convention (82/72/CEE) and of the EU directive "Flora-Fauna-Habitat" (92/43/CEE). Fauna: the Italian Alps generally share the variety in biodiversity of vertebrates and invertebrates typical to the Alpine ecosystems. The Alpine area is home to 200 breeding bird species, 21 amphibians, 15 reptiles, and some 80 mammals. Another 200 migratory species can be observed in the Alpine region. A sub-endemic species of agnates (fish) is typical of the Italian Alps (Lampetra Zanandreae).

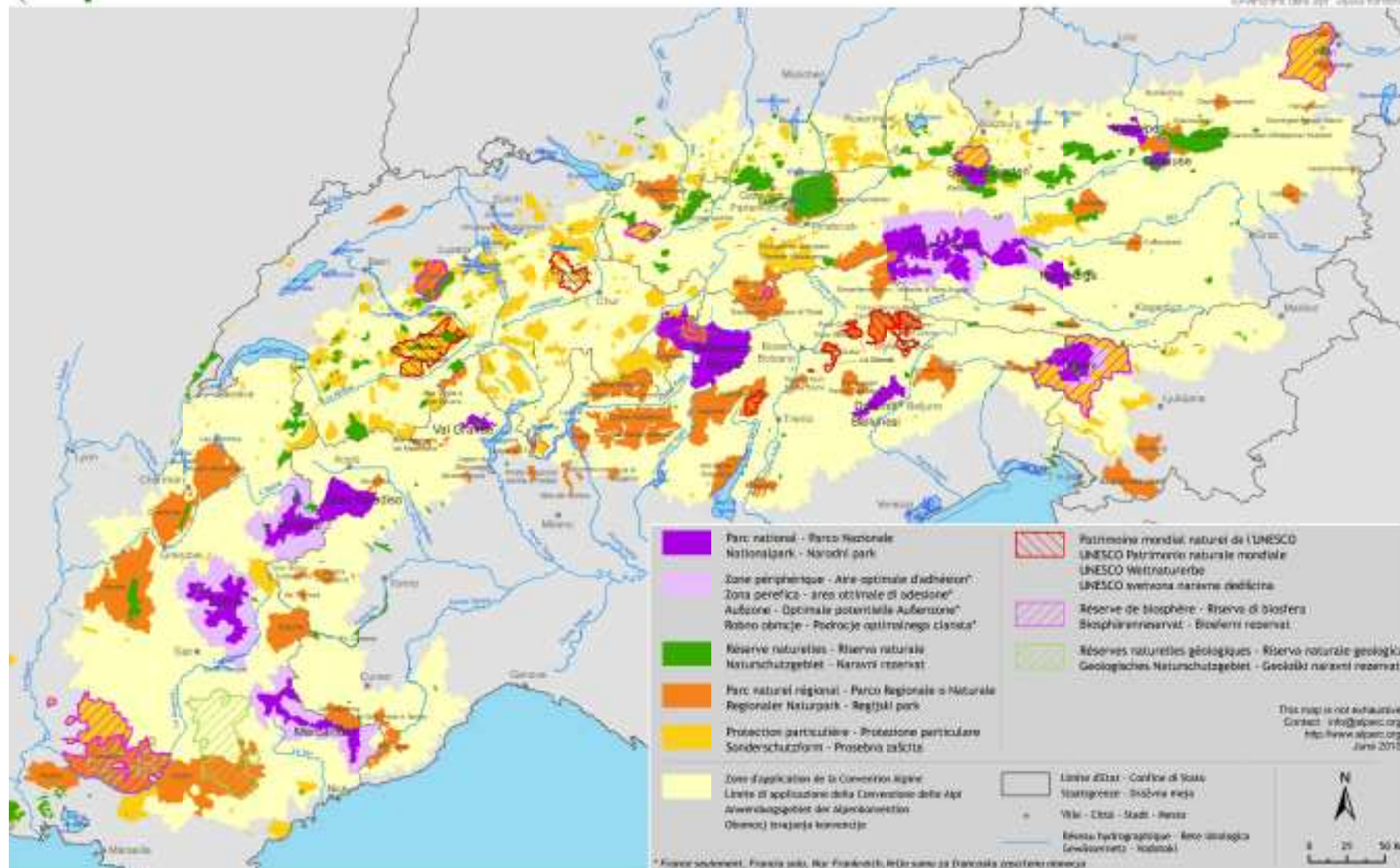
(wide-ranging form of protection defined by UNESCO, usually made up of three zones: a protected zone that is often an existing protected area, a transition zone and a development zone), 2 Natural World Heritage sites are present in the Alps, inscribed on the UNESCO World Heritage List (sites whose natural value is outstanding for humanity as a whole, and UNESCO requires the preservation of them for future generations, also by means of management plans based on wide acceptance)⁶⁰. Moreover, other types of protection are established according to national or regional law in the different Alpine countries, which often overlap existing protected areas. They comprise about 500 sites and include: quiet zones, biotopes covered by protection orders, protected landscape areas, fragile natural areas, listed areas, forest reserves, etc⁶¹.

C.2.3 Alpine protected areas

In the Alpine territory about 900 large protected areas (with a surface over 100 hectares) exist, and covering about 25% of the Alpine convention scope of application. They include a large variety of natural habitats and traditional landscapes. Different categories of protected areas, being mutually complementary, and having a specific environmental value are to be found in this region, in particular: 14 national parks (large natural areas or areas that have been changed very little by man, generally with a high level of protection and where, however, certain traditional activities may be permitted), 70 regional and/or nature parks (large areas usually characterised by traditional human mountain farming and forestry activities and significant levels of tourism, which often, also, contribute to regional development) 300 nature reserves (areas varying from few hectares to several thousand hectares, generally with a high level of protection similar to national parks, whose aim is often the protection of rare habitats, unique fauna and flora or endangered wetlands), 10 biosphere reserves

⁶⁰ UNESCO WHL sites in the Alps

⁶¹ "S.I.G. ALPARC 2008"



Map 27: Large protected areas in the Alps

© SIG Alparc 2009

National contribution: protected areas in the alpine countries

Austria

About 32 % of the Austrian Alps are protected by nature conservation acts, in comparison the nature conservation area of the whole territory of Austria covers about 27 % (overlapping areas are considered).

Category	Area km ²	% of the Alpine Territory
National park	2,314	4,2
Nature reserve	2,786	5,1
Natura 2000, spa	6,808	12,5
Natura 2000, psci	6,526	12
Protected landscape	10,359	19
Protected part of landscape	85	0.1
Nature parks	3009	5,5
Special protected areas	1,354	2,5

Special Protected Areas are distributed across all parts of the Alps. Their share in the Austrian Alps is at about 12% of the total area, thus slightly below the average for the Alpine range (Tappeiner et al. 2008). The most important environment protection categories are considered under the national parks scheme. There are six national parks in Austria of which three are located in the Alpine area (National Park Hohe Tauern⁶², National Park Kalkalpen⁶³, National Park Gesäuse⁶⁴). Furthermore, the so-called National Park Nockberge⁶⁵ in Carinthia, which is not internationally acknowledged, (due to regulations allowing agricultural land use) can be mentioned. All seven national parks have a combined area of 2.8% of the total area of Austria.

There are six biosphere parks in Austria of which three are located in alpine areas and one is located partly in alpine areas (total area of all six biosphere parks: 152,467 ha.): Großes Walsertal (Vorarlberg, see good practice 10)⁶⁶, Gossenköllesee (Tyrol), Gurgler Kamm (Tyrol)⁶⁷, Wienerwald (Lower Austria/Vienna)⁶⁸.

In addition to these large-scale areas there are many Nature Reserves (441 with an area of 3.6% of the total area in 2009) and 47 Nature Parks in Austria⁶⁹. Particularly these latter categories cover

a large area (about 500,000 ha) and aim specifically at the inter-action of people and nature. Very often these landscapes took many centuries to form into their current shape, and they thus, need to be conserved and maintained by the people who live there. In Nature Parks the cultural landscapes of specific aesthetic appeal is opened up for the visitors through special arrangements and accessed as an area for recreation.

Presently the geographical main focus/emphasis lies in Eastern Austria, the provinces of Lower Austria, Styria and Burgenland, though the number of areas seeking to become a Nature Park is constantly rising. About half of them are located in the alpine areas (for example: Tiroler Lech, Kaunergrat, Ötztal, Weissensee, Zirbitzkogel – Grebenzen).

Switzerland

Since 1991 the size of legally protected areas in Switzerland has increased. In 2007 national protected areas accounted for some 5.7% of the total land area of Switzerland. The significant increase in 1992 is attributable, in the most part, to the inclusion that year of the no-hunting zones in the protected areas.

It is on the Northern Alps that the surface of protected area has increased most; at some 95,000 hectares, it is also here that it is largest in absolute terms. In relative terms, the protected area is largest in the western Central Alps, where it constitutes 9.3% of the total area of the region.

The size of the protected area increases or decreases when its legally determined borders are changed. So when the size of the protected area increases, usually this does not mean that new biotopes have emerged. It is more likely that new areas have been admitted into the inventory. In other words, the indicator does not show how the natural environment has changed, rather how the legally defined borders of the protected areas have changed. Nature and landscape reserves encompass the Swiss National Park, alluvial zones, raised bogs and fens, amphibian spawning areas, water and migratory bird reserves, as well as Federal no-hunting zones. Accordingly, changes in the area of nature and landscape reserves are calculated using the National Park and the various federal inventories. The Fläche Schweizer Nationalpark (that is the only national park in Switzerland), the Regionaler Naturpark Thal and the Naturlandschaft Sihlwald cover an area of 715 km². Specific protection areas cover 1.897 km² including the areas of Feuchtgebiete international Bedeutung, UNESCO Naturerbe, Moorlandschaften and Kantonale Schutzzonen.

⁶² www.hohetauern.at

⁶³ www.kalkalpen.at

⁶⁴ www.nationalpark.co.at

⁶⁵ www.nationalparknockberge.at

⁶⁶ www.grosseswalsertal.at

⁶⁷ www.naturpark-oetztal.at

⁶⁸ www.bpww.at

⁶⁹ www.naturparke.at

Slovenia

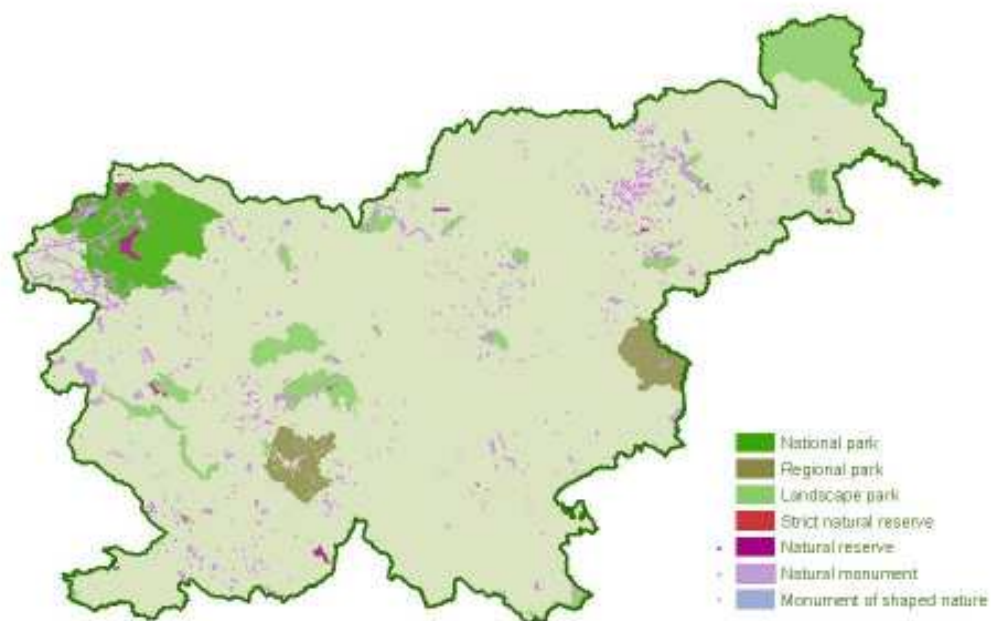
In Slovenia, the surface under nature protection within the Alpine Perimeter covers 116.077,0265 ha.

The widest area is occupied by the Triglav National Park that is the only Slovenian national park, named after Triglav, the highest mountain in the heart of the park and in Slovenia (2864 m). The Triglav National Park extends along the Italian border and close to the Austrian border in the north-west of Slovenia, that is, in the south-eastern section of the Alps. Its territory is nearly identical to that occupied by the Eastern Julian Alps. The park covers 83978,397 ha, or 3% of the territory of Slovenia. The Triglav National Park is among the earliest European parks; the first protection dates back to 1924. Alongside three regional parks, there are almost 45 landscape parks within the whole country. At the same time, Slovenia is included in the Natura 2000, European network of nature protection areas. Around 10% of Slovenia's territory today falls within protected areas, 35.5% of the territory is protected under Natura 2000, and 14,901 valuable elements of nature have been given the status of valuable natural feature. The different categories of protected areas in Slovenia include national, regional, landscape parks, natural reserves, and natural and horticultural monuments. With regards to the Alpine territory, the figures that follow can help correctly represent the situation in Slovenia:

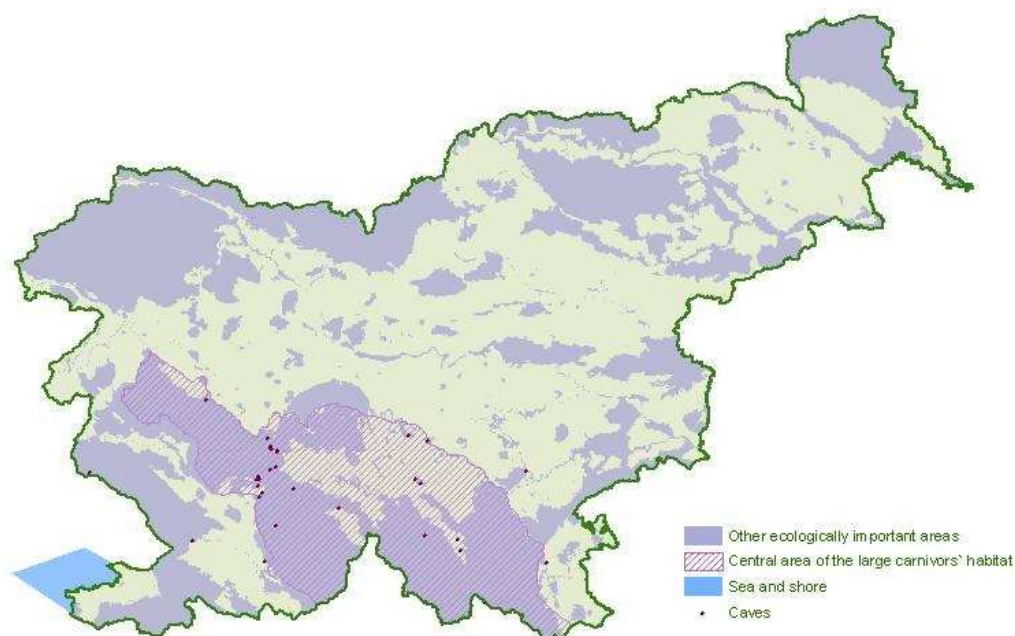
To the number of protected areas reported above, the following have to counted, too:

status	Surface ha*	Number
National park	83978,397	1
Regional park	0,926	1
Landscape park	25001,680	14
Natural reserve	3169,375	19
Natural monument	13746,548	151
Horticultural monument	205,254	19

status	/	Number (points)
Natural monument	/	151
Horticultural monument	/	2



Map 28: Protected areas in Slovenia



Map 29: Other ecologically important areas in Slovenia

C.2.4 Water

The Alpine water resources take many different forms and they all have a particular role to play in the Alpine water cycle and its surroundings. The Alpine water resources comprise rivers, lakes, wetlands, groundwater bodies, glaciers and precipitations while the evaporation and outflow of water to the surrounding areas represents output fluxes from the Alpine area's water balance. Glaciers, soil, artificial and natural lakes are very important for the storage of water. The amount of water in rivers depends on the climate, the rainfall, depending on the season, and on the basic geological conditions. In areas characterised by an Atlantic climate, the river discharge is much higher than in those characterised by continental weather. The density and pattern of the surface water network depend primarily on the geological subsoil. In karst regions, the density of surface waters is low despite high precipitation. The outflow of water runs underground and the water often reappears at the bottom of valleys at a great distance from the place of the rainfall. The influence of precipitation on the water cycle and phenomenon such as erosion depend primarily on the land cover. In this respect, forests influence the runoff and retention of water intensively. The lakes in the Alpine space and especially the lakes located on the borders of the Alps are able, to a certain extent, to balance the outflow, and they are important for the retention of sediments. Examples of lakes with balancing functions on the borders of the Alps are Lake Constance, Lake Léman, as well as Lake Chiemsee or Lake Traunsee.

In the Alps, rivers and lakes are highly interlinked and they all flow into the 6 main Alpine river basins (Rhine, Rhone, Po, Danube and Adige). The most important river basins fed by Alpine river systems are the catchments and river basins of the Rhine, Rhone Po and Danube. The wetlands of high importance are described in the 92/43/EC Fauna-Flora-Habitat-Directive (FFH) and the Natura 2000 net. Rivers, lakes and groundwater bodies often cover surfaces

involving different countries and administrative levels. Therefore, upstream-downstream relations are important for river management. Along different rivers, international commissions whose primary goal is the common management of the river, its shores and adjacent land were therefore established many years ago. One example is the European Commission of the Danube, dating back to the 1856 Treaty of Paris and comprising representatives from each of the riparian countries, which is responsible for the administration of the Danube River. The surface occupied, the hydromorphology, the structure of rivers and lakes and the water quality has been modified significantly over the past two centuries by human activities.

The Alps supply a disproportionate amount of water from 35% (Danube) up to 80% in peak times (Po) of the overall discharge in the different catchments. The significant contribution of the Alps to the total discharge of the 4 main Alpine river basins always needs to be taken into consideration when dealing with water management issues. The Alps play a specific role in temporary important periods of water scarcity. Due to climate changes, the regime of catchment might change to a constantly reduced water level in summer, which has an impact on water quantity as well as on the temperature of surface waters. As a consequence, it is likely that the need for water, in particular for agricultural purposes and for electricity production, will meet with increased competition from the needs of river-water ecosystems⁷⁰.

⁷⁰ RSA 2

Bibliography

Bätzing W., 2005

Le Alpi: una regione unica al centro dell'Europa. Bollati Boringhieri, Torino.

Baumol and Oates, 1988

The Theory of Environmental Policy, Cambridge University. Press, Cambridge, UK.

Behring, K. & Helbrecht, I., 2002

Wohneigentum in Europa. Ursachen und Rahmenbedingungen unterschiedlicher Eigentumsquoten im Vergleich (Ludwigsburg: Hrsg. von der Wüstenrot Stiftung).

Boulding K. E., 1966

The Economics of Knowledge and the Knowledge of Economics in American Economic Review, 16 (May): p. 1-13.

Chemini C., Rizzoli A., 2003

Land use change and biodiversity conservation in the Alps. In Journal of Mountain Ecology, 7 (Suppl.): p. 1-7.

EEA, 2010

Europe's ecological backbone: recognising the true value of our mountains. EEA Report No. 6/2010.

Hofmeister K., 2005.

Flächensparende Siedlungsentwicklung in Alpenländern. Steuerungsmöglichkeit der Raumordnung auf kommunaler Ebene in Bayern, Tirol und Südtirol Würzburger Geographische Manuskripte 69.

Körner C., Spehn E., 2002

Mountain biodiversity – A Global Assessment. New York, London: Parthenon Publishers.

Kneese A.V. & Sweeney J.L. , 1985

Handbook of Natural Resource and Energy Economics, Amsterdam: North-Holland.

Mishan E. J., 1967

The costs of economic growth, New York: Praeger.

Pearce D. W., and Turner R. K., 1989

Economics of Natural Resources and the Environment. Brighton: Wheatsheaf.

Tappeiner U., Borsdorf A., Tasser E. (Herausgeber), 2008

Alpenatlas, Spektrum Akademischer Verlag, Heidelberg.

Umweltbundesamt, 2010

Neunter Umweltkontrollbericht – Biologische Vielfalt und Naturschutz, Umweltbundesamt, REP-0286, Wien.

Weingartner R, Viviroli D, Schädler B, 2007

Water resources in mountain regions: a methodological approach to assess the water balance in a highland-lowland-system. *Hydrological Processes*, 21(5), 578-585.

C.3 Human assets

Human assets are generally considered to indirectly produce economic value. They have been developed over time and can be seen as representing a heritage of a certain territory. Even though heritage is usually, formed by material goods, the value of these assets largely depends on human intervention, culture and perceptions.

These assets can be considered as a variable closely related to human history and sensitivity, being influenced by a cultural heritage that developed over generations. In turn, the Alpine cultural heritage itself has been influenced both by natural factors, such as the hard climate, and the geomorphological conditions where Alpine civilizations developed (which often appear as common to different Alpine peoples), and by human ones, directly connected to the history, values and thinking of men: civilization, politics, society and culture.

Often the human factor, interpreted as a variable in the development process of a given territory, is a vital and essential asset since this it is one of the major "driving forces" of society.

Human heritage's present attitude and power in the Alps are at the same time dependent on history and on the present specific combination of local and global socio-economic elements. The relative value of this heritage can be estimated through a comparison between the living conditions inside and outside the Alpine area.

In the process of development and achievement of a specifically alpine heritage, historical factors participate too, which are linked to the traditions and past experiences, very diverse in a space topographically complex as the Alpine one, as well as current factors: goods and services supply, cultural facilities (education and recreation), welfare (hospitals, elderly, disabled, infants care), economic framework (political support to development and innovation, credit).

The alpine region as a whole seems to show a socio-economic structure and trends consistent with the one registered in the surrounding European non-alpine zones. The distinctive process of advanced economies according to which jobs tend to shift to the service sector in presence of economic growth, is to be observed also in the Alps, where one of the historical drivers of local well-being is tourism. Nevertheless, local disparities in economic development, sometimes pronounced, are quite common and can be noticed from one valley to another.

Good practice 38: Towns and lands of art and history, France

Since 1985, the French Ministry of Culture and Communication has supervised the putting into effect of a policy of enlivening and drawing value from the country's heritage. This is done in partnership with the grouping of areas brought together under the title of Villes et Pays d'Art et d'Histoire (Towns and Lands of Art and History).

The agreement was finalized by a convention worked out with the managements of architectural and heritage undertakings and with those of the regions and groups concerned. The convention involves financial and technical support from the ministry and includes an obligation to receive qualified workers accepted by the ministry. The national council of towns and districts of art and history, (Le conseil national des Villes et Pays d'Art et d'Histoire) set up in 1995, participates in the development and general policy of the network and issues advice as to which places are acceptable for membership of the designation as well as for the withdrawal of support from places where standards slip.

In 2008, about 137 towns and districts were part of this network, among which 10 are in the Alps.

The main objectives of the Convention are:

- sensitize local inhabitants to their environment and encourage a tourism of quality;
- introduce young audiences to the architecture, heritage and urban planning;
- present the town or the country in an Interpretation Centre of Architecture and Heritage (CIAP).

More information: www.vpah.culture.fr

A comprehensive list of the assets distinctive of the alpine region, which can be to a large extent, linked to human intervention is a challenging goal, and would go beyond the aims of the present report. Though, the following elements could be taken into consideration: ability of the area to serve as a living and working space⁷¹; distinctive industry and manufacturing activities (also with reference to locally grown natural and environmental assets)⁷²; cultural heritage and landscape⁷³; presence of cities of economic relevance⁷⁴; characteristics of agriculture and farming typologies⁷⁵; typologies of tourist and recreational services & initiatives; diffusion of social services and their effectiveness in reaching alpine inhabitants; level of education and presence of educational services; infrastructure endowment of the region (transport, communication, ICT networks, etc.).

Good practice 39: the case of the Italian Fund for the Environment's "Heart's Places", Italy

Since its first edition in 2003, the initiative from the Italian Fund for the Environment (Fondo Ambiente Italiano - FAI) named "Heart's Places" – "Luoghi del Cuore" has represented an innovative procedure for the identification, valorization and promotion of the Italian cultural heritage. The Italian Fund for the Environment (FAI) is a

⁷¹ Several territorial features are likely to determine the attractiveness of an area as a suitable location for people and businesses settlements, among which: geographical location, level of accessibility, availability of appropriate services and infrastructure, presence of governmental favourable policies or incentives/support, education services, health and social services.

⁷² Typically these activities are linked to long-term cultural habits (e.g. traditional handicraft), availability of specific natural resources (e.g. timber, hydropower, biomass, etc.), land characteristics (e.g. mines) and specific territorial policies or public spending support (e.g. Agricultural policies, etc.).

⁷³ Both the concepts of nature conservation and the preservation of cultural properties participate in the definition of heritage, according to Unesco World Heritage Convention (1972). Cultural and natural significance can be assigned to a variety of sites and properties. In the mountains, landscape often can be recognised as having a specific aesthetic and cultural value.

⁷⁴ Urbanization is a distinctive long-term process of human settlements which is taking place also in the Alps.

⁷⁵ Farming is a distinctive activity of mountain areas worldwide. Rural areas are common in the mountains and food production is a basic component of the mountain economies. Moreover, appropriate policies aimed at the valorisation of food production from mountain zones are likely to improve the level of positive externalities produced in these territories (see: FAO/SARD-M, 2005; Robinson, 2007). Farming can deliver several types of economic outputs (joint outputs), including positive externalities. Mountain farming is considered to be a multi-functional activity, strictly linked to the territory where it takes place (OECD, 2001), which can provide for ecosystem services and other methods of income generation (e.g. accommodation services, tourism, etc.).

national non-profit foundation that has operated since its birth in 1975 as a major supporter in the mission of concretely promoting the respect, visibility and valorization of the Italian natural, historical, artistic and traditional heritage.

The central innovation in FAI's "Heart's Places" initiative is the bottom-up mechanism for the places' selection, based on voluntary signaling on the behalf of the people resident in Italy, without age or nationality limits. The project's aim is to realize a wide-based census in order to identify the people's opinion about the most valuable natural, monumental and artistic Italian treasures. Following the census' indications, FAI is then able to solicit the responsible local and national institutions for the protection and safeguard of the selected places for present and future generations. This initiative has offered a platform for the mediation between citizens, municipalities

Figure 21: The Antersasc Valley, Autonomous Province of Bolzano, Italy, (Source: FAI – I Luoghi del Cuore)



and institutions giving all participants the possibility to act directly for the protection of their favorite places.

In order to both, ensure a prompt evaluation and valorization, and to widen the action scope and potential effectiveness of the initiative, the "Heart's Places" census was established to be held once every two years and to propose a new title for each edition. The 2006 census on "Natural Places" received 120.960 votes. The 2010 census - concluded on September 30th, 2010 – focused on those locations eminently representing the Italian history, tradition and values and inspiring Italy's image worldwide, in the spirit of the 150th anniversary of the Italian Unification.

In all FAI's "Heart's Places" five editions, the Italian Alpine Regions registered a significant public participation, and a notable expression of preferences is to be reckoned for places spread around all the Alpine Italian provinces, such as: Alpe Cortlys-Sikken-Salzen (Valle d'Aosta); Francotto Park (Cuneo); Mount Soglio (Turin); Mount Secco (Bergamo); Colcerver and Laghetto delle Tose (Belluno); Italy's balcony of Sighignola (Como); Antersasc Valley (Bolzano); Carezza Lake (Trento); San Floriano Park (Pordenone).

More information: www.iluoghidelcuore.it/

In some of the following sections dedicated to human assets, we will focus on the role of humans with regard to the development and valorisation of that particular group of alpine assets, which are to be considered as the result of human commitment, work and decisions to settle and live in the alpine territory.

C.3.1 Heritage and landscape

The alpine landscapes, shaped by specific forces, being linked to the alpine territory, differ greatly from those existing outside the mountain area. The interaction among various natural, political, social and cultural forces brought to develop distinctive forms of landscape, which exert a powerful attraction on visitors. This is to be linked on the one hand to the typical geomorphological features of mountain landscape, which offer recreational and sporting opportunities and a unique scenery. On the other hand the cultural mountain landscape – which can be defined as the outcome of human activities on nature – has also exerted a great charm on visitors since time immemorial.

The great variability of the environment, which can also be recognised in spatially restricted areas, due to strong altitudinal gradients and abrupt changes in geomorphology, influenced the development of the alpine area. In particular, human settlements and agriculture, enable the Alps to offer the visitors a combination of natural, cultural, and gastronomic perceptions, that are extremely rich and varied.

The landscape, as considered in this section, therefore represents a diversified resource, mainly, but not exclusively, attractive for people living outside the Alps, and can be seen as a driving force for tourist valorisation of the territory. Its preservation and enhancement in the long term becomes a central focus, and integrates well, the sustainable developments' general concept.

The characteristics of mountain landscape, coupled with the presence of attractive elements scattered throughout the area, is in favour of its inclusion among the factors of rural development rather than those of urban development. Within the Alpine area

large towns are not common. As a consequence the known logistic and relative accessibility difficulties favour the development of flexible and customized facilities and services (e.g. farm holidays, bed and breakfast, hiking services). All around the region, aiming at meeting the needs of different users, maybe only occasionally present in the territory, frequently in small groups.

Good practice 40: Landscape management in the spatial development strategy of Slovenia

The Spatial development strategy of Slovenia (Official Journal of the Republic of Slovenia 76/2004) is based on the consideration of social, economic, and environmental factors of spatial development. In line with the principle of sustainable development, which is its basic principle, the Spatial Strategy enforces prudent land use and provides for the safety of life and natural resources. It emphasizes endeavours to preserve spatial identity and to enhance the Slovenian identity as well as its local and/or regional identities. In the context of European competition, this offers comparative advantages. The Spatial Strategy is composed of a textual and a cartographic part.

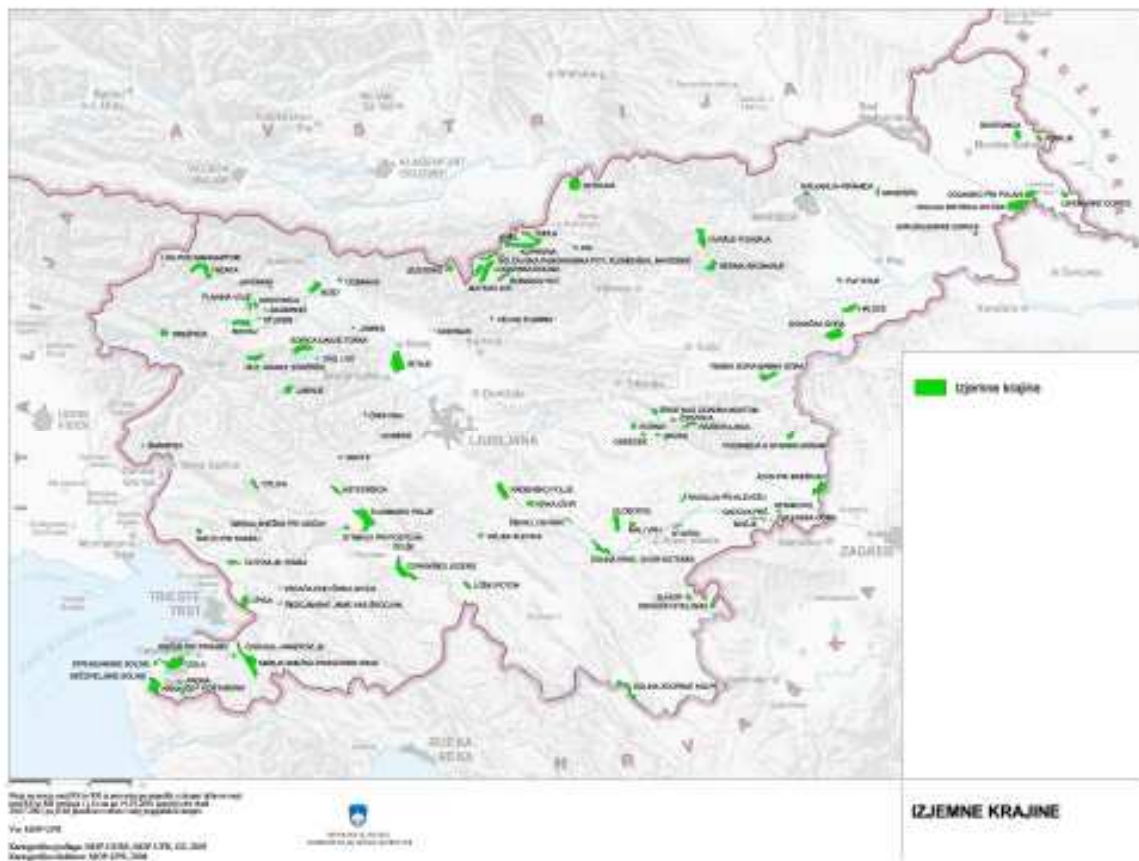
The Strategy defines landscape areas with recognizable characteristics, which are of national significance and gives guidelines for landscape planning. They have been defined on the basis of valuable cultural heritage in rural areas and outstanding landscapes that is mainly on the basis of cultural characters. To develop the landscape, the Strategy provides guidelines for the conservation of the Slovenian identity from the aspect of the cultural and symbolic significance of the landscape, for the conservation of the natural qualities of the landscape, and also for the use of natural resources. It also provides guidelines for defence activities in physical space and spatial restrictions of development due to potential natural or other disasters, as well as for water deficiency. With specific regard to landscape, the Strategy defines the concept of "outstanding landscape" and the locations and names of the outstanding landscapes in the country.

One of the most important expert sources in the area of landscape assessment is a publication illustrating the regional distribution of landscape types in Slovenia, a study largely used in landscape assessment. Slovenia has been regionalised according to

landscape features into five landscape macroregions, including: Alpine macroregion, Pre-Alpine macroregion, Sub-Pannonian, Karstic and Coastal.

More information:

www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/publikacije/drugo/en/sprs_eng.pdf



Map 30: Outstanding landscapes in Slovenia

C.3.2 Cultural heritage and facilities

The heritage of a territory is widely analysed in the literature and practice of international bodies. In particular UNESCO provides detailed explanations concerning both the natural and cultural heritage categories. The category of heritage which can be directly linked to human interventions can be divided into some distinct components: the cultural heritage or the heritage of memories, experiences, information, craft and artistic representations legacy of past human trades, which partially also permeates the landscape referred to above (including in particular monuments, groups of buildings, or specific sites, according to Unesco WHC); infrastructure, initiatives and services enhancing the historic heritage offer (exhibitions, museums, etc.) and fulfil the recreation and culture needs (e.g. green and equipped areas, tourist facilities, cinemas, theatres, events).

According to the preparatory works delivered within the UNESCO World Heritage WG of the Alpine Convention (UNESCO Working group)⁷⁶, the sites that fall within the scope of the Alpine Convention – either cultural, natural, or mixed sites, including cultural landscapes – represent only 2% of the total of the sites currently inscribed in the World Heritage List (WHL). Though, in Switzerland, Slovenia and Austria, these sites correspond to a much higher proportion. Cultural sites are predominant over other typologies. Of the different cultural criteria set by the rules of inscription in the WHL, and which are at the basis of the inscription procedure, it is noticeable that criteria (i) master-pieces and (v) vulnerable traditional practices representative of a particular culture are particularly rare in Alpine registered sites. Mixed sites are absent, while natural sites are little represented in the WHL.

An examination of the national tentative lists confirms this trend, in strictly Alpine sites:

there is a strong predominance of cultural sites over other typologies. Alpine mixed sites, absent from the WHL until now, are present in the tentative lists in a proportion similar to that of cultural landscapes and natural sites. This partly reflects the strong anthropization of the Alpine Arc, which had a remarkable influence in shaping the alpine environment and scenery. As a consequence, the typologies of mixed sites and cultural landscapes seem particularly appropriate to render the nature of this area.

A first comparative analysis of the Alpine sites already inscribed in the WHL and of those present in the National Tentative Lists shows that certain criteria are relatively rare in both (in particular: (x) *natural habitats* and (v) *traditional vulnerable practices*). This relative rarity, according to the preparatory works of UNESCO WG of the Alpine Convention, is shared by other criteria ((ix) *traces of earth's history* & (vii) *natural beauties*).

The heritage is expressed on one side by the availability of cultural and artistic properties & products (arts, ancient crafts, customs, traditional festivals and performances), whose diversity is enhanced by the richness of civilizations and traditions that evolved locally; on the other by the influence it exerts on the present society, subject to internal and external forces that have determined a certain socioeconomic development path.

Infrastructure, initiatives and services are typically influenced by local culture and historical heritage. They are addressed to the population living both inside and outside the Alpine region.

Infrastructure has greater value as a tourist attraction, and can be more easily managed with *ad hoc* policies. Though, the enhancement of local and Alpine cultural heritage represents a process of reappropriation of identity and a recovery or consolidation of self-esteem for the local people, which is essential for the success of any consistent territorial development initiative.

⁷⁶ Alpine Convention UNESCO World Heritage Working Group, Alpine sites and the UNESCO World Heritage – Background study, 2010

The services referred to are primarily addressed to the people living in the Alpine region. They include social services (maternity, children and elderly care) and health services. Access to information and other related services, such as telecommunications access (broad band internet, radio and television) can also be considered included in the above-mentioned category. These services still represent an additional component and a complementary tourist attraction that contributes not only to meet the needs of residents, but also to assure visitors higher levels of services.

The provision of cultural services, recreation, health and social as well as economic (mainly credit and employment) in the last century represented the major limiting factor for the quality of life in mountain areas, with significant implications on the depopulation trend.

Good practice 41: Walk of peace in the Soča region foundation, Slovenia

The "Fundacija poti miru v Posočju" ("Walks of Peace in the Soča Region Foundation") was founded in 2000, after the Slovenian Government adopted a ten-year program to co-finance the activities of this foundation from various ministries. The objective of the project is to preserve, restore and present the historical and cultural heritage of the First World War in the area of the Isonzo Front for the study, touristic and educational purposes. Its activity is directed towards the establishment of a Study Center of the First World War with a history library and documentation center.

Figure 22: Outdoor museum Zapirkraj



In collaboration with the Institute for the Protection of Cultural Heritage and with experts, restorers and conservators, the Foundation restores the memorials from the First World War. In 2007, the outdoor museums and the most important remains and memorials of the Isonzo Front in the Upper Soča Region were interconnected into the Walk of Peace, in operation since 2007.

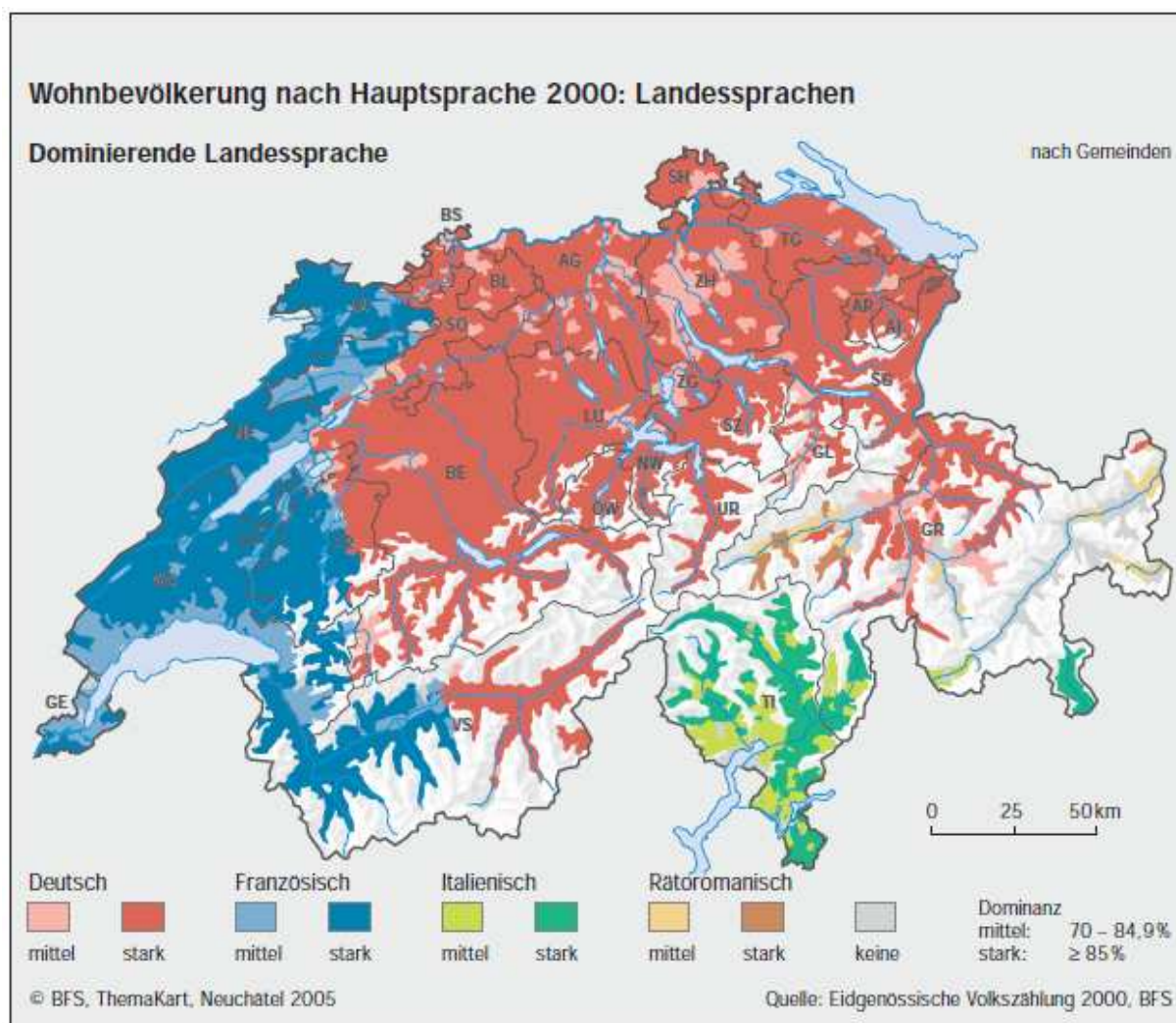
The Foundation plans further activities, such as a path along former Isonzo front line, an inventory of the fallen soldiers in Gorizia and Karst Counties, a cross border tourist park at Kolovrat, and the development of a European park of peace and memory. It employs four young university-educated local people (support in brain drain prevention) and in the main tourist season even more. Many other localities are interested in the transfer of the practices to their areas.

From 2007 to 2010, about 59.000 tourists have visited the Information Centre in Kobarid, about 3.200 have taken part in guided tours.

Paths of Peace could be established elsewhere in the Alpine Convention area, connecting the memorial places and traces of WWI, promoting war heritage, peace and understanding among people and nations.

More information: www.potimiruvposocju.si/

Map 31: Main language in Swiss municipalities in 2000



National contribution: alpine languages and dialects: a cultural richness

Language diversity and its valorization in Switzerland

Languages represent a valuable cultural asset for most of the Alpine areas. In Switzerland, this is particularly the case. The Swiss Federal Constitution (art. 70), recalls that the official languages of the Confederation are: German, French, Italian, and Romansh (when communicating with persons who speak Romansh). It assigns to the Cantons the right to decide on their official languages, respecting the traditional territorial distribution of languages and taking into account the indigenous linguistic minorities, in order to preserve harmony between linguistic communities. At the same time, a message aimed at encouraging the reciprocal understanding and exchange between the linguistic communities is expressed. Moreover, the

Confederation supports the plurilingual Cantons and those of the linguistic Romansh and Italian minorities, which, according to the Constitution itself, need to be preserved and promoted (Graubünden and Ticino). Figures concerning the spoken languages in Switzerland were collected in 2000 and show a large majority of German speakers (4,6 M – 63,7%), followed by French (1,5 – 20,4%), Italian (0,5 – 6,5%), Romansch (0,04 – 0,5%). The remaining Swiss inhabitants speak other languages.

German dialects around the Alps: an Arge-Alp community project

A project on the distinctive characteristics of German dialects used in the Alps (and namely: in Germany, Austria, Switzerland and Northern Italy), has been developed by the ARGE ALP community (pooling together territorial governments from Austria, Germany, Italy, and Switzerland to enhance transboundary cooperation in different fields). The contents

resulting from the research activity performed in the German speaking communities throughout the Alpine zone, are searchable on line on a dedicated web site. Starting from local knowledge, languages and specific terminology (often being strictly related to traditional knowledge and mountain activities), a lively linguistical database, including interactive maps and recordings, has been developed. Browsing through it, it is possible to listen to the vast, diverse terminology and prononciations that can be found within the German speaking communities of the Alps. Clear differences exist between dialects, though for instance in the Alpine part of Germany there are no specific ethnic or cultural minorities⁷⁷.

Good practice 42: The Glentleiten Open Air Museum in Upper-Bavaria, Germany

The Glentleiten Open Air Museum is situated in the charming landscape of the foothills of the Alps, between Murnau and Lake Kochelsee in the surroundings of the well-known tourist centre of Garmisch Partenkirchen in Bavaria. The museum lies in the middle of a rich natural environment and a typical Alpine landscape. A tour around the museum premises with its forest, pastures and historic garden allows visitors to see some 60 buildings – farmhouses, mills, mountain lodges, workshops and much more – which were rebuilt in their original shape. In combination with their complete interiors they draw an authentic picture of rural life in Upper Bavaria's past and how it has been influenced by the farming community. The extensive museum grounds include woods, pasture and historical gardens. Interesting and changing events and exhibitions convey a lively image of the past. From folk music day to craftsmen's day, from children's week to gardening lessons, there is something for everybody of every interest. Craftsmen present professions that have died out long ago - from filigree handicrafts such as lace-making to physically strenuous labour carried out by smiths and whetstone makers. Depending on the season and weather conditions, work is carried out in the fields and meadows.

More information: www.glentleiten.de

C.3.3 Science & technology

The accessibility of education and training opportunities is a prerequisite for the maintenance of the inhabitants inside the region in the short and medium term, and to trigger further development in the medium and long term. Accessibility of the above mentioned services means a presence of institutions and organisations providing education and training services distributed over the area, appropriate transport infrastructure, and collective transport services suitable to reach them in a reasonable time, coupled with appropriate incentives.

Education, especially at university level, educates specialists in different disciplines, who often work in locations quite far from universities. If it is undeniable that the availability of university facilities located in the territory is necessary to train a qualified workforce on-site, it is also of the utmost importance to develop economic sectors that can absorb the qualified professionals coming out of local universities, preventing the exodus to regions with higher demand for skilled and qualified workforces.

Given the specifications of the Alpine area, the local training and research centres are expected to train specialists in subjects close to the local reality and needs, being able to deliver appropriate solutions for mountain areas. The presence of firms is also crucial, as a dynamic business activity is the link to the production phase and the interface of the difficulties and challenges that the research should help overcome, contributing from its side to stimulate technological development into the enterprises.

⁷⁷ www.argealp.org/fileadmin/www.argealp.org/atlas/index.html

Good practice 43: Education excellence for mountain assets' management in the Alps, in Germany and Italy

Sixteen universities are based in the main centers and capital cities of the Italian Alpine Provinces and Regions, which means, the offer of tertiary education is distributed and accessible even from potential marginal areas such as mountain areas. Furthermore, some of the main Italian universities in the Alpine regions run a number of branch faculties and courses in other locations, either in the same or bordering Region/Province. In some of the main universities mentioned, or branch faculties, courses and degrees offered are directed towards the development of skills connected with mountain-related specific disciplines and fields of study, in order to train scientific and professional experts in mountain issues (a specific initiative dealing with enhancement of local products and land-linked know-how has been launched at the foothills of the Alps in Piemonte with the University of Gastronomic Sciences, in Pollenzo (Cuneo). A specific university degree on mountain themes has been activated e.g. in Edolo (Brescia), in the Italian Central Alps by the University of Milano. Other cooperations have been started for instance in Piedmont by the Catholic University of The Sacred Heart of Milano and Brescia in Domodossola, in addition, specific summer courses have been launched on mountain topics, also in cooperation with international institutions like the Mountain Partnership. Research foundations and centers, mainly depending on the above-mentioned universities, can also be found spread through all the Italian Alpine regions. Other initiatives and training courses exist regarding other typical mountain fields, such as forestry and wood products.

Two universities of applied sciences in Germany are located under the scope of application of the Alpine Convention: Rosenheim, which is well known for a course in Wood technology and industrial engineering and also took part in some regional cooperation projects in the Alpine area, e.g. in the framework of the INTERREG Alpine Space Programme) and Kempten, delivering a special competence in tourism management. 894 students attended the courses of the Faculty of Engineering in Rosenheim in 2009/2010 and some 385 students attended the courses in Tourism management in Kempten University in 2008/2009.

Good practice 44: Social dimension and economic performance in Austria

The Austrian Strategic Plan for Regional Policy (ÖROK 2007, strat.at 2007-2013) has selected mountain areas as one of the key spatial categories for future regional development. Whilst it suggests that the amenity value of the landscapes of the mountain areas will be one of the most influential aspects for future tourist use in these areas, further studies commissioned by ÖROK recognize that a more comprehensive assessment of regional opportunities is required to meet the challenges of remote rural (and mountain) areas. In particular, good practice examples on the social dimension reveal the need for innovative action aimed at enhancing integration and social dialogue, as well as the inclusion of diversity as a particular regional strength in regional development approaches.

In general, adult literacy rate is not a significant problem and does not differentiate between the regions of Austria. This seems different for school enrolment with pockets of low educational levels in smaller regions of Alpine areas. There are efforts to achieve higher school levels through increased commuting to secondary and tertiary schools (e.g. long-term commuting rate for students in the area of Upper Styria is higher than 40%) revealing the deficit of local education facilities in parts of the area.

Economic performance in the Alpine regions is somewhat mixed, with high levels in western provinces and low performance in large parts of Eastern Austrian Alpine regions (particularly mountain regions in Styria, Carinthia, Eastern Tyrol and Lower Austria). The average is almost equal to the Austrian average (see map). The economy in the area of the Alpine Convention attains about 37% of total national GDP (with a population of about 40% of the country). In relative terms GDP of the Alpine area of Austria achieves about 92% of the Austrian average (30,080 €/inhabitant, compared to 32,600; figures calculated for 2007). However, there are also some difficulties in the economic development in western Austria, indicated by low GDP growth over the last decade.

C.4 Energy and sustainable rural development

C.4.1 Introduction: Energy (r)evolution in the alpine Space

There is no serious doubt that climate change is caused by mankind, due to the increased CO₂ concentration in the atmosphere by the combustion of fossil fuels. The fossil resources are limited and must in many cases be imported from non-alpine countries. In order to reduce environmental impacts caused by energy production, and in particular to stop the emission of greenhouse gases, and to improve the energy autonomy of alpine countries, it is time to search for alternatives. To reach these objectives, two main challenges must be tackled: one is the overall reduction of energy consumption – meaning also the increasing of energy efficiency - and the second is the development and use of renewable energies. Only a paradigm shift in the energy sector offers a promising perspective for a sustainable development, not only but also for the alpine area.

The alpine region, due to its highly sensitive ecosystem, is severely affected by climate change and its resulting environmental and socio-economic consequences. The alpine space can only cope with the challenges arising from climate change if the trends are anticipated early and mitigation and adaptation measures are implemented effectively. The promotion of renewable energies could significantly contribute to evading the climate dilemma.

By its nature and natural resources, the alpine area offers very good conditions to further develop renewable energies. The availability of water, sun radiation, wind and biomass is one major asset, to develop renewable energies built on these resources. On the one hand, the regional added value, which is generated by the installation and the operation of renewable energy facilities offers promising development options specifically for rural areas. The creation of jobs and the independency to imported

energies are further major benefits. On the other hand, to develop renewable energies is a particular challenge in the Alps due to the vulnerability and topographic particularities of this region. It is obvious that a sensitive nature need a sensitive care and thus a specific and adapted strategy based on local and regional conditions, which includes ecologic (potential impact on nature), topographic, economic (potential added value) and social situations.

It is obvious that climate protection in the alpine space by an increased use of renewable energies cannot solve the global problem of climate change and global warming. However, the alpine space can make an important contribution toward realizing the EU's 20-20-20 targets in becoming as energy efficient as possible and by the promotion of renewable energies. Turning to this logic does not only mean to reduce CO₂ emissions but also to create new economic benefits for its rural and peripheral areas, thus creating real Win-win-solutions.

It has to be stated, that the enhanced usage of renewable energy does only lead to a CO₂ reduction if fossil energy is replaced with renewable energy. Therefore, an actual reduction of the energy demand is the decisive key factor for reducing CO₂ emissions.

This chapter deals with the chances and risks for a sustainable rural development in the Alpine Space by an increased development of the renewable energy sector.

C.4.2 Energy sources allocation in the Alpine space: how is the situation today ?

a. Facing the lack of available data and of comparability between the alpine countries

One of the first things, which appeared while elaborating this chapter, was the difficulty to collect and interpret data about energy consumption and production in the extent of the alpine perimeter.

Data availability of energy indicators is often reduced to the national level (NUTS 1, 2). Regional data exists only for the departments and regions in France, Italy and Bavaria, but these regions are not covered completely within the perimeter of the alpine Convention. Therefore, it is not possible to estimate quantitative energy data for the whole perimeter of the alpine Convention.

The alpine states and regions are collecting data with different methodological approaches, which makes a comparison between the regions of the alpine space more or less impossible. Moreover, some sources of renewable energies, as e.g. solar heating, can not be reported in quantity, because the energy is used right at the production site – without being further quantified (see also ARGE Alp 2009; CIPRA 2007).

Therefore, this chapter will predominantly focus on general and qualitative trends within the alpine states. Qualitative case studies will also be presented in order to draw a more specific picture about the current situation and suggest solutions on how to best solve challenges within the energy sector in the alpine space.

b. Global challenges: climate change and Peak Oil / Peak Gas

The energy mix of the alpine countries is still dominated by fossil fuels. Oil, gas and oil products (petrol, heating oil, etc.) represent the highest share of the energy consumption. While hydropower electricity is often exported, huge amounts of fossil energy are introduced in the alpine countries.

The high share of fossil energies (cca. 70%) in the energy mix of industrial countries is responsible for two main global challenges:

- The energy consumption is closely related to the carbon dioxide emissions, as energy generation almost inevitably involves combustion processes, which release carbon dioxide. Carbon dioxide emissions are the main trigger factor for global warming. Greenhouse gases change the radiation balance, which results in higher air temperature. The alpine population, but also tourism and the numerous transits of people and goods contribute to climate change. According to the study of the Wuppertal Institut for Climate, Environment, Energy GmbH it is estimated that in the Alpine Space 100 Million. CO₂ tons are produced per year. That means 7,4 tons per capita (WI 2009).

c. Development of the oil price

The reserves of fossil energy resources are scarce. One indication is the continuous rise in the global oil price and in particular the price for petrol and heating oil. In summer 2008, it reached its present peak level, due to the strong demand from the asia-pacific countries. Afterwards the price dropped because of the global economic recession but, it settled down on a higher level than before. This development means that for the alpine space more money has to be spent on heating and mobility. For the future, a further increase of the oil price is assumed. Therefore, searching for alternative energy production is strongly needed. Renewable energies are becoming cheaper and some of them are about to reach grid parity.

d. Import-dependency

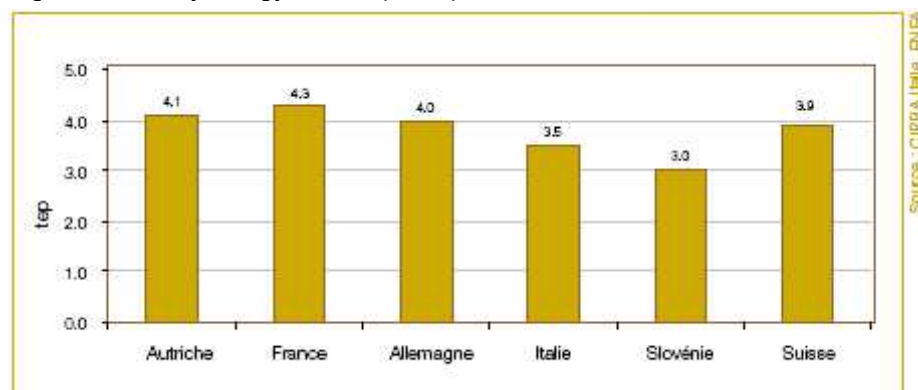
Another challenge lies in the dependency of alpine countries from foreign imports. The installations for fossil energy production are in most cases situated out of the alpine space. Water, sun, wind and wood are largely available in the alpine space as natural resources. If in the future, the energy supply gets organized on a regional, decentralized scale especially in the alpine area, these resources could generate important economic values for the alpine regions.

e. Development of energy consumption

Energy consumption of the alpine population has increased steadily in the last years. It almost doubled between 1970 and 2004 (Pastorelli 2007). The rise in population and economic growth are important trigger factors for an increased energy demand and therefore initiate an increasing demand in living space, comfort and mobility, which lead to an increase in industry production and construction activities.

Therefore, the indicator "Energy need per capita" can only be explained in relation to other indicators such as economic structure, settlement and transport infrastructure, heating days and the degree of energy efficiency.

Figure 23: Yearly energy consumption per inhabitant



f. Significance of renewable energy

The share of renewable energy consumption in the alpine space is still very low (below 10 %). In the last years, a higher-than-average growth has been recorded.

In particular biomass and other renewable energies such as wind and sun are in an upward trend. Hydropower, wood energy, other biomass and ground source heating are currently the most frequently used renewable energy sources in the alpine regions.

Throughout the alpine area, the highest share of renewable energies exists for the production of electricity (e.g. over 50% in Switzerland). Fossil energies are playing only a marginalized role in electricity production. By far, the highest share is represented by hydropower. The benefits of hydropower as a highly reliable and largely CO₂-free renewable source of electricity production and its contribution towards serving the energy demand of the alpine states are of considerable importance next to the additional value of helping stabilize the European energy grid (RSA II 2009: 37).

g. CO₂-reduction

The use of renewable energy helps to avoid greenhouse gas emissions: a study shows that. Savings due to renewable energy exploitation in the alpine space are estimated

by 18,9 million tons of greenhouse gas (Pastorelli, 2007).

Related to the CO₂-outcast, technical progress has shown a relative decoupling of energy growth from CO₂ emissions. Today, there is significantly less CO₂ emissions caused per energy

unit, than there was in the seventies. Because of the constant growth of energy input, these CO₂ savings have been over compensated.

h. Biomass

To estimate the "neutralized" CO₂-amount in alpine forests, it is assumed that 43 % of alpine area is covered by forest, which means about 8,2 million hectares. From this value, it has been calculated that 59,4 million tons of CO₂ are absorbed yearly and stored in the alpine forests.

C.4.3 Renewable energies in rural areas in the Alpine Space: Chances, qualitative potentials, threats, weaknesses

The alpine region as a large contiguous natural area with a high occurrence of natural resources has in principle a great potential for the use of renewable energies. Nevertheless, there are different conditions in respect of each type of renewable energy in terms of utilization, efficiency and interferences with flora and fauna, potential conflicts and acceptance by the local population. In order to gain a mixed picture of the opportunities and risks of renewable energy specifically for the strengthening of the rural area, it is necessary to examine the various sources of renewable energies in relation to the specific situation of the Alps. The following chapter provides an overview.

a. Definition of renewable Energy

A definition of renewable energy is available in the glossary of this report. The most relevant types of renewable energies in the alpine space are hydropower, biomass, solar energy, wind energy and geothermal energy. They will be the ones further examined in this chapter.

One of the longest-used and thus considered as the "traditional" renewable energy resource is hydropower, which is used in the alpine region by running-hydropower stations, pump storage hydropower plants and storage power stations. The other ancestral renewable energy source, is wood which is the principal source of biomass energy in the Alps.

The use of renewable energy represents an essential contribution to sustainable development and is promoted in the Alpine countries with different political and financial.

b. Description of the geographic and socio-economic conditions for the application and development of renewable energies in the Alps.

Hydropower

In the alpine space, hydropower is by far the most widely used renewable energy source. This is due to the large amounts of water available in the Alps and the existence of an adapted geomorphologic relief. Basically, hydropower is gained by running water, which is led through turbines, which drive a generator. The more water available and the higher the kinetic energy is, the more energy can be generated. Nowadays, energy from alpine hydropower has a high strategic importance for the European energy network. Indeed, because an even short-term regulation of the alpine storage power plants is possible, it offers the opportunity to cover peak demand as a complement to the band energy from nuclear and coal power plants in the European network (SC NAT 2007: 2). Thus, alpine hydropower energy, in addition to its regular use as a callable balancing power system, guarantees the stability of nets and balances unstable and not predictable electricity generation from wind and photovoltaic systems.

However, the scope for further development of hydropower is not that high in the alpine space. The optimization and expansion of existing facilities, in cases where it is ecologically and economically reasonable (CIPRA 2009: 14) comes thus into question. In this context, the greatest potential of improvement consists in the implementation of new and optimization of already existing small hydroelectric power plants and in running hydropower stations at rivers.

In the long term, electricity from hydropower could decrease again due to climate change. A further dramatic decrease of the glacier volume together with changes of the rainfall,

could lead to excessive depletion of reservoirs in dry winters. According to some climate change models, a shift in precipitation towards winter is predicted on the one hand, and on the other hand an increased electricity demand for cooling in summer and in winter for heat pumps is expected. The resulting increase in electricity demand can eventually not be met by carbon-neutral energy sources such as hydropower, as the electricity production from hydropower could fall due to the expected climate changes by 2050 by up to 10% (CIPRA 2009: 9).

In operation, the costs of electricity from existing power plants are relatively low, the installation of new systems, however, is quite expensive, which argues for an increase of the efficiency while maintaining or improving the ecological aspects of the existing facilities. In some cases it was possible to triple the electricity output through modernisation and expansion of storage capacity while the ecological situation was improved at the same time (CIPRA 2009:5). This win-win-situation should be highlighted: in some cases, the energy yield as well as the ecological situation can be improved together through modernisation measures applied on existing facilities.

The high added value of hydropower is accompanied by a great importance for rural development: water charges, taxes, create revenues for the region and the municipalities.

In addition, the use of water energy also allowed the creation of jobs in rural areas.

In addition to production of electricity, streaming waters have to meet a number of other important functions (river ecosystem, river habitat, element of the landscape, irrigation, recreation, etc.). The construction and operation of hydropower stations is linked to unavoidable impacts on the river stretches and wetlands. The use of hydropower therefore also implies disadvantages, and in particular significant modifications of natural balance. The installation of hydropower plants implies risks for fish and other aquatic life.

Good practice 45: the SHARE Project, international project

The SHARE – Sustainable Hydropower in Alpine River Ecosystems – project⁷⁸ is an European project which is developing within the framework of the European Territorial Cooperation Alpine Space programme 2007-2013, and which is set to take place from August 2009 to July 2012 in five Alpine countries: Italy, France, Germany, Austria and Slovenia. The partnership is formed by 13 project partners, that work under the coordination of the Italian Leading Partner ARPA (Regional Agency for the Environment) Valle d'Aosta. Several organizations also contribute as official observers.

The SHARE's purpose is to develop, test and promote a decision support system to merge, on an unprejudiced base, both river ecosystems and hydropower requirements, in sight of the pursuit of an integrated river management. The Alps represent by far the largest freshwater European reservoirs, but they are also home to many and sometimes unique river- and riparian species. Moreover, since numerous activities rely on Alpine water bodies, increasing conflicts on water resources and their use is likely to be seen in the near future.

Figure 24: Reservoir in Arc-Iser transfer system (Source: www.share-alpinerivers.eu/news-press/images)



The decision support system that SHARE aims to develop will include economic and environmental standards in order to boost new eco-investments directed to mitigate hydropower's impacts and restore water bodies' quality, following an approach that is based on the integration between local specificities and operational requirements by adapting the existing scientific tools to the transnational, national and local

⁷⁸ www.share-alpinerivers.eu/

normative schemes.

SHARE's final objective is to provide public administrators and all stakeholders involved in river and hydropower-related issues with instruments to realize a balance between the hydropower's needs and water bodies' health.

Solar power

The solar power can be converted in energy in different ways and by different technologies: solar panels are used for heat generation, in particular for housing and generation of hot water. Photovoltaics (PV) are used for the direct conversion of solar radiation into electricity.

In all alpine countries, the use of solar energy for room heating is promoted. Photovoltaic systems for electricity generation are currently not so widespread, but they are forecasted to grow strongly. Despite relatively high costs of photovoltaic electricity production and relatively high CO₂ emissions in the production of solar cells (energy return after 1-2 years in operation), photovoltaic is considered a forward-looking technology because of its large potential, especially as photovoltaics and solar panels with an advanced technological development are becoming more affordable and more efficient in operation. A big advantage of solar energy is, that in the operation of solar systems, no emission and therefore no impact on the environment is induced.

With increasing demand and further technological developments, it is expected that the currently very high cost of solar electricity production will be reduced. Grid parity for photovoltaic electricity is expected to be reached in the years to come, according to recent studies. The installation of solar panels on rooftops is environmentally safe and can produce substantial quantities of electricity. For example, in Germany, various studies calculate a power production of up to one third of today's needs through the establishment of photovoltaic systems on roofs, facades and open spaces (CIPRA 2009:17-18). Unlike hydro and wind power,

solar systems have no moving parts, making the plants less susceptible to interference and less demanding in maintenance. It should also be mentioned, that their operation does not induce any noise, which is a factor not to be underestimated, especially in rural areas.

Preconditions for the exploitation of solar energy in the alpine space are a south, southeast – southwest-orientated adjustment, inclination of max. 50 degrees and enough roof space without obstacles. Particularly south-orientated hillside situations without mountain shadowing are suitable for the production of solar energy.

In Switzerland, manufacturing and environmental organizations have developed a solar calculator, which can be used to estimate the electricity potential of a particular site⁷⁹.

In Bavaria, a Solar Atlas was published in August 2010. The Solar Atlas includes concepts and methodologies of solar energy generation, maps of sunshine duration and global radiation, application examples and the relevant legal framework (StMWIVT 2010).

Due to their clear air and the high solar radiation, the alpine space provides suitable conditions for the use of solar energy. The geomorphology of the mountain area shows disadvantages compared to the lowlands because of shadowing by the mountains. The limited space specifically of big flat areas in mountain zones is another restriction for the implementation of ground solar plants. It could result in spatial conflicts with other interests. Photovoltaic roof systems could answer to this conflict. On the one hand in suitable areas, the slope and exposure to the sun could be used specifically for the installation of photovoltaic systems on mountain slopes for efficient energy production. But on the other hand, conflicts of interests with nature protection, tourism, land management and mountain associations can be expected. The climatic conditions, particularly in the high altitudes,

⁷⁹ www.wwf.ch/de/tun/tipps_fur_den_alltag/wohnen/solarenergie

such as low temperatures and stronger winds are advantageous for photovoltaic systems, but a disadvantage for solar thermal plants. Nowadays, due to the differing conditions (especially with regards to the different instruments of promotion), the current distribution of solar systems throughout the alpine region varies (CIPRA 2007:6).

A major disadvantage of solar power is the irregularity of solar radiation, which differs on a seasonal and even daily basis. As the solar radiation is not predictable in the long term, the energy supplied solely by solar energy can hardly be sufficient. The combination with other energy sources allows compensating for this disadvantage, together with alternative storage concepts (liquids, new battery systems). A second disadvantage is the currently high production cost of photovoltaic cells and facilities, which however, are predicted to be further reduced.

Apart from the mentioned scarcity of flat areas for the implementation of large photovoltaic(PV) fields, the use of solar energy does not imply strong conflicts and therefore could be an excellent contribution to further expand the use of renewable energies, especially in rural areas. Already today, many PV's can be spotted on rooftops in villages and single farms. The acceptance of PV on rooftops and in the open space concerning the impact on the characteristic landscape is apparently high, especially higher when compared to wind turbines. The PV installation on rooftops on agricultural or residential buildings in rural areas can also be a visible sign of innovation.

Wind energy

The production of electricity by a wind turbine is implemented by the conversion of kinetic energy of the wind into electric energy. The rotor blades of a wind turbine cause a rotational movement of the blades, which in turn drives a generator to produce electricity.

While the generation of electricity from wind energy in many European countries plays a dominant role, the share of wind energy in the Alpine region is very low, with the

exception of the flat foothills of the Alps, e.g. in Germany and Italy.

The main advantage of wind energy is the free and infinite availability of wind as energy source. The electricity production by wind energy is very low in emissions, the operation of wind turbines is emission free. Additionally the share of "grey energy" for manufacturing and installation is low. Local farmers and other landowners can benefit from wind energy by leaseholds (CIPRA 2007:7).

The main disadvantage of wind energy is - similar to the solar energy - the instability of wind conditions, so that a constant energy performance solely by wind turbines is hard to achieve. In the alpine region, the wind speed shows considerable differences depending on the location, the surrounding mountainous relief, windward and leeward locations and also within the seasonal cycle (CIPRA 2002:5). Also, turbulence, snow and ice hamper the operation and maintenance of wind turbines. Wind gusts and storms can even lead to the collapse of a wind turbine.

In the alpine space, the specific wind situation provides few suitable sites for the implementation of wind turbines: the locations with the highest wind speeds are mostly on mountain tops or on other wind exposed locations, which by nature have a high visibility. An installation of wind turbines in such locations would therefore affect the landscape, and would also require high investments in infrastructure.

Because of their height and the rotation of the rotors, the installation of wind turbines is often associated with landscape spoilages. This situation implies a considerable high conflict potential in particular in the alpine region, which is a major tourist destination in Europe. The rotor blades also affect the local flora and fauna, especially birds and bats. They are noisy in the immediate vicinity and can impose a disturbing shadow flicker by the rotating blades.

Nevertheless, it seems that the acceptance of wind power in some regions of the Alps is quite high: a survey carried-out in Switzerland shows that 89% of respondents

in general, and even 97% of respondents who live in the vicinity of wind turbines, were in favour of the expansion of wind power. The success of windpower projects implies the careful selection of the potential sites (in terms of development, protected areas, landowners, government agencies, technical investigations), and a high level of communication, including all stakeholders (CIPRA 2007:7).

In Bavaria, the Wind Atlas was released in August 2010, containing concepts and methodologies on the use of wind energy, overview maps of the average wind speed, application examples and the relevant legal framework (StMWIVT 2010a).

To increase social acceptance, in several countries such as in Austria and Germany, the model of the installations, including participation of the citizens was developed: it is called the operator communities. The people participate financially in the construction of the wind power plants and are also shareholders in the profits from the compensation for electricity fed into the grid. With this model, several wind power sites and individual facilities have been and are still built (CIPRA 2002:6).

However, social acceptance of wind energy is not a constant parameter. It's a big challenge for concrete projects to guarantee acceptance over the longer term.

Geothermal Energy

The geothermal energy can be used in different ways and by using different technologies.

There is a distinction between the direct use of heat itself and the use of thermal energy after conversion into electricity in a geothermal power plant. Examples for the direct use of geothermal energy are the heating by geothermal heat pumps, supply for district heating or as an energy source for combined heat and power. The generation of electricity from deep geothermal is being developed (LfU 2010:3).

Because of the diversity of use, which differs depending on the geological site conditions, a great growth potential is predicted for

geothermal energy. In the Alps there are several geothermal power plants and direct use of geothermal energy in Austria, Germany and Italy.

The advantages of geothermal energy lie in the permanent availability of energy. Once a geothermal source has been explored, it delivers energy independently from the climatic or weather conditions and without seasonal or daily deviations, which is a major advantage compared to solar and wind energy. The exploration of geothermal energy requires comparatively small land use for the geothermal facility and its production does not cause pollution.

The main disadvantage of geothermal energy, specifically with regards to the alpine regions is the fact, that even though the resource is available everywhere beneath the earth's surface, an economically efficient utilisation of geothermal energy is restricted to certain areas of high enthalpy, like in Larderello, Italy (LfU 2010:3). In other areas, the utilisation of geothermal energy usually needs deep drilling, which costs more. Additionally, geological constraints further narrow the scope of suitable areas in the alpine regions, as extensive and costly preparations for the exploration when a deeper drilling is required to reach the geothermal source can lead to an economic inefficiency. Depending on the local situation, even geological risks like earthquakes can be induced by the drilling activities. This phenomenon already probably happened in Basel (Switzerland) in 2006 and 2007.

The share of geothermal energy in renewable energy is still relatively low, but will be expanded in the coming years, especially in the Molasse basin north of the Alps in Bavaria and other suitable regions with high enthalpy, making an exploration economically efficient.

Biomass

The heat generated by the burning of biomass, mainly wood, is a classic method of renewable energy use. The principle is still the same but the technical methods for a more efficient use of the energy sources have changed considerably. For the generation of

heat in buildings, wood pellets are burned in specific pellet stoves or central heating furnaces. Another possibility to gain heat by biomass is to use waste heat from biomass power plants, following the conventional principle of district heating.

Biomass is also used for the production of fuel. Biodiesel is the main bio fuel used in Europe, manufactured by the use of rapeseed oil. The growth conditions for rapeseed however are rather limited in the alpine regions.

In the Alps, the rate of use of biomass as a renewable energy source is around 10% (CIPRA 2009:15). Timber is by far the largest share of biomass sources. Wood and wood wastes are increasingly used in biomass power plants in the Alps for district heating and electricity production. The combined utilisation for heating and electricity generation is generally highly recommended for biomass in order to attain an efficient use of the energy content of biomass.

The benefits of biomass use for energy are the basically neutral CO₂ balance in comparison to conventional fossil fuels, as the CO₂ which is released by the burning of plants is bounded by energy plants again. Moreover the consumption of biomass as a source for energy generation follows the principle of sustainability; the biomass resources are available in a long-term perspective, as their time period for renewal is comparatively short.

The main disadvantages of biomass are mainly spatial conflicts. Specifically in the Alps, space for growing the biomass raw material is rather limited, even in rural areas. A significant expansion of biomass production to be used for energy therefore seems to be unrealistic. This does not however, affect the existent traditional use of biomass, which is timber.

Additionally the production of bio fuels implies conflicts in land use: those areas that are used for the cultivation of energy crops are no longer available for other functions such as food production or nature conservation (CIPRA 2009:16). But, by the

use of "second generation biofuels" (biodegradable wastes, crop residues etc.) these conflicts can be solved.

Potentials for growth of renewable energies in the alpine space

The above presentation of the key renewable energy sources shows that each technology has advantages and disadvantages that should be carefully considered in view of a further extension of these technologies. Furthermore, geographical and socio-economic conditions vary significantly between the alpine regions. No one-fits-all-strategy can be implemented in such a heterogeneous context. Therefore it is imperative for each alpine region to analyse carefully its' strengths and weaknesses, opportunities and threats in the field of renewable energy production. The geomorphology of the Alps, the potential trade-offs with tourism and nature conservation and the economic prospects for individual regions should be carefully weighed up against each other. There is currently no full and comprehensive potential analysis about what types of renewable energy sources for the regions and sites are best and what potential trade-offs occur. A coordinated and alpine-wide energy initiative would therefore contribute to the systematic strengthening of rural areas by the expansion of renewable energies, especially the very peripheral areas in the Alps.

Due to the technical advantages and disadvantages of different energy sources it is clear that a one-sided extension of a specific renewable energy carrier cannot lead to a reliable and stable energy supply. In this context it appears to be even more important to develop an alpine-wide energy strategy. To avoid a supply shortage, an alpine-wide smart grid, eventually in combination with so-called virtual power plants⁸⁰ could be a way to achieve a

⁸⁰ A Virtual Power Plant is an interconnection of small and decentralised renewable energy supplier such as wind turbines, photovoltaic, small hydro power plants and wood-fired power stations to one unit which can react demand-driven on peak-loads. The interconnection of different sources of renewable energy sources by smart grids bypasses bottlenecks of the individual sources due to e.g. varying weather conditions.

balanced energy mix from renewable energy sources in the Alps. The regions can contribute to this effort depending on their individual site conditions. Bottom-up initiatives and procedures on the local and regional level could accelerate the change of the energy paradigm, as it has for example in the case in Voralberg.

Overall, it is clear that the growth potential of hydropower is marginal. For example in France, 90% of the hydraulic potential is already utilized. Action to improve the efficiency of existing facilities and a better ecological integration seems to be more reasonable. Great growth potential however, lies in the field of solar energy, especially because the efficiency of the energy production in the area is significantly higher than biomass energy on the same surface. Photovoltaic cells can produce approximately 100 times more energy than biomass on the same area (CIPRA 2009: 16). In suitable areas the slopes of mountains could be specifically used for the installation of photovoltaics.

Wind energy also has, in principle, a great growth potential, but is clearly in conflict with tourism, protection of landscape and nature conservation, as the unobstructed mountain panorama is an important unique selling point for many tourist regions. Thus, it is necessary to carefully select suitable locations for the installation of wind turbines. The establishment of concentrated wind farms is potentially more suitable than the decentralized and scattered construction of individual wind turbines.

Geothermal energy is predicted to have a strong growth potential. But because of the geological and geomorphological conditions in the alpine region, this however, primarily affects the alpine foothills and not the mountain areas.

Biomass and particularly wood has always been one of the most used renewable energy sources in the Alps. Biomass power plants and more specifically wood pellet heating systems are common in the Alps. Increased use of wood for energy is expected since this material is largely available in the Alps.

Intermediate results

- Expansion and development of renewable energies combine economic rural development opportunities with climate protective measures.
- The expansion of renewable energies however should always be based on the regional geographic and socio-economic situation and should consider the potential conflicts.
- Currently, a systematic analysis about the strengths, weaknesses, opportunities and threats on regional (NUTS III) levels in the Alpine Convention perimeter does not exist. Outlooks are based on national calculations and data, which are not harmonized for the alpine space.
- Recommendation: based on a detailed SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis of the preconditions for each region of the alpine space a recommendation should be issued, explaining which types of renewable energies are particularly suitable and worthwhile for further expanding, related to the type and characteristics of regions (in terms of natural resources, vulnerability, conflicts, acceptance, etc.)

Regional added value from Renewable Energies

On European and national levels, the further expansion of renewable energies and energy efficiency measures in conjunction with a more flexible energy market is often considered as the main approach on how to address the economic crisis. Other keywords in this context are green economy and clean tech. The latter encompasses technologies, procedures, goods and services aimed at reducing environmental impacts and enabling the use of renewable resources and systems.

The Alpine countries support the development of renewable energies with a variety of measures and funding programs.

The goal is to increase the share of Renewable Energies in the total energy production significantly. Structurally weak rural areas could benefit from this development under certain conditions, as some examples from the regions of the Alps already demonstrate. With sufficient available resources and opportunities to use for energy production, municipalities can aim for their energetic independence, aligned with other positive economic effects: the creation of jobs and income earnings and a positive image of the community or region due to its individual contribution to climate protection.

The basis for a community decision to be made on the expansion of renewable energies in order to obtain the status of energy self-sufficiency, should always be a potential (see above) and a solid perspective for its regional value added potentials. The expected positive effects must be demonstrated from the outset as detailed as possible, not least to be more persuasive towards hesitating public bodies.

Good practice 46: Wildpoldsried in 2009, Germany

Wildpoldsried – ("Klimaschutzkommune" – environmentally friendly community) with around 2.500 inhabitants already developed its vision for Environment and Energy in 1999 "Wildpoldsried innovativ und richtungsweisend". The concept was adopted and developed until now and has won a variety of environmental awards. To protect the climate, Wildpoldsried emphasises the production of renewable energies. Currently, about 260% of the energy demand of the municipality is produced by the means of renewable energies, so they are able to export its energy surplus. The initiative Wildpoldsried has three main orientations:

1. Renewable Energy and Energy Saving;
2. Maximum use of wood as ecological building material;
3. Water Protection and ecological wastewater treatment.

Many local enterprises and private people are involved in this economic business cycle. Furthermore, the public is regularly informed about climate protection and renewable energies.

Figure 25: The Bavarian village of Wildpoldsried



As a result, 250% of the total electricity needs of the community are produced with renewable energies: 1580 solar photovoltaic kwp, 5 wind turbines, 3 hydro power plants, 4 biogas plants. The construction of a village heating system saved 150.000 liters of heating oil and thus 470 tons CO₂. There are also 880 m² of solar thermal energy, and several smaller woodchip stoves in the village. Due to the energy image of the municipality more and more citizens orient themselves to innovative and climate-friendly investments and they build with wood. Finally, in case of heavy downpours, the water is collected and delay drained. The direct riparian and lower rivers are significantly relieved.

Several awards have been won by the municipality and Wildpoldsried is very well known as "good practice example" for climate protection and renewable energies in Bavaria and beyond.

More information:

www.wildpoldsried.de/index.shtml?wir

To calculate the added value, it is required to distinguish between the:

- direct added value which is created by the planning and installation of the renewable energy facility and
- the added value which is created by operating the Renewable Energies facility (Dilger 2009:7).

A) The factors for the added value chain in renewable energy facilities are the following:

- Planning / Initiation (e.g. by engineering offices);
- Production of the Renewable Energy Resources facility (e.g. by manufacturer of Biogas facilities);
- Construction / Installation of the facility (e.g. by building companies and craftsmen);

- Operation and Maintenance (e.g. by farmers and foresters).

B) The further regional economic added value can be calculated by the following indicators:

- Reduction or avoidance of import costs for fossil fuels;
- Tax revenues from the Renewable Energies facilities;
- Leasing receipts ("Pacht") for municipal premises;
- Creation of Jobs.

The regional added value combines the private and public benefits by the shift to renewable energies. Private and public benefits are depending on each other: the higher the private added value, the more revenues that can be achieved by local authorities through taxes and fees (Dilger 2009).

Currently there are no harmonized calculation methods, so it is not possible to compare regions or municipalities in the alpine space, which have already strived in the direction of energy autarky or even

reached this status. In fact, even on national level, only few studies exist, which systematically examine the regional added value by the installation and operation of renewable energies. In 2010, the report "Kommunale Wertschöpfung durch Erneuerbare Energien" was released in Germany, which is one of the first comprehensive studies which analyses the impact of the extension of renewable energies on job creation, purchasing power and local tax income (Hirschl, Bernd et. al. 2010).

A sound and harmonized calculation basis developed specifically for the alpine regions would be a significant contribution to further strengthen the Alpine Space in expanding the share of renewable energy on a local level. It is important for local decision makers to know the expected added value on local or regional levels, based on a sound and reliable calculation, as this could raise the motivation to use renewable energies as well as for the economical development, specifically in rural areas.

National contribution: development of renewable energies

Austria

Renewable energy sources account for 27% of primary energy consumption. Biomass and hydropower are the most important renewables with a share of 14% and 10% respectively. Other renewables such as solar, wind, waste and geothermal have a share of around 3% in total.

Biomass

In Austria, where 47% of the country's surface is covered with woods, traditional use of wood biomass for heating purposes has always played an important role in the energy supply system. While the contribution of wood log has not changed significantly over the last two decades, the introduction of wood chips and wood pellets into the heat energy market has been a great success. In 2008, 23% of the final energy consumption for room heating came from biomass (72 PJ out of 314 PJ).

The nationwide potential for exploitation of solid biomass from both forestry and agriculture for the year 2020 is expected to be 148-212 PJ by the Federal Ministry of Agriculture, Forestry, Environment and Water Management. In comparison solid biomass delivered 135 PJ of final energy consumption in 2008.

Electricity produced from biomass (including waste) reached nearly 5% of gross electricity consumption in 2008⁸¹.

Hydropower

Around 66% of the electricity was produced with hydropower in 2008. Hydropower plants can be found all over Austria. The Danube river accommodates huge run-off river power stations. Pump hydro storage plants located in the Alps play an important role for the energy system and in particular for the balancing of electricity production and demand.

The alpine region is famous for its many river power plants and storage power plants; new power plants are being constructed continuously. Pump storage power plants play an important role in particular for the storage of electricity produced by wind power plants.

The nationwide potential for exploitation of hydropower for the year 2020 is specified by the

Federal Ministry of Agriculture, Forestry, Environment and Water Management to be up to 154 PJ in terms of final energy consumption. In comparison hydropower delivered 140 PJ (=38,868 GWh) of final energy consumption in 2008⁸².

Wind energy

Most wind power plants are located in the eastern parts of Austria (Burgenland, Niederösterreich) due to optimal conditions in terms of wind speed and geomorphology. The Tauern wind farm, currently the highest wind farm of Europe, is located in the Austrian alps in the Low Tauern mountain range at an altitude of 1900 meters.

The share of electricity generated in wind power plants was 3% in 2008⁸³.

The alpine region offers at a height of 70 m an average wind energy potential of less than 51 to 100 W/m² compared to 600 W/m² in insular locations. In the lowland, where most of the 620 wind power plants can be found, the wind energy potential is on average 250 – 350 W/m².

The exposed positions of alpine locations are still challenges for the implementation of wind turbines, as the turbulence and fluctuating wind speeds are at many times higher than in the plains. Thus, the load of the machine is also much higher. In addition, most of a long supply line of the power cord is installed in difficult terrain. Considering both facts projects in the Alps are also economically challenged as the cost of wind power plants in the Alps may be compared with that of off-shore locations.

The nationwide potential for exploitation of wind energy for the year 2020 is specified by the Federal Ministry of Agriculture, Forestry, Environment and Water Management to be 26 PJ in terms of final energy consumption. In comparison wind energy delivered 7,2 PJ of final energy consumption in 2008. Due to economic reasons further wind energy exploitation focuses on the plains rather than on the alpine region⁸⁴.

⁸¹ www.propellets.at, www.biomasseverband.at, www.statistik.at, www.energiestrategie.at/images/stories/pdf/02_bmlfuw_09_erneuerbare2020.pdf, www.lebensministerium.at/filemanager/download/55304

⁸² www.lebensministerium.at/filemanager/download/55304, www.energiestrategie.at/images/stories/pdf/02_bmlfuw_09_erneuerbare2020.pdf

⁸³ www.igwindkraft.at/redsystem/mmedia/2010.02.03/1265190805.pdf

⁸⁴ vms1.zamg.ac.at/beauvort/index.php, www.energiestrategie.at/images/stories/pdf/02_bmlfuw_09_erneuerbare2020.pdf, www.lebensministerium.at/filemanager/download/55304, www.igwindkraft.at

Solar energy

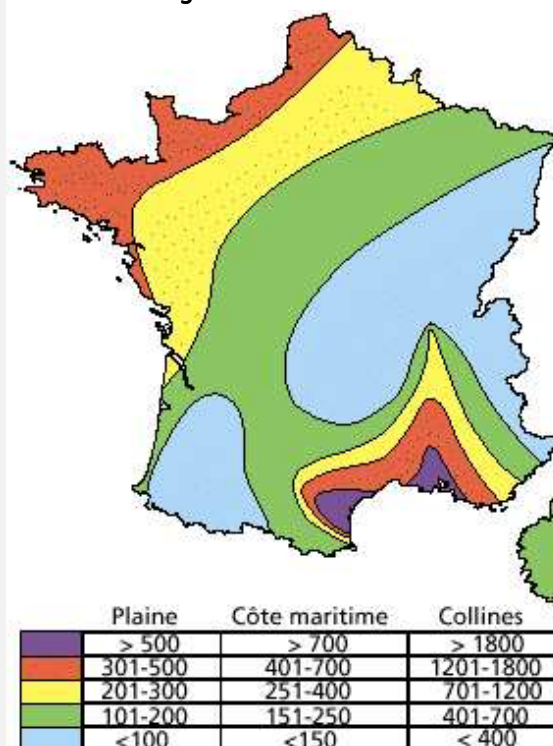
Installations for solar thermal energy are distributed all over Austria with the highest share in Oberösterreich, Niederösterreich, Steiermark and Tirol. Installation rates are mainly triggered by the subsidies available at the federal state level⁸⁵.

Electricity produced from solar energy, landfill gas and sewage treatment plant gas are small in quantity but growth potentials are significant.

The major part of the alpine region features a global radiation of 1,100 to more than 1.300 kWh/m²/year. In comparison in the greatest part of the non-alpine region the global radiation is less than 1.100 kWh/m²/year.

The nationwide potential for exploitation of solar energy for the year 2020 is specified by the Federal Ministry of Agriculture, Forestry, Environment and Water Management to be 7,2-10,8 PJ for photovoltaics and 25-28 PJ for solar thermal in terms of final energy consumption. In comparison, photovoltaic delivered 0,1 PJ and solar thermal 4,8 PJ of final energy consumption in 2008⁸⁶.

Map 32: Average wind power according to the different zones, W.m² for a vertical section taken at 50 m above ground



<http://www.manicore.com/documentation/eolien.html>

France

In France, the development of renewable energies is based on an energy mix with the political will of diversifying the offer, taking into account the potential and ressources of the different regions. That is to say, that the potential of developing renewable energies is mostly based on the natural resources of the region.

Wind energy

Wind energy represents a hope for the future of energy in France. Thus, if France realizes its objectives on land and offshore, by 2040 the power produced by wind could be multiplied by 50.

According to the opposite map, wind energy can mostly be developed in regions Bretagne (North-West) and Languedoc-Roussillon (South East).

⁸⁵ www.pvaustria.at/upload/1698_PVMarktstatistik2008.pdf

⁸⁶ www.pvaustria.at/content/page.asp?id=62

www.energiestrategie.at/images/stories/pdf/02_bmlfuw_09_erneuerbare2020.pdf

www.lebensministerium.at/filemanager/download/55304

www.austriasolar.at

www.pvaustria.at

Solar energy

Considering the yearly sunshine average, the photovoltaic potential is mostly located in the South of France. Solar energy has in France, a high potential but is still under-developed⁸⁷.

Geothermal energy

Moreover, even if geothermal energy is still little known in France, the potential offered by suitable sites, in particular for deep geothermic is significant: about 110.000 megawatts (ie the actual power of the French parc).

Concerning the alpine regions, the region Rhône Alpes has a consequent wood energy potential. Its wind energy potential is mostly in the Rhone valley and no windmills are so far implemented in the perimeter of the alpine Convention⁸⁸.

Germany

In Bavaria, the use of biomass and hydropower is predominant within the renewable energy sources. Due to the high availability of biomass, especially wood, the share in Bavaria of the total production of renewable energies is 67,2% for biomass in (in 2004) and 28,8% for hydropower. The other types of renewable energy amount to 4% of which solar thermal has the highest contribution (2%) (StMWIVT 2008: 21). Wind energy does not play an important role, which is due to unfavorable wind situations (STMWIVT 2008: 28).

Italy

In the Italian alpine regions there is a significant hydroelectric potential and installed energy production. A good quantity of forest biomass is also available in the alpine Italian regions, but, in this regard, the role of the various local policies and/or the sensibility of public administrators towards renewable energies (Renewable Energy Resources) is determinant.

Among the Italian alpine regions, Valle d'Aosta, considering its area and inhabitants, is probably the region with the highest Renewable Energy Resources production per capita and per hectare (mainly due to hydroelectric power).

In Southern Italy, significant efforts and investments have been made to support Renewable Energies production, especially highlighting photovoltaic and wind sources.

Finally, some regions have started to concretely support the development of Renewable Energy Resources in their territories since only a few years

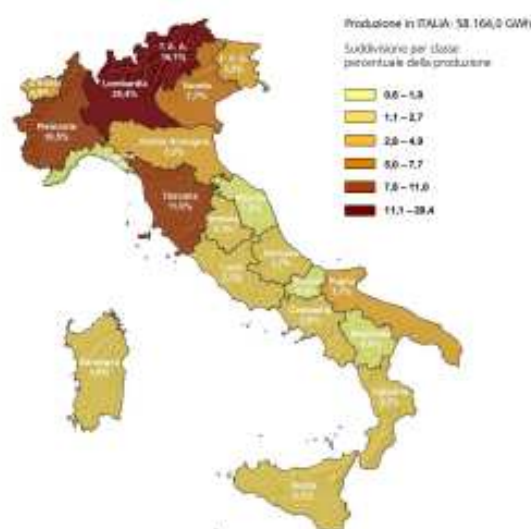
ago. Therefore, in these regions, Renewable Energy Resources are still in the expanding phase.

As illustrated in the map below, the current share of energy production from Renewable Energy Resources by regions out of the total energy production from Renewable Energy Resources in Italy in 2008 reached more than 20% in Lombardia. For the alpine regions, these shares are: Lombardia 20,4%; Trentino Alto-Adige 16,1%; Piemonte 10,5%; Veneto 7,7%; Valle d'Aosta 4,9%; Friuli Venezia-Giulia 3,3%.

Switzerland

In Switzerland, an increased consumption of renewable forms of energy is noticeable, especially of the energy produced by wood and some other renewable sources (difference +6,5% from 2008 to 2009). Above average growth was seen in the field of solar heating (+13,2%) and use of ambient heat (+8,6%) in 2009. An important source of energy in Switzerland is also biogas. They see it as an "energy of the future".

Map 33: Share of energy production from Renewable Energy Resources by Regions out of the total energy production from Renewable Energy Resources in Italy in 2008



⁸⁷ www.prothermie-confort.com/carte-de-france-ensoleillement-ou-gisement-solaire.html

⁸⁸ www.suivi-eolien.com/

C.4.4 Frame conditions to enhance renewable local energies

a. Energy-Policies

International policy

Since the signing of the Kyoto-Protocol, every alpine state, except Monaco, is legally bound to reduce their greenhouse gas emissions at the average of 8% in the years between 2008 and 2012 related to the level of 1990. At the moment, negotiations are running for the post-Kyoto period. Countries, such as China, India and the US, which have not taken any responsibility until now, should also make their obligation to reduce their greenhouse gas emissions. A new long-term agreement is planned which foresees the target of global emission reduction of at least 50% by 2050 (related to 1990) and reduction targets between 25 and 40% by 2020 (related to 1990).

EU policy

The EU energy policy strives for an efficient energy interior market, securing the energy supply within member states and climate protection.

The EU and its member states pursue the aim to limit the rise of global average temperature by less than 2°C related to the pre-industrial period.

Greenhouse gases should be reduced by 2020 (related to 1990) up to 20%, respectively up to 30% in the framework of a global agreement. The share of renewable energies should be expanded by up to 20% from total energy consumption in the EU and energy efficiency should increase by up to 20% by 2020. To achieve these aims, a roadmap has been developed to promote renewable energies and an action plan for energy efficiency. Moreover, the European Emission trading scheme (ETS) initiated in 2005 fixed the cap for CO₂ emissions in electricity sector and in industry.

Alpine states policies

National contribution: energy policies of alpine states

Austria

The increased use of renewable energy sources is, among with the reduction of energy consumption, a key element of Austrian energy Policy. Austria's goal under the Directive 2009/28/EC on Renewable Energies is a 34% share of renewable energy in gross final consumption of energy by 2020 compared to 24% in 2005.

The Austrian Energy Strategy was developed with the aim to meet the energy and climate targets. The strategy includes measures to increase the use of wood biomass, wind power, solar power and hydropower. In order to achieve the 34% target and provided that the energy consumption can be stabilized at 1.100 PJ, the level of 2005, additional 70 PJ of renewable energy needs to be developed upwards from 326 PJ in 2008⁸⁹.

In Austria green electricity legislation was introduced in 2002 due to the EU directive 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market with the latest amendment in February 2010. The green electricity ordinance regulates eligibility of support and feed-in-tariffs in terms of amount and duration. The target for 2015 is a 15% share of labelled green electricity. In order to achieve this goal, additional capacities of 700 MW from hydropower, 700 MW from wind power and 100 MW from biomass are needed.

Slovenia

Energy policy targets in the Republic of Slovenia are set out in the Resolution on the National Energy Programme -NEP (OJ RS, No. 57/04).

According to the NEP the share of renewable sources of energy in the primary energy balance has to rise from 8,8% in 2002 to 12% by 2010 and targets in individual spheres are:

- increasing the share of Renewable Energy Resources in the supply of heat from 22% in 2002 to 25% by 2010,
- raising the share of electricity from Renewable Energy Resources from 32% in 2002 to 33,6 % by 2010,

⁸⁹ www.energiestrategie.at

- ensuring up to 5,75% share of biofuels for transport by the end of 2005.

For the period towards 2020 "The National Action Plan for Renewable Energy Sources 2010-2020" is in preparation to set sector targets.

Other important basic documents for renewable electricity are:

- Energy Act (OJ RS, No. 27/07 and 70/08),
- Decree on Support for Electricity Generated from Renewable Energy Sources (OJ RS, No. 37/09, 53/09, 68/09, 76/09 and 17/10)

Italy

The Italian government, implementing the EU Directive 28\2009\CE, art. 4, carried out the "The National Action Plan for Renewable Energy Sources 2010-2020".

The "National Action Plan" (PAN) established the target value for Renewable Energies final gross consumption in 2020 to be 17% of the total energy consumption. Regarding the target value for Renewable Energies production, the PAN sets out the general objective to be 28,97% of the total gross production. Besides the general targets, the EU Directive foresees that all member states will grant a 10% consumption coverage in the fields of transport from renewable sources by 2020.

The "National Action Plan for Renewable Energy" represents the most recent policy framework on renewable energy currently operating in Italy. Prior to the PAN's approval, which is subject to the EU Commission, the other main policy frameworks in the field of renewable energy in Italy were:

- The Legislative Decree 79/1999, which established the common rules for the internal energy market and introduced the "Green Certificates";
- The Legislative Decree 387/2003 and further modifications and integrations, implementing the EU Directive 2001/77/CE, on the promotion of electric energy produced by renewable sources;
- The Ministerial Decree 18.12.2008, establishing the incentive programmes' framework for the production of electric energy from renewable sources;
- The 2008 Budget Law, art. 2, paragraphs 1 and 143-154.

France

Adopted under the French presidency of the European Union in December 2008, the European climate and energy package has

retained the goal of "3 x 20" before 2020: 20% reduction of the emissions of greenhouse gases compared to 1990, 20% renewable energy and 20% energy savings.

In this context and in the framework of the law Grenelle de l'environnement, France has set the objective of 23% of the French energetic needs covered by renewable energy sources before 2020.

Germany

In August 2010 the German Federal government adopted the "National Action Plan for renewable energy in accordance with Directive 2009/28/EC on the promotion of the use of energy from renewable sources" The action plan outlines that the binding domestic target of an 18% share of renewable energies in gross domestic energy consumption will be reached by 2020 and may even be surpassed. Currently this share is about 10%.

With regard to individual sectors, the action plan stipulates for 2020 a 15,5% share for renewable energies in the heat/cooling sector, a share of 38,6% in electricity and a share of 13,2% in transport. These new figures are current estimates or expectations. In connection with the legally binding 18% target, the Federal government had already defined and legally stipulated sectoral targets before the national action plan was drawn up. By 2020, for instance, the share of renewable energies in electricity consumption is to be at least 30%, the share in the heat sector 14%. These sectoral targets will remain valid.

In its National Action Plan, the Federal government lists in detail the existing and planned measures, tools and policies of the Federal Government to promote the development of renewable energies. Necessary measures to achieve the objectives and instruments, such as the Renewable Energies Act (EEG), are already basically established but will be regularly evaluated and further developed in the future. In addition, the Action Plan outlines exemplary regional and local activities which achieve the overall goals (Bundesrepublik Deutschland, 2010)⁹⁰.

Switzerland

Swiss Energy policy is based on four sections: Energy efficiency, renewable energies, large power plants and energy exterior policy. Targets are the reduction of greenhouse emissions by up

⁹⁰ www.erneuerbare-energien.de/inhalt/46291/4590/

to 20% in 2020 (related to 1990) and up to 50% by 2050 (related to 1990). The share of fossil fuel energy should be reduced by 2020 to 20% related to 1990 and the share of renewable energies on the total consumption by 2020 should increase by about 50% from today 16% to 24%. With the intended revision of the CO₂ act, the national Post-Kyoto-Targets for the period after 2012 should be fixed and with the CO₂-steering tax and the participation at the European Emissions trading scheme (ETS), CO₂-Emissions authorization will get a price.

Transnational policy in the alpine space (Alpine Convention)

The **Energy protocol** of the Alpine Convention states in Article 1: "The Contracting Parties shall commit themselves to creating framework conditions and adopting measures for energy saving, production, transport, distribution and utilization within the territorial scope of the Alpine Convention in order to establish sustainable development in the energy sector which is compatible with the Alpine region's specific tolerance limits. In so doing the Contracting Parties will make an important contribution to protecting local communities and the environment and to safeguarding resources and the climate".

The Energy protocol of the Alpine Convention has been completed in 2009 by the Climate Action plan of the Alpine Convention.

Platform on water management in the Alps

The work of the Platform is primarily relying on the results of the second Report on the State of the Alps "Water and Watermanagement" (2007 – 2009) and the conclusions of the water conference of 30th and 31st October 2008, which took place in Munich.

For the period 2009 – 2011, the platform "Water Management in the Alps" has set 4 priorities:

- Small hydro power: exchange of information, state of play and good practices with respect to small hydropower aiming at developing common guidelines;

- Review state report: review of relevant plans for water management, in particular of river basin management plans (RBMP) according to the EU Water Framework Directive (WFD), focusing on the examination of alpine specific topics, and depending on data availability, the assessment of their adequate consideration.
- enhancement of cooperation with the scientific community;
- exchange of good practices.

Interregional policies

Arge Alp adopted in June 2009 a resolution about how to orientate its energy policy. In this document, Arge Alp recommends that its member regions strive for the 2000 Watt society in the long run. In the field of renewable energies, the working community is focusing on the Renewable Energies hydro power and biomass (energy wood) and states:

- As by far the most important renewable energy, hydropower should be promoted and expanded in its efficiency, where it is economically and ecologically useful.
- Promotion and coordination of energetic exploitation of biomass in consideration of short distances.

b. Funding instruments

National contribution: overview on funding instruments in the Alpine States

Italy

In Italy, the funding programmes aimed at stimulating and fostering the production of renewable energy, are managed by the G.S.E. S.p.a. (Energy Services Board). G.S.E.'s activities concern the allocation and distribution of economic incentives to the energy production from renewable sources in order to support the sector's economic operators. In particular, G.S.E.'s actions involve:

- The qualification of electric generation plants powered by renewable sources;
- The recognition of the compliance of co-generation technical conditions;
- The emissions of "Green Certificates", and the verification of the relative obligations of producers and importers;
- The issue of "Origin Certificates" for electric energy produced by plants using renewable energy sources or using high-efficiency co-generation;
- It manages the system of incentives for electric energy produced by photovoltaic and thermodynamic solar plants;
- It withdraws from producers and delivers to the market the electric energy produced by renewable sources.

There are several incentive mechanisms currently operating in Italy:

a) *"Green Certificates" (CV)*: the article 1 of the Legislative Decree 79/1999 introduced the duty, for both producers and importers of non-renewable electric energy, of putting into the national electric system a minimum quota of electric energy produced by plants using renewable sources since 2002. The quota was initially established to be 2%, whilst the 2008 Budget Law set out an annual 0,75% increase for the 2007-2012 period.

The subjects can fulfil the obligations either by putting into the network electric energy produced from renewable sources or by buying "Green Certificates" from other producers. Green Certificates are the instrument by which those subjects demonstrate the obligations' fulfilment and therefore represent the incentive for renewable energy production. A market is created where the demand is made up of the obliged subjects and the supply is constituted of "green

certificates" entitled electric energy producers. Therefore, Green Certificates are titles proving the production of a certain amount on energy from renewable sources. In accordance with the 2008 Budget Law, since January 2009, the number of Green Certificates an obliged subject has to possess is equal to its duty expressed in MWh.

b) *"All-comprehensive tariff mechanism"*: the 2008 Budget Law introduced a new incentive mechanism (then confirmed by the Ministerial Decree 18/12/2008) as an alternative to the "Green Certificates" but limited for plants working since 31/12/2007 with no more than 1MW average nominal power per year. The above mentioned plants are allowed to ask for withdrawal tariffs of the electric energy introduced into the network, differentiated by source, for a 15-year period recognition. These tariffs are called "all-comprehensive" for their value and include both the incentive part and the component linked to the remuneration from the sell of the energy introduced into the electric network.

Until the end of the incentive period the tariffs will be the only source of remuneration of electric production from renewable sources.

c) *"Conto Energia" (Energy Bill)*: it grants a constant remuneration for electric energy produced from solar photovoltaic and thermodynamic plants, for a predetermined period (20 years for photovoltaic; 25 years for thermodynamic) through a tariff computing the whole energy production of these plants (feed-in premium).

Source: Gestore dei Servizi Energetici, 2010⁹¹.

France

Since 2009 and in the framework of the Grenelle de l'environnement, the Heat Fund (Fonds Chaleur, 1 billion € for 3 years (2009-2011) aims at promoting renewable sources of heat production (biomass, solar thermic, geothermal...). It targets collective housing, local authorities and all enterprises (agriculture, industry, tertiary). It aims at financing projects for the production of heat from renewable energies (biomass, geothermal, solar), while ensuring a lower price than the heat produced from conventional energy.

It also aims to encourage employment and investment in this sector.

The Fund is expected to allow the additional production of 5,5 Mtoe of renewable heat or

⁹¹www.gse.it/media/pubblicazioni/documents/guidafontirinnovabili.pdf

recovery by 2020⁹².

The FNCOFOR (National Federation of forest municipalities) has developed many programs promoting wood as a building material and energy source:

- *programme "1.000 wood boilers in rural areas"*: is for owners of wood boilers and heating networks and to the territories of projects seeking local promotion of their local wood resources.

This program, started in 2007, will continue until 2012 with the objective of installation in the territory of 1.000 new wood boilers. The objectives of this program are:

- 500 MW of installed capacity
- 250.000 tons of wood consumed
- 75.000 tep substituted
- 200 local jobs created or consolidated⁹³

Austria

In Austria the Green Electricity Act allocates currently 21 M€/year funding for the production of green electricity. The green electricity legislation was introduced in 2002 due to the EU directive 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market with the latest amendment in February 2010. The green electricity ordinance regulates eligibility of support and feed-in-tariffs in terms of amount and duration.

The "Climate and Energy Fund" makes nearly 500 M€ for the period 2007 to 2010 available. The Climate and Energy Fund acts as a driving force for innovation for climate and sustainable energy technologies. The strategic orientation of the Climate and Energy Fund is closely related to national and international commitments and frameworks for climate and energy targets⁹⁴.

In 2008 around 40 M€ (excluding the budget for the Climate and Energy Fund) were invested into energy research and development programs⁹⁵.

A number of subsidy schemes for renewable energy and energy efficiency measures are available at the federal state level differing in type of subsidy, eligibility, amount, etc. Also, a number of municipalities offer subsidies e.g. for the installation of renewable energy systems.

Slovenia

For the consumption of the renewable energy electricity, no stimulation mechanisms or obligations exist. There is a support scheme (Feed-in tariff scheme) for the production of Renewable Energy Resources electricity.

Germany

Renewable Energy Sources Act (D)

The Renewable Energy Sources Act (EEG) was introduced in 2000 and underwent 2 amendments in 2004, and 2009. The main purpose of the act is to promote the use of renewable energies by a system of financial grants. The financial support covers the production of electricity from hydropower, landfill gas, sewage treatment gas, mine gas, biomass, geothermal energy, wind energy and from solar radiation.

The purpose of this Act "is to facilitate a sustainable development of energy supply, particularly for the sake of protecting our climate and the environment, to reduce the costs of energy supply to the national economy, also by incorporating external long-term effects, to conserve fossil fuels and to promote the further development of technologies for the generation of electricity from renewable energy sources" (EEG Section 1).

The regulation of the EEG foresees that plant operators receive a fixed payment for the electricity produced for 15 resp. 20 years (EEG Section 21). In order to safeguard the feed-in of the renewable energy, "grid system operators shall immediately and as a priority purchase, transmit and distribute the entire available quantity of electricity from renewable energy sources" (EEG Section 8).

The amount of the tariffs paid is differentiated by type of renewable energies, size of the renewable energy plant and in the case of wind energy by the location. Since 2002 tariffs for newly installed plants are based on degression, which means that the fixed rate for newly installed systems decreases yearly by a certain percentage. The aim of this payment system is to strengthen innovation in plant construction and to lower the operating costs of the renewable energy technologies.

⁹² www2.ademe.fr/servlet/KBaseShow?sort=-1&cid=96&m=3&catid=23403

⁹³ portail.fncofor.fr/detail.do?idRubrique=338&noArticle=1288

⁹⁴ www.klimafonds.gv.at/

⁹⁵ www.nachhaltigwirtschaften.at/edz_pdf/0936_energieforschungserhebung_2008.pdf

Switzerland

SwissEnergy is running from 2011-2020 (relaunch of the Programme Swiss energy). The programme is part of the four-column-strategy. It primarily strengthens the promotion of energy efficiency and the renewable energies. The programme promotes concrete steps towards the vision of "2000 watt society".

Programme SwissEnergy (CH), Building Programme, (CH) cost-covering Compensation (KEV): 247 million CHF are paid per year to compensate the difference between fee and market price.

If a supplier decides for the feed-in tariff, he cannot sell his electricity as "green power" on the eco power market at the same time. The rules about the KEV are fixed in the modified Energy Ordinance (EnV), which came into effect on first January 2009. Investments can profit from the KEV, which went into operation after the first of January 2006. Applications for such constructions are accepted from the national grid association (swissgrid)⁹⁶.

C.4.5 Conclusion: sustainable renewable energies strategy for the alpine space

Three main criteria appear to be influential in the decision of a defined region or municipality to extend the share of renewable energies:

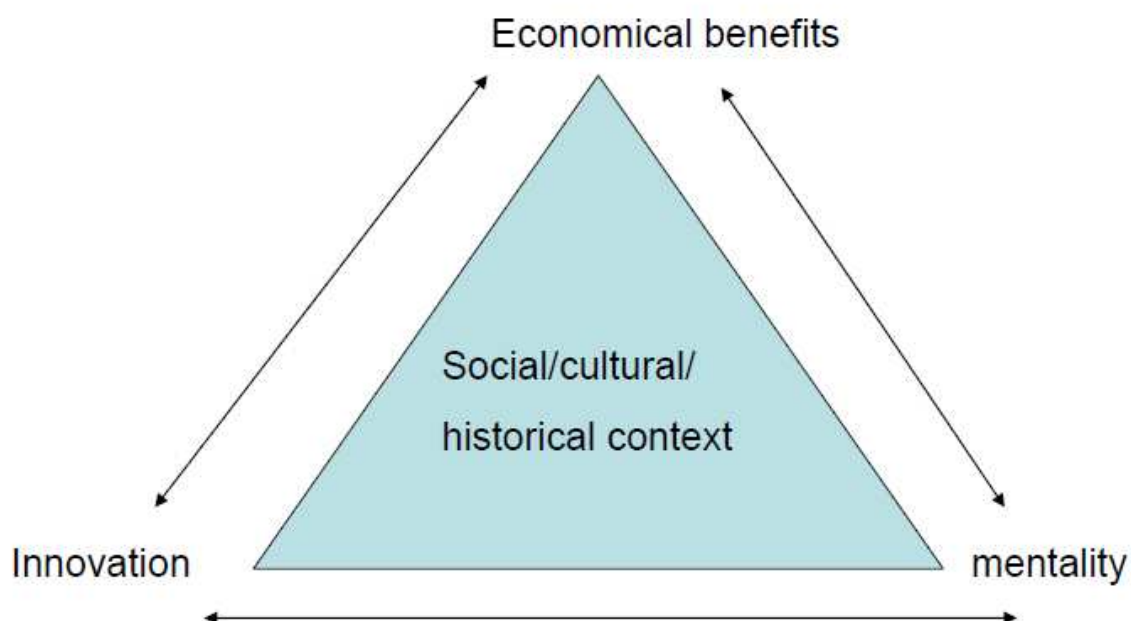
- innovation / technical possibilities (1),
- potential economical benefits (2)
- mentality of decision makers, stakeholders and population (3).

These three criteria are at the same time linked to the geographical, social, cultural and historical context of the referring region. Criterion (1) sets the technological framework: what renewable energy facilities are possible to install and to operate in an economically and ecologically efficient way in relation to the geographic situation of the region. Criterion (2) is the driving force, and also an important argument for decision makers: what will be the economic benefit in respect to e.g. tax income, job creation and energy autarky? This has to be calculated on a sound and reliable basis. Criterion (3) refers to potential conflicts with the public and/or

group of interests and NGOs: what impacts do the extension of Renewable Energies imply (e.g. on Nature Protection, tourism, forestry etc)? The criterion also refers to soft aspects such as an improved public image of the municipality or region to be a "forerunner" or "good practice example" for using Renewable Energies to a large extent. In some cases this attribute can be used in turn to promote the region for tourism and other branches. Criterion (3) is very strongly linked to the social, cultural and historical context. Therefore, an aligning communication process with the public should be considered within an Renewable Energies strategy on local or regional level. Taking all three criteria and the crosscutting aspects into account, a balanced consideration of these determining factors should be taken into consideration in order to develop Renewable Energy Regions of Excellence in the Alpine Space. Their interconnection by a smart grid would strengthen their visibility and also contribute to an Alpine-wide grid stability and thus to a reliable renewable energy supply.

⁹⁶ www.bfe.admin.ch/themen/00612/02073/index.html

Figure 26: Frame conditions and parameters influencing the regional boost of renewable energies



Conclusion 16:

Owing to its nature (slopes, force of gravity) and natural resources (wide availability of water and biomass, high sunshine periods), the Alpine Space offers very good conditions for generating renewable energies.

Conclusion 17:

In order to contribute to energy saving and sustainable generation of renewable energy in the Alps, regional strengths and opportunities should be identified on the basis of relevant and harmonized data.

Bibliography

ARGE Alp (2009)

Schlussbericht Energiepolitik. Version vom 5.03. 2009.

BAFU/BFE (2009)

Unsere Energiezukunft. Magazin Umwelt, Nr. 2.

Bundesrepublik Deutschland (2010)

Nationaler Aktionsplan für erneuerbare Energie gemäß der Richtlinie 2009/28/EG zur Förderung der Nutzung von Energie aus erneuerbaren Quellen. Englische Fassung als Online-Ressource: www.erneuerbare-energien.de/inhalt/46291/4590 published by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. Abgerufen am 15.11.2010.

CIPRA 2002:

Haubner, Elke (2002): Der Wind der Veränderung. Alpmedianet (Hrsg.), CIPRA International, Schaan. http://www.cipra.org/pdfs/62_de/at_download/file.

CIPRA 2009:

CIPRA Compact Nr 01/2009. Energie im Klimawandel. Ein Hintergrundbericht der Cipra.

Dilger, Gregor (2009)

Regionale Wertschöpfung durch die Nutzung erneuerbarer Energien. Agentur für Erneuerbare Energien e.V. (Hrsg.), Berlin
www.unendlich-viel-energie.de/uploads/media/21_Renews_Spezial_Regionale_Wertschoepfung_dez2009_online.pdf.

EEA report Nr. 6/2008:

Energy and environment report 2008, European Environment Agency.

Gestore dei Servizi Energetici, 2010

G.S.E.'s Handbook of the incentives for the production of electric energy from renewable sources
www.gse.it/media/Pubblicazioni/Documents/GuidaFontiRinnovabili.pdf.

Hirschl, Bernd; Aretz, Astrid; Prah, Andreas; Böther, Timo; Heinbach, Katharina; Pick, Daniel; Funcke, Simon (2010):

Kommunale Wertschöpfung durch Erneuerbare Energien. Institut für ökologische Wirtschaftsforschung (IÖW) (Hrsg.). Schriftenreihe des IÖW 196/10. Berlin 2010
http://www.unendlich-viel-energie.de/uploads/media/IOEW_ZEE_Kommunale_Wertschoepfung_durch_Erneuerbare_Energien_SR_nov10_02.pdf.

LfU 2010:

Bayerisches Landesamt für Umwelt (2010): Erdwärme. Die Energiequelle aus der Tiefe. Augsburg 2010.
www.lfu.bayern.de/umweltwissen/doc/uw_20_erdwaerme.pdf.

Pastorelli, 2007:

CIPRAINFO, Nr. 85, Dezember 2007. Die Alpen nach Kyoto.

Schweizerische Akademie der Technischen Wissenschaften (SATW):

Roadmap Erneuerbare Energien Schweiz. Eine Analyse zur Erschliessung der Potenziale bis 2050.

SC NAT (2007):

Energieressourcen: Zahlen und Fakten. Nutzung, Potenziale und Risiken verschiedener Energieressourcen in der Schweiz.

StMWIVT 2008:

Bayerisches Staatsministerium für Wirtschaft, Infrastruktur, Verkehr und Technologie (Hrsg.): Eckpunkte der bayerischen Energiepolitik. München 2008.

StMWIVT 2010:

Bayerisches Staatsministerium für Wirtschaft, Infrastruktur, Verkehr und Technologie (2010): Bayerischer Solaratlas. München 2010

StMWIVT 2010a:

Bayerisches Staatsministerium für Wirtschaft, Infrastruktur, Verkehr und Technologie (2010): Bayerischer Windatlas. München 2010

C.5 Energy saving, energy management and rural development

C.5.1 Introduction

At the Xth Alpine Conference 2009 in Evian, the environmental ministers adopted the Climate Action Plan⁹⁷ which is based both on mitigation and adaptation strategies. When talking about mitigation strategies, consumption is one important field for measures as well as the use of potential renewable energies. Taking into consideration their resources in wood and water and their potential in terms of solar, wind and geothermal energy, alpine regions could lead the way by using mainly renewable energies to cover their needs. Objectives of the proposed measures for energy supply are to significantly reduce CO₂ emissions and to promote the use of renewable energy sources.

For this chapter some aspects of sustainable rural development are highlighted, such as spatial and land planning, energy supply and consumption and finally tourism.

The objectives of measures in the field of spatial and land planning are to ensure efficient space management, promote urban densification and to promote CO₂ efficient urbanisation and planning. Measures are to promote the integration of bioclimatic criteria (exposure to the sun, natural ventilation ...) in the tools used for land planning, particularly on a municipal level, to localise urbanisation projects in areas served by eco-friendly public transport and finally to maintain natural areas (as carbon sinks).

For energy supply and consumption the Action plan proposes to develop in a participative way an energy policy specific to the Alps in order

1. to create a consensus for a future sustainable management of energy in the alpine space,
2. to increase the energy efficiency of buildings by promoting the rehabilitation of existing buildings and the construction of « passive » buildings.
3. to respect natural balance and landscapes, promote renewable energies, and their use for heating purposes on a local level by individuals and communities, by using recent technologies with high energetic efficiency which, in the case of biomass, limit pollution emissions in the atmosphere.
4. to disseminate existing techniques that reduce energy consumption by favouring local resources while building, particularly by improving the training of mountain building professionals (training campaigns, networking...).
5. to launch information campaigns and take concrete measures to promote the use of biomass (mainly wood from mountain forests) and other renewable energies respecting the environment and produced locally.

The objective for measures for transport is generally to shift traffic towards more eco and climate-friendly means of transportation in order to significantly reduce CO₂ emissions linked to transport. As transport is not in the scope of this report so much, the measures foreseen in the Action plan are not further elaborated in this text.

In tourism the Alps could contribute to reduce CO₂ emissions produced by tourist activities and ensure travel professionals offer the option of sustainable transport and even promote alpine holiday offers that are "climate neutral". These contributions could serve as background for innovation in tourism development.

On top of these objectives and measures of the Climate Action Plan of the Alpine Convention, Liechtenstein announced an architecture award "constructive.li" with the aim to enhance sustainable construction and at the same time architectural quality. The

⁹⁷ www.alpconv.org/climate/index_en.htm

award is planned for every five years. The first award is foreseen for the Alpine Conference in March 2011 in Brdo pri Kranju.

Germany supported the elaboration of a pre-study on how the Alps can become climate neutral by 2050. This pre-study gives some indications on the scope of the main study and appropriate targets to be further analysed.

The Report on Energy and environment 2008 of the EEA (EEA report Nr. 6/2008) states that with reference scenarios (POLES; WEM and PRIMES) the share of renewable energies of the primary energy consumption will increase by up to 10% in the year 2020 and 18% in the year 2030. With more demanding policies for the reduction of GHG emissions and support of renewable energies as well as energy efficiency results of 13% in the year 2020 and up to more than 24% in 2030 may be possible. An important issue here is the need for a faster increase of energy efficiency in order to decrease the absolute energy consumption.

Differing approaches for energy saving and energy management support innovation in rural development because they mostly rely on local energy sources and have to be implemented primarily on the local or regional level.

C.5.2 Energy saving objectives in international and national approaches on energy management

a. Legislation and objectives for energy saving and energy management on European level

In order to promote progress, since 2000 the EU has, in a legislative framework, set two indicative targets for renewable energy: to increase the share of electricity generated by renewable energy to 22% in 2010 for EU15 (compared with 14% in 2000); to increase the share of biofuels in diesel and petrol used for transport to 5,75% in 2010 (compared with 0,6% in 2002).

European countries signed up in March 2007 to a binding EU-wide target to source 20% of their energy needs from renewable sources, including wind power, solar power (thermal and photovoltaic), hydro-electric power, tidal power, geothermal energy and biomass by 2020. In order to reach this objective EU Member States agreed to a new directive on promoting renewable energies, which set individual targets for each member state. The goal of the EU Commission is to increase the current target of a 5,75% share of biofuels in overall fuel consumption by 2010 to a 10% share by 2020. Listed here are the main steps:

- Nov. 1997: Commission publishes White Paper setting out a Community Strategy and Action Plan for renewable energy⁹⁸ for achieving a 12% share of renewable sources in the EU's energy mix. The decision was motivated by concerns about security of supply and environmental protection.
- Sept. 2001: EU adopts Directive on the Promotion of Electricity from Renewable Energy Sources - Directive 2001/77/EC.
- May 2003: EU adopts directive on the promotion of the use of biofuels or other renewable fuels for transport – Directive 2003/30/EC. The Communication from the EU Commission from 2004 regarding the share of renewable energy in the EU⁹⁹ assesses the development of renewable energy in the European Union. These are the main objectives:
 - to implement the provisions of Directive 2001/77/EC (on the promotion of electricity from renewable energy sources in the internal electricity market) under which the Commission is required to make a formal report evaluating the progress towards achieving national targets for 2010 for renewable energy sources;
 - to assess the prospects for achieving the target of 12% of overall energy

⁹⁸ Renewable energy: White Paper laying down a Community strategy and action plan

(europa.eu/legislation_summaries/other/127023_en.htm)

⁹⁹ Commission Report in accordance with Article 3 of Directive 2001/77/EC, evaluation of the effect of legislative instruments and other Community policies on the development of the contribution of renewable energy sources in the EU and proposals for concrete actions [COM(2004) 366].

- consumption being produced from renewable energy in 2010;
- to put forward proposals for concrete actions at national and Community level to ensure the EU's renewable energy targets are achieved in 2010.
 - The energy efficiency is covered by Directive 2004/8/EC on the promotion of cogeneration based on a useful heat demand in the internal energy market. The use of combined heat and power (CHP) presents a substantial potential for increased energy efficiency and reduced environmental impacts.
 - March 2006: The Commission opened a wide-ranging debate on a future European energy policy with the publication of a Green Paper on Forest protection and Information¹⁰⁰. The need to act at EU level was prompted by mounting concerns regarding high oil and gas prices and worries about Europe's increasing dependency on a few external suppliers, as well as the global-warming crisis. As a follow up to the Green Paper, the Commission unveiled a "package" of energy and climate change proposals in January 2007. In the Communication from the EU Commission in 2006 it's mentioned that the Global Energy Efficiency and Renewable Energy Fund (GEEREF) proposed by the European Commission will help to "mobilise private investments in energy efficiency and renewable energy projects". Promoting such projects will contribute towards sustainable development: it will help to stabilise energy supply in the poorest regions of the world, as well as provide benefits among others in terms of the environment, climate change and air quality.
 - March 2007: EU summit endorses a binding target to source 20% of the bloc's energy from renewable sources by 2020.
 - 9th Dec 2008: Political agreement on the Renewables Directive (EurActiv 09/12/08).
 - The Directive 2009/28/EC establishes a common framework for the use of energy from renewable sources in order to reduce greenhouse gas emissions and to promote cleaner transport. To this end, national action plans are defined, as are procedures for the use of biofuels. Each Member State has a target calculated according to the share of energy from renewable sources in its gross final consumption for 2020.
 - 30th June 2009: EU issues template for National Renewable Energy Action Plans (NREAPs) (EurActiv 01/07/09).
 - As regards the topic of saving energy, the Directive 2010/31/EU cover the field of energy performance of buildings, this is the main legislative instrument affecting energy use and efficiency in the building sector.
 - 2020: Target date for EU objective of sourcing 20% of energy from renewable sources.

¹⁰⁰ GREEN PAPER On Forest Protection and Information in the EU: Preparing forests for climate change
(eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0066:FIN:EN:PDF)

b. Legislation and objectives for energy saving and energy management on national level

Member states of the Alpine Convention are coping with energy savings in a similar way. Governments, energy utilities and other organizations provide a wide range of grants, rebates, discounts and other incentives that help to use less energy, enable switch to renewable energy and nevertheless produce it effectively.

National contribution: Legislation and objectives for energy saving and energy management on national level

Italy

An organization called "Energysaving" is a management consultant service which provides technical and economic services in order to reduce consumption of energy.

Generally we could say that in the last two decades the use of petroleum has decreased, while usage of natural gas, brushwood, solar, wind and hydro power are increasing. There is a good practice example in the building sector. A special certificate that confirms the energy efficiency of buildings called "CasaClima" is granted in the Province of Bolzano/Bozen. CasaClima not only focuses on new buildings, but also on lasting renovation. Many other Italian and even European regions are interested in implementing such a certificate.

Different provincial administrations offer cash contributions (up to 50% of the invested money) to people who implement energy-saving and energy-efficiency measures and use renewable energies in residential or business buildings.

Slovenia

The consumption of energy in Slovenia increases globally from approximately 2% each year (according to the association Focus (Slovenian association for natural development)). Slovenia has two main laws that among other proposals also define energy saving: Energy Act which was updated in 2007 and lately in 2010; Construction Act from 2002 which defines standards for energy efficient buildings.

The National Energy program has been issued in 2004 and with it, Slovenia set itself the following objectives in the energy efficiency field: to reduce energy intensity (30% by 2015 as compared to 2000); to achieve 16% share of CHP (Combined Heat and Power) in 2012 in the production of

electricity; 30% lower energy consumption in new buildings and the possibility of reducing energy consumption in the public sector by 15%. An additional incentive to implement energy efficiency measures is also the Kyoto Protocol, to which Slovenia has committed itself to reducing greenhouse gas emissions by 8% between the years 2008 to 2012 according to the year 1986. There is also a decree on energy efficiency in Slovenia which states that, in terms of heating and ventilating buildings, 25% of the energy should come from renewable sources.

So called "Eco sklad" is a national eco-fund which grants subventions for usage of renewable energy resources and better energy efficiency of residential buildings. Non-refundable resources are granted for solar heating systems, renovations and reconstruction of buildings in order to make them more energy efficient, buildings of new low-energy and passive buildings, heating systems on wooden biomass, and facade renovations.

Austria

The organizations that deal with energy savings in Austria are Austrian Energy Agency and association for energy savings "O.Ö. Energiesparverband". Due to the high level of dependence on energy imports that are associated with increasing uncertainty, the efficient use of energy is becoming increasingly important. Austria's contractual obligation to reduce its greenhouse gas emissions by 13% relative to the 1990 level by 2010 (Kyoto objective) and the EU directive on energy end-use efficiency and energy services 2006/32/EC (energy efficiency directive) constitute additional reasons for using energy as efficiently as possible.

Alternative energy resources and "green energy" is especially appreciated in Austria.

Agrar plus in St. Pölten is the organization that deals with bioenergy, especially the use of biomass. They also stress the possibility of plant-oils to be used as an alternative fuel. As a good example of energy savings there is the city of Graz with "Green Light" initiative. They also won a prize at EU level for the improvement of street lighting to a more efficient one, using low energy consumption bulbs and saving approximately 60% of energy that was used for this purpose before. Another important organization is "die Umweltberatung" – environmental consultancy that offers tips on how to use energy more efficiently.

Switzerland

In Switzerland major institutions dealing with energy are S.A.F.E. – Schweizerische Agentur für Energieeffizienz, Swiss Federal Office of Energy (SFOE) with its programme Swiss Energy and the other is Schweizerische Energie Stiftung (Federation Suisse de l'Énergie). SFOE claims that Switzerland's overall energy consumption in 2009 fell by 2,5% compared to 2008. The main reasons for the fall in consumption were the warmer weather and the weak economy. In the building sector a major player for energy savings is a building standard called Minergie, aimed at new as well as refurbished buildings. It is mutually supported by the Swiss Confederation, the Swiss Cantons along with Trade and Industry. Specific energy consumption is used as the main indicator to quantify the required building quality.

Germany

The main organization dealing with energy savings in Germany is German Energy Agency called DENA (Deutsche Energie Agentur). Germany relies on renewables - solar, wind and water energy resources: climate change, energy security and regional output are only three words for an energy strategy that is based partly on the systematic expansion of renewable energies. So their share in Germany will increase to 30% by the year 2020. Germany could be supplied entirely from renewable energy sources in 2050. These are findings of a study of the research of renewable energy¹⁰¹.

As regards energy savings in Germany, there is great potential. Existing buildings need about three times as much energy for heating than new buildings. In addition, about 87% of the total energy needs are being used in households for space heating and hot water. Modern buildings can reduce energy by up to 80% in comparison to the existing buildings. DENA initiates several pilot projects on energy savings. One of these in the field of buildings efficiency is "Zukunft-Haus". DENA is therefore developing national information and motivation campaigns for energy efficient construction in close cooperation with the politics, science, business, organizations (public as well as private) and partners in the market. The main message is: save energy, gain value.

Another innovative project in Germany is so called "e-Energy", which is ICT-based energy of the future. E-Energy is a support program of the Federal Ministry of Economics and Technology in

government-wide partnerships with the Federal Ministry for the Environment, Nature Protection and Nuclear Safety. Technology Partner sheep in six pilot regions to develop and test key technologies and business models for an "Internet of Energy". Unfortunately none of this is in the alpine territory, but there is a possibility to implement it there as well.

France

In France there is a French Environment and Energy Agency called ADEME (Agence de l'Environnement et de la Maîtrise de l'Énergie) that is dealing with energy management and Energy Efficiency Policy Measures at the state level. It is in charge of implementing energy and environmental policies. It operates within a 4 year agreement with the government (2007-2010).

France is developing energy efficiency and renewable energy sources through the energy bill which proposes to reduce France's energy intensity (i.e. the ratio of energy consumption to GDP) by 2% each year until 2015, and then by 2,5% until 2030.

ADEME's activities are in line with France's national policy, and cover two additional objectives:

- To encourage the public and socio-economic players to save energy, particularly in sectors that consume high quantities of energy on a daily basis (households, offices, shops and transport).
- To promote renewable energy sources (biomass, solar power, geothermal energy and heat pumps).

French law has recently introduced a new tool: energy saving certificates.

Liechtenstein

Liechtenstein has ambitious energy policy goals and wants to become "Energy Role Model for Europe". In 2004, Liechtenstein set ambitious energy policy objectives with its "Energy Concept 2013". The goal of the energy policy is to achieve lower energy consumption and increased use of renewable energies. Liechtenstein aims to exceed the Kyoto objective of reducing greenhouse gas emissions by more than 8% compared with levels in 1990. Energy savings will be achieved through improved room insulation and the realization of ultramodern standards for new buildings. The Energy Concept also envisages an increase in the share of renewable energy sources to more than 10% of overall energy consumption by 2013. By promoting solar energy installations, the government aims to triple the use of solar energy in the same period.

A new and more effective Energy Efficiency Act

¹⁰¹ Studie des Forschungsverbunds Erneuerbare Energien (FVEE)

confirmed by Parliament envisages more financial resources than before to be distributed on behalf of energy reduction. The Government wants to recognize the Minergy standard, with its broad reliance on renewable energies and its rational use of energy, by contributing State funds for the achievement of Minergy goals both in the case of new buildings and the refurbishment of old buildings. A special label has been created for the "Liechtenstein Bundle of Energy", which is similar to brands used by other countries, but deliberately has its own design. The name "Bundle of Energy" embodies the idea behind the label: the association with someone who is full of energy. The name represents both a mandate and a program – a package of measures for a livable energy future. The goal of this program is to achieve measurable steps toward a livable energy future. Another key point of the "Bundle of Energy" is the promotion of renewable energies. Through increased subsidies of investment in photovoltaics, the package includes a commitment to purchase the electricity produced. Similarly, combined heat and power installations will receive State subsidies. Subsidies for the use of solar energy will increase. With its Energy Concept, Liechtenstein has set itself the ambitious target of tripling thermal energy use by 2013¹⁰².

¹⁰² www.liechtenstein.li/en/fl-portal-aktuell?newsid=15332

C.5.3 Approaches of energy saving and energy management

a. Approaches for communities, towns, regions

Energy autarky has many advantages for a region. There is not only the decreased dependency of the region on external energy supply but also an increase of purchasing power in the region because local energy sources are used and with this a strengthened local economy and further working places exist, through local investment a better control over the results of energy, and in the case of overproduction there is the possibility to export and sell the energy. Decentralized energy generation is another characteristic of local renewable energy which has, as a rule, shorter ways to the consumer and in the case of failure the loss and problems are not as high as if one central energy supply failed. Many communities in the Alps are part of the e5 program and/or of the climate alliance, which support the communities to make a regular check of their energy supply and consumption situation focusing on community buildings as well as on private buildings, transport, information and communication as well as other fields of action. This program enables communities to develop and implement future-oriented energy policies on a local level.

The climate alliance sets quantitative goals of CO₂ reduction (every five years 10%). Both work with an eco-audit approach through continual processes and are applicable for communities and regions.

Good practice 47: Program e5 for efficient energy usage in municipalities, Austria

Started in 1998, e5 is a program for the attention of Austrian municipalities. It aims at encouraging local actions for climate protection, promoting energy efficiency and renewable energy use. Currently, 63 municipalities in Austria benefit from elements of this program and over 50% of the inhabitants of Vorarlberg live in e5 municipalities. It covers all relevant fields of application in the energy sector: energy supply, recycling, planning, mobility and buildings. The team of animators provides support and

advice to e5 municipalities, enabling them to determine the degree of progress of their energy policy and the measures which could be implemented. It encourages the networking of members in the municipality (politics, government, citizens, firms, initiatives) and the exchange of experiences between municipalities, and in particular the communication of good practices in the field of energy management.

The e5 members get involved in an activity program, annually updated and implemented by

Figure 27: The Austrian municipalities, members of the e5 program



an "energy team". At least every four years, the municipalities go through an evaluation. The independent external panel awards them a set number of "e", depending on the degree of application and the content of the taken measures. An energy profile of the municipality is performed. It allows a graphical representation of the strengths and weaknesses of the municipal energy policy in many fields of action: land use and planning, municipal buildings and facilities, energy supply, mobility,...

The program e5 has allowed the public sector to go further in the field of energy efficiency. In 2002, the Swiss initiative "Energy City" and the program e5 have led to the establishment of the "European Energy Award® (EEA)". EEA is a European program, which assists municipalities in the implementation of policies for climate protection.

Today, the alpine municipalities of Mäder and Langenegg (which, with Zwischenwasser have reached the highest level) are among the most energy efficient villages in the European ranking.

More information: www.e5-gemeinden.at

The label "Energy town" in Switzerland is a procedure for towns aimed at having a comprehensive energy, transport and environmental policy. Energy town is an association, which offers different services to its members as for example consultation, project support, exchange, training courses and others. Energy towns decide and implement measures in the fields of planning, buildings, supply and disposal, mobility, internal organization, communication and cooperation. And are assessed every four years by a specific label - commission¹⁰³.

In several regions the energy provision based on biomass (wood) of single buildings, groups of buildings, quarters, up to several communities or valleys is an approach which involves not only the end user but also the energy supplier and often communities or an institution of public-private partnership for the provision and distribution of energy. Such an example is the eco – model "Achtental". The objective is to become energy self sustaining by 2020¹⁰⁴.

Another community in the Austrian Alps "Kötschach-Mauthen" set its goal to become energy self-sustaining through hydropower, biomass and biogas in combination with long-distance heating.¹⁰⁵

The small town Güßing in the region Burgenland, Austria is today already energy self sustaining with energy from biomass and sun, has created 1.000 jobs, exports energy and became centre for renewable energies in the region. In 1990 the parliament of the town decided to become independent from fossil energy sources¹⁰⁶.

The energy region "GOMS" in Switzerland aims at sustainable, decentralized and local energy generation. To achieve this goal, the region counts on the potential of biomass hydropower and solar energy as well as geothermal power. By 2030 renewables

should be expanded, new jobs in the region should be established, new income generated and a positive image for the tourism region Goms enhanced.

Good practice 48: Bioenergy region Goms 2030; Project "Gleichstrom" 2007 - 2010, Switzerland

High valley planes in the Valais Alps have good conditions for renewable energy use. Mountain forests provide climate neutral fuel and the region is well known for its long and intense sunshine duration. Moreover, already existing hydropower use is creating a solid base for the elimination of usage of fossil fuels.

Local public-private partnership company GOMS has the vision to establish the region of Goms as the first "bioenergy region" in the Swiss Alps by 2030. Sustainable, decentralized and local energy production will be promoted so that production, transformation and consumption in the region of Goms will be realized with minimization of transport. With capitalization of endogenous energy potential local added values will be increased and new jobs will be created.

In order to realize this goal by 2030, projects based on local knowledge and experience will be carried out. By implementation of the project "Gleichstrom" all parties should be motivated to join the vision.

Concrete projects have been implemented in the framework of the regional energy concept:

Energy production: biogas power plant, regional wood pellet association, hot water from Furka tunnel, pilot installation Münster - universal turbine for water supply, solar energy programme "Alpine Sun", wood dehydration.

Energy efficiency: support programme for efficient household equipment, mobility, building management.

Energy awareness: energy days in schools, water forum Gletsch, voluntary work.

Most important decision makers are involved and motivated, recognizing synergies of cooperation, and working together for independent, decentralized energy supplies. The population of the Goms region is aware of the potential and opportunities of renewable energy use and identifies with the 'bioenergy region Goms'. Measures and projects for efficient promotion of renewable energies are identified and are supported by those involved. Results, structures and procedures are evaluated.

More information:

www.unternehmengoms.ch/PDF_Dossiers/info_3_10.pdf

¹⁰³ www.energiestadt.ch

¹⁰⁴ www.oekomodell.de

¹⁰⁵ www.aae-energy.com

¹⁰⁶ www.eee-info.net/cms

In lower Austria the administration of the land supports communities in development of energy concepts and implementation of energy efficiency projects. For this they establish consultation services and different tools and guidelines on how to proceed. The land supports the elaboration of such concepts and other measures financially as well.¹⁰⁷

Strategies of regions, towns and communities to become energy self-sufficient are first of all to reduce energy consumption (up to 50%) by renovation and low energy concepts for new buildings and equipment, secondly to cover the remaining energy needs with renewable energy and thirdly to develop energy saving transport concepts with focus on public transport, soft mobility tools and energy efficient motorized traffic (car-sharing, newest technics, etc.).

b. International projects and territorial cooperation in the Alps

There are many untapped opportunities to save energy and encourage the use of renewable energy sources in Europe, but market conditions do not always help. The Intelligent Energy - Europe program is the EU's tool for funding action to improve these conditions and move us towards a more "energy intelligent Europe".

Local and regional energy agencies support the transition to more sustainable energy systems. They spread management practices, provide information guidance, and offer a range of services based on specific local needs. More than 60 new energy agencies have been set up with the support of Intelligent Energy - Europe since 2004. They add to about 200 agencies set up under SAVE II (1998-2004), the predecessor of the IEE programme (IEE has been active since 2004 on).

AlpEnergy is funded by the Alpine Space Programme 2007-2013, as a part of the "European Territorial Cooperation" (Objective 3 of the Regional Policy 2007-2013). It brings together power suppliers,

development agencies, research institutes and public administrations, from five different countries of the alpine space (France, Germany, Italy, Slovenia and Switzerland) to address the central issue of renewable energy supply.

Even if hydropower, solar and wind energy, wood and other biomasses are richly distributed throughout the area, they are unequally accessible because of many territorial discrepancies. The need to balance an increasing production and use of renewable energy sources requires a stronger and more extended electric grid capable of dealing with high levels of remote power generation.

AlpEnergy focuses on both technical as well as economic aspects to introduce an efficient operational model that aims at a standardization of both technologies and procedures.

AlpEnergyWood is an EU Community Initiative Alpine Space Programme with slogan "together for the promotion of sustainable energy". The main aim of the project is to gather and share knowledge and practices of professionals, local communities, and citizens of nine Alpine Space regions in the promotion of a natural local resource: wood-fuel.

ENERBUILD is an Alpine Space program for Energy Efficiency and Renewable Energies in the building sector. Due to the harsh climate in the Alps, traditional buildings in this region face a particularly high energy consumption. The challenge is the reduction of fossil fuels and the promotion of Energy Saving and Producing Buildings as an instrument to face this problem.

¹⁰⁷ www.gemeinden.energieberatung-noe.at

Good practice 49: Steam piping project between the Swiss Waste Incineration Plant in Buchs (KVA) and Liechtenstein enterprises

More than 20 years ago, the idea was first raised of taking the energy generated by the Waste Incineration Plant Buchs SG (KVA) and feeding it not only into the community heating network of the municipality of Buchs, but also delivering this residual heat to neighbouring Liechtenstein by a steam pipe. Since all Liechtenstein municipalities are also members of the association that operates the KVA, this idea was not only based on economic and ecological arguments, but also on an expression of smoothly functioning cross-border cooperation.

Figure 29: The new Energy Bridge across the Rhine, between the canton of St. Gallen and Liechtenstein, serves as a bicycle path and carries the steam pipe from the KVA (background, right). © M. Fasel



A year ago, the bridge connecting the two shores of the Alpine Rhine was established. The "Energy Bridge" between Buchs and Schaan constitutes

Figure 28: Part of the restored stretch of the Inland Canal. The structural elevation and the adjustment of the flow velocity and water depth promote the development of feeding and breeding areas for water birds, small animals and various fish species. © M. Fasel



the visible core component of this project. Elsewhere, the 6-kilometer steam pipe, which

feeds major industrial companies in Liechtenstein, is buried underground.

The positive effects of this cooperation in both economic and ecological terms as well as the benefits for all partners involved also justify the costs for development of the piping network, so the KVA is also able to sell a considerable surplus of the generated residual heat at market price to nearby areas abroad, while the buyers can save about 10 million liters of heating oil. This lead to at least 20.000 tonnes less CO₂ every year and has a positive side effect for the State itself. With this CO₂ saving, Liechtenstein can achieve one third of the reduction targets agreed within the framework of the Kyoto Protocol.

The crossing of the Alpine Rhine was not just conceived as a steam pipe viaduct, but also as a combined pedestrian and bicycle bridge. Along with the planning for the steam piping system, the restoration of the existing Inland Canal was designed in the area where the pipe runs parallel to the canal.

C.6 Innovation and sustainable valorisation of the resources

C.6.1 Creation of economic added value through the cooperation of research centers and alpine stakeholders

Sustainable economic growth is increasingly related to the capacity of regional economies to change and innovate. This means that a much greater effort needs to be put into creating an environment that encourages innovation and research and development (R&D). The promotion of innovation is therefore a central feature in the Lisbon National Reform Programmes and a main priority for the new Cohesion Policy programmes for 2007-2013. The strategy Europe 2020 (COM (2010) 2020) foresees a spending of 3% of the GDP for research and development. Looking at the EU's budget, the spending for R&D and innovation is forecast to reach 7% in the year 2013. The Communication on the re-examination of the budget (COM (2010) 700) requests an even stronger focus on innovation.

For rural areas, innovation is widely regarded as one of the key factors to increase competitiveness. Innovation can help to value natural resources and human assets. Innovation is a transversal theme common to all economic activities. The economic structure of rural areas is mainly made up of small and medium enterprises (SME's). SME's usually can't afford to have an in-house R&D-department. External input can be helpful for the innovation process. One other main challenge for enterprises in rural areas is the access to research and development institutes, which tend to be located in urban areas. Due to the particular situation of rural areas, a public intervention to encourage innovation can be justified. The notion of Triple Helix is sometimes used to describe the cooperation between the public and private sectors as well as R&D institutions as a basis for economic growth. One could add organisational / territorial innovation as a

fourth dimension so to make the Quadruple Helix approach¹⁰⁸.

Encouraging innovation in rural areas can have several approaches:

- **Clustering** of enterprises of a specific branch in a given territory (e.g. cluster strategy "The Ark" in Valais, good practice 4);
- Creation and fostering of **networks** of enterprises for exchange of experiences and mutual learning (e.g. through transnational cooperation like in the Alpine Space program);
- Promoting **cooperation between enterprises and R&D institutes** (e.g. CTI, the Swiss Innovation promotion agency);
- Facilitating **the creation of specific university branches and specialized training institutes in mountain areas**, with sufficient autonomy in definition of programmes and capacities to develop partnerships with businesses and population;
- Providing the necessary hard and soft **infrastructures**, which enable enterprises to innovate and be competitive (e.g. broadband access, risk capital).

As research and education institutions can play a crucial role in innovation, it is important that they become interested in the issue of innovation in mountain areas. An ongoing dialogue with mountain stakeholders with regards to their needs and ideas must be created. Research studies should be oriented towards the satisfaction of mountain dwellers' needs. Partnerships with mountain dwellers should be established to ensure an effective transfer of know-how and technology. The Alpine Convention could take a proactive role in defining research topics which are of particular relevance for the alpine arc.

The participants of rural development have an inherent responsibility to search for innovation to increase their competitiveness. They should seize the opportunities offered

¹⁰⁸ ESPON: Handbook of Territorial Diversity, Experiences from the ESPON Territorial Diversity project, p. 29 (www.espon.eu).

by the financial support systems available for developing innovation and must make use of opportunities offered by various networks, including social and professional networks to exchange experiences and engage in a process of mutual learning.

Good practice 50: The Swiss Innovation Promotion Agency CTI, Switzerland

CTI is the Swiss Innovation Promotion Agency. For the past sixty years, it has fostered knowledge and technology transfer between companies and universities by bringing them together as partners on applied research and development projects. CTI also provides assistance to start-up companies.

CTI has a budget of around 100 million CHF. "Science to Market" is the CTI credo. Companies work with universities to generate new knowledge that can be used to develop products and services and bring them to the market.

CTI provides funding to:

- Market-oriented R&D projects, which companies and universities work together on to develop products and services;
- The creation and expansion of scientifically-based companies;
- Knowledge and technology transfer through platforms and networks.

R&D project grants are available in all disciplines where scientific innovation is possible. Project applications are submitted on the basis of the

bottom-up principle. Grants are awarded to innovative projects that have considerable market potential.

CTI helps entrepreneurs get started by putting them through Venturelab training modules. These modules provide entrepreneurs with the tools and methods they need to successfully implement their business ideas in a company. Newly formed companies and new entrepreneurs can also request professional coaching. Support is given to knowledge-intensive and technology-based companies with great market potential.

The CTI's KTT initiative strengthens regional knowledge and technology transfer between universities and regional industries. Local professionally run KTT consortiums provide assistance to SMEs and universities by facilitating contacts and helping them to develop projects. Innovative Swiss companies and researchers also gain access to international programmes and networks such as IMS, ESA and EUREKA.

More information:

www.bbt.admin.ch/kti/index.html?lang=en

Conclusion 18:

For rural areas, innovation is widely regarded as one of the key factors able to increase competitiveness. For companies in rural areas, access to research and development institutes, which tend to be located in urban areas, is difficult. Given the particular situation of rural areas, public intervention to encourage innovation is justifiable.

Conclusion 19:

Small and Medium-sized Enterprises can benefit from cooperation between Research & Development institutions and public and private sectors. Organizational and territorial innovation can strengthen them further.

D CONCLUSIONS AND MAIN ISSUES OF SUSTAINABLE RURAL DEVELOPMENT FOR THE FUTURE

D.1 Rural development and innovation are key tools for the Alps

Mountains are strategic areas in Europe because of their widely relevant natural resources and human assets as water, biodiversity, cultural heritage and recreation areas and their function as early warning systems regarding climate change. They are an important centre of biodiversity for the entire region of Europe. They also represent a significant contribution to the discharge of the four main Alpine rivers basins. Therefore, they should not be acknowledged as "less favored areas" but as areas with different characteristics, which require a specific approach and instruments.

Promoting the alpine area and its assets is one of the goals of rural development and innovation policies.

Sustainable rural development is generally recognized as the product of those human activities that, using resources in rural territories, aim at increasing welfare; it is the key tool for encouraging diversification and innovation in rural areas aiming at reversing depopulation processes, stimulating employment and equality of opportunities, responding to growing requests for more quality, health, safety, personal development and leisure, and finally improving the quality of life for the population in the Alps.

It is influenced by a wide variety of policies, and can be assessed as part of a more general regional development concept.

On the European scale, the **European Agricultural Fund for Rural development** (second pillar of the Common Agricultural Policy) recognizes 4 axis of action for rural areas. The European Union also gets involved at the alpine level with the "**European Territorial Cooperation Alpine Space**

Programme 2007-2013".¹⁰⁹ The aim of this program is to increase the competitiveness and the attractiveness of the cooperation area in a sustainable way.

At the national level, the alpine countries, which are members of the European Union have National Rural Development Programs for the period 2007-2013 which are in line with the four axis of the EAFRD.

To these policies can be added policies specific to mountain areas. In The Alps, only France, Italy and Switzerland have enacted integrated legislation specific to mountain areas (Price, 2008).

In this context, innovation is widely regarded as one of the key factors to increase competitiveness of rural areas. Innovation can help to value natural resources and human assets and can be found in transversal approaches, such as tourism and agriculture, energy saving or development of renewable energies.

Innovation appears to be one of the tools that rural areas need, to face the changes they are confronted with. Public authorities must support it and encourage the transfer of technology and knowledge from urban centers towards alpine areas.

But innovation is not an objective in itself. It must be used to respond to certain needs and solve problems. Its evaluation must take into account the values with which it deals and the potential of transferability to other territories it contains.

The success of innovation processes rely on the cooperation, from the beginning to the end, of the different parties (researchers, citizens, enterprises, financiers, stakeholders...) involved in the project. They must also take into account the complexity of the alpine reality and bring together contradictory concepts such as "global and territorial", "consensus and social changes", "social, economic and environmental"...

¹⁰⁹ www.alpine-space.eu/

D.2 Risks in future rural development in the Alps

The Alps are under changes which endanger their economic liabilities and modify their quality of life in rural areas. The main changes are:

- **climate change:** climate change threatens winter sport destinations especially in low-altitude destinations and will involve water scarcity which will reduce energy production and thus create conflicts of interests between different end users.
- **decrease of agricultural activities:** within recent years, major changes in the organization of agricultural production and in the perception of rural space have taken place. Important determinants of these changes are the liberalization of agricultural markets, the increasing consideration of environmental concerns, a far-reaching move towards a recognition of the multifunctionality of rural space and towards supporting a diversification of agricultural and, more widely, rural activities. In the Alps, as elsewhere in Europe, the number of agricultural workers is decreasing. Despite this decline, agriculture remains in the Alps often dynamic and continues to play an essential role in the natural and cultural identity of the Alps. Planning its future is a challenge for the farmers and the whole society.
- **polarization between urban centers and peripheral areas:** one of the most significant trends which is to be observed in the Alps is the polarization between marginalization and urbanization. On the one hand, areas where agricultural land use has been abandoned but neither tourism nor urbanization has occurred are next to more active ones, confronted with urbanization or intensive tourism. As a result of structural change, younger people tend to move away so that the region faces ageing, depopulation and isolation.
- **ecological and social compatibility of renewable energies:** whereas the energy sector acknowledges an increasing

demand for CO₂ free energy sources, the implementation of renewable energies sometimes lacks social acceptance. The installation of renewable energies such as hydropower plants is questionable since the ecological systems of the rivers can be endangered by the implementation of these renewable energy sources.

To face these tendencies, rural development policies have to take into account these social evolutions in particular, by promoting alpine natural resources. For example, taking into consideration their resources in wood and water and their potential in terms of solar, wind and geothermal energy, Alpine regions could lead the way by using mainly renewable energies to cover their needs.

D.3 Opportunities and chances for rural development strategies

The changes that face the Alps can also be seen as incentives toward a sustainable development of the territory. Indeed, the Alps, confronted with climate change or to the evolution of public policies, which often match with the diminution of the offers of services of general interest, experiment with evolution of the mentality and of the identity of their inhabitants.

For example, climate change offers new potentials and opportunities in the creation of added value. Thus in the agricultural field, due to new weather conditions new crops could be cultivated; in the field of tourism, four seasons offers could be developed.

Approaches of communities, towns or regions play a crucial role in implementing innovative adaptation and mitigation measures. The local stakeholders have a major position to trigger innovation and employment in rural mountain areas, especially in promoting the development of energy self-sustaining or climate neutral territories, increasing use of renewable energy and improving energy efficiency as well as employing new concepts and strategies in tourism.

In this context, collective approaches of progress, leading to the organization of quality supply-chains also appear to be a positive concept for a sustainable rural development. For example in the field of tourism, industry or agriculture, the sustainable improvement of the incomes will come from the capacity of mountain dwellers, farmers and woodmen to develop, in partnership with local stakeholders, cooperative projects aiming at structuring these supplies.

In the energy sector, the increasing demand for CO₂-free energy sources as well as the current imperative for energy efficiency and renewable energies represents an interesting opportunity for rural development. Wood as an environmental-friendly and regional resource is becoming more and more important for house construction and as a resource for producing energy.

D.4 Main challenges for rural development

The main challenges outlined by the working group tend to be of an operational nature and might form the basis for future political action in the Alpine area and hence contribute to maintaining attractive living conditions in these territories.

The group recommends taking into account the specific characteristics of the Alpine mountain regions. This does not mean that public policy should be thought of in terms of offsetting Alpine handicaps (including the natural handicap of the mountains), but rather in terms of developing the strengths of the Alpine mountains by capitalizing on the value of the services provided by their resources and allowing the assets of Alpine inhabitants to be shared by all citizens.

The group suggests organizing the main challenges by focusing on six major and mostly cross-cutting issues:

1. Coordination of public policies in the Alpine area and emergence of new types of territorial governance.

2. Improvement of the functional relationship between mountain areas and urban centres in the Alpine valleys and at the Alpine fringe.
3. Mobilization of research for innovation in and for mountain areas.
4. Reinforcement of economic activities specific to the Alps (by exploiting the territory's richness to generate profit and hence maintain and create new jobs).
5. Networking around the sustainable development experiences in the Alps.
6. Promotion of energy saving and use of renewable energies

D.4.1 Coordination of public policies in the Alpine area and the emergence of new territorial governances

The challenges facing the Alps outlined in this report can act as drivers for an integrated approach to rural development. The aim is to coordinate all policies so that they focus on what is vital for sustainable rural development. Bottom-up governance involving various population groups is a basic principle and one which would allow us to successfully implement integrated approaches both generally and specifically, at the local and regional levels.

As we have seen, the Alpine territory has undergone a certain amount of demographic change. The issue of adapting to climate change has emerged as a core task. The different policies and the transverse development measures of the Alpine area need to be coordinated to take this into account. The working group suggests that policy makers adopt a macro-regional approach to the Alpine space. This will help strengthen the coordination of national and European tools, which may in turn contribute to the adaptation of the Alpine economy to the already-perceptible consequences of global warming.

Main challenge 1: The Alpine Convention needs to contribute to discussions about a macro-regional approach and other forms of territorial governance for the Alpine territory. In this context, regional authorities could be more involved and generate greater added value.

Main challenge 2: Ways to mitigate and adapt to climate change in the Alpine area need to be identified as these can fuel sustainable rural development especially by encouraging the initiatives of communities, towns or regions.

In this context, the members of the working group note that the creation of public policy targeting Alpine territories is undermined by a lack of statistical information about the territory of the Alpine Convention.

Main challenge 3: Dialogue between the responsible institutions of the Alpine Convention, and the institutions responsible for national and the community-level statistics needs to be improved so that the perimeter of the Alpine Convention is taken into account in the development of statistical aggregates.

D.4.2 Improvement of the functional relationship between mountain areas and urban centres

The members of the working group stress that the spatial dynamics of the Alps are closely related to their relationship with neighbouring cities and their surroundings (whether or not these fall within the perimeter of the Alpine Convention). Indeed, these spatial dynamics are among the most powerful on the continent. They attract the attention of policy makers with respect to the following points:

- The volume of daily commuter and leisure-related traffic between cities and rural areas, and the need for solidarity between the local authorities involved: it is important that local authority resources

are invested also beyond the economic activity of the territory concerned.

- Some Alpine territories are dominated by a residential economy. The group emphasizes the need to structure and accompany other sectors of the economy to prevent spaces from emerging whose sole function is to act as bedroom or secondary home areas.
- The group notes that a considerable share of the innovation potential, which complements the endemic innovation created within the Alps, is located in major cities near the Alps (whether or not these fall within the perimeter of the Alpine Convention).

Main challenge 4: An approach involving both urban and rural areas in thinking about how to ensure a balanced development of the rural Alpine area is needed.

Main challenge 5: Pilot regions able to set up cooperation between centres and rural surroundings in order to develop specific programmes to improve their functional relationship need to be identified and motivated.

D.4.3 Mobilization of research for innovation in mountain areas

The members of the group consider that the ability of Alpine territories to generate sustainable development for themselves depends on their ability to mobilize researchers and enhance knowledge exchange in order to promote innovation in the territories of the Alps. They therefore recommend:

- encouraging research to focus on specific or major topics for these territories such as how to capitalize on ecosystem services, diversify the tourist economy, create social innovation and manage natural hazards, etc.
- attracting trained staff from Alpine regions to become involved, taking into account that such individuals usually

maintain strong links with their homeland and its surroundings.

Main challenge 6: Existing research frameworks in mountain areas need to be identified, enhanced and put to good use.

Main challenge 7: Specific tools to promote a policy of innovation integrating the specific characteristics of the Alps and based on the examples of good practices outlined in the report need to be identified.

Main challenge 8: The value of Alpine assets and ecosystem services need to be considered as a basis for better safeguarding the fragile mountain environment.

D.4.4 Reinforcement of economic activities specific to the Alps

Overall, the group recommends that policymakers should take into account the specific challenges, changes and strengths of the Alpine mountain areas when drawing up major public policy (common agricultural policy, cohesion policy, transport policy, etc.). Taking Alpine specifics into account would make it possible to capitalize on the value of the diverse range of natural resources and human assets that can be found in Alpine mountain areas. These areas should not be seen in terms of offsetting their handicaps but in terms of exploiting their natural assets in order to generate profit.

The working group emphasizes the following points:

- Concerning agriculture: in order to counter the trend of agricultural abandonment and depopulation in remote areas, the competitiveness of farmers has to be maintained or re-established by sustaining a multifunctional type of agriculture through adequate subsidies as well as marketing agricultural products through designations of origin.
- Concerning the role of forests in mountain areas: public policies should be

developed to enhance the multifunctional role of mountain forests (protection against natural hazards, beauty of the landscape and attractiveness for tourism, production of wood as a building material or fuel, etc.).

- Concerning the production of energy: the production of renewable energies needs to be supported by ensuring that territories have a share in the wealth produced. It is also important to choose energy sources that are adapted to different territorial specifics.
- Concerning the industrial sector: the transformation process needs to be supported and the creation of new enterprises encouraged. The use of ICT's can help to develop new market potential and to bridge physical distances.
- Concerning tourism: the tourism sector needs to be more competitive, particularly in view of its ability to adapt to climate change.
- Concerning ecosystem services: different payment models need to be investigated.

Main challenge 9: Programmes and financing need to be promoted and identified so that successful experiences can serve others and the impact of innovation can be assessed.

D.4.5 Networking of sustainable development experiences in the Alps

Finally, the group emphasizes the importance of encouraging policies to promote bottom-up approaches and local initiatives. The Alpine Convention will encourage the participation of Alpine stakeholders and Alpine activity networks.

Main challenge 10: Allocation of institutional and financial means and necessary competences to transform successful experiences into policy.

D.4.6 Promotion of energy saving and the use of renewable energies

Alpine regions can make an important contribution to the achievement of the EU's 20-20-20 targets by becoming as energy

efficient as possible and promoting renewable energies.

The Alpine regions have many natural resources. This means that they can considerably help to lower CO₂ production and reduce the dependence of European regions on countries that produce fossil fuels.

The Alpine forests have a substantial amount of energy-efficient building material while energy-efficient building construction has long been a tradition. As making energy savings is by far the cleanest and most available way to reduce greenhouse gas emissions, the working group suggests primarily focusing on the promotion of energy saving.

Main challenge 11: The development of regional energy concepts as a basis for promoting renewable energy production and higher energy efficiency in construction must be supported.

Main challenge 12: Data and know-how in energy saving and renewable energy generation must be collected.

Main challenge 13: Energy saving and energy efficiency should take priority in the generation of more energy.

Main challenge 14: The potential of and risks underlying renewable energies on local and regional levels in the Alpine area need to be systematically analyzed.

The positive and negative impacts of the different types of renewable energies, specific to the Alpine regions and their framework conditions, need to be assessed.

However, there is also a significant potential for the production of renewable energies (hydropower, biomass, solar energy, wind power and ground heating). While this is to be supported, its potential negative effects on the environment should also be taken into account. A sound knowledge of all the impacts of renewable energy generation – positive as well as negative – is needed in order to hold objective discussions.

Thus, energy saving measures and the use of renewable energies should both be encouraged.

The group supports improving the profitability of energy production and the new economic potential this could offer Alpine communities.