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Managing Alpine Land Resources – Approaches and Instruments

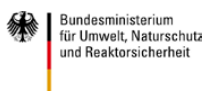
Final Report DIAMONT Work Package 9:
Elaboration and Optimisation of Indicator Based
and Qualitative Tools to
Stimulate and Steer Regional Development



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1 Introduction

This report sums up the work carried out within Work Package 9 “Elaboration and Optimisation of Indicator Based and Qualitative Tools to Stimulate and Steer Regional Development” (working title) of the INTER-REG IIIB project DIAMONT.

It outlines a wide field of different relevant work steps, omitting those working steps that turned out to be not successful, not feasible or not presentable within the scope of this work. Taking a step back, the work concentrated on two major issues:

- The identification and characterisation of land resource management as an important issue for regional development in the Alps
- The elaboration of an instrument collection which is capable of supporting sustainable land resource management

Starting from a broad thematic approach endorsed by the DIAMONT project - which discussed major issues of development in the Alps, respective phenomena and finally identified main trends in a pan-alpine framework – clearly creates difficulties in structuring the selection of appropriate regional development instruments. So one of the first tasks has been thematically focus the instrument research in a way that at the same time considers the expectations of the overall project and will be acceptable for all parts of the Alps.

Even if they represent only one segment within the whole DIAMONT project, instruments play a major role for the implementation of policies. Basically, the successful application of instruments in view of sustainable development is the underlying objective of all efforts for indicator selection, monitoring and data analysis in regional development. The purpose of these efforts is to provide information that is relevant to policy makers and which is ultimately transformed into policy action – which is the implementation of instruments.

With this work package, a collection of instruments for land resource management as one core subject of sustainable regional development is handed over from all major alpine countries. The instruments are docu-

mented in a systematic manner, indexed with keywords, and supplemented with an assessment of characteristics and partly best practice examples.

The authors would appreciate if this compilation can contribute to support regions in their way towards a sustainable management of their land resources.

We want to thank our partners who contributed through advise and their collection of instruments, particularly Vincent Briquel (CEMAGREF), Janez Nared and Mimi Urbanc (AMGI), Valerie Braun and Michael Beismann (UIBK), Loredana Alfare and Marco Zumaglini (UNCEN) and Konstanze Schönthaler and Stefan v. Andrian-Werburg (Bosch&Partner GmbH).

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2 Executive Summary

What are the tasks in Work Package 9?

The work package is dedicated to develop an instrument collection which could stimulate and steer sustainable regional development for one exemplary problem area in the Alpine Space. Collected instruments are expected to be characterised and their acceptance and problem-solving capacity to be confronted with practical estimation in test regions. By this task the work package is the link from indicators and data in the DIAMONT project towards applicable instruments. As instruments are always oriented towards a practical application, the work package attempts to touch ground and work with a closely defined, tangible subject.

Instruments for steering regional development – a definition

In the context of spatial development, the term “instrument” is used as a generic term for all approaches to achieve intentionally spatial development objectives. Examples for such instruments may be regional planning, economic incentives, public participation processes, etc. Driving forces themselves also influence regional development, but do this not intentionally. At a lower hierarchy than instruments, the term “measure” stands for concrete actions in the process of implementing spatial development objectives. As an example, a tourism development concept would in this context be regarded as an instrument, while sign-posting hiking paths would be considered a specific measure within this instrument.

Finding a focus - Land resource management

Broad and complex main trends in the Alpine Space are elaborated in the preceding work packages within DIAMONT. The task of WP 9 – identifying relevant regional development instruments – requires a step to reduce this complexity for the benefit of accomplishing a comprehensive compilation of instruments for the chosen policy field. Another requirement for the project has

been to reflect the objectives of sustainable development within this thematic subject.

In the process of sharpening the thematic subject, a list of regional development problems is developed based on previous results of DIAMONT as well as on challenges of urban areas as identified in policy documents.

The “phenomena”, identified within the trends in Alpine area in the DIAMONT work, are assigned to different “regional development problems”. In terms of relevance of these development problem, the conclusion can be drawn that the “Increasing land resource demand for urban areas” is related to the highest number of phenomena among all regional development problems. In order to underline the significance of land resource demand for numerous fields of regional policy and to reflect debates on the increasing emphasis placed on the management aspect of land policy, the perspective of the issue has been broadened towards land resource management

The term land management describes “policies and fields of action for efficient consulting, planning, controlling and co-ordination of all measures and instruments for access, availability, use and change of use, development, allocation and building up of land including buildings for urban, ecological, economic and other purposes in urban and rural areas” (Magel 2004). In order to stress that land is a finite resource particularly in Alpine territories, which consequently requires a responsible handling of this vital source of land use, the term “resource” has been added.

Sustainable management of land resources

What does the concept of sustainable development mean for the management of land resources? Picking up the multiple-pillar-concept of sustainable development, it becomes obvious that land resource management is in its multidimensionality reflects many, if not even all aspects of sustainable development. Discussing land resource management will inevitably bridge the gap to and between other policy fields.

A transformation from general objectives of

sustainable land resource management towards objectives for action for land resource management, would suggest to consider ecosystem functions of land, give priority for inner-urban development and density of built environment, foster the functional mix of basic needs as well of interregional co-operation, provide the co-ordination of settlement and traffic infrastructure in view of optimal and economical provision of public and private services, give access to land for housing and economic development and to safeguard open spaces.

Driving forces of land resource demand

What are the drivers behind land resource demand and how could their influence be managed? In general, land resource demand is particularly triggered by socio-economic and technological change, individual preferences, infrastructure policies and subsidies, spatial planning, and municipal budgets and financing. Each of these drivers is embedded in a complex cause-effect-relationship, such as the polarised spatial development due to socio-economic changes. This leads to the abandonment of traditional agricultural areas and their according settlements in favour of easier job opportunities in services or industry and as an opposing trend to concentration of economic power, labour market and public services in the well accessible core towns of the Alps.

Competition between municipalities represents an important driving force for increasing land resource demand and deregulation of planning norms and objectives, urging municipalities often into a down-ward spiral of economic efficiency and spatial qualities. This competition takes place between municipalities as well across national border, whereas the cross-national competition in the Alpine Space gains an growing role.

Relation towards objectives of the Alpine Convention

Sustainable management of land resources in the Alpine region is reflected in the framework convention of the Alpine Convention and particularly in the implementation protocols of Spatial Planning and Sustainable Development, the Protocol Soil Conserva-

tion and the Protocol Transport as well as in its declaration on population and culture.

Cross-sectional issues and sectoral aspects of land resource management

A central challenge in addressing issues of land resource management lies in the fact that particular this policy field suffers from fragmented sectoral responsibilities. The relevance of land resource management for economic, social, environmental and institutional issues makes it one of the main subjects within the concept of sustainable development.

Which areas could expect a high demand for land resources?

Beyond the identification of Alpine-wide labour market regions carried out in other DIAMONT activities, the question is tackled how and where municipalities can be identified which face driving forces behind increasing land demand? In a "problem-oriented clustering" of municipal data those municipalities are identified where - according to scientific hypotheses and to a restricted array of Alpine-wide statistical data - an increased pressure on land resources can be supposed.

Instruments for land resource management – step to sustainable regional development

A major activity in this work package is the approach to instruments for sustainable land resource management as a contribution to regional development. Starting from collecting national instruments for Germany, coherent guidelines for an Alpine-wide collection of instruments are developed and the collection was carried out together with DIAMONT partners.

The collection delivered about 110 instruments in total, of which a comprehensive overview cannot be given in this report. A complete documentation of the instruments is provided in an online database hosted by the Bavarian Ministry for Environment, Public Health and Consumer Protection.

The screening of existing development instruments in the Alpine countries and the analysis of respective literature led to a classification of instruments into the five cat-

egories of “laws and regulations”, “spatial planning instruments”, “economic burdens and incentives”, “voluntary approaches and agreements” and “information and research”.

As practical experiences are of particular interest for local stakeholders and practitioners, the collection of instruments is supplemented with best practice examples for selected instruments. These can be accessed as well in the DIAMONT database.

Assessment of instruments

The assessment of instruments intends to allow easier selection of the right instruments, better understanding of instruments and their suitability and to foster a better transnational understanding and comparing of instruments for sustainable land resource management.

In the scope of this project “baseline assessment” of all collected instruments is carried out in a qualitative manner, through which the most decisive information serving basic selection functions can be provided. For this each instrument is assigned with information on the five criteria “relevance”, “acceptance”, “implementation”, “feasibility” and “effectiveness”, each related to a key question. Even if not comprehensive in terms of arising criteria this assessment delivers a coherent Alpine-wide estimation of all collected instruments. It is interesting to note that the highest-ranked instruments in regard to sustainable land resource management are already existing. Once again, it needs to be stressed that the bottleneck in this respect is the inappropriate application rather than a lack of instruments.

The opinion of mayors in the Alpine Space

In a survey of the mayors in the Alpine region, conducted and administered by EURAC within WP 8, questionnaire-based data from 1325 municipalities across the Alpine bow are collected and analysed. In one part of the questionnaire, mayors are asked to share their opinion on the situation and the future importance of 24 policy fields in municipal policy and on the role different types of instruments play for the development of their municipalities.

The answers to these questions, singularly

as well in combination with other questions give some interesting lights to the perception of land resource management in the Alpine area and the estimation of relevant instruments. For example local decision-makers assess land resource demand to be either extremely or very important in more than half of Alpine municipalities. Those mayors expressing a high policy priority to land resource demand are also holding a significantly more positive attitude towards instruments of regional development in general than those that assign below-average policy priority to the issue. Interestingly is that medium-sized municipalities perceive their situation in regard to land resource demand most critical, while large, urban municipalities describe their situation slightly more positive.

Feed back from stakeholders to selected instruments

In the course of DIAMONT test regions have been selected to carry out workshops with regional stakeholders. In these workshops participants are introduced in the field of regional development and land resource management. In the first workshop participants described a wide range of development problems related to the availability and the management of land resources. Generally, a functioning response network to these development problems would consist of four pillars:

- Instruments that establish a knowledge base regarding land demand and inner-urban potentials,
- Instruments to activate land in appropriate places,
- Instruments that establish a regional balancing mechanism based on inter-municipal co-operation,
- Instruments that balance the interests and needs of different stakeholder groups through participatory processes.

Deficits of instruments ...

The outcome of this confrontation with regional stakeholders delivers deficits and perspectives of instruments. Even though it is a commonplace, it can in general be confirmed that it is rather insufficient implementation of existing instruments than a lack of

instruments that is obstructing progress.

Spatial planning instruments require an improved consideration of time and spatial perspectives which often reach beyond average municipal practices, a strengthening of presently weak representation of landscape and nature conservation aspects and better incentives for the economic consideration of land and soil resources.

Economic instruments suffer from counter-productive supportive measures; a precondition for their implementation is a definition of market limits through regional or national development objectives .

Good examples of voluntary but binding inter-municipal commitments in regard to spatial development are, other as for fields such as water supply or public transport, virtually not existing though they are at the core of scientists' and planners' discussion.

Information and research instruments are so far rarely implemented, even though the need of a relevant information basis is recognised as crucial precondition for the success and acceptance of land resource management. These instruments have a significant potential for the future.

... and future needs

Some proposals for further development contain strengthening the implementation of existing instruments, the complementary combination of spatial planning objectives with other instruments, a new definition of the role of the municipal level together with the enforcement of regional levels, the development of a "land-awareness"-climate among political stakeholders and the monitoring of land resource development.

Land resource management is facing new challenges, particularly in the Alpine area, which will amplify the existing conflicts. Climate change adaptation needs will lead to further restriction of available land resources for settlement and infrastructure, demographic change will set new preconditions for land demand and new perspectives for agriculture and rural areas might sharpen land use conflicts between settlement, infrastructure, agriculture and forestry.

3 Approach in WP 9

3.1 Objectives in the framework of DIAMONT

The starting point for the approach of work package 9 are the objectives as they are outlined in the application form for the project DIAMONT. In the course of the project, some objectives have been adjusted to new insights and constraints.

- The objectives from the application form concerning WP 9 are: „DIAMONT develops, tests and optimises indicator based and qualitative tools serving to stimulate and steer sustainable regional development in one exemplary problem area“.
- „DIAMONT will develop indicator based and qualitative tools serving to stimulate and steer sustainable regional development in the Alps, notably by strengthening economic and social cohesion. Based on the definition of the European Spatial Development Perspective (ESDP, cp. European Commission 1999), this approach combines environmentally sound economic development which preserves present resources for use by future generations with balanced spatial development (see ESDP, §17). DIAMONT will thus contribute to the economical and social welfare on the regional scale“.

One important step in this context is to provide an overview over regional development instruments for a selected thematic field of relevance for the Alpine space. To systematically structure this task, a typology of instruments is developed (see Ch. 6) and the “thematic field” is defined (see chapter 4). The collection of instruments in the DIAMONT-database and the selection of land resource management as regional development problem within the broad issue of urbanisation in the Alps are important results of WP 9.

An overall objective within the DIAMONT-project is the identification of regions with similar development in the Alps and the discussion of instruments serving to stimulate and steer sustainable development in

these particular environments. Starting from the results of WP 8 delivering the definition and delimitation of so-called labour-market areas, WP 9 tried to identify those labour-market areas with similar development of key factors which might trigger the demand for land resource management (see Ch. 5).

For further progress within DIAMONT, WP 9 provides input for WP10 and 11 by a pre-selection of instruments out of the database for further work in the test regions. In return, using the professional judgement of stakeholders in the workshops on these selected instruments, their possible strengths and weaknesses are detected. This feed back from the workshops was used for the proposal of further development of instruments (cp. chapter 6.8.4).

3.2 Methodology

Starting from the objectives of work package 9 a methodological approach is developed bridging from indicators and data towards applicable instruments. As instruments are always oriented towards a practical application, the project aimed to touch ground and make its output more tangible than it has been necessary and foreseen in the previous steps.

The methodology is grouped into four major work steps (cp. Figure 3.1, next page) which are briefly introduced in view of their functional role and which are presented in more detail in the following paragraphs. The figure also displays the relevant outcomes of the major work steps in the orange boxes.

Focusing on a specific subject for regional development instruments

Previous work within DIAMONT has delivered main trends and phenomena describing important overall processes that are presently under way in the Alps or which are deemed likely to occur in the near future. The objective to deal with instruments requires a more specific focus to facilitate a more detailed examination of instruments. Therefore a thematic focus has been elaborated which identifies “land resource management” as one of the core questions for regional development.

A central question which arises is how land

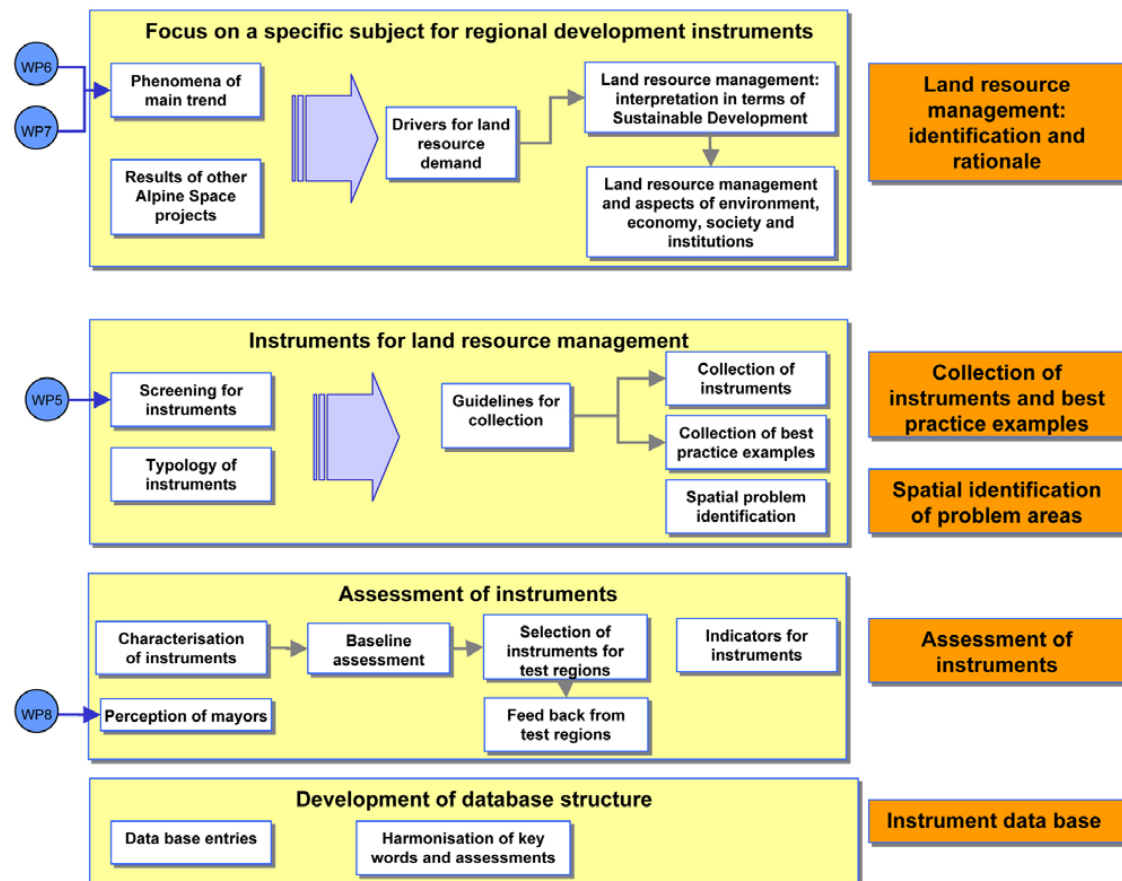


Fig. 3.1: Methodological approach WP 9

resources are supposed to be managed in light of sustainable development of a region. Even though a comprehensive answer to this question would require quite holistic approaches reaching far beyond the scope of this project, some a suggestion for the interpretation land resource management in terms of sustainable development is discussed later in this report (cp. Ch. 4.1) and the different aspects between land resource management and environment, economy, society and institutions are introduced (cp. Ch. 4.4).

Tasks in this work step are the definition of land resource management and its relation to the main trends and phenomena in the Alpine space, to identify driving forces which trigger land resource demand (cp. Ch. 4.2) and to consider the different aspects how the handling of land resources is linked to environmental, economic, social and institutional issues (cp. Ch. 4.4).

Instruments for land resource management

In a first screening of possible instruments, which is based inter alia on the information already collected in work package 5, the scope of instrument collection has been defined. Guidelines for the collection of instruments facilitated a coherent approach within the DIAMONT partnership. The collection also includes reporting on best practice examples and the development and refinement of a typology of instruments (cp. Ch. 6 and 7).

Based on the statistical data collected for the Alpine Convention area in work package 8, an approach is tested how to identify municipalities where driving forces for land resource management problems are concentrated (cp. Ch. 5).

Assessment of instruments

The assessment of instruments is carried out at different stages of the overall process:

- in a first assessment information is provided for better characterisation of instruments,
- a subjective assessment is the perception of instrument categories by mayors within an Alpine-wide questionnaire of mayors of Alpine municipalities (cp. Ch. 6.6),
- a further selection of instruments is dedicated to address specific issues raised in the test regions of the DIAMONT project (cp. Ch. 6.8.1)

Development of database structure as communication and documentation tool

Besides results as regards content, a database structure is developed to store the collected information, thus allowing communication between project partners during the collection and the assessment phase. This structure also serves for the documentation of the instruments (cp. Ch. 7.2).

3.3 Terminology

This report deals with ways to address fields of regional development through instruments. Regional development instruments are but one part of a complex relationship between spatial phenomena, policy objectives, and instruments that stakeholders have at their disposal. For this report, the following section provides an introduction to the terminology used.

- The term of “regional development” encompasses two aspects:
 - » The dynamic of development processes of specific regions, primarily understood as economic development of these spatial entities, but also including aspects of socio-cultural, environmental and transport development.
 - » Political concepts which address development problems of rural regions related to structural changes, particularly in the field of regional economic policy or regional policy as a whole.

In regard to peripheral areas, regional development is understood in the sense of integrated rural development (cp. Mose 2003). This concept strongly takes into consideration local agendas and

the participation of local stakeholders in decision making processes. It combines cross-sectional approaches, subsidiarity, participation, establishment of networks between private, public and voluntary partners as well as appropriate concepts to involve the local population and their potential (consulting, regional management).

- Objective: The guiding principle of spatial development is the integration of spatial requirements of society and economy with ecological functions. This guiding principle needs to be operationalised through normative development objectives (cp. Figure 3.2) such as protection of natural resources, providing opportunity for economic development or establishing equivalent living conditions across all territorial entities. These objectives form the implicit or sometimes even explicit basis for the application of instruments and the implementation of measures on different spatial levels and by different stakeholders.

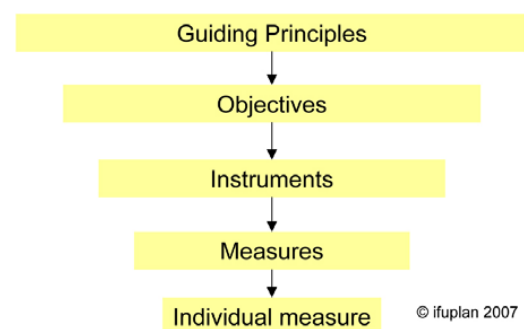


Fig. 3.2: Hierarchy of spatial development

- Instrument: In the context of spatial development, the term instrument is used as a generic term for all approaches to achieve spatial development objectives¹ (cp. Figure 3.2). The term “regional development instrument” is referring to any instrument that is designed to intentionally stimulate and steer regional development. Examples include regional planning, economic incentives, public participation processes, etc. Driving forces themselves also influence regional development, but not intentionally. For this reason we do not regard driving forces as an instrument. For the purpose of this

¹ The term tool is frequently used as a synonym for instruments. Within this project, these two terms are used interchangeably.

project, spatial development instruments are differentiated into types and subtypes illustrated in Figure 3.3 (cp. Keiner 2005, Rogall 2002, ARE 2004, Costanza et al 2001).

Within the spectrum of land resource management, a general differentiation exists between formal, regulatory instruments ("hard" instruments) and instruments that focus on voluntary action, co-operation and participation ("soft" instruments). This differentiation, however, is not giving an implication regarding the effectiveness of instruments. In certain cases, a strict top-down approach might be appropriate, while in others that are more depending on broad support, a participatory process is the most effective approach.

- Measure: In literature, the terms "instrument" and "measure" are often used simultaneously. Usually, the implementation of an instrument requires one or several concrete actions, which are summarised under the term measure. Measures thus represent a lower hierarchy of steps in the process of implementing spatial development objectives. Instruments are defined as abstract and consequently transferable and comparable, whereas measures are site-specific, concrete and thus barely comparable (cp. Figure 3.4). Instruments as an abstract model may allow the invention of new, specific measures in the according regional context, whereas measures may help to identify instruments, if these are not yet established as an abstract model. As an example, a tourism development concept would in this context be regarded as an instrument, while sign-posting hiking paths would be considered a specific measure within this instrument.
- Land resource management: The term land management describes "policies and fields of action for efficient consult-

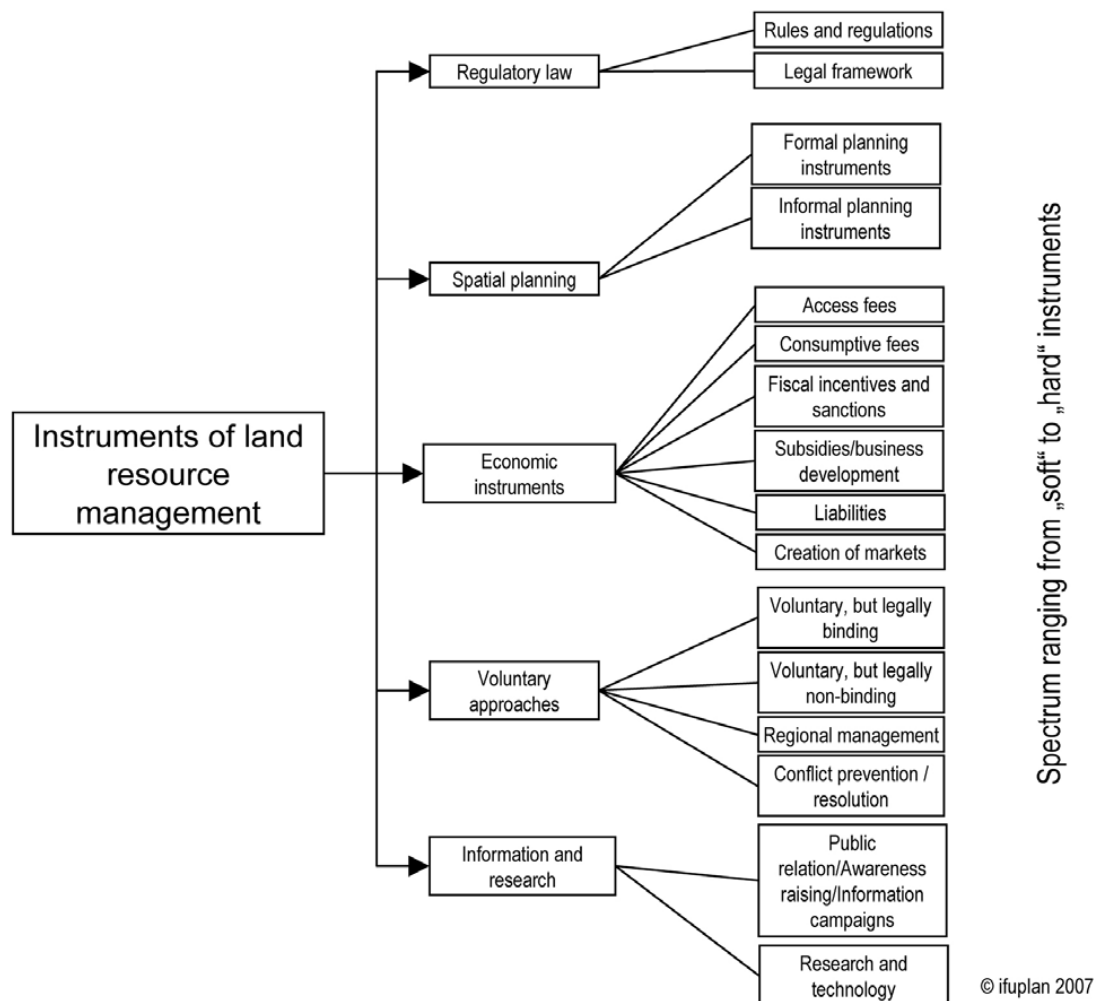


Fig. 3.3: Categories and sub-categories of instruments of land resource management

ing, planning, controlling and co-ordination of all measures and instruments for access, availability, use and change of use, development, allocation and building up of land including construction for urban, ecological, economic and other purposes in urban and rural areas" (Magel 2004). In order to stress that land is a finite resource particularly in Alpine territories, thus requiring a particularly responsible handling, the term "resource" has been added. The demand from different drivers for land resources is in most cases satisfied with little objections. Therefore land resource demand leads in most cases to the conversion of unbuilt to built land, which is in some cases tagged as "land take".

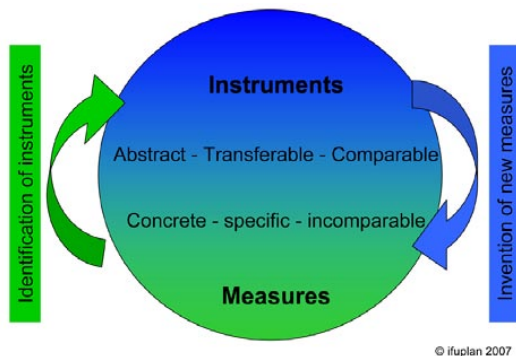


Fig. 3.4: Relation between instrument and measure

- In addition to this short definition, chapter 4.4 provides more details on social, economic, ecological and institutional implications of sustainable land resource management.

3.4 The context of Work Package 9 in DIAMONT

As an intermediate Work Package within the course of DIAMONT, WP 9 is both basing and referring to the preceding DIAMONT Work Packages as well as delivering outputs for the consecutive WP 10 and 11. Figure 3.5 illustrates the position of WP 9 in the overall DIAMONT context. The flow of information to and from work package 9 are outlined and its embeddedness into the overall project structure are outlined below.

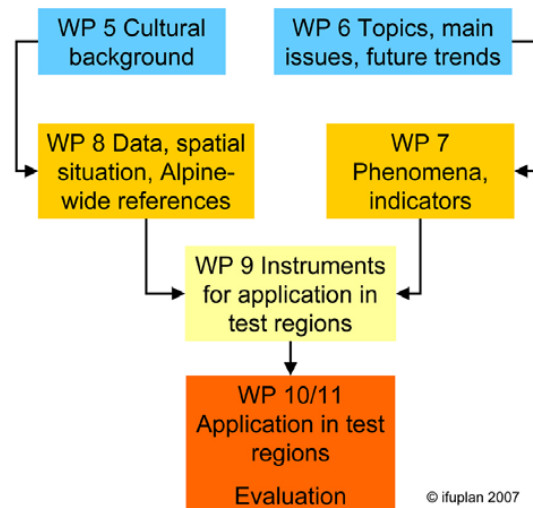


Fig. 3.5: The context of WP9

Results from WP 5

One relevant result from WP5 for WP9 is a comparative overview of different regional policies in the Alpine countries. The comparison includes relevant administrative levels for regional development as well as different objectives and strategic approaches. In short, the analysis tries to portray the "regional policy landscape". WP5 postulates that traditional factors and cultural differences are no longer of strategic influence; in times of globalisation regions increasingly face common challenges and therefore regional policy responses will follow a pattern of convergence in goals and means to meet these challenges in the future. Supposing that this convergence is in fact taking place, a transfer of regional development instruments and best practices between regions would become highly relevant both in order to cope with these changes and to strengthen the regional level in respect to the global level. Converging goals and means should ease the transfer between regions. But the decisive issue is whether the challenges are really similar and occur simultaneously across different Alpine regions.

Another interesting input for WP 9 is a general overview of super-ordinate regional development tools and measures, which are listed in tables for each country and contain information about their legal base, objectives, hierarchical level, orientation and monitoring in place (Boesch et al. 2007).

In most Alpine countries, the regional level is the node where rough specifications of

spatial development from the central level are formulated towards more specific and more binding documents of spatial development. The core competence for spatial planning is designated to the federal state level in Austria, Germany and Italy. In these countries, the federal states draft specific plans ("Landesentwicklungsprogramm" in Tyrol and Bavaria, Spatial Coordination Plan in Friuli Venezia Giulia), which are the binding basis for subsequent regional or local spatial development plans.

Between the level of federal states and individual municipalities, some Alpine countries foresee regional spatial development plans featuring a varying level of liability. In Italy, the planning authority of the regional level is limited, while Slovenia entirely lacks the administrative category of regions.

Results from WP 6

WP 6 delivers an Alpine-wide analysis of experts' estimations on Alpine development. As a result of a Delphi-survey, eight main issues (see Fig. 3.7) are identified and analysed (Briquel 2007).

Considering the range of these main issues, the DIAMONT project team decided in March 2006 to focus the following work on the thematic field of urbanisation processes especially on "Local centres and fringes between competition and co-operation".

Results from WP 7

WP7 uses these main issues from WP6 (see above) as working base and specifies them further to so-called main trends², listed in Figure 3.7. For each of these main trends, WP 7 identifies several phenomena³, with the intention to describe the main development trends in detail and to prepare and focus the indicator selection and development (Schönthaler & v. Andrian-Werburg 2007).

This comprehensive work (about 40 phenomena and indicators for the chosen main trend) is the starting point for the identification of a regional development problem field for the detailed instrument research in WP 9. (see Ch. 3.5).

Results from WP 8

As WP 8 is being partially carried out simultaneously with WP 9, its final results were not available at the beginning of WP 9. Within the mayors survey conducted by WP8, however, a separate section has been prepared by WP 9, investigating the mayors' perception of regional development instruments (see Ch. 6.5). Additionally, collected and processed indicator data, as well as the

² The term "main trend" indicates that Alpine regional development differs from region to region, but can be arranged in several super-ordinate development trends detectable in different regions.

³ Defined as describing "...important peculiarities and sub-trends intertwined to form the respective main trend."

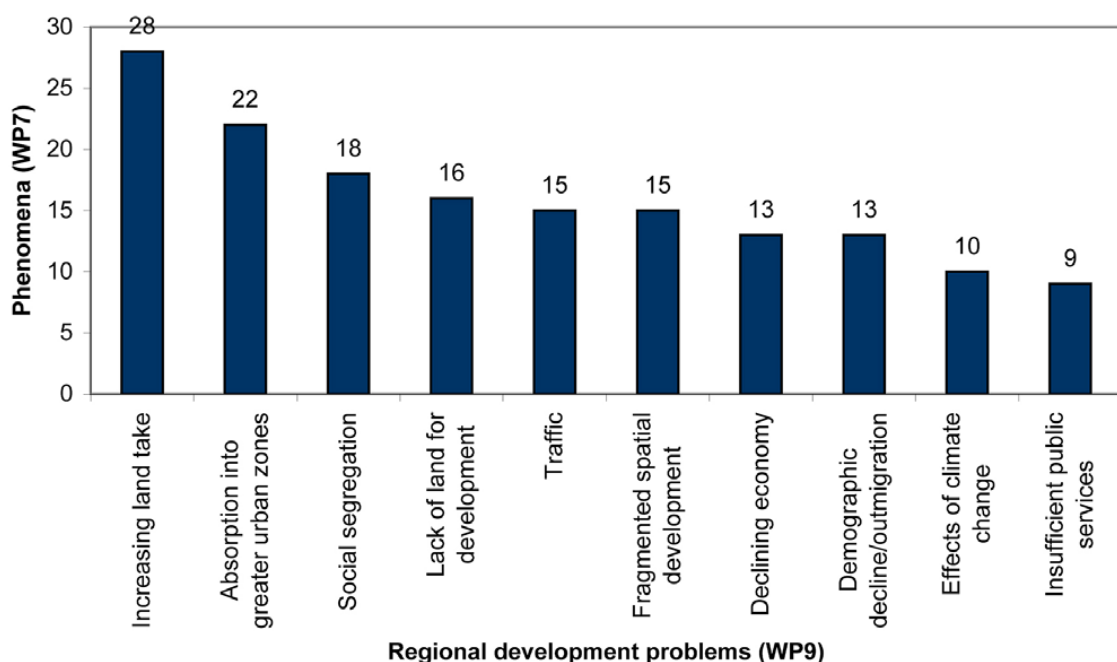


Fig. 3.6: Relation between phenomena and regional development problems

results of the factor analysis, are useful background information for the selection of a problem field for further instrument work.

Output from WP 9 for WP 10 and WP 11

The Work Packages 10 and 11 conducted workshops in selected test regions in Austria, France, Germany, Italy and Slovenia¹ with the objective to discuss regional development instruments with practitioners. In the first workshop round in June/July 2007 general and specific development problems of the respective regions were discussed

¹ Waidhofen (AT), Gap (FR), Idrija (SI), Sonthofen/Immenstadt (DE), Tolmezzo (IT) and Traunstein (DE).

with local stakeholders. The discussion of specific development instruments from the respective country as well as from other Alpine countries followed in the second workshop round from September to November 2007.

WP 9 prepared a collection and a first assessment of instruments which served as a resource for partners to choose suitable instruments as a background for their first workshop round. For the second workshop a set of instruments was delivered, which - according to a context analysis drafted by project partners for each test region and to the outcomes of the first workshop - appear to be appropriate for the respective region.

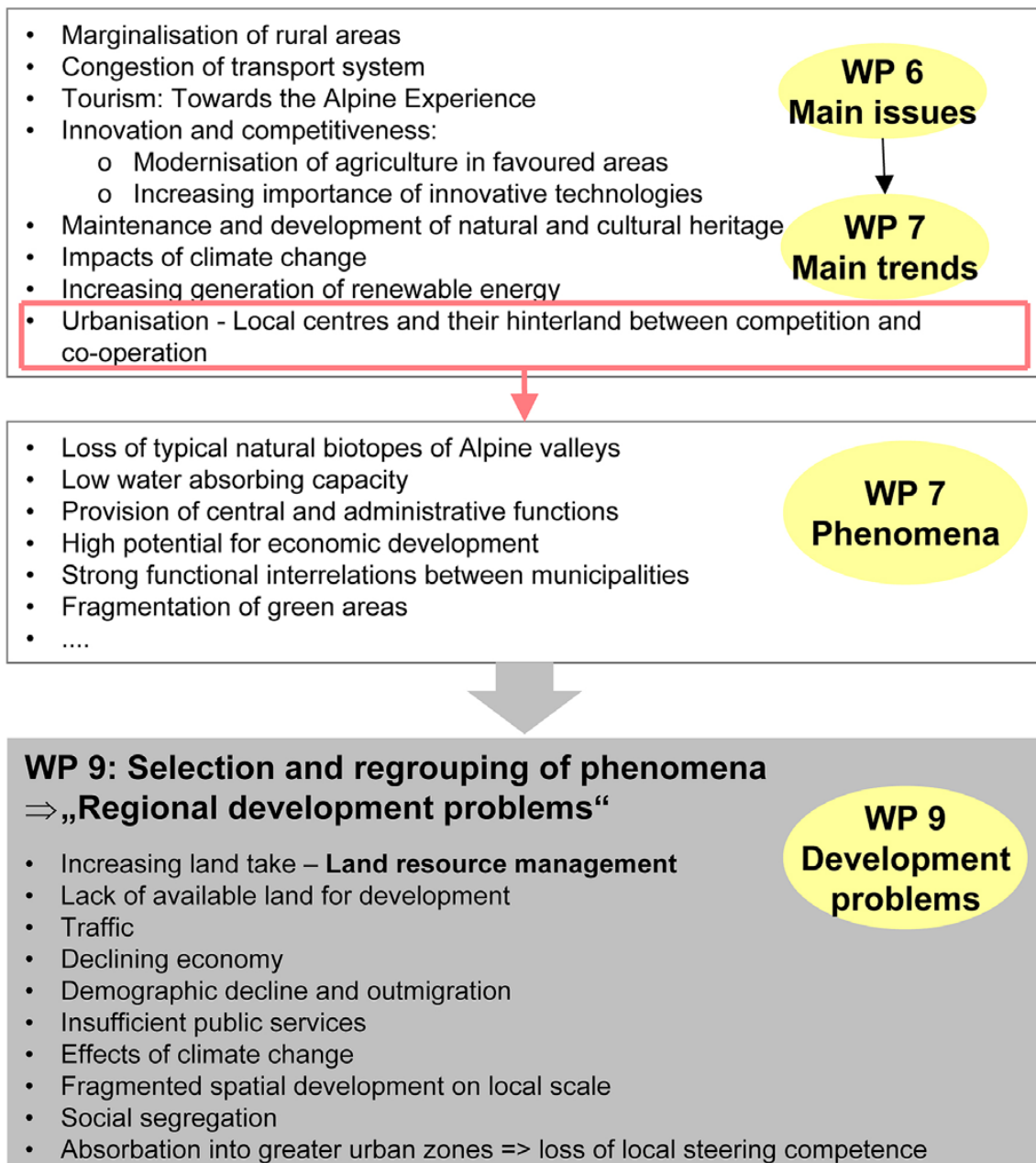


Fig. 3.7: The deduction of regional development problems in WP 9

3.5 From main trend phenomena to land resource management

The thematic field of “Local centres and their hinterland between competition and co-operation” in the context of urbanisation processes is a very broad one. Against this background the task of WP 9 – identifying relevant regional development instruments – requires a step to reduce this complexity for the benefit of accomplishing a comprehensive compilation of instruments for the chosen policy field. In the process of sharpening the thematic subject, a list of regional development problems based on phenomena as formulated in WP 7 is developed, also taking into consideration the challenges of urban areas as identified in the Swiss Agglomeration Policy (ARE/SECO 2001, ARE/SECO 2006) and the Swiss Spatial Development Report (ARE 2005). The selection of phenomena of WP 7 is grouped towards these specific regional development problems (see Figure 3.7 and Annex II).

Using a matrix, relevant phenomena- based on qualitative estimation - are assigned to each regional development problem. This linkage gives an indication which phenomena are recurring in several development problems. In terms of relevance of each development problem, the conclusion can be drawn that the “Increasing land resource demand for urban areas” is related to a high number of phenomena among all regional development problems (cp. Figure 3.6). As increasing land resource demand is an issue that concerns almost all urban entities - even those facing a declining economic development – the search for regional development instruments is focused on this particular issue.

In order to underline the significance of land resource demand for numerous fields of regional policy and to reflect debates on the increasing emphasis placed on the management aspect of land policy, the perspective of the issue has been broadened towards land resource management (for a definition of the term see Ch. 4).

Traditionally, the issue of land resource demand has been discussed from an ecological point of view and was perceived solely as a matter of hindrance for economic development and growth. This perception has for a long time obscured the fact that planning, assigning and allocating land uses is at the core of many, if not all decisions of regional development. As outlined in chapter 4 sustainable economic as well as societal regional development is in many respects related to the provision, functional mixture as well as efficient structure of developed land.

4 Land Resource Management

4.1 What is sustainable management of land resources

4.1.1 The concept of Sustainable Development

Starting from the familiar three-pillar-concept of sustainability (Hauff 1987), the recent discussion has introduced a variety of concepts and visualisation of the topic. These further developments have added new aspects of sustainability to the political and scientific discourse, some of which are briefly outlined here:

- The 'egg of sustainability', illustrating the embeddedness of the human system into the ecosystem (Guijt & Moiseev 2001),
- the 'Prisma-Model', introducing the institutional dimension to the three traditional dimensions (Spangenberg & Bonriot 1998).

Furthermore, a discussion exists between advocates of 'strong' and 'weak' sustainability. 'Strong' in this context means that one aspect of sustainability cannot be compromised for the sake of another aspect, while 'weak' sustainability implies that e.g. an economic decline would be acceptable to a certain extent for the sake of ecological improvements.

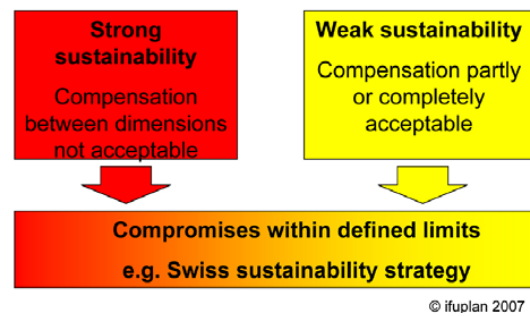


Fig. 4.1: Spectrum of sustainability

Therefore, the concept of 'strong' sustainability implies constant improvements in all pillars of sustainable development, while the concept of 'weak' sustainability foresees that one pillar can suffer a negative development as long as the total of all pillars is improving.

General sustainability objectives	Objectives of sustainable spatial planning
Protect soils and land and their fertility	Densify settlements and economically use land resources
Lower emissions	Reduce traffic through co-ordination of urban development and public transport and promote environmentally compatible tourism
Sustain and promote health, well-being and security	Safeguard environmental quality and protect the population from immissions and risks from waste treatment, disposal and natural hazards
Secure bio-diversity	Protect, promote and establish links between unintersected and semi-natural stretches of land
Secure and promote quality and efficiency of infrastructure and public services	Decentrally concentrate economic activities, central-place-functions and settlement nodes
Secure and promote competitiveness	Secure access to land as a factor of production in centers of economic development
Reduce energy consumption	Efficiently use energy
Secure and promote solidarity, social coherence and equity	Safeguard access to basic infrastructural needs of energy and communication
Conserve and promote landscape, culture and natural habitats	Secure cultural landscapes through agriculture that operates nature-oriented
Secure and promote identity and culture	Protect valuable architectural ensembles of villages and landscape

Tab. 4.1: Objectives of sustainable spatial planning (Source: Keiner 2005:62)

Transfer from the concept to land resource management

Transferring general sustainability objectives to objectives of sustainable spatial planning and thus bridging the gap between the concept of sustainability and its spatial implications, Keiner (2005) drafted the scheme showed in Tab. 4.1.

To focus the consideration of sustainable development on the issue of land resource management, several concepts and declarations are at disposal. The Bathurst Declaration on Land Administration for Sustainable Development of the International Federation of Surveyors (FIG) identifies the most serious problems facing the relationship between land and society, of which the following aspects apply to the European, Alpine context (FIG 1999):

- Degradation of land due to unsustainable land use practices,
- lack of land for suitable urban development,
- increasing vulnerability to disaster,
- destruction of biodiversity,
- lack of adequate planning and of effective land administration,
- tensions between environmental conservation and development.

Interpretation of sustainable land resource management on national and international level

Germany

The German Federal Office for Building and Regional Planning (BBR) has recently modified its guiding principles of spatial development and for the first time included 'Growth and Innovation' as one of three main tasks of spatial planning in Germany (BBR 2006b). Further main tasks are 'Safeguarding basic needs provision' and 'Preserving resources, shaping cultural landscapes'. These guiding principles reflect the recent change of perspectives on spatial development, which is increasingly incorporating competitive aspects of regional development.

Switzerland

The Swiss Federal Office for Spatial Development (ARE) characterises sustainable settlement development with the following criteria (ARE 2003):

- Densification of settlements and economical use of land,
- limitation of traffic to tolerable levels through co-ordination of settlement and traffic infrastructure,
- connecting, sustaining and fostering landscapes in relation to settlements,
- decentralised concentration of economic activities, central-place functions and settlement priorities,
- reduction of infrastructure costs and efficient use of energy.

Austria

While implementing the principles of sustainable development, the Austrian Spatial Development Concept of 2001 is assigning "(...)strategic importance(...)" to the field of local urban development (ÖROK 2001:13). The concept recognises the significant influence of settlement structures on the use of resources and on traffic volumes and therefore, sustainability in urban development is argued to be characterised by a functional mixture and spatial vicinity of basic needs. According to the concept, settlement development should be directed towards nodes and axes of public transport; sufficient densities in catchment areas of public and private service providers ensure economical provision of local retail facilities and social infrastructure. Furthermore, local development planning is expected to include aspects of resource efficiency in addition to aspects of architectural design.

Slovenia

In "Slovenia's Development Strategy" the fifth development priority has been set to the "integration of measures to achieve sustainable development". In this priority field the subject of land resources is addressed in sections on a balanced regional development and the of improving spatial management (Institute of Macroeconomic Analysis and Development 2005).

The objectives are dedicated to "adjust

spatial management to the general demographic and social policy objectives and the anticipated migration developments". The strategy also recommends a closer co-operation between urban and rural areas which should be based on binding partnerships. The internal development of urban areas ("populated areas") is favoured against the expansion of new areas and a better utilisation of populated areas (concentration of buildings) and revitalisation of degraded urban and other land for renewed use is required.

„Equivalent living conditions“ and sustainable development

A central issue for the understanding of the different concepts is, how are policy objectives defined in terms of "congenious living conditions" or „equivalent living conditions“?

Obviously it is impossible to define what an "equivalent living condition" may look like as this depends strongly on individual preferences. The basic idea is, people should meet everywhere equivalent living conditions in terms of public services, accessibility, life quality, etc. even if these qualities are differently composed.

This basic idea is polarised into two poles: The traditional spatial planning principle providing basic services and infrastructures as a basic right. This approach sometimes becomes compromised by individual stakeholders or even authorities snuggling in oversized services which correspond more the concept of congenious living conditions. The other, so to say neo-liberal pole asks for the cost-benefit relation of such service provision and is almost ready to abandon services for which an insufficient cost relation is stated.

Certainly there exists no definition what a "basic right" of service supply in the Alps may include. The underlying understandings are often not clearly articulated, as this would be politically incorrect not to say politically disadvantageous. Land resource management is right in the center of this stress field.

France

The French National Strategy for Sustainable Development (Interministerial Committee for Sustainable Development 2003) is referring in various articles to the issue of land resource management. Particularly Article I.A.2. is explicitly addressing the is-

sue of containing urban sprawl and refers to an action plan that includes the establishment of territorial coherence frameworks, the safeguarding of suburban undeveloped land through appropriate measures and a national awareness campaign promoting the advantages of inner-city neighborhoods and urban life. In Article I.D.1, the Strategy is also referring to the necessity of urban renovation to improve the housing conditions of large segments of the population and to increase inner-urban attractiveness. A reference to multi-functional land use beyond urban areas, however, is not part of the strategy.

The Rural Development Act of 23 February 2005 gave the Mountain Range Committee the task of defining objectives and specifying the actions that it deems desirable for development in the mountain range. It draws up an interregional blueprint for the mountain range. This document is now mandatory and it sets out the broad strategic guidelines for the medium term and long term (Direction Générale de la Coopération Internationale et du Développement 2006).

European Union

On European level, the European Conference of Ministers responsible for Regional Planning (CEMAT) in their "Guiding Principles for Sustainable Spatial Development of the European Continent" identified polycentric development of the European settlement structure as an objective of sustainable spatial development (Council of Europe 2000:13). The polycentric settlement structure is one distinctive urban feature of Europe, also in the sense of subsidiarity and easy access to public services, recreation, cultural and retail infrastructure. This holds particularly true for the Alpine region, which has never been dominated by primate cities and even today features a high density of smaller-sized urban cores fulfilling central functions for their hinterland. To accomplish this objective, a range of measures was deemed necessary in the policy field of controlling the expansion of urban areas, including...

- limiting trends towards suburbanisation by increasing the supply of building land in towns and cities,

- activation of building gaps and use of space-saving building methods,
- developing building land near traffic nodes and railway stations,
- promoting inner-urban development,
- increasing the quality of living and housing conditions in urban areas, including the conservation of existing ecosystems and the establishment of new green areas and biotopes.

Alpine Convention

The Alpine Convention provides in articles of its Framework Convention and the connected Implementation Protocols some interpretations of sustainable land resource management. Particularly the Protocol Spatial Planning and Sustainable Development and the Protocol Soil Conservation stipulate the rational development, delineation and localisation of settlement areas and settlement patterns, considering particularly the needs of soil conservation and related environmental assets (cp. Ch. 4.3).

4.1.2 DIAMONT interpretation of land resource management

This brief overview over several interpretations of sustainability in regard to land use, urban development and land resource management is illustrating both the multidimensionality of the issue as well as the common ground that stakeholders from policy, research institutions, organisations and planning practice have found. Being aware that the intensity of land demand will continue to be highly heterogeneous on regional and even local level, Jörissen and Coenen (2007) argue for a regional differentiation of qualitative and quantitative steering strategies. Against this backdrop and for the purpose of this work package, we interpreted the term of sustainable land resource management - following the Swiss Sustainable Development Strategy - as outlined in the following textbox.

Sustainable land resource management in the course of work package 9

Sustainable land resource management is following the general objectives of...

- covering present needs without compromising needs of future generations,
- guarantees living conditions in the sense of human rights by creation and maintenance of a high number of life style options,
- Fairness within and between generations in terms of the use of ecological, economic and social resources,
- Comprehensive protection of biological diversity (ecosystem diversity, species diversity, genetic diversity),
- Long term equity between ecological, economic and social objectives.

The transformation from these general objectives towards objectives for action for land resource management, these contain

- Taking into account ecosystem functions of land
- priority for inner-urban development and density of built environment,
- functional mix of basic needs,
- interregional co-operation,
- co-ordination of settlement and traffic infrastructure in view of optimal and economical provision of public and private services,
- access to land for housing and economic development,
- safeguarding of open space.

Cross-sectional issues are joint action of all relevant stakeholders and the selection, adaptation and combination of instruments according to changing framework conditions such as regional disparities, demographic change and municipal budget constraints. Further integral tasks include aesthetic and functional quality of the built and non-built environment, awareness of the limited availability of land resources, efforts to include all social strata and stakeholder groups in land use decisions and the precautionary principle in view of future generations.

As sustainable development is a policy concept rather than a scientific theory, it cannot be falsified or proven correct. It is a normative guideline, which in regard to land use includes aspects of society, economy, ecology, aesthetics (cp. Lendi 2003), ethical considerations, cultural heritage and responsibility towards future generations.

Due to the high persistence of land use decisions (transport infrastructure, urban development, tourist infrastructure, abandonment of agriculture etc.), quality of the built and non-built environment has always been and continues to be a particularly important cross-sectional task of sustainable land resource management (Lendi 2005).

Picking up the multiple-pillar-concept of sustainable development, it becomes obvious that land resource management is in its multidimensionality a reflection of many, if not even all aspects of sustainable development. Discussing land resource management will inevitably bridge the gap to and between other policy fields.

The effects of land resource management are part of the everyday experience of every individual (cp. REGALP 2004). Therefore and drawing from experiences across the Alpine region in regard to acceptance of nature conservation, major infrastructure projects and settlement expansion, it is hard to imagine land resource management in the sense of weak sustainability. Limitations of land use that accompany the implementation of sustainable land resource management will only be accepted under the precondition of economic prosperity and social well-being; economic development will inevitably be held accountable for environmental degradation and environmental

improvements will always have to consider participatory aspects of the regional social framework.

Thus sustainable land resource management will only be feasible in the sense of a mediatory approach which is based on the commitment to strong sustainability but allows compromises within those limits which exclude substantial negative trade-offs between the pillars of sustainable development.

4.2 Driving forces of increasing land demand

The process of increasing demand for land resources is complex and determined by various driving forces (see Figure 4.2, cp. BayStMLU 2003b), ranging from social change to policy decisions and processes of global change.

In general, driving forces of land resource demand can be differentiated into six categories (cp. Hofmeister 2005): Socio-economic and technological change, individual preferences, infrastructure policies and subsidies, spatial planning, municipal budgets and financing and finally land prices and availability of brownfield potentials. Important implications of these driving forces of land demand are highlighted below.

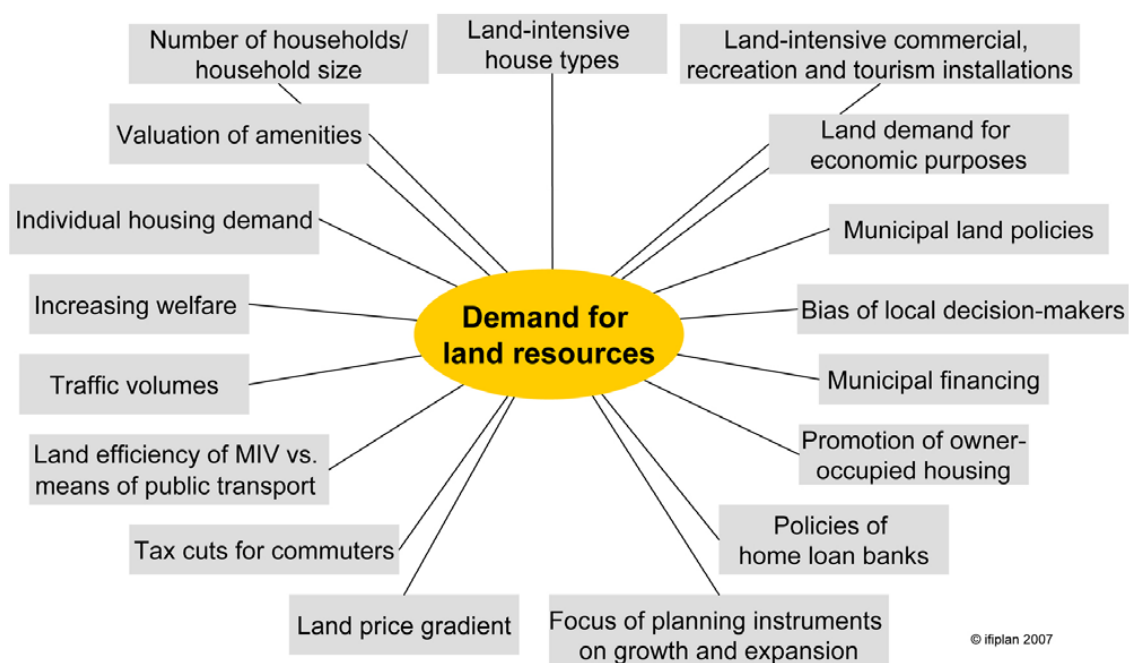


Fig. 4.2 Driving forces of demand for land resources

4.2.1 Socio-economic and technological change

One of the major developments that enabled the process of urban sprawl is the decline of agriculture and the transformation towards a post-industrial society characterised by extreme division of labour and intensified global trade of products and services. Land that has for centuries been of vital importance for livelihood and food security is increasingly being released from the agricultural production cycle and transformed to other uses.

In general, two types of transformations can be observed in the Alpine region. In remote areas, particularly in the central and south-western Alps of Ticino, Piemonte and Liguria and in the Slovenian Alps, former agricultural land is undergoing a process of natural succession towards reforestation. In easier accessible areas, within commuter distance to employment opportunities of urban areas and along major transport routes or in the vicinity of transport infrastructure, however, land continues to be used for agriculture, taking benefit of good infrastructures, but also frequently transformed to urban development. Work-related mobility is regarded as one major driving force behind increasing land resource demand, particularly in combination with economic growth (cp. Ulmer et al. 2007). Processes of sub- and peri-urbanisation are effects of an ongoing functional differentiation of space and an increasing valuation of living in the countryside. A direct consequence of these processes are increasing traffic volumes, which again result in further land resource demand for an expanding traffic system.

Another aspect of socio-economic change is the reduction of average household-sizes and consequently the growing demand of land required to accommodate a stagnating or even declining population. Additionally, higher living standards as reflected in the increase of motorization, in larger residential areas and shopping facilities also result in increased demand for land. Demographic change, on the other hand, is rather believed to have a reducing influence on land resource demand (cp. Ulmer et al. 2007). Despite demographic change, how-

ever, a saturation of land demand for residential purposes is in the case of Germany not expected to become effective before 2030 (BayStMLU 2003b).

Data and prediction models of future population densities and land demand for settlement, infrastructure and transport are either imprecise or not available at all (Lendi 2003).

4.2.2 Individual preferences

The single-family home continues to be the aspired form of living in Central Europe. While it fulfils the perceived need of individuality, it is also the most land-consuming form of housing per housing unit. Furthermore people desire more place for living and sometimes even a second home, a trend which is reflected in increasing housing space per inhabitant. Through their natural assets and easy accessibility in the middle of Europe, certain regions of the Alps are among the main destinations of European amenity migration¹ (cp. Perlik 2006).



Fig. 4.3: Planned acquisition of owner-occupied housing within next five years dependent on age

Fig. 4.3 underlines for the case of Germany the relation between age structure and land demand for owner-occupied housing. In the age between 25 and 39, roughly $\frac{1}{4}$ of the age group expresses the wish to acquire an owner-occupied home within the next five years.

¹ Amenity migration is defined as a "...significant contemporary societal phenomenon of large numbers of people moving to places perceived as having superior natural environment and/or distinct culture - amenity attributes." (Glorioso 2000).

Against this backdrop, the share of owner-occupied housing in Alpine countries (cp. Fig. 4.4) is suggesting that with the exception of Italy, all Alpine countries have a huge backlog demand that is in the process of acquiring owner-occupied real estate, often on greenfield sites. The relation between owner-occupancy and land resource demand can be established through two aspects. First, a correlation exists between ownership and housing type, i.e. owner-occupied housing is disproportionately realised in housing types that feature high land demand per residential unit such as single-family and semi-detached single-family homes (cp. Pfeiffer & Braun 2006).

Furthermore, the effect that elderly remain in their over-dimensioned residences after children have moved out and/or partners have deceased – the so-called “remance-effect” – is significantly higher for the case of owner-occupied housing compared to tenancy housing (cp. Heinze et al. 1997). The probability of a 55-year old 1-2-person tenancy household to move until the age of 75 is 52%, while for the same owner-occupied household it is 23% (cp. Heinze et al. 1997). This leads to the effect that particularly the elderly occupy accommodation units that grossly exceed their actual need of housing.

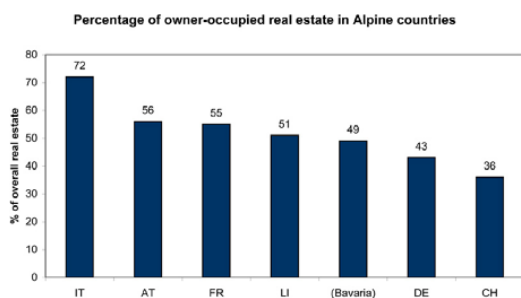


Fig. 4.4: Percentage of owner-occupied real estate in Alpine states²

Fig. 4.4 displays significant differences in owner-occupancy in Alpine countries, which Helbrecht & Behring (2002) attribute to a broad range of aspects, including the level of social security systems that is in place in these countries, cultural differences in regard to the importance of owner-occupancy, af-

fordability of owner-occupied housing and the level of housing rents. The relevance of owner-occupied homes, which are the most common form of private retirement provision, is argued to be directly proportional to the national level of social security systems.

In general, the individual demand for residential area is identified to be the second most important driving force behind land resource demand (Ulmer et al. 2007).

4.2.3 Infrastructure policy and subsidies

Accessibility is playing a major role in the incorporation of formerly rural or semi-rural areas into the commuter belt of urban areas. In the European context, most areas of the Alps feature good or even very good accessibility, particularly considering the difficult terrain. This fact reflects the dominance of individual motorised mobility and the emphasise that Alpine states and the EU have placed on road traffic infrastructure. Residential and commercial areas that have been established are thus oriented towards and mostly rely on individual motorised mobility and are not designed for public transport accessibility.

Besides public subsidies for traffic infrastructure, public subsidies in the field of housing and construction have in the past encouraged land-intensive forms of housing and commercial structures, preferably on greenfield sites. Examples for these federal state or municipal subsidies that contradict sustainable land resource management include subsidies for building owner-occupied houses³, commuter compensation and municipal programmes providing cheap building land for local residents.⁴

3 E.g. National Housing Programme (SI), Eigenheimzulage (DE, until 31.12.2005), Eigenheimförderung (AT) etc.

4 Due to tighter legislation in regard to social housing and housing subsidies in South Tyrol, the situation there differs from other Alpine states. In South Tyrol, state support for housing predominantly pursues social objectives and therefore is targeted towards low-income households.

2 Data for Slovenia not available. Data for Bavaria from Press bulletin 446/05 of the Bavarian State Ministry for the Interior, dated October 15th 2005. Data for Liechtenstein cp. Studer 2006:27.

4.2.4 Spatial planning objectives

Spatial planning objectives in the Alpine states have in the past been addressing the issue of urban sprawl and spill-over of settlements and commercial infrastructure. Planning concepts existed and still exist that promote a system of central-places and of development axes connecting these urban centres. In reality, however, the central-place-paradigm has not lead to a containment of settlement areas. Instead of concentration or decentralised concentration, spatial development is increasingly resulting in a disperse settlement pattern detached from urban centres, built-up areas and public transport infrastructure.

“Much of the countryside has lost its rural character without having gained urban qualities.”

Swiss Development Strategy 2005 (ARE 2005a:3)

4.2.5 Municipal budgets and financing

In all Alpine states, municipal authorities play a key role in spatial development within certain limits set by higher-ranking legislative regulations and planning stipulations. In times of growing budget constraints, the attraction of new residents and businesses poses one option to improve municipal revenues and municipalities are increasingly involved in a competitive race for business and private housing investments. According to a Delphi survey among German experts on land resource management (return of 404 questionnaires), municipal tax revenues are the major driving force behind land resource demand (cp. Tab. 4.2).

Beyond that, experts identified the legal framework (municipal planning authority, system of revenues, regional planning) and tax discounts for entrepreneurs as further relevant driving forces (cp. Ulmer et al. 2007).

These figures underline the importance of attracting businesses and population for

Land- or population-related municipal tax revenues (share of overall municipal revenue in brackets, rough estimations, not comprehensive)					
France	Slovenia ¹	Switzerland ²	Germany	Austria ³	Italy
Business tax (50%)	No land tax	Income tax (67%)	Business tax (35%) ⁴	Allocation of state funds in proportion to municipal population (30%)	Real estate tax of 4-7% of cataster-based real estate appraisal
Tax on built-up land and accommodation units (30%)		Business tax (10%)	Land tax (17%)	Communal tax (tax on wages collected from employer) and land tax (17%) Income tax and value-added tax (29%)	
Land tax (20%)		Land tax (3%)	Income tax (15%)		
		Etc.	Value-added-tax (2.2%)		

Tab. 4.2: Land- or population related municipal tax revenues in Alpine States

¹ Source: DEXIA 2005.

² In Switzerland, municipal taxes are differing from canton to canton. Therefore, the figures presented here are rough estimations based on <http://www.kommunaler-wettbewerb.de/kofi/seiten/ch-210.html>

³ Source: http://www.staedtebund.at/de/finanzen/gemeindefinanzen_uebersicht.xls.

⁴ Source: Dt. Städtetag 2002.

municipal budgets across the Alpine bow. The status quo of the Alpine countries' municipal financing systems is thus creating incentives for local decision-makers to further expand business and residential areas for the sake of improving municipal tax revenues.

Investors demands and housing preferences

As a consequence of these taxation systems that encourage the zoning of new settlement areas and offer no incentives for effective use of the existing building stock, inter-municipal, intra-regional and cross-border competition is increasingly taking place across the Alpine bow. These framework conditions are forcing municipalities – even though they might be aware and unwilling to follow this mechanism – to take part in the competitive race. Further land-take-related policy such as traffic infrastructure or tourism development are similarly becoming absorbed in the argumentation pattern of spatial competition (cp. CIPRA 2007).

Furthermore, decision-making on local level is not unaffected by personal relations between land owners, investors and decision-makers and consequently, land use planning decisions on local level are in many cases more reflecting individual needs of local stakeholders instead of requirements of sustainable land resource management from a regional perspective (cp. Lendi 2003).

4.2.6 Land prices and availability of brown-field potentials

The level of land prices as well as the availability of land is determined by supply and demand as well as by land speculation. In their effort to attract residents and therefore potential tax payers, municipalities are eagerly preparing land for development. On the other hand, existing potentials of already prepared land and of brownfields are by far not being utilised. That means that even though sufficient land resources exist that have already been prepared for development, new greenfield sites are still being incorporated in municipal land use plans for future construction.

This paradox situation – the so-called building land paradox – can be traced back to the unwillingness of land owners to sell already developed land, for reasons of speculation or for private reasons such as passing the plot on to their children for construction. In this context, the taxation of real estate in Alpine countries is not providing any incentives to activate this potential. In theory, municipalities are capable of exerting pressure on land owners through instruments such as building orders. In practice, however, local decision-makers – for reasons of conflict aversion – refrain from applying these strict instruments.



Fig. 4.5: Derelict railway property opens up new inner-urban development potentials, Berchtesgaden train station (DE) (Source: www.pixelio.de)

Consequently, appropriate sites within or close to urban built-up areas remain unavailable or unaffordable on the land market and municipalities resort to new developments of greenfield and greyfield sites, whose localisation is more determined by the availability of sites than by spatial planning considerations (ÖROK 2001).

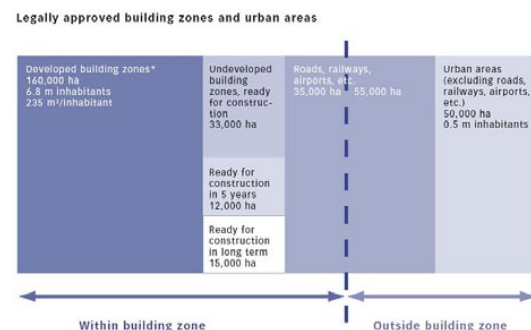


Fig. 4.6: Development potential within and outside of building zones – the case of Switzerland (Source: ARE 2005a:8)

The increased pressure on land resources is based on a multitude of driving forces, some of which are beyond the sphere of

influence of regional stakeholders such as demographic change, the continuously increasing demand of residential area per capita, the share of single households, the housing aspirations of broad segments of society, as well as the level of mobilisation (cp. StMLU 2003).

On the other hand, there are factors steering land consumption which are rooted in local situations and which can be influenced by local and regional decision makers. These factors include:

- historic settlement patterns and recent settlement development,
- economic and population growth or vicinity to regions featuring these processes,
- the degree of accessibility to road and railway infrastructure,
- the level of inter-municipal competition and co-operation in the field of land resource management,
- and the availability of real estate at affordable prices.

4.3 Embeddedness in the Alpine Convention

Sustainable management of land resources in the Alpine region is reflected in the framework convention and various implementation protocols of the Alpine Convention as well as in its declaration on population and culture.

In the Framework Convention, guiding principles of sustainable land resource management such as the precautionary principle, the polluter-pays-principle and the co-operation principle are laid down in Art. 2, para. 1.

Subordinated implementation protocols specify the stipulations of the framework convention for various policy fields:

Protocol Spatial Planning and Sustainable Development:

- economic and environmentally friendly use of resources and land itself (Chapter 1, Art. 1c and Art. 3c),

- principle of subsidiarity as well as the promotion of solidarity among spatial entities in the Alps through effective measures (Art. 2),
- appropriate and economical delineation of settlement areas, including measures that ensure that these zones are actually put to use (Art. 9, para. 3a),
- safeguarding of necessary locations for economic, cultural, supply and recreation purposes (Art. 9, para. 3b),
- directing and concentrating settlements along axes of transport infrastructure and/or existing built-up areas (Art. 9, para. 3f),
- preservation of characteristic settlement patterns (Art. 9, para. 3g),
- compensation measures on appropriate levels need to be considered among municipalities (Art. 12, para. 2a).

Protocol Soil Conservation:

- Economic and cautious handling of soil and land, particularly through (Art. 7)...
 - » § considering the needs of soil conservation, particularly the economical use of land, in the drafting and implementation of plans and programmes (para. 1),
 - » § limiting soil sealing and land resource demand through land efficient and soil-conserving building. Settlement development should be targeted towards inner-urban areas and settlement expansion should be contained (para. 2),
 - » § explicitly considering the limited availability of land in the Alpine space (para. 3).

Protocol Transport:

- Application of spatial planning and structural measures to shift traffic volumes towards more environmentally friendly means of transportation (Art. 7, para. 1c).

Through adoption by national parliaments of currently five Member States of the Alpine Convention (Austria, France, Liechtenstein, Slovenia, Germany), the Framework Convention and its Protocols have become legally effective.

In addition to these legally binding protocols, the Alpine Conference adopted a non-binding Declaration on Population and Culture in 2006. In regard to inter-municipal, inter-regional and international co-operation of spatial entities, this declaration contains the following relevant statements:

- Preservation and modernisation of existing settlement structures and development of settlement conditions that follow the principle of sustainability as well as territorial particularities (III:1),
- Acknowledgement of the significance of inner-Alpine cities, particularly as centres of supra-municipal social, cultural, and economic services in interaction with their hinterland (V:1).

4.4 Aspects of land resource management

Land resource management is a vital task both in the process of growth and settlement expansion as well as in the process of decline and outward migration of population and businesses with a multitude of economic, social and ecological implications (cp. Annex III).

The evaluation of the phenomena identified in course of previous work packages of DIAMONT (cp. Ch. 3.5) has already given evidence that management of land resources is an issue of high relevance to the Alpine Space. Besides this a major objective of DIAMONT is to consider the concept of sustainable development. As this is somehow difficult by dealing with one single sector, the focus of DIAMONT was directed towards a different, more comprehensive perception.

One central difficulty in addressing issues of land resource management lies in the fact that particular this policy field suffers from fragmented sectoral responsibilities. But this precisely makes the issue of land resource management to one of the main subjects within the concept of sustainable development.

4.4.1 Cross-sectional aspects

Land resources represent the basis for an almost unmanageable variety of interlinked functions in terms of economic, social and ecological functions. The management of land resources barely can be carried out with only one simple cause-effect relation in mind and is clearly one of the major challenges of sustainable development.

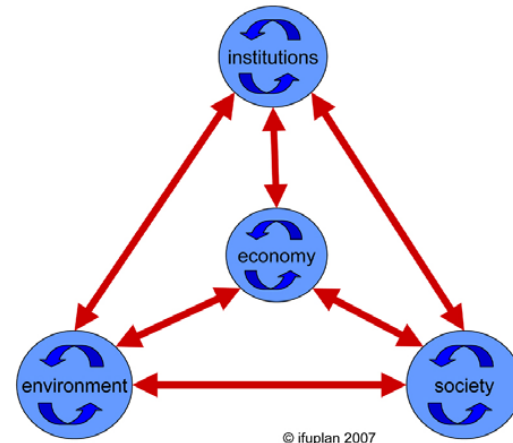


Fig. 4.7: Pillars of sustainability

The cross-sectional character of land resource management exists within the pillars as well as between the pillars of sustainable development (cp. Fig. 4.7).

Giving an example for the cross-sectional character within one pillar, land resource management within the environmental pillar requires to consider effects between land use and climate effects which may have further effects on vegetation or fauna. More examples for intra-pillar issues are presented in the chapters below.

Inter-pillar effects exist or can emerge depending on the specific situation. Examples include:

- Effects between naturally privileged areas for residence (sun, climate, air quality), real estate prices and social strata affording the price for this residence.
- Economic added value produced in commercial areas of municipalities are one financial source for public services provided by the municipality.
- Development of land causes the loss or degradation of its ecological functions.
- Planning, management and legislation

of site provision for economic enterprises by municipal institutions and economic development.

- Assessment of environmental aspects within and across municipal borders by the responsible institutions when land resources are touched.
- Institutional provision of urban development meeting the needs of an ageing society, particularly spatial needs of families and elderly people.

Besides these examples it is most likely that in future further cross-sectional issues will emerge, triggered by effects of climate change and corresponding adaptation strategies. These may heat up the competition between use of land resources for energy production, food production and built up land.

The DIAMONT survey on cultural attitudes in the context of regional development (Boesch 2007) concludes that all Alpine countries strive to reduce disparities and to achieve an integrated approach in their regional policy. But it also argues that “sustainability is still a more or less distant and quite weak goal, proclaimed to be achieved in the end, but not really present as a development issue, and with no high priority on the regional policy agenda”. This may be interpreted as an indication “that mainstream economic progress is the road map to regional development”, replacing traditional Alpine land uses and production modes which have evolved as multifunctional land uses adapted to the cross-sectional requirements of the Alpine environment.

The challenge and an important objective for sustainable management of land resources will be to consider its cross-sectional character if mismanagement of the past shall be overcome. Some guiding principles how to consider this character may be derived from the “ecosystem approach” which has been developed in order to maintain the holistic human use of ecosystems (CBD 2002).

Two potential objectives can thus be identified based on phenomena of work package 7:

- Regional stakeholders combine efforts to safeguard agricultural land and (semi-) natural areas, while at the same time providing investors and those wanting to

build homes with land for development.

- Setting up quantitative and qualitative thresholds regarding new development areas with the objective to decrease the growth rate of newly built-up areas.

4.4.2 Economic aspects

In the course of tightening municipal budgets, economic aspects of land use and settlement as well as infrastructure development are increasingly discussed. Market liberalisation and privatisation of formerly public services is raising further questions in regard to funding of public infrastructure. The efficiency of settlement structures and infrastructure in economic terms (construction and maintenance) is thus increasingly becoming a location factor for regions of the Alps.

Austrian case study on urban sprawl-related costs

For the case of Austria, additional investment costs for technical infrastructure caused by urban sprawl have been assessed at 2.76 billion EUR respectively 15% of overall public investments for the period between 1991 and 2010 (cp. Österreichisches Institut für Raumplanung 1999 and <http://www.raumplanung.steiermark.at/cms/beitrag/10019479/133429>). Private land owners are bearing only 37% of these costs, the rest is financed through public budgets (national, federal and municipal).

The study assessed the difference between two scenarios:

- *Trend scenario, extrapolating current trends into the future.*
- *Sustainability scenario, assuming efforts in the fields of land policy, infrastructural fees and awareness raising that encourage efficient use of land resources.*

The assessment was strictly limited to investment costs in the fields of road construction, water supply and waste water treatment and thus reveals only a narrow segment of the overall external costs of sprawl. Therefore, maintenance costs and subsequent external costs would have to be added to arrive at the overall costs.

A similar study, focusing on social costs of sprawl, appraised transport costs for child care, student transport, home care and meals on wheels for scattered settlements to range between 40.000-80.000 EUR p.a./1000 inhabitants, compared to 2.000 EUR p.a./1000 inhabitants for consolidated settlements (ÖIR 2001).

Public budgets

Economic development is on the one hand accompanied by demand for building land – both seem to be strongly coupled (Binswanger et al. 2004) – while land resource demand is decoupled from population growth (Schulz & Dosch 2005). On the other hand, developing and maintaining built-up land is expensive – not only for the land owner, but also for public budgets (cp. textbox).

Once built, infrastructure related to developed land needs to be maintained over decades, which can become a substantial financial burden for municipalities, especially if economic and population development is undergoing a process of stagnation or even decline. There are already municipalities facing high costs for infrastructure maintenance and population decline. For Italian mountain regions that have for decades been struggling with depopulation tendencies such as parts of Piemonte, Liguria or Friuli-Venezia Giulia, but also for regions in other parts of the Alps such as cantons of Central Switzerland and certain areas in the South-eastern fringe of the Austrian Alps (Kärnten, Steiermark), the issue of infrastructure and public service maintenance and costs has been becoming particularly relevant (cp. PUSEMOR 2007).

In many parts of the Alps – especially in urban areas – there is still a need for additional building land either for residential purposes or for commercial / industrial zones. Most municipalities react on this demand by enlarging their residential or commercial zones into former agricultural areas (cp. Fig. 4.8). This leads to several negative environmental impacts (and in consequence indirect costs), but brings also high direct costs for the municipalities, which are not always compensated by accruing business and income tax revenues. These costs can be distinguished into those for

- technical infrastructure (supply and disposal),
- traffic infrastructure and
- social infrastructure.

While investment costs for technical infrastructure can at least partly be passed to investors, long-term costs remain for the municipality which are not easy to calculate.

This holds true also for transport infrastructure like additional local access roads, while higher-ranking road networks and public transport systems are generally completely financed by the public. On the other side expected benefits for municipal budgets like additional taxes are often over-estimated or even never occur in certain cases.



Fig. 4.8: Land-intensive greenfield development in the German Alpine foothills (Photo: S.Marzelli)

The investment costs for social infrastructure (education, health care, social services, sport and leisure infrastructure, parks...) are financed from public budgets, but are – unlike traffic and technical infrastructure costs – more depending on population size and density than on the location of a new housing project (inner-urban or greenfield).

In the end, municipalities have to find ways for further development while at the same time keeping development and maintenance costs for technical and social infrastructure as low as possible. One possibility is to utilise inner-urban development potentials before developing greenfields (cp. AC, Protocol Soil Conservation, Art. 7, para. 2). An assessment of inner-urban development potentials in four pilot municipalities in Bavaria revealed a share of development potential within the existing building stock between 18-37% (cp. BayStMLU 2003a).

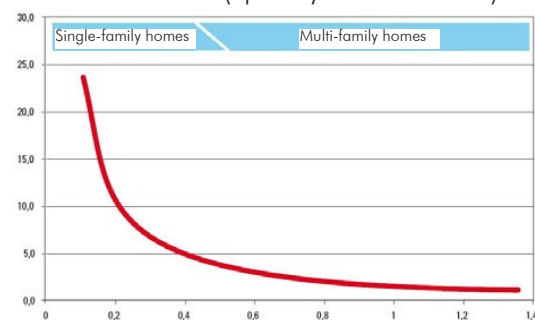


Fig. 4.9: Interrelation of technical infrastructure needs and floor-space index (Source: Gutsche 2005:6)

Technical infrastructure costs

Each municipality and/or respective public service providers are obliged to provide residential areas with a certain level of technical infrastructure. This includes the construction of access roads, street lights, water supply, waste water treatment, electricity and communication infrastructure and maintenance of these public services.

While private households and businesses are charged standardised access fees, the municipal budget and/or public service providers have to bear the financial burden of connecting these areas to the public service networks. In the end, these costs are allocated on all tax payers and all users of these networks, which means that the public is paying and thus cross-subsidising the disproportionately high costs of greenfield development. Fig. 4.9 is illustrating the decreasing provision needs for road access, drinking water, waste water, gas and elec-

tricity per residential unit in parallel with an increasing floor-space-index. In short, multi-family homes have significantly lower costs per residential unit than single-family homes.

In general there is a strong interrelation between density of population or workplaces and infrastructure costs. This becomes evident also in Fig. 4.10, where technical infrastructure costs for different housing types are brought into relation with costs accruing for single-family houses.

But infrastructure costs do not only play an important role for expanding residential areas. Paradoxically, municipalities have to face higher proportional costs for the maintenance of technical infrastructures under the condition of a declining population.

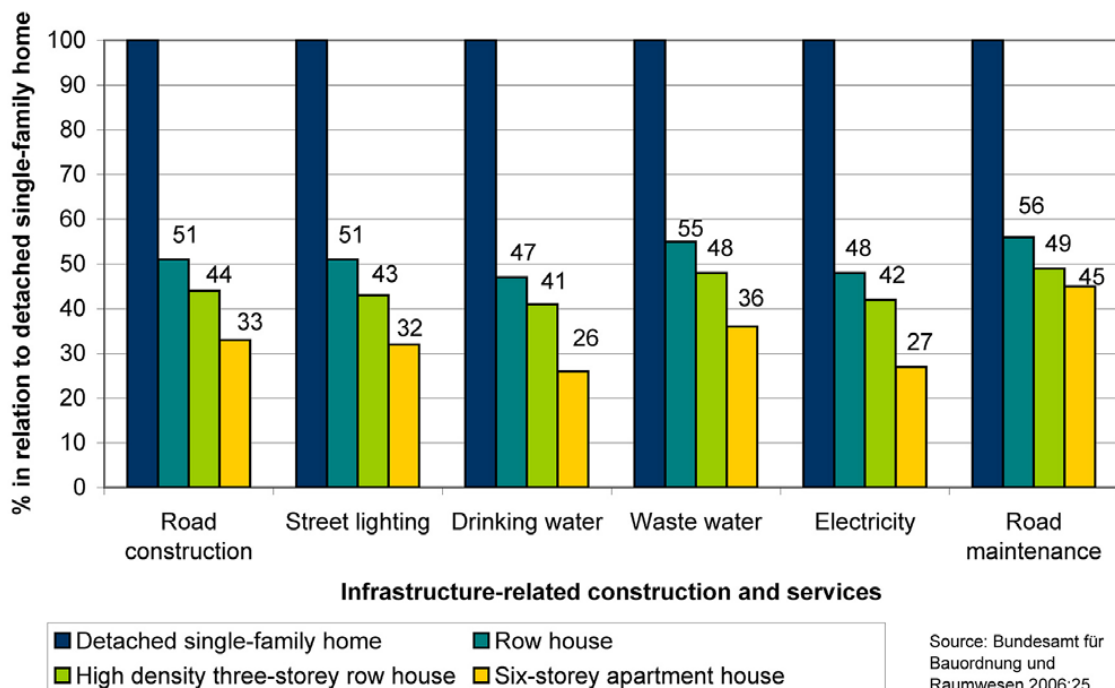


Fig. 4.10: Technical infrastructure costs of various densities compared to a single-family home
Source: Bundesamt für Bauordnung und Raumwesen 2006:25 (modified)

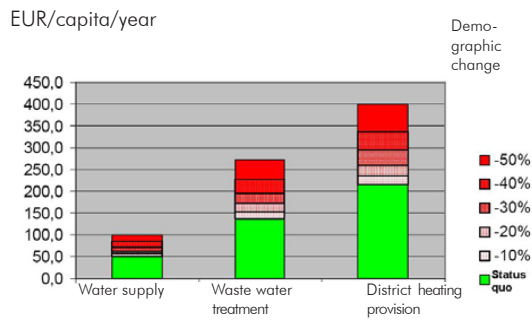


Fig. 4.11: Increasing costs for technical infrastructure in the process of population decline (Source: Koziol 2005:17)

Technical infrastructures such as water supply, sewage water system, waste water treatment and heating will in most cases be maintained at the same level or on the same distances, even if a smaller population rely on these service provisions. Depending on the population decline, an increase of costs per capita of up to 100% has been calculated (Koziol 2005).

Private costs

Private costs caused by sprawl are mostly related to farther distances that have to be covered to meet basic needs (housing, work, supply, education, recreation, social contacts). Another aspect that comes to the fore in the course of deregulation and privatisation of former public services is a differentiation of services as well as respective

tariffs and fees according to the location where the service is demanded.

This differentiation is imaginable and already discussed in the fields of public transportation, communication and postal services (discussion on monopoly of postal services). In the case of the Austrian postal system, the process of privatisation between 1996 and 2006 was accompanied by closure of roughly 1.000 postal agencies predominantly in rural areas between 2001 and 2004, affecting local supply, competitiveness and individual transport expenditures within these regions.

Development objectives

In respect to economic effects of land resource management, Tab. 4.3 is relating development objectives within the framework of sustainable regional development as outlined and interpreted by the authors based on Chap. 4.1 to spatial phenomena of the Alpine region that have been identified in WP 7. As outlined below, it is a crucial step in view of regional development instruments to relate assessed phenomena to respective development instruments. Without development objectives and the deriving direction of development that is desirable in view of sustainable development, the application of instruments is not yielding the desired results.

WP 7 phenomena	Potential development objectives
Financial squeeze of the municipality	Municipalities shall be financially capable of fulfilling their core functions of providing central functions and services (administration, education) to their citizens and of developing the natural and built-up environment according to principles of sustainability. One important element in this strategy is the implementation of the principle of connectivity, meaning that municipalities are entitled to sufficient government funds to fulfil their legally assigned duties. On the other hand, cost-effective and -saving strategies need to be developed on regional and local level in regard to infrastructure and service provision and the provision of land for commercial and housing development.
(Strong) labour market	Sufficient employment opportunities are a vital aspect of a region's attractiveness for the local population and for newcomers. The goal is to create and maintain a strong labour market while mitigating its negative effects on increasing land resource demand.
Strong functional interrelation between municipalities	Joint draft of land-use-plans among municipalities with functional interdependencies.
Unemployment	Reduction of unemployment with measures that are at the same time socially acceptable and sensitive towards the issue of increasing land resource demand.
High importance of branches of an urban economy	Priority in regional and municipal policy for branches producing a high ratio of added value per spatial unit under the precondition that traditional and local economic structures are maintained as well.
Coupling of economic and population growth to space consumption	Decoupling of growth and space consumption, i.e. creating more added-value on the same amount of commercial area, providing appropriate housing opportunities to more people on the same amount of residential land through redensification.
(Bad) provision of business-related services	Serving the needs of local businesses in terms of business-related services to enable them to compete successfully in the supra-regional market. If publicly funded, these services should have a strategy towards cost-effectiveness.

Tab. 4.3: Economic phenomena and development objectives

4.4.3 Social aspects

The social sphere and human well-being is affected in different aspects from the land resource management and allocation of land uses.

Quality of life and human health

The way where and how settlement areas as well as transport infrastructures are developed is affecting human health. Health is defined by the WHO as the "state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". In these terms, the management of land resources is relevant to human health as it affects the quantity and quality of open spaces and green belts at a large as well as at a very local scale.

The allocation of residential, recreation, industrial and commercial areas as well as of transport infrastructures governs the impact of health-relevant emissions such as PM10 as well as noise emissions. The latter are known to represent one of most disturbing factors in modern societies. In this regard,

the amenities of many Alpine landscapes – silence, nature experience, landscape aesthetics – represent a special and vulnerable quality for human life.

The distribution of land resources has influence on quality of life in special terms as well: most travelling time for commuting is perceived by most people as a waste of life time and source of stress.

Mobility

Scattered settlement patterns make public transport systems difficult to maintain, which is particular true for peripheral municipalities in the Alps. Consequently, people are becoming heavily dependant on car mobility. Consequently, social groups such as elderly, disabled, children or those with a low income who do not own a car or who are not able to drive are being discriminated. Insufficient services to residential areas by public transport or unacceptable distances of these areas to public transport stops exclude these groups from social life, shopping facilities and cultural events (WHO 1999, WHO 2002).

Accessibility of public services and information

Closely related to the question of mobility and population development is the accessibility of public services and information particularly in sparsely populated mountain settlements, if residential areas are established outside of compact settlement structures. Following a declining customer base, decentralised shops, public services, medical care will retreat, impairing the situation for those social groups which have no access to appropriate transportation. But also access to information via broad band access, movies, cultural events etc. may turn out to be a relevant factor for social attractiveness.

Natural hazard prevention

Whether it is a conscious decision to bear the risks from natural hazards or people are not aware of natural hazards these represent realistic threats and are likely to increase in the future. Commercial and residential areas in the Alps are in many cases exposed to Alpine natural hazards which require either a constraint of land use as a risk prevention. In the worst case society has to face economic losses or even health and life endangerment.

Demographic decline

Demographic change (decrease and ageing of population) is an important social aspect within the context of land resource management. It is important not only regarding the social infrastructure (schools, retirement homes/senior housing, outpatient care etc.) but also concerning the question of settlement development. The regional pattern of demographic changes plays a decisive role, as places of declining or stagnating population are often intertwined with growing municipalities, leading to polarised and fragmented spatial trends on regional level. But ageing will continue to take place in all Alpine regions – even in those featuring an inflow of population. Social services and the provision of shopping facilities close to residential areas become relevant factors for sustained attractiveness of peripheral towns and settlements as places of residence (Heinze 1997:63f, PUSEMOR 2007). Spatial planning and decision-makers on all spatial levels therefore are required to

integrate these new challenges accompanying demographic change into their work and develop well-suited strategies for each region.



Fig. 4.12: Residential home for the elderly, Waging a. See (Photo: S. Marzelli)

As demographic change is only a side aspect of the task of WP9, only some general trends as well as some important strategies in the field of land resource management are listed below (cp. Bundesministerium für Verkehr, Bau und Stadtentwicklung [BMVBS] 2007):

The most relevant trends are:

- Shrinking households sizes,
- increasing size of living space per person,
- in spite of the population decrease the demand for living space will increase over the next 10 to 20 years, but will be shrinking in the long-term,
- increasing demand for senior-oriented housing and assisted living,
- change in mobility demand of elderly (frequency of movements and type of transport modes),
- change in social, educational and cultural infrastructure demand (e.g. less schools, but more care homes needed),
- change in supply needs.

Strategies recommended by the BMVBS in the context of land resource management include:

- Strengthening of inter-municipal co-operation in various policy fields (in the sense of division of municipal tasks and functions to improve cost-effectiveness; co-operation in settlement and business development etc.),
- review of central places for the concentration of settlement development, infrastructure and economic development,
- limiting respectively capping land-take for new settlements with the help of housing benchmarks,
- inner-urban instead of greenfield development.

In regions with great attractiveness – either in economic terms with high inward migration rates (often agglomerations) or scenically attractive regions with many second homes (mostly tourist resorts) - land resource

management is important to sustain a social balance within communities. In this regard, the main task is to provide affordable accommodation for local people with an average income (e.g. young families) as well as for underprivileged social groups. Many municipalities, e.g. St. Moritz, are considering strategies to safeguard the acquisition of real estate through the local population (cp. CIPRA 2007).

Development objectives

For those phenomena identified in Work Package 7 which occur in the social field and are related to land resource management, objectives are identified in Tab. 4.4. These objectives may support different strategies such as an offensive strategy to reform changes by compensating population decline through migration or family promotion or a defensive strategy which adapts existing infrastructures in the education sector and home care sector to changing conditions.

WP 7 phenomena	Potential development objectives
(Bad) Provision of educational services	Providing easy accessibility to basic educational services (kindergarten, elementary school, secondary school) as well as adult education in decentralised locations
Lack of recreational areas	Providing easily accessible recreational areas in sufficient density throughout urban areas. Improving the functionality and aesthetic quality of these areas.
Population growth in the core city	Maintaining and providing employment and shopping facilities close to centres in the vicinity of core cities in order to counteract polarisation processes between core cities and surrounding small centres. Encourage densities in the core city that promote their urban qualities and economic attractiveness in terms of business contacts and qualified work force without compromising qualified and valuable green areas.
Unfavourable age structure	Dual strategy necessary: Providing family-friendly structures (housing, child-care) and at the same time - as demographic change is inevitable - providing more structures for elderly people within the current building stock. This also implies the assessment of new projects (commercial, housing and infrastructure) in regard to demographic sensitivity and flexibility.
(Bad) Provision of public transport	Accessibility of public transport within a certain range / for a certain percentage of population / in a certain quality. Public transport should be provided in a way that makes it competitive with motorised individual traffic particularly in densely populated areas, while at the same time, mobility for disadvantaged parts of the population (poor, young, elderly, handicapped) in remote areas should be ensured as well. This requires cost-reducing innovations and a long-term-strategy that also entails deficits in the initial stage. In the end, a competitive inter-modal system of public transport should reach cost-effectiveness (through increased demand, not through further cuts in service provision).
High attractiveness of towns as place of residence	Balance of inhabitants between cities and countryside at a level of sustainable development. In order to manage the turn-around in land resource demand for housing purposes and urban sprawl, it is necessary to maintain and improve the attractiveness of towns as places of residence. This entails the provision of affordable housing in core urban areas, high environmental quality of urban areas, and diverse employment opportunities as well as activation of brownfield potentials.
Provision of public and private services for daily life	Providing central and administrative functions for the urban as well as for the rural population from the cities' catchment areas. Central and administrative functions need to be a) accessible b) affordable for municipal budgets. The latter implies considering alternative ways of delivering these functions (e.g. e-government, mobile medical treatment, PPP etc.).

Tab. 4.4: Social phenomena and development objectives

4.4.4 Environmental aspects

The term land resource management is often affiliated with the aspect of land resource demand for infrastructure and settlement mainly from agricultural area. There is no question that this represents the most important outcome of land resource management in environmental terms.

However this is not the only effect and other environmental effects of land resource man-

agement may gain similar weight from an ecological view. So environmental consequences of management of land resources can be differentiated into direct and collateral effects.

Within the Delphi survey carried out in the DIAMONT project (Work Package 6), some potential environmental effects have been identified. Based on these references, a list of phenomena has been developed within Work Package 7. Potential development objectives (cp. Tab. 4.5) reflect some of these ecological consequences.

WP 7 phenomena	Potential development objectives
(Loss of landscape diversity)	Stopping the loss of landscape diversity, particularly of habitats with high ecological value and representativeness.
Loss of typical natural biotopes of Alpine valleys	Stopping the loss of landscape diversity, particularly of habitats with high ecological value and representativeness.
Fragmentation of green areas	Maintenance of sufficient sizes of continuous green areas in regard to their ecological functions.
Low water absorbing capacity	Increase the amount of on-site infiltration and reduce run-off by limiting and reducing the percentage of sealed soil surface
High dependency on water importation	Minimising run-off and maximising the on-site infiltration of precipitation by reducing soil sealing. Minimising pollutant and fertiliser immissions into the groundwater by agriculture and industry.
Impairment of human health by noise (WP7)	Increase environmental quality in densely populated areas by reducing noise nuisance and improving safety measures against existing and unavoidable noise immissions.
Bad air quality	Improve air quality by minimising traffic emission

Table 4.5: Environmental phenomena and development objectives

Direct environmental effects

Direct environmental effects of land resource management practices are mainly observed as:

- the loss of surface through land use change from undeveloped to developed land, basically deleting most ecological functions of this land plot. This means the loss of production, regulation, information function for this site and of carrying function for other land uses. One of the most intensively discussed ecological impacts is the proceeding loss of high-fertile agricultural soils as substantiated by studies in Germany⁵ (Siedentop 2005). The displacement, transport or relocation of soil is in many cases equivalent

with the loss of fertile soils in terms of naturally grown soils and their ecological qualities.

- Surface sealing with all its ecological aspects on ground water regeneration, interception of precipitation and regulation of water run-off and water filtration. In their entirety these local effects accumulate to environmental effects which require ground water table protection, flood management of river catchments and protection of surface water.
- Change of local climates for humans as well as for wildlife and plants. This refers to higher average temperatures in built up environments, inversion layers particularly in Alpine urban environments and spread of urban emissions supported by local katabatic wind systems⁶.

⁵ An explanation for this is that settlements in former times were preferential founded in sites with a high natural productivity. Enlargement of settlements happen therefore on those productive soils.

⁶ Wind blowing down a topographic incline.

Collateral environmental effects

Collateral or indirect effects from land resource management on the environment depend on the location where land use changes occur and on their appearance. These collateral effects include a wide array of intentional or unintentional effects, which often are detected after the underlying land use changes have been carried out, as some examples may explain:

- Urban sprawl increases traffic volumes between residential and working areas which requires the upgrade or new construction of traffic infrastructure,
- new construction or even the upgrade of traffic infrastructures implies additional traffic emissions which affect natural habitats,
- traffic noise affects recreation areas close to residential zones as well as the open landscape; here landscape amenities such as quietness, the experience of solitude and the contemplation in nature are affected by noise,
- transport infrastructure and built up areas may act as a physical barrier between semi-natural and natural sites, thus affecting the migration of wildlife; furthermore the fragmentation of natural biotopes means that due to smaller area size and relatively longer perimeters the affected zone of biotopes is increasing,
- commercial areas are a source of emissions from industrial or craft production and will cause additional traffic volumes both for logistic reasons as for people commuting for work,
- technical infrastructure for transport, energy supply, commercial areas etc. have often negative effects on the on the landscape scenery,
- also the withdrawal of human use from areas may have environmental impacts, as such a retreat is in many cases coupled with the abandonment of traditional land use practices which have established semi-natural ecosystems of high ecological value.

When considering the precautionary principle particularly in an ecologically sensitive region such as the Alps, these direct and indirect effects should be anticipated, making

land resource management a high priority task in the framework of sustainable development.

At a general level it becomes difficult to estimate how many species are endangered because of urban land use change or what share of the increase of traffic volume are caused by urban sprawl. However some indications state that land resources are under pressure and processes of change are drivers for many environmental impacts:

- Compared with the decreasing rate of other environmental subjects such as energy consumption, emissions, water abstraction the rate of land resource conversion is still growing (Siedentop 2005).
- A continuous increase of areas for urban and transport infrastructure is observed at national level. For Germany a daily conversion rate to urban and transport infrastructure of 139 hectare for 2000 and of 93 hectare for 2003 is reported (Siedentop 2005). But also within the Alpine Convention perimeter urban areas are increasing; in the Swiss Alpine area, for instance, an increase of 17 % has been registered in the time period from 1979/1985 to 1993/1997, exceeding the national average (UBA 2005).
- The loss of fern and phanerogam species in Germany is related for more than 300 species out of 350 besides intensive agriculture to the destruction of plant habitats through land conversion (BfN 2002).

However at a regional or local level environmental impacts can be more precisely assessed at a strategic level within the framework of strategic environmental assessments or at project level within the framework of environmental impact assessments.

4.4.5 Institutional aspects

Why is land resource management also an institutional challenge? This question is closely connected to the cross-sectional character of land resource management and to the appropriate spatial level of management. In some cases, existing institutional settings are sufficient to manage land resources, while in other cases a sustainable solution will only be achievable on regional level. This becomes obvious when reflecting that

- single municipalities have different potentials to offer on their sites in terms of suitability for economic enterprises, logistic needs, recreation purposes, agriculture etc. These potentials can fully be taken advantage of in a co-operative rather than in a competitive manner.
- Urban and infrastructure development will certainly affect traffic flows not only in the municipality where the source of the traffic is located, but on the whole transport network;
- From an outside perspective, regional entities are capable of attracting more attention than a single municipality, so the visibility (in terms of tourism, economy, residence) of regional entities is higher and more effective.
- Labour markets and consumption (shopping, public services, waste treatment) are increasingly functioning in regional or even supra-regional contexts.
- Urban and infrastructure development feature different cost-benefit-ratios in the long term depending on the factual suitability of individual sites, which requires a neutral assessment at supra-local level.

The perimeter of the Alpine Convention encompasses a total of currently 5887 municipalities. In the ancient settlement areas of Italy and Ticino, as well as in France, municipalities are usually smaller in size and more densely settled, while in those areas that in historical terms have only recently been settled such as Austria, Switzerland and Germany, municipalities are above-average in size and rather sparsely populated. In the course of time, smaller-sized municipalities have been increasingly struggling to

meet modern demands in regard to administration and provision of public, social and educational services. As a consequence, administrative reforms and mergers of municipalities – either obligatory or voluntary – are constantly reducing the overall number of Alpine municipal entities.

Traditionally, municipalities of the Alps hold a dominant position in spatial decision making. This situation is most pronounced in Austria, Germany, Switzerland and Italy. In these countries, municipal revenues are to a large extent depending on the population size and/or the number of businesses on municipal territory. This framework condition is increasingly fuelling a competitive race between municipalities for in-migration and relocation of businesses and firms in the Alpine region. In general, this process creates incentives for municipalities to develop businesses and jobs and to increase their attractiveness as places of residence.

Regional co-operation

In recent years, however, municipal competition has been identified as one driving force of increasing land resource demand and deregulation of planning norms and objectives. Municipalities as well as higher administrative levels are trapped in a prisoners dilemma; either they participate in a race to the bottom or they will be out-competed by their neighbouring rivals.

One Alpine characteristic is further intensifying the dilemma. The Alps are highly transected by national borders. In the process of growing mobility, imbalances in the spatial development framework (different levels of planning restrictions etc.) are exerting ever greater and far-reaching spatial influences. Inter-municipal competition is increasingly crossing national borders. Some examples are the competition between South-east Bavaria and the Land Salzburg (see text box), South Bavaria and North Tyrol, Innsbruck and northern South-Tyrol or Vorarlberg and Switzerland. This process may be seen as part of the European cohesion process which also evolves new fields of competition. These structural inequalities are ultimately threatening the spatial cohesion of the Alpine Space, as they degrade the strategic element of spatial planning with the effects that have been

presented in this chapter.

Institutional developments are required to reflect appropriately the cross-sectional character of land resources (cp. Ch. 4.4.1). Up to now, existing institutional structures are often not adapted to cross-sectional challenges of spatial development as most institutions are organised in a sectoral manner.

In this context, inter-municipal, inter-regional and cross-border co-operation in the field of spatial development is deemed essential for sustainable development of the Alps (cp. AC, Protocol Spatial Planning and Sustainable Development, Art. 4 and 5; CIPRA 2007).

The sufficient management of land resources requires a revised setting of institutional responsibilities both in regard to spatial level and regarding the different cross-sectoral aspects. Within these requirements, the basic requests of the "ecosystem approach" (CBD 2002) may be recognised, particularly guidelines 4 and 5¹.

Appropriate institutional arrangements need to be drafted and established at appropriate spatial levels within the regions of the Alps. In certain cases, this process might require the establishment of new supra-local entities, as existing ones sometimes prove to be inefficient in size or range of competencies. The example of the Regional Pool of Commercial Areas of Neckar-Alb in Baden-Württemberg underlines that new forms of regional co-operation can be based on voluntary commitments and nonetheless be of binding character to ensure sustainable spatial development in the long run.

Spatial competition across borders – the case of Salzburg and South-eastern Bavaria

The case of the agglomeration of Salzburg and the adjacent German region of South-eastern Bavaria is an impressive example of the processes and effects of inter-regional competition in the Alps. Subsequent processes of European unification such as freedom of movement, the installation of the European common market and the Schengen treaty, this cross-border region is increasingly perceived by its population as one spatial entity for living, working and shopping. The cutback of political borders and restrictions, however, has not been accompanied by a harmonisation of spatial development objectives and planning regulations. In Austria, municipalities are not bound to relevant spatial planning restrictions as the national level is not entitled with spatial planning competencies and regions are similarly rather weak in influence. Beyond that, Salzburg as an agglomeration is entitled to installations of higher centrality than the smaller-sized towns on the Bavarian side. In Bavaria, on the other side, the State Development Plan as well as the Regional Plan are in theory powerful instruments that have been used in the past to steer spatial development particularly in the field of large-scale retail.

Over the last years, retail businesses and Austrian municipalities have identified this misbalance and are following a strategy of explicitly draining South-eastern Bavaria's purchasing power through large-scale shopping centres built along the Austrian-German border. According to studies, this drain amounts to 7,2% of the Bavarian border counties' purchasing power (SABE-V-Study 2005).

As a consequence, regional and federal political stakeholders on the Bavarian side are pressured by municipalities of South-eastern Bavaria to ease planning restrictions and to permit similar projects on the Bavarian side. A recently amended version of the Bavarian State Development Plan is now lowering planning standards in those Bavarian districts that share borders with Austria.

¹ Guideline 4: Carry out management actions at the scale appropriate for the issue being addressed, with decentralisation to the lowest appropriate level. Guideline 5: Ensure inter-sectoral cooperation.

5 Areas with Particular Demand for Land Resource Management – Problem-oriented Clustering

Within the DIAMONT project an Alpine-wide database is compiled which provides the fundamental basis to analyse data at municipal level (see Tappeiner et al. 2008, forthcoming). From this data pool Alpine-wide labour market regions, consisting of core towns and adjacent municipalities, are identified. Out of these selected regions are dedicated to carry out a regional analysis and involve local stakeholders in workshops on land resource management. Beyond the identification of these labour market regions, the question arises how and where can municipalities be identified which face driving forces behind increasing land demand? And to what extent and in what combination could Alpine-wide statistical data at LAU-2-level support this?

The objective of the problem-oriented clustering of municipal data is to identify those municipalities where - according to theory - statistical data suggests an increased pressure on land resources (cp. Siedentop et al. 2007a/2007b). In this, the analysis is restricted to those indicators that were available on an Alpine-wide basis. For this Alpine-wide approach, aspects that would be feasible for a certain share of Alpine countries (such as sectoral split, land use changes below 25 ha etc.) could not be taken into account. In view of cluster interpretability, it was decided to select a limited set of indicators which still allows a transparent interpretation.

Underlying hypotheses

Within the restricted data-set, land resource demand was considered to be determined by the following driving forces:

- Population dynamic (difference between 1991 and 2001)
- Youth rate (population <15/population 15-64)

- Travel time to core city

The underlying consideration behind the interpretation of each of these three indicators was as follows:

Population dynamic: A positive population dynamic (natural growth and/or inward migration) is resulting in an increased demand for building sites for housing, commercial and industrial activities. Furthermore, a growing population can be regarded as an indicator for attractive municipalities. Attractive either in terms of economic development and employment opportunities, vicinity to other employment centres, in terms of affordable land prices or amenities such as attractive landscape and high recreational value.

Youth rate: Generally speaking, the segment of the population between 20 and 40 years of age is at a stage of life where owner-occupied real estate is being acquired (mostly in single family homes or semi-detached houses) and where the individual demand in regard to accommodation size increases. A high youth rate (Population under 15/Population between 15-64) is suggesting that a disproportionate part of the population is either approaching or already within this age segment (cp. Siedentop et al. 2007b).

Distance to core city: Core cities are by definition cities that exert substantial influence on their surrounding territory in regard to employment opportunities, provision of shopping facilities and cultural and social activities. Therefore, close vicinity of municipalities to core cities as defined by the indicator "Distance in minutes" is believed to be a significant factor regarding land use and demand for land resources for residential purposes in these municipalities. Following the process of residential suburbanisation is suburbanisation of workplaces, services and shopping facilities towards outer perimeters.

Methodology

Considering national differences within the Alpine bow

As the Alpine average of population dynamic and youth rate is concealing national differences, the national average of population dynamic has been subtracted from

the municipal value (e.g. municipal population dynamic is 115%, national average is 104%, thus the value for population dynamic above national average is 11%; in IT (with national average of 101%) the same municipality would receive 14%). The indicator value for population dynamic and youth rate therefore reflects national differences across the Alpine region.

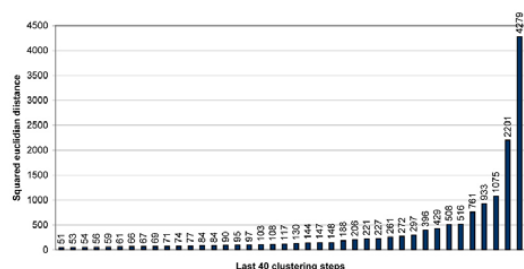


Figure 5.1: Distance between clusters

Cluster Analysis

The clustering procedure is split into two steps (cp. BayStMLU 2003:42). In the first step, a hierarchical clustering is carried out for the data set, which produces information in regard to appropriate numbers of cluster to be built).

Hierarchical clustering in general starts with assigning one cluster to every municipality, thus building 5,887 clusters in the Alpine region. From there, cases are combined in an ordered scale (z-value).

clusters according to their proximity to each other. In the end, after 5,887 steps, theoretically only one cluster would remain. Fig. 5.1 displays the last 40 steps of this procedure with the respective Euclidean distance between the remaining clusters. The figure outlines that the last steps of clustering create the biggest differences between clusters.

Therefore, a compromise has to be found that weighs an interpretable number of clusters against heterogeneity within clusters. From a methodological point of view, it is recommended to select a number of clusters following a significant step in regard to Euclidean distance. On the basis of this diagram, it has been decided to stop clustering before the last five steps, thus building five clusters (Euclidean distance 761, cp. Fig. 5.1).

In a second step – building on the information on an appropriate number of clusters - five clusters are created using the Cluster Center Analysis. Among these five clusters, cluster number four is showing characteristics that comply with the theory outlined above (cp. Tab. 5.1). It combines municipalities with below-average driving distance to core city, above average population dynamic and youth rate in the national context. The values in Tab. 1 represent average indicator values in each cluster on a stand-

Cluster					
	1	2	3	4	5
Standardised value (Distance to core city in min.)	0.85740	-0.54879	1.36388	-0.46935	1.80108
Standardised value (Population dynamic in national context)	0.01444	-0.28177	-1.04390	1.11017	8.44859
Standardised value (youth rate in national context)	0.84032	-0.29123	-1.14857	0.50336	12.27122

Tab. 5.1: Cluster centers

		Number of municipalities	%
Cluster	1	1138	19.3
	2	2576	43.8
	3	794	13.5
	4	1378	23.4
	5	1	0.0
Valid		5887	100.0

Tab. 5.2: Cluster counts

Tab. 5.2 displays the number of munici-

perties that have been assigned by Cluster Center Analysis to each cluster. Cluster 4 thus represents about 1/4 of Alpine municipalities.¹

The map (cp. Fig. 5.2) displays the distribution of Cluster-4-municipalities (problem-oriented cluster) across the Alpine region in regard to labour market areas as calculated by EURAC and to Perlik's urban areas (Perlik 2001, Schönthaler & v. Andrian-Werburg 2007) within the AC-perimeter.

1 Cluster 5 contains only one municipality and can thus be neglected.

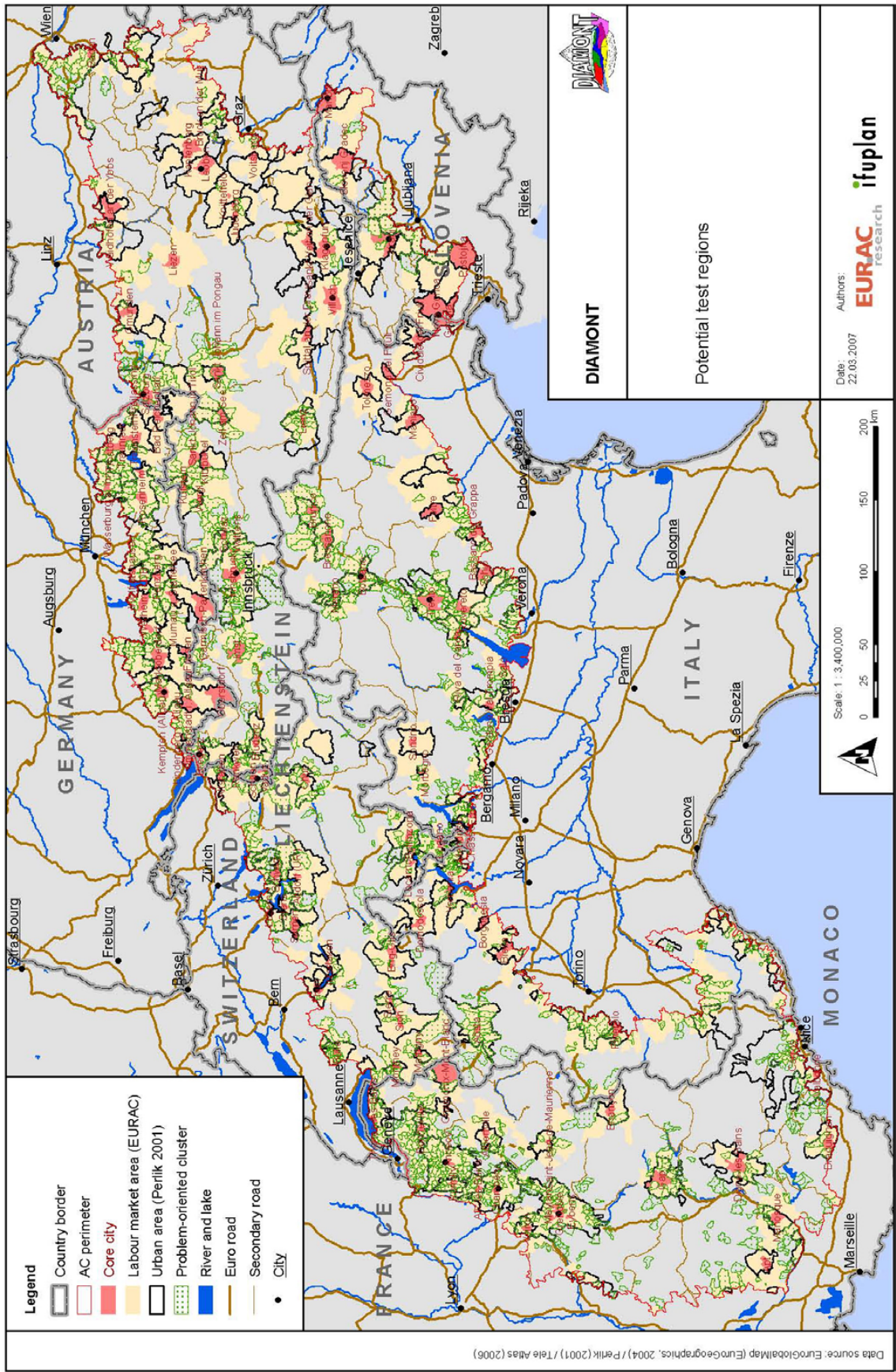


Fig. 5.2: Alpine-wide problem-oriented cluster The problem-oriented cluster in detail

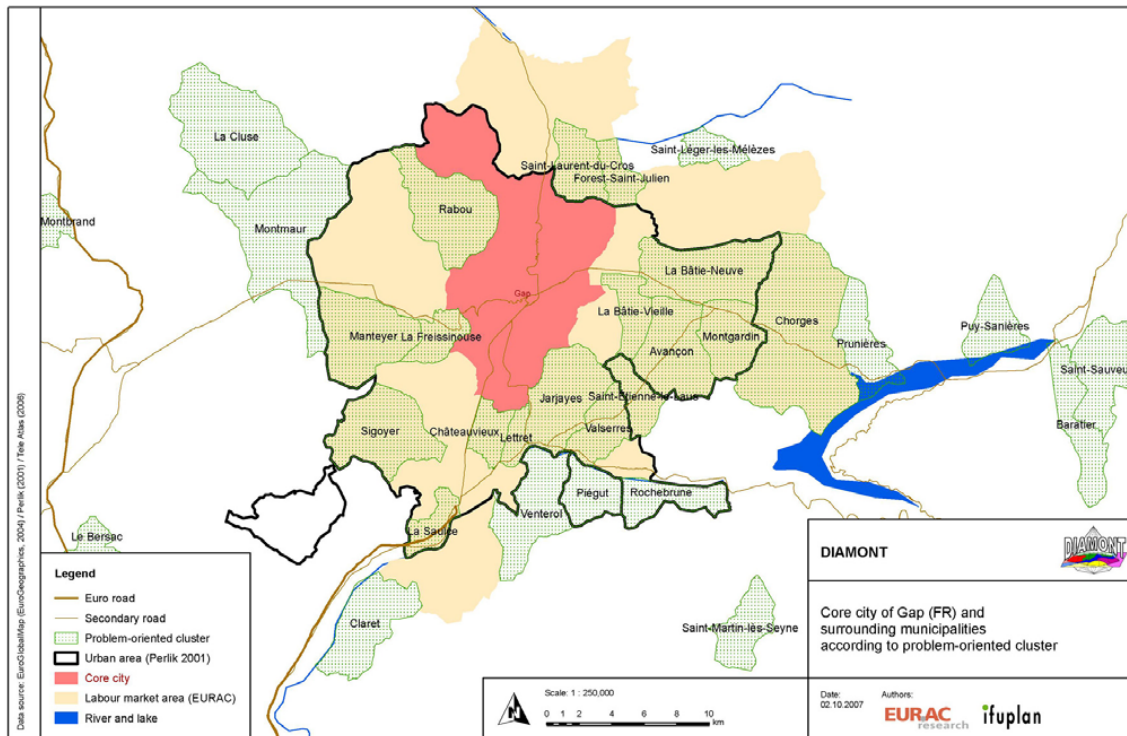


Fig. 5.3 Problem-oriented cluster in detail - the case of Gap (FR)

A regional cut-out of the Alpine-wide clustering for Gap (FR) (cp. Fig. 5.3) is suggesting that pressure on land resources is unequally distributed among municipalities of one labour market region. Municipalities coloured in green are part of cluster 4, the “land-demand-cluster”.

Along axes of the federal transport network infrastructure, municipalities that are assumed to be subject to demand for land resources are situated even at wider distance from the core city than in places where this infrastructure does not exist. The fact that “distance to core city” is one parameter of the clustering process explains why considerable areas in the central Alps do not feature municipalities of this type.

On an Alpine-wide scale (cp. Fig. 5.2), the spatial distribution of “land-demand”-municipalities is confirming that settlement pressures are going beyond of what is currently perceived as core cities and their immediate catchment areas (depicted through the labour market regions identified in DIAMONT). Areas that feature a concentration of “land-demand” municipalities include the Upper Italian Lakes, the Adige-Valley, the Tyrolean Inn valley, the Alpine Rhine valley as well as areas under the influence of agglomerations such as Vienna, Munich and Nice.

Problem-oriented clustering in perspective

On the one hand, it has to be kept in mind that the clustering method does contain substantial restrictions:

- First it is based on a theoretical assumption concerning the driving forces of land demand on municipal level. This means that in reality there surely is a more complex system of determinants involving political processes, individual preferences and subjective decisions by local stakeholders. This complexity, however, can not be reflected in an Alpine-wide available set of harmonised indicators and thus cannot feed into an Alpine-wide problem-oriented data analysis. But even if more data would be integrated, the information reduction paradigm would always catch analyses at this point – the individual reality will always remain more complex than model assumptions can possibly be.
- Aspects that would have been worthwhile considering such as land availability due to agricultural decline or the level of real estate prices were also not covered in the database to a degree that would have allowed an Alpine-wide analysis in view of land resource demand.

- The clustering contains municipalities that feature indicator values which suggest some degree of demand for land resources. A comprehensive field-check of the cluster categories, however, has not been carried out within DIAMONT. Therefore, the classification to a certain category does not necessarily mean that in every single case these municipalities do in fact have a disproportionate land demand. In single municipalities, the opposite could be the case; municipalities that are subject to increased pressure on land resources could already have developed strategies how to limit excessive land resource demand while remote municipalities might still be unaware of the problem and thus might feature much higher rates of land conversion.

But despite these restrictions, summing up, the results and the significance of the problem-oriented cluster can be characterised in the following way:

- The clustering is transparently reflecting three variables that are undoubtedly related to an increased pressure on land resources – proximity to core cities and their labour markets, above-average population dynamic and a disproportionately young population.
- The approach supports the general concept that the analysis of Alpine-wide data can reveal specific problem-oriented patterns in the Alpine Convention area across national borders even if they are caused by complex factors.
- The result that high coincidences of driving forces for land demand occur also in rural areas outside of the catchment of core towns suggests that land resource management is not restricted to the immediate surroundings of core towns.
- Such an analysis can provide the basis for common, transnational investigations of this subject and the comparison of specifics between countries.
- The restrictions affirm that efforts for harmonising and linking existing data at national level are promising and should be enforced. A more comprehensive harmonised data set would allow more precise analyses to be carried out.

6 Instruments for Land Resource Management at Regional Level

6.1 Alpine-wide collection of instruments

The collection of suitable instruments dealing with the subject of land resource management was carried out in three steps according to the following methodology:

- As a pilot action, national instruments for Germany are collected and a preliminary typology of these instruments is developed
- Based on these first experiences, coherent guidelines for the collection are described in a guideline paper to ensure a standardised research procedure among partners.
- The collection of instruments itself was conducted by partners within the DIAMONT project (cp. Tab. 6.1:) according to the guidelines in order to benefit from the local knowledge and the language skills of the project consortium.

Country	Partner
Austria	Institute of Geography, University of Innsbruck (Valerie Braun, Michael Beismann)
Germany	Bosch&Partner/ifuplan (Stefan v. Andrian-Werburg, Claudia Schwarz, Florian Lintzmeyer)
France	Cemagref (Vincent Briquel)
Italy	UNCEN (Loredana Alfare, Marco Zumaglini)
Slovenia	AMGI (Janez Nared, Mimi Urbanc)

Table 6.1: Instrument research

Collected data are stored in a common online database (cp. Ch. 7). Due to the differing perception of the thematic field in dependence of the situation in the test regions, the database entries vary from country to country.

6.2 Categorisation of instruments

Issues of land resource management are considered to play an important role in future municipal policy, more than half of Alpine mayors consider it to be of very high or high relevance (cp. Ch. 6.5.1). In this context, in the countries belonging to the Alpine region a broad range of instruments is either directly or indirectly influencing land use and management of land resources. The screening of existing development instruments in the Alpine countries and the analysis of respective literature led to a classification of instruments into the five types presented in the table below (see Turowski et al 1999, Lendi 2003, ARE 2004, ARE/UVEK 2003, Rogall 2002, Keiner 2003, Jörissen & Coenen 2007).

All these different types of instruments are applied at different spatial levels (EU, national state, federal state, region / district to municipalities) and by a broad variety of stakeholders and actors (politicians, administrative boards, economic actors, NGOs etc.) (cp. Fig. 6.1 and Tab. 6.2). Instruments have been collected with a focus on regional and/or local level of implementation. Nonetheless and as land use policies are always functioning within the stipulations of a broader framework, instruments have also been included that apply at federal state and national level.

After the overview provided in Tab. 6.2 the different categories are introduced in according subchapters describing their different forms, conventional and innovative approaches. These instruments often are not applied in an isolated manner but are interlinked or may contain elements of different instrument categories.

For example spatial planning instruments such as a land use plan are based on a legal framework, but offer the municipality the possibility to apply their legal codes for the regulation of local details. In the planning process the participation of stakeholders and the public is foreseen, and if appropriate also participatory approaches such as “future workshops” with citizen may be part of the process.

The SWOT-analysis of strengths, weaknesses, opportunities and threats at regional level together with drafts for regional spatial planning may start as a voluntary

approach of the municipalities within that region leading to a regional management which is enforced by legal codes of the participating municipalities.

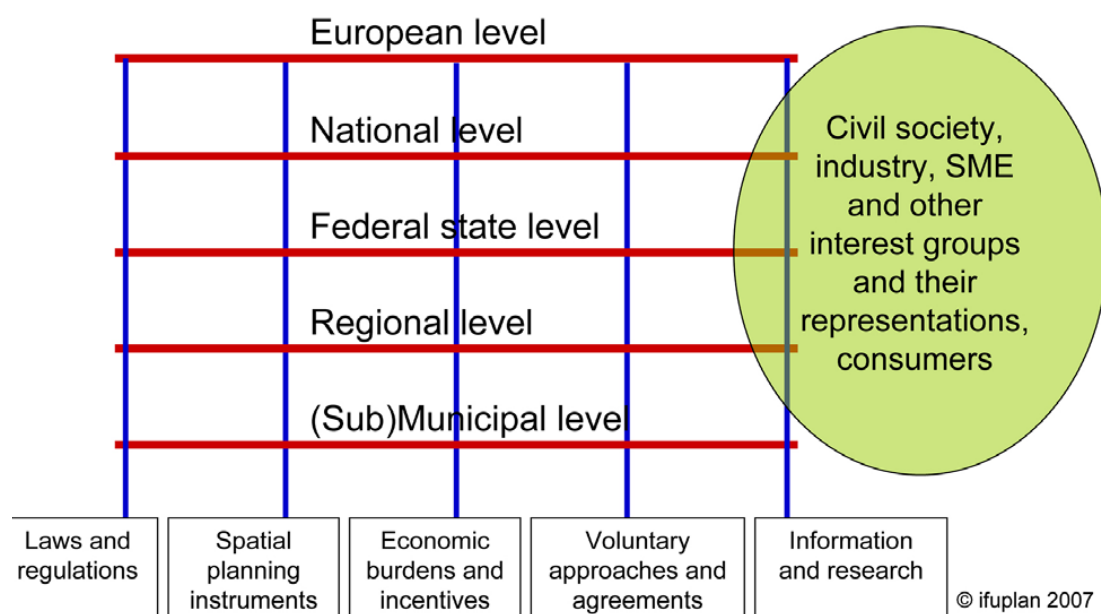


Fig. 6.1: Types of instruments

Category	Sub-category	Examples
Laws and regulations For the case of DIAMONT, predominantly laws that affect the regional and local level have been collected. The framework for concrete spatial planning on local and regional level.	Legal codes Municipalities are entitled to enact laws on local level, so-called legal codes, which constitute an executing legal norm, e.g. for construction on their municipal territory.	Municipal charter regulating construction and housing (binding regulations regarding density, number of accommodation units per plot, time limit on building permit => mobilisation of inner-city potentials)
	Laws Local, regional or super-ordinate laws directly affecting regional development	Protected Areas, Flora-Fauna-Habitat Directive, Bird Directive, Water Framework Directive, Soil Protection Directive, immission and emission thresholds etc., National Construction Law
Spatial planning instruments Planning instruments regulate the type of land use on various spatial levels.	Formal planning instruments Instruments with legally binding character, stipulating concrete localisation of spatial development options on local level.	National, federal state, regional, municipal development plans, environmental impact assessment, municipal landscape plan, principles of spatial planning
	Informal planning instruments Modern integrative and participatory planning documents and processes of generalised, advisory but legally not binding character.	Urban development concept, urban master plan, municipal landscape plan, methods of participatory planning going beyond legal requirements, citizens' panels, visioning exercises, municipal retail concepts

Tab. 6.2: Categories, sub-categories and examples of instruments (continuation next pages)

Category	Sub-category	Examples
Economic instruments Economic instruments try to support desirable behaviour by economically subsidising desirable and sanctioning undesirable behaviour in regard to sustainable development	Access fees / supply fees Fees that accrue for access to public infrastructure and services	Cost-effective fees for access to waste water treatment, road access for residential plots, electricity, gas and communication infrastructure, non-consumptive fee for road use (e.g. toll motorways in AUT and CH)
	Consumptive fees Fees taking into account the actual consumption of a collective good	Consumptive road pricing (LSVA in CH, motorways in IT, truck toll in DE), added-value-absorption of real estate after infrastructure has been improved
	Steering Taxes Tax level taking into account the costs and benefits of activities on society as a whole	Eco-tax on fossil fuels, additional tax burdens on high-emission plants and vehicles, real estate tax levied on current market value of plot => incentive to mobilise inner-urban plots for construction
	Subsidies and local business development Direct financial aid but also indirect aid through e.g. waive of fees for special user groups.	Direct subsidies: Village and urban renewal programmes (= increasing attractiveness of inner-urban areas), Financial and non-financial support (subsidies, tax cuts, provision of services, counselling) for SME and start-ups, municipally-funded public transport Indirect subsidies: Free access to public transport for students or tourists travelling without cars etc., limit subsidies for real estate acquisition
	Liabilities Municipal, federal state or national state liabilities for property damages and personal injuries accruing as a result of natural hazards, immission loads, traffic etc.	E.g. public liability for flood or avalanche damages in zones designated for construction
	Creation of markets / regional marketing Legal and institutional framework for trademark protection of certain production standards, tradable land use permits	E.g. labelling and marketing of regional products, organic products, decree regulating the use of attributes such as "Alpine" or "Mountain" for products from Alpine agriculture in Switzerland etc.
Voluntary approaches and agreements / Cooperation Bottom-up approaches try to achieve certain development goals by voluntary action and agreements between different interest groups while abstaining from state regulations and laws.	Regional management Non-hierarchical regional structure to combine efforts of the whole range of regional stakeholders in view of implementing a regional development concept. Either interpreted as a regional development agency or as a cross-sectional issue incorporated in all aspects of regional administration and government.	Regional management Belluno (IT), Gorenjska (SI), Auerbergland (DE), Pinzgau (AT)
	Voluntary, but binding contracts Voluntary accession to conventions bearing binding regulations (e.g. ban on the construction of major roads crossing the Alps as laid down in the AC)	Ramsar-Convention, Alpine Convention Urban Development Contracts between municipalities and private investors "Housing plots for locals"-Initiatives (= Einheimischenmodelle)
	Voluntary co-operation and commitments, not legally binding Commitments of individual companies, public authorities, administrative units or between user groups	National commitment to reduce land resource demand to 30 ha per day (DE) Networks, inter-regional co-operation Eco-Auditing of companies and administrative units, Soil Conservation Alliance in Bavaria (= "Bündnis zum Flächensparen") between public, private sector, and other private stakeholders

Tab. 6.2: Categories. sub-categories and examples of instruments (continuation next page)

Category	Sub-category	Examples
	Conflict prevention and resolution Resolution of existing and imminent spatial conflicts or conflicts about development goals or policy options through approaches of voluntary conflict resolution	Conflict mediation, moderation, round tables
Information, research This approach aims at improving information and public awareness about development issues.	Public relation / Awareness campaigns / Information campaigns Campaigns creating awareness about interrelations between human behaviour and actions, the condition of the environment and socio-economic conditions	Awareness campaign on the advantages of local retail "Nahversorgung ist Lebensqualität" in Bavaria and Austria, Campaign on Cultural Landscape Change (Oberallgäu/DE)
	Research and Technology Access to research and technology institutions and regional dissemination of know-how	Capacity building projects in ICT (e.g. Polo Poschiavo)

Tab. 6.2: Categories, sub-categories and examples of instruments

6.2.1 Laws and regulations

Instruments that fall under this category are characterised by a high level of predictable effectiveness. This qualifies them for the mitigation of immediately harmful processes such as the emissions of toxic substances or the standardised regulation of land use management. Theoretically, the observance of laws and regulations is easy to control, even though deficits exist in terms of implementation and execution.

As these instruments react on damages and harmful processes, their ex-post-approach is on the other hand considered to be a significant weakness. Through their long legislative process, laws and regulations are rarely at the cutting edge of new approaches and developments.¹

Compared to other instruments, they are deemed not as capable of meeting their objectives in an economically efficient way. Inflexibility, lacking dynamic and partly limited acceptance are further negative aspects of this category of regional development instruments.

Laws are either directly steering regional development or are providing the legal basis for the implementation of instruments. Legal codes are laws that local spatial entities are entitled to enact and which steer and regulate local affairs such as construction, waste and water management etc.

¹ In certain cases, however, laws can provide the necessary framework for private voluntary initiative, as was the case for the German Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz EEG).

Conventional approaches:

- Emission thresholds,
- Protected area regulations.

Innovative approaches:

- Subsequent tightening of thresholds,
- abolishment of provisions made to safeguard existing standards,
- application of prescribed techniques (use of solar energy for heating, reuse of waste heat),
- thresholds for energy consumption,
- flexible standards, e.g. a graduate scheme to limit thresholds for automobile emissions.

6.2.2 Spatial planning

Spatial planning instruments differ in regard to spatial level (from supra-national to sub-municipal), scope (from holistic spatial development concepts to one-dimensional sectoral planning) and their legal status (binding or non-binding). They are characterised by the formulation of long-term objectives and strategies and in most countries incorporate the counterflow-principle².

Traditional spatial planning concepts in Germany, France, Austria, Switzerland, Slovenia reflect the central-place-theory, i.e. the concept of development axes and of functional-spatial separation of tasks.

² Describing the principle that super-ordinate planning stipulations need to be observed on lower level and vice-versa that lower level needs to be integrated in super-ordinate planning stipulations.

Planning stipulations can be differentiated in so-called “positive” planning (zoning of land for a certain use) and “negative” planning (exclusion of land from certain uses). Furthermore, planning instruments and procedures can either be formal or informal in terms of stakeholder involvement, process orientation and legal relevance. In general, it is foreseen that land use conforms with spatial planning documents and their stipulations:

- Formal planning instruments: Instruments of legally binding character and regulated procedures on various level. As a general rule, these instruments are related with super-ordinate and subsequent planning documents according to the counterflow-principle.
- Informal planning instruments: Modern integrative and participatory planning documents and processes of generalised, advisory but legally non-binding character.

Conventional approaches:

- Spatial and regional planning according to traditional principles

Innovative approaches:

- Establishment of a municipal land stock through municipal pre-emption rights,
- re-zoning of undeveloped building land in inappropriate places,
- obligation to provide evidence that land demand cannot be met through redeveloping schemes within the existing building fabric,
- monitoring, controlling and benchmarking of land resource demand, strategic environmental assessment of land use planning,
- strengthening of supra-local planning levels (regional to national level, municipal to regional level) through supra-local and area-wide concept plans, quality objectives and standards of settlement development,
- review of the delineation of functional spatial planning entities.

6.2.3 Economic burdens and incentives

Unlike laws and regulations and binding planning documents, economic burdens and incentives are not committing stakeholders of spatial development to act in a certain direction. Nonetheless, these instruments are either financially punishing undesirable or rewarding desirable behaviour to a degree that effects behaviour modification in the sense of policy objectives. Related concepts include the polluter-pays-principle and the internalisation of external effects.

These economic instruments can further be differentiated in the following types:

- Access fees/supply fees: These are fees that accrue for the provision of access to public infrastructure and services (e.g. motorway vignette in CH and AT).

Innovative approaches:

- » Internalisation of costs caused in dependence of location where the service is provided, including supply, connection and use fees,
- » internalisation of external costs,
- » absorption of value-added,
- » road pricing.
- Consumptive fees: Fees that take into account the actual consumption of a collective good (e.g. mileage-related motorway fee in IT).
- Steering Taxes: Basing on certain ecological and spatial planning objectives, tax levels are modified to a degree that takes into account the costs and benefits of activities on society as a whole (e.g. additional tax burden on high-emission vehicles and plants, fuel tax).

Innovative approaches (cp. Keiner 2005):

- » Charges for soil sealing, building permits outside of building zones, for unused zoned building land, charges according to type and intensity of land use,
- » motor vehicle tax dependant on emission level,
- » toll on toxic substances,
- » bonus-malus-systems for energy efficiency of buildings.



Fig. 6.2: Density is a historic feature of Alpine settlements, Egga in Valais (CH) (Source:www.pixelio.de)

- Subsidies and local business development: Direct financial aid but also indirect aid through e.g. waive of fees, free consultancy services for special types of businesses (agriculture, small- and medium-sized enterprises, start-ups) or groups (e.g. builder owners).

Innovative approaches:

- » Abolishment of counter-productive subsidies,
- » promotion of soil-desealing and deconstruction,
- » promotion of redensification (cp. Fig. 6.2),
- » privileges for environmentally-friendly products (permit for low-emission vehicles in cities etc.)
- Liabilities: Municipal, federal state or national state liabilities for property damages and personal injuries accruing as a result of immission loads, traffic and natural hazards (e.g. public liability for flood or avalanche damages in zones designated for construction).

Innovative approaches:

- » Tightening of private environmental liabilities,
- » product liability,
- » environmental liability,
- » obligatory environmental liability insurance,
- » establishment of mandatory reserves for environmental damages.
- Creation of markets / regional marketing: Creation of markets for environ-

mental and spatial goods, but also for certain spatial, environmental or social qualities (e.g. quality of open space, social peace etc.). Legal and institutional framework for trademark protection of certain production standards and exchange of tradable land use permits for the use of limited resources.

Innovative approaches:

- » Establishment of land exchange markets,
- » Stock market for land use permits,
- » Tradable transit permits.

6.2.4 Voluntary approaches and agreements

Voluntary approaches try to achieve certain development goals by voluntary action and agreements between different interest groups while abstaining from state regulations and laws. These approaches frequently, but not necessarily include bottom-up-aspects:

- Regional management: Non-hierarchical regional structure to combine efforts of the whole range of regional stakeholders in view of implementing a regional development concept. Either interpreted as a regional development agency or as a cross-sectional issue incorporated in all aspects of regional administration and government. The delineation of regions here does not necessarily correspond to official planning or administrative regions but to the relevant area of common interests.
- Voluntary, but binding contracts: Voluntary accession to conventions bearing binding regulations (e.g. Protocol on Soil Conservation of the Alpine Convention).
- Voluntary co-operation and commitments, not legally binding: Commitments of individual companies, public authorities, administrative units or between user groups.
- Conflict prevention and resolution: Resolution of existing and imminent spatial conflicts or conflicts about development goals or policy options through approaches of voluntary conflict resolution which may contain participatory ap-

proaches such as round table, early involvement of local citizen and stakeholders as well as professionally moderation or mediation processes.

Conventional approaches:

- » Target formulation by spatial planning, development agencies or environmental authorities including announcement of further measures, voluntary commitments in industry, agriculture etc.

Innovative approaches:

- » Commitments to reduce land resource demand for settlement and infrastructure,
- » Negotiation and mediation in land use conflicts.

6.2.5 Information and research

This approach aims at improving information, dissemination of research results and creating public awareness about land resource management issues through reporting, labelling, and disseminating relevant information from different sources. Here the European Directive on public access to environmental information and repealing 90/313/EEC has paved the way towards a much broader participation and exchange of relevant information.

Advantages of these approaches include their high flexibility, feasibility and acceptance. They are easy to embed within existing structures. Disadvantages include the noncommittal character of these instruments and consequently their limited effectiveness.

- Public relation / Awareness campaigns / Information campaigns: Campaigns creating awareness about interrelations between human behaviour and actions, the condition of the environment and socio-economic conditions (cp. Güthler 2006).
- Research and technology: Access to research and technological institutions / regional dissemination of know-how.

6.3 Overview over collected instruments

As the collection has delivered 110 instruments in total (28.11.07), a comprehensive overview cannot be given in this report. A complete documentation of the instruments is provided in the online database, an overview of instruments sorted by country of origin is presented in Annex IV. In the following section, basic statistics of the database entries and some examples of instruments are presented.

Instruments in the different Alpine countries

Fig. 6.3 provides an overview over the national distribution of instruments. As there was no Swiss partner for WP9, the entries for Switzerland are not comprehensive, but rather selective. The Austrian partners focused their research for instruments on Tyrol, because the Austrian federal states have different planning laws and instruments and thus it was not feasible to include all nine of them. For similar reasons, Italy concentrated the research of instruments on the Autonomous Region of Friuli Venezia Giulia.

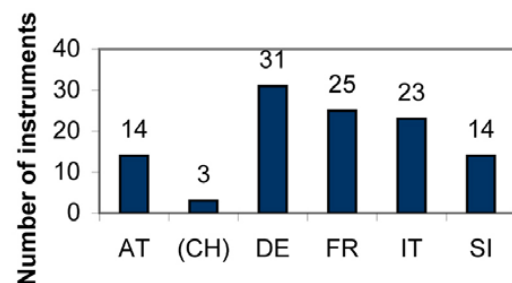


Fig. 6.3: National distribution of instruments

As the research does not claim to be exhaustive, it is not possible to deduce the general availability of instruments for land resource management for the Alpine countries from the presented distribution. The fact that Germany features more instrument entries than Slovenia thus does not allow any conclusion in regard to the overall number of available instruments.

Instrument types and subtypes

Fig. 6.4 displays the distribution of instrument categories in the database. As land resource management represents a core task of spatial planning, it is not surprising that spatial planning is the most frequent

category of instruments.

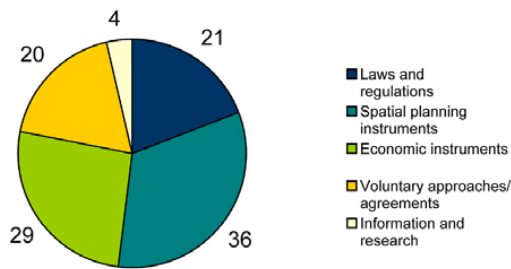


Fig. 6.4: Types of instruments in the database

Laws and regulations

The instrument type “Laws and regulations” does not only refer to the legal framework for spatial planning like the “Tyrolean Law of Regional Planning” in Austria or the “Spatial Planning Act” in Slovenia, but is also comprising laws and legal codes like the “Building order” in Germany or the “Declaration of public utility” in France.

Spatial planning instruments

34 of 37 spatial planning instruments are formal planning instruments, while only three are informal planning instruments, thus suggesting that informal planning instruments are still rather unusual in application. One example for such an informal planning instrument is the “Municipal density model” in Germany, which “...assigns differing building densities to various development areas of the municipality depending on their provision of public transport, their central-place-function and spatial category”.

Basic instruments of spatial planning such as land use planning and zoning feature widespread similarities across the Alpine bow.

Economic instruments

The second most frequent instrument type in the database are economic instruments. They can be differentiated into six subtypes as presented in Fig. 6.5. Roughly one third of the overall 30 database entries for this type are classified under the subtype “Subsidies and local business development”, distributed across all Alpine countries except Slovenia. One example is the “Reduced sales prices and rental fees charged from local companies” in France, representing “...specific subsidies whom in an autonomous way all local authorities and their groupings can allot”.

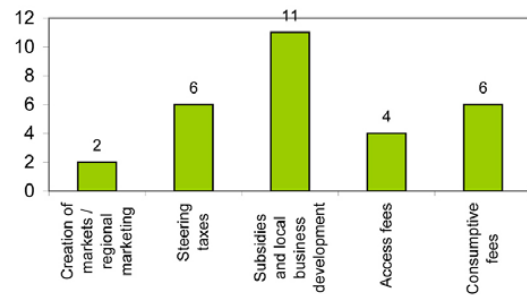


Fig. 6.5: Subtypes of economic instruments

Within economic instruments, another third are consumptive or access fees. These fees are also being applied in all Alpine countries, one example is the “Building Land Development Fee” in Slovenia which “...is a fee to partly cover costs connected with equipping building land with local infrastructure. ...”.

Steering taxes are mostly taxes on real estates or infrastructure like the “Municipal Tax on Estates” in Italy, which “...applies to buildings and plots of either cropland or building land”. Often these taxes constitute important sources of municipal revenues (cp. Ch. 4.2.5).

The subtype of “Creation of markets/regional marketing and voluntary contracts” within the framework of economic instruments is not yet very common and rather in the pilot status. E.g. in Germany as well as in Switzerland, the instrument of “Tradable land use permits” has been discussed exhaustively for several years now, but has not been implemented in practice yet.

Voluntary approaches and agreements/co-operations

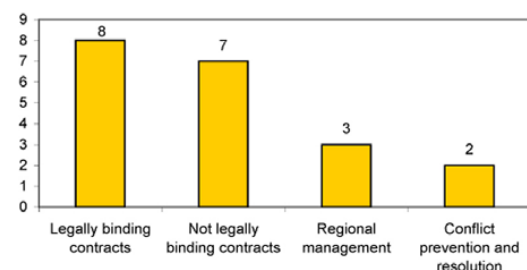


Fig. 6.6: Subtypes of voluntary approaches and agreements

20 examples for the instrument type “Voluntary approaches and agreements/co-operations” exist in the database, differentiated into legally binding or not legally binding contracts, conflict prevention/resolution

and regional management (cp. Fig. 6.6). The most frequent type of voluntary agreements are contracts between different interest groups and/or between different bodies (like municipalities). One example for a voluntary, but not legally binding contract is the “Municipal land policy resolution” in Germany, which is a declaration of municipal councils “... to give priority to inner-urban development over greenfield development. ...”. An example for voluntary, but legally binding contracts is the “Public establishment of inter-municipal co-operation” in France where “... the legislator encouraged municipalities to group together voluntarily to manage public facilities and services (waste treatment, water and sanitation, school bus services, construction and management of collective facilities, etc.) and continue to carry out joint projects, notably in the field of urban planning and economic development (residential areas, activity areas, urban renewal undertakings, etc), for which they substitute to single municipalities. ...”.

Conflict resolution and prevention

The subtype “Conflict resolution and prevention” bases in both cases on participation of stakeholders or the public, like the “Stakeholder conference” in Italy. One example for regional management is the “Contrat de Pays – Pays contract” in France. A “pay” is defined as “...any territory featuring geographic, economic, cultural or social cohesion, even if its area goes beyond the boundaries of a department or region. Bound together by a shared project, a Pays can include 80, 100 or even 150 to 200 municipalities. These entities constitute a development pool within which rural and urban areas mutually support one another. ...”.

Information, research

With only three database entries from Germany, including the “Cadastre of brownfield sites and commercial vacancies” or the “Information campaign on land use change”, the type “Information, research” is only sporadically represented in the database.

Spatial reference of instruments

As the DIAMONT project addresses issues of regional development, the intention was to concentrate the instrument research on local and regional levels. Consequently, most instruments in the database are referring to these lower spatial levels (cp. Fig. 6.7. Instruments on national level are mainly from Slovenia (nine entries), which can be explained by the size of Slovenia in relation to the other Alpine countries and the potentially smaller demand for local or regional tools.

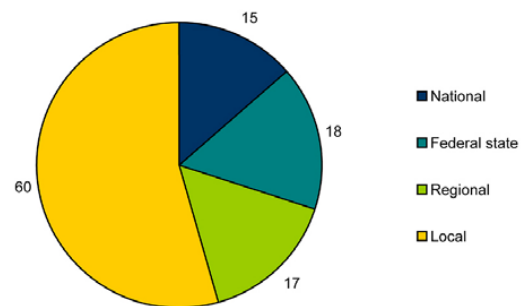


Fig. 6.7: Spatial level of instruments in the database

For Germany some instruments at national level were added, which have – or in theory would have – a great impact on land resources. However, these instruments of taxation such as the “Land use tax”, which is in discussion but not yet implemented, have to be installed on supra-regional level to generate substantial steering effects and to avoid a “prisoners’ dilemma”³ among municipalities.

The federal state level is an adequate spatial level for steering regional development in Italy (Regions) and Switzerland (Cantons). In the case of Austria, several land-related subsidies are listed referring to the federal state of Tyrol.

6.4 Best practice

As practical experiences are of particular interest for local stakeholders and practitioners, the collection of instruments is supplemented with best practice examples for selected instruments. These can be ac-

³ In Game Theory, the Prisoners Dilemma describes a situation in which rational behaviour leads actors to play defect in order to reach a maximum personal gain even though each players’ personal gain would be higher if they co-operated.

cessed in the DIAMONT database through the respective instrument or by using the search mask function “show best practice” (see Fig. 7.4). Each best practice example features a short summary in English. As the database offers the possibility to add hyperlinks or upload additional files, additional documents in the native language of the respective country are available for some best practices.

To exemplify some interesting best practices are described in the following, while a complete list of best practice is provided in the Annex V.

Rezoning of residential area to agriculture land in land use plan (AT) – The example of Zwischenwasser

The first land use plan in Zwischenwasser (drafted in 1978) had foreseen building zones to an extent that over the last decades turned out to be significantly beyond the actual demand for building land. As the municipal council realised that infrastructure costs following development would be too high, they decided in 1984 to rezone 6 ha of building land (dedicated in the zoning plan for the construction of second homes, but not yet developed) to open space. The second revision in 1988 again zoned about 15 ha open space as building land for second homes and residential houses.

In 1991 8,4 ha of building land has again be rezoned to open space. At this time 40 landowners were affected, the municipality compensated them for the preparation of the land for development, but not for the difference in prices between building land and agricultural land. Consequently, the municipality had to come up for 3,3 Mio ATS (about 230.000 EUR) in compensation payments, but received support by the federal state (Land Vorarlberg).

The rezoning decisions of 1984 and 1991 were both appealed. However, both appeals have been overruled in court on the grounds that the original zoning would lead to the establishment of a new subdivision apart from the main village, which would result in disproportionately high costs for infrastructure provision.

Municipal land policy resolution (DE) – The example of Jengen “Municipal management of land resource”

Due to its proximity to the express highway to Munich, the municipality of Jengen is exposed to high pressure on their land resources. The structural change in the agricultural sector and the increasing vacancy of farms on the other hand opens up new possibilities for inner-urban development.



Fig. 6.8 Identification of inner-urban potential, Municipality of Jengen (Source: StMUGV)

The municipal council decided to adopt a general resolution to prefer inner-urban development in the future and to minimise soil-sealing. In a first step, twelve building gaps and three former homesteads were transferred to residential and business areas. Potential areas for inner-urban development were identified in detail and registered in a geographic information system (GIS) (cp. Fig. 6.8). This is a great benefit for the administration of the municipality as they have additional information (e.g. land use plan, biotopes, aerial views, land register maps etc.) included in the GIS. Additionally, potential areas for de-sealing of soil surface have been registered.

Regional integrated development plan – Schéma de la Cohérence (SCOT), Metropole Savoie

The idea of a SCOT in general is to allow municipalities to perform a coherent policy in the fields of urbanism, habitation, the implementation of commercial equipment, transport and commuting, as well as environmental protection and nature conservation within a perimeter called “bassin de vie”⁴. It is a planning document which is 3 “Bassin de vie” is the smallest spatial entity where the inhabitants have access to infrastructures, services and employment. (Insee: www.insee.fr/fr/ffc/docs_ffc/bassins_vie/bassins_vie.htm)

implemented for 10 years.

The SCOT of Metropole Savoie (Combe de Savoie, de Chambéry et du Lac du Bourget) was set up for the perimeter of 103 municipalities and a population of about 205.000 inhabitants (1999). The region has been and still is very dynamic in terms of economic and population growth (e.g. Wachstumsrate +1,07% per year between 1990 and 1999) and had therefore a high increase of areas for settlement and infrastructure during the past decades. 13% of the territory is urbanised⁵. Between 1973 and 2000 the population increase was 36% while the increase of urbanised surfaces had a value of 112% - about three times higher than the population growth (Source: <http://www.metropole-savoie.com/>). Forecasts see a population growth of 45.000 inhabitants until 2020 for the region. Therefore the SCOT focuses on the following main tasks:

- Demography and urban development:
 - » Preparation for the immigration;
 - » Distribution of the population on the different parts of the territory;
 - » ...
- Transport for commuters:
 - » Inner-urban transport;
 - » Improve the train connections between the main agglomerations;
- Improve the road network;
- Nature protection and protection of agricultural land.

The SCOT of "Metropole Savoie" has been established in 2005.

6.5 Results from the mayors' survey

The mayors' survey of the Alpine region, conducted and administered by EURAC within WP 8, contains questionnaire-based data from 1325 municipalities across the Alpine bow.

As one part of the questionnaire, mayors have been asked to share their opinion on the situation and the future importance of

24 policy fields in municipal policy, ranging from the provision of employment opportunities over aspects of tolerance and participation to environmental protection and nature conservation.

Furthermore, the mayors were invited to share their estimation on the role different types of instruments play for the development of their municipalities. The answers to these questions, for themselves as well as combined with feedback on other topics reveals some interesting insights into the perception of land resource management in the Alpine region and the estimation of relevant instruments.

6.5.1 Perception and political relevance of land resource demand

The issue of land resource demand has been directly and indirectly part of the questionnaire, gathering information from mayors in regard to:

- the situation of their municipality in view to land resource demand for settlement and infrastructure,
- the issue's future importance in municipal policy,
- the situation of their municipality in view of endowment with semi-natural areas,
- the future significance of reserving semi-natural areas in municipal policy.

Fig. 6.9 displays the share of mayors that consider land resource demand to be an important issue in future municipal policy. Even though the issue is rated to be either an extremely or a very important policy field in more than half of the Alpine municipalities, the national results display interesting differences. Switzerland (CH), France (FR) and Italy (IT) feature below-average ratings, while specifically SI and AT and DE assign above-average importance to this policy field. Liechtenstein (LI) is somewhat a special case as it is situated in the densely populated Alpine Rhine Valley, delimited in its spatial potentials by the river course and the adjacent mountain range. Especially the high values for Slovenia (SI) are interesting to note in the context of country-specific development problems such as industrial de-

⁵ Source: http://www.metropole-savoie.com/uploaded_medias/downloads/26/Obs.SCOT%201bd-FINAL.pdf

cline and weak accessibility. On the other hand, the specific geomorphologic situation of SI (karst, relief), which limits spatial development options, is one possible explanation for the local significance assigned to land resource demand.

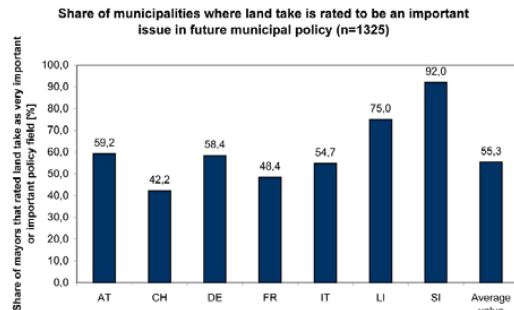


Fig. 6.9: Share of municipalities where land resource demand is an important future policy issue

* Average value calculated on national values weighed according to national population size in AC perimeter

Comparing the municipal situation in regard to land resource demand on the one hand and the provision of semi-natural areas on the other (cp. Fig. 6.10), the different perception of these two issues implies that mayors do differentiate between the conservation issue of semi-natural areas and the issue of increasing land resource demand for settlement and infrastructure. Almost 10% describe their situation in regard to land resource demand as either “bad” or “very bad”, a total of 45.5% do not describe the respective situation in positive terms.

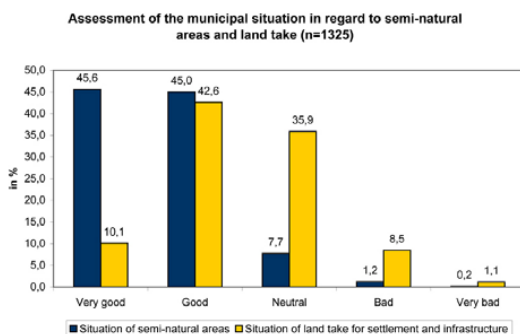


Fig. 6.10: Assessment of the municipal situation in regard to land resource demand and semi-natural areas

Differentiated according to population size, the current status of land resource demand for settlement and infrastructure is most positively perceived in larger, urban municipalities of more than 10,000 residents (cp.

Fig. 6.11).

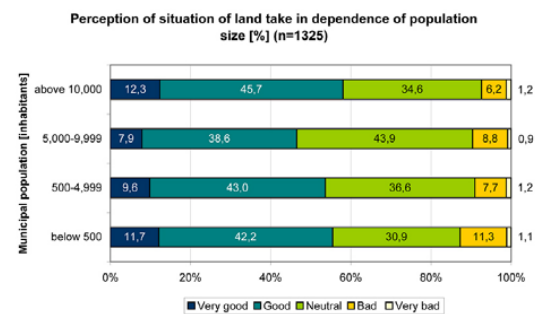


Fig. 6.11: Perception of municipal situation in regard to land resource demand in dependence of population size

Mayors from medium-sized municipalities of between 5,000 and 10,000 inhabitants express the least positive perception of the issue, while interestingly the most outright negative assessments were expressed by mayors from micro-municipalities with fewer than 500 residents. The fact that fairly similar judgements were expressed across all population categories implies that all spatial entities in the Alpine region are similarly confronted with the issue of increasing land resource demand for settlement and infrastructure. It is not an issue that is only relevant for urban areas and agglomerations.

Despite their relatively positive assessment of the status quo of land resource demand, 70% of mayors from urban municipalities of more than 10,000 inhabitants consider the issue either “extremely” or “very important”, compared to only 47.3% of their counterparts from micro-municipalities (cp. Fig. 6.11).

In Fig. 6.13, the relation between the assessment of policy importance assigned to land resource demand and to employment generation is displayed. The attitude towards the importance of employment generation is in this context considered as an indicator for a particular focus on economic growth in municipal policy. 37.4% of mayors who perceive land demand to be a policy issue of highest importance perceive employment generation to be either extremely or very important. Vice versa, only 20.8% of mayors who perceive employment generation as top-ranking policy objective assign a similar importance to land take.

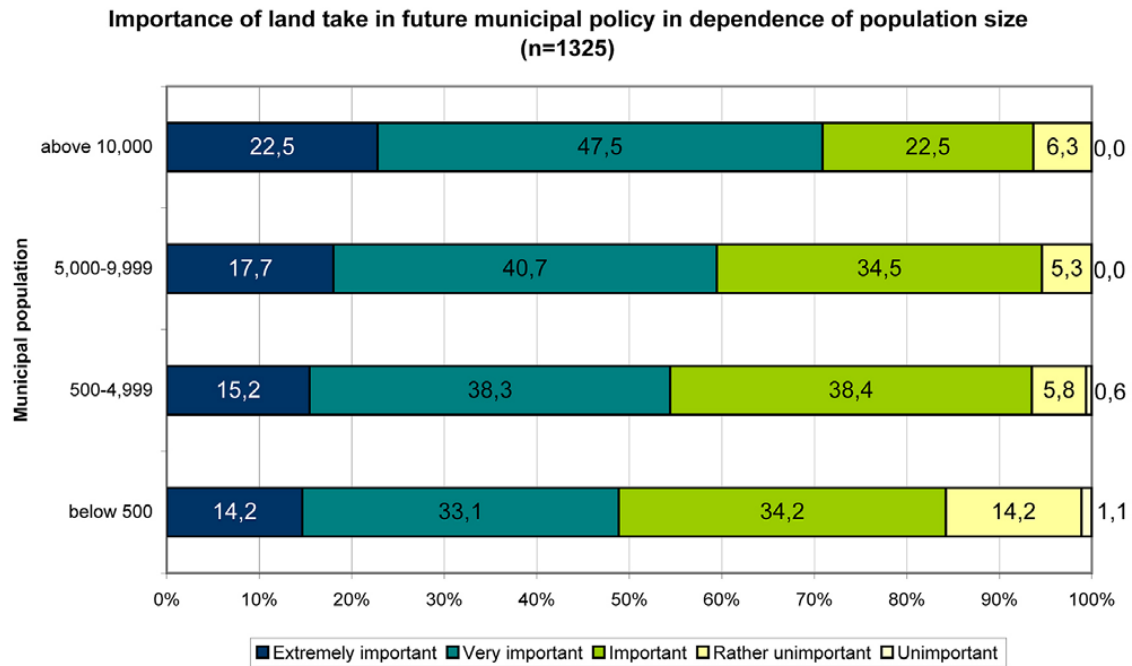


Fig. 6.12: Perception of importance of land resource demand in relation to municipal size

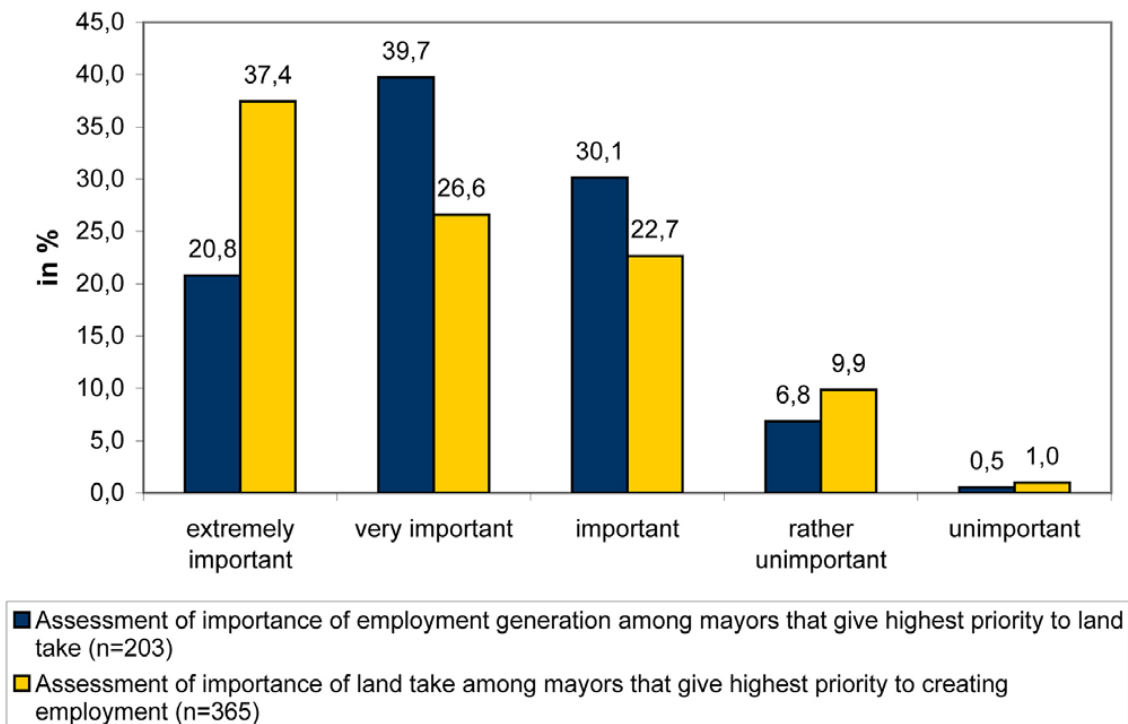


Fig. 6.13: Assessment of land resource demand and employment generation in future municipal policy

6.5.2 Land resource demand assessment and instrument perception

The mayors' instrument perception in dependence from municipal population size has already been analysed in the final report of WP 8. As a general trend, it has been

observed that mayors of larger municipalities are displaying a significantly more positive attitude towards instruments of regional development than those of smaller municipalities. The following figures illustrate the assessment of instruments as categorised in WP8. These ten categories are overlapping, but do not exactly correspond to the categorisation used in WP9 (cp. Ch. 6.2).

Interestingly, a comparison of instrument perceptions of mayors who considered land resource demand to be a policy issue of highest priority⁶ (cp. Fig. 6.14) and those who considered it to be “rather unimportant” (cp. Fig. 6.15) revealed differences in the degree of sympathy towards instruments of regional development, but not in the ranking order of instruments in regard to their importance⁷.

For both groups, the highest favourable rating was given to the instrument category of spatial planning. 30.3% of land resource demand-“sensitive” mayors rated it to be “extremely important”, another 36.7% rated it to be “very

important”; among mayors that gave secondary importance to the issue of land resource demand, 12.8% rated the instrument category of spatial planning to be “extremely important, with another 31.4% rating it to be “very important”. Both groups simultaneously rated the instrument category of “trade of use rights” to be least important.

⁶ Number of returns differs as – depending on the instrument – up to 25 returns indicated neither a rating nor the options “no opinion” and “unclear question”. For matters of better interpretability, all these three categories have been omitted from the figure, which explains why columns do not reach 100%.

⁷ 67% of the first considered spatial planning to be either extremely or very important, while only 44.2% of the latter expressed similar perceptions. Nonetheless, both assigned highest priority to spatial planning.

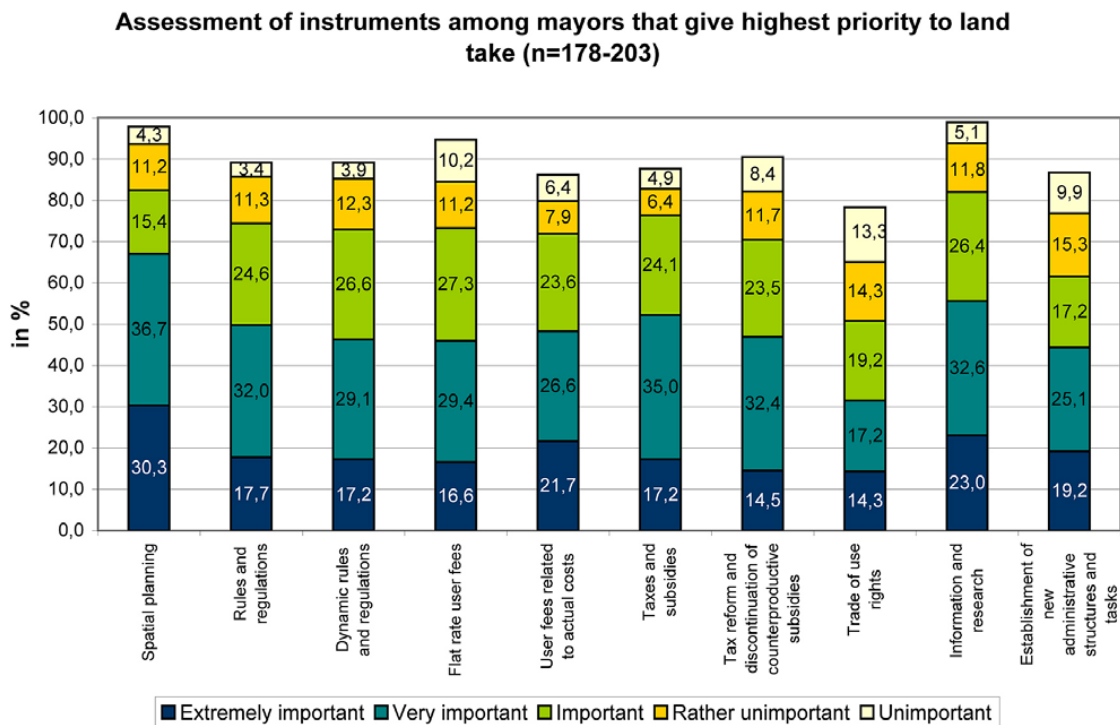


Fig. 6.14: Assessment of instruments by mayors with high priority for land demand

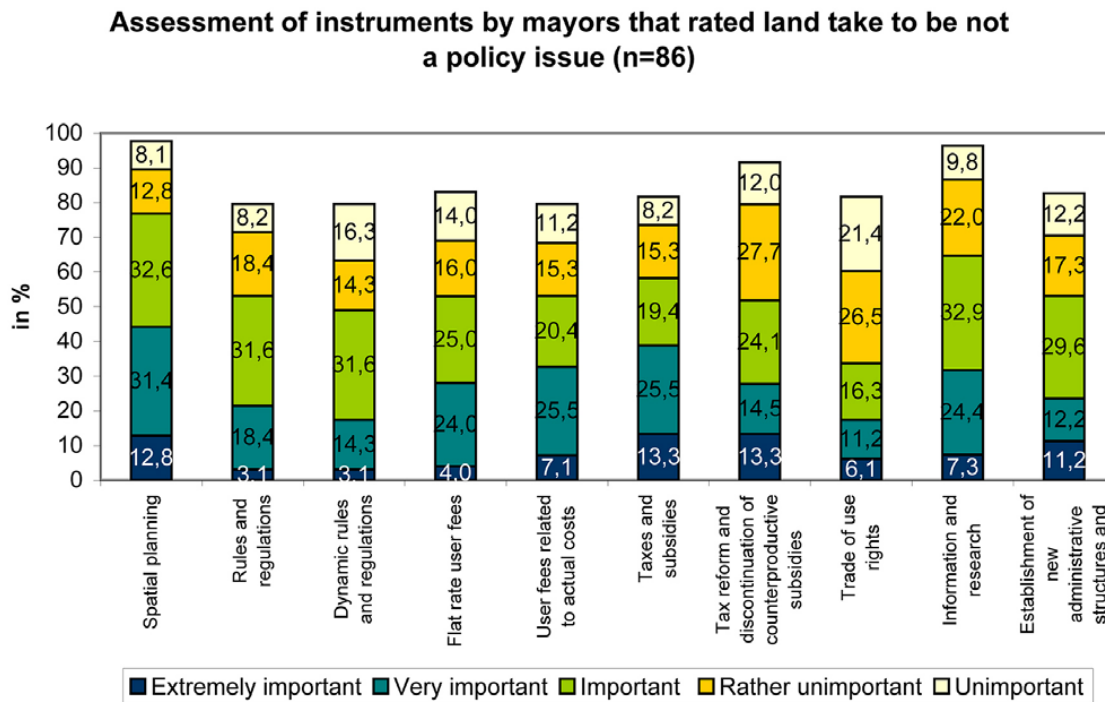


Figure 6.15: Assessment of instruments by mayors with low priority for land demand

6.5.3 Conclusions from the mayors questionnaire

The analysis of the mayors survey of land resource demand can be summed up as follows:

- Local decision-makers assess land resource demand to be either extremely or very important in more than half of Alpine municipalities.
- Significant national differences exist regarding the importance of land resource demand in municipal policy. 50% of mayors from Slovenia, Liechtenstein, Austria, Germany and Italy considered it to be highly important.
- The problem of land resource demand and of preserving semi-natural areas is considered differently in Alpine municipalities. While the situation of semi-natural areas is overwhelmingly considered to be satisfactory, the situation of land resource demand is seen much more critical.
- Medium-sized municipalities perceive their situation in regard to land resource demand most critical, while large, urban municipalities describe their situation slightly more positive.
- The smaller the municipality, the less relevance is ascribed to the issue of land resource demand in future municipal policy.
- Municipalities with high priority for land resource demand consider employment generation to be more important than vice versa municipalities with high priority for employment generation assess the relevance of land resource demand.
- Mayors expressing a high policy priority to land resource demand are holding a significantly more positive attitude towards instruments of regional development in general than those assigning below-average policy priority to the issue.

6.6 Assessment of instruments

The assessment of instruments intends to allow easier selection of the appropriate instruments, better understanding of instruments and their suitability and to foster a better transnational understanding and comparing of instruments for sustainable land resource management.

In course of the assessments it turned out that sound assessments for such an ample collection of instruments would be not fea-

sible in a satisfactory way in the given limits of the report. Therefore a twofold approach attempted to overcome existing constraints:

- In a first “baseline assessment”, all collected instruments have been assessed qualitatively according to the most decisive questions in order to provide basic selection functions for users of the instrument collection. Even if not comprehensive in terms of arising criteria this assessment delivers a coherent Alpine-wide estimation of all collected instruments.
- A second “specific assessment” – given as perspective – could be used for selected instruments to produce more in-depth knowledge and information.

6.6.1 Baseline assessment – qualitative approach

An enquiry on instrument evaluation led to several approaches used for the evaluation of policy programmes or projects, instruments and measures (EuropeAid 2006, Hildén et al. 2002, Lang 2001). An interesting approach designed for the evaluation of policies and programmes in the context of the EU external aid programmes is compiled on the internet-pages of EuropeAid⁸, where evaluation methods are described. This approach works (amongst others) with so-called “families of evaluation criteria”, which are to be considered. These are: relevance, effectiveness, efficiency, sustainability, impact, coherence/complementarity and Community added value⁹. The first five criteria correspond with the evaluation of development aid by the OECD.

Another approach for the evaluation of environmental policy instruments on national level was carried out in a case study in Finland. This used similar criteria like EuropeAid, namely relevance, impact, effectiveness, efficiency (cost-effectiveness), acceptability, transparency and participatory rights, equity, flexibility, predictability and sustainability (Hildén et al 2002).

Basing on these criteria and against the

⁸ http://ec.europa.eu/europeaid/evaluation/methodology/methods/mth_qes_en.htm

⁹ Describing whether a specific policy interventions adds value to other policy interventions from EU member states

background of the Malawi- and Adis-Abeba-principles a baseline assessment of instruments, which is presented in the following was designed for WP 9.

As mentioned, the baseline assessment of instruments within the DIAMONT project is only feasible in qualitative terms. Individual assessments were reached through a desk analysis based on the instrument’s description in the database; they are provided for the following five criteria, each related to a key question:

- Relevance,
- acceptance,
- implementation,
- feasibility and
- effectiveness.

The assessment is carried out by grading each single instrument according to five suggested criteria from 0 to 5 (effectiveness only 0 to 4), whereas “0” indicates that the criteria does either not apply to the respective instrument or an assessment was not possible for another reason indicated. The ranking can be supplemented by a short explanation and further comments in a comment field in the database.

Relevance

Key question: How relevant is the instrument in regard to managing land resources?

The relevance is differentiated in direct relevance and indirect relevance. Direct relevance refers to instruments with land resource management as their core intention, while indirect relevance refers to instruments having other policy objectives at their core, but which nonetheless have a certain effect on land resource management.

Assessment of the instrument's relevance in regard to land resource management

Ranking	0	1	2	3	4	5
Explanation	Criteria not applicable	Weak indirect relevance	Strong indirect relevance	Weak direct relevance	Strong direct relevance	Very strong direct relevance

Acceptance

Key question: To what extent do the following stakeholders and institutions accept the instrument? For the implementation and long-term effectiveness of an instrument, the degree of acceptance among relevant stakeholders is of crucial importance. The broader its acceptance, the more likely it is that the instrument is not being opposed from influential stakeholder groups.

The following range of stakeholders was taken into account:

- Municipal administration/local politicians,
- local economy/lobby groups,
- environmental NGOs,
- municipal residents/individuals,
- super-ordinate administrations and authorities (Regional Planning, Water Management etc.).

Assessment of the general attitude of above-mentioned stakeholders towards the instrument

Ranking	0	1	2	3	4	5
Explanation	Criteria not applicable	Accepted by one of the above-mentioned stakeholders	Accepted by two of the above-mentioned stakeholders	Accepted by three of the above-mentioned stakeholders	Accepted by four of the above-mentioned stakeholders	Accepted by all of the above-mentioned stakeholders

Implementation

Key question: How broad is the instrument implemented? The degree of implementation in practice allows to draw conclusions on the applicability and "user-friendliness" of the respective instrument. Therefore, the

database instruments have been ranked according to their percentage of spatial entities in which they are already being implemented.

Assessment of the instrument's degree of implementation

Ranking	0	1	2	3	4	5
Explanation	Criteria not applicable	No practical example yet due to complex requirements	Pilot projects requiring substantial staff and budget input, but no application outside of project areas	Less than 25% of spatial entities have endorsed the instrument	Most stakeholders and administrative structures are familiar with instrument, implementation in 25-50% of spatial entities	Broad implementation in almost all spatial entities, huge number of successful best practices

Feasibility

Key question: What significant requirements are necessary for the implementation of the instrument? The underlying consideration regarding this criterion is that the more preconditions need to be fulfilled, the more difficult it is to implement an instrument. In this context, six types of preconditions have

been differentiated, namely:

- Budget/hardware,
- staff,
- legislation,
- know-how,
- political will,
- participation/support.

Assessment of necessary preconditions of the instrument

Ranking	0	1	2	3	4	5
Explanation	Criteria not applicable	Provision of five of the aforementioned requirements necessary	Provision of four of the aforementioned requirements necessary	Provision of three of the aforementioned requirements necessary	Provision of two of the aforementioned requirements necessary	Provision of one of the aforementioned requirements necessary

Effectiveness

Key question: Given that the instrument is having an impact (effects from the instrument can be isolated against other processes), to which extent do the expected outcomes of the instrument correspond to its objectives? The core aspect of this criterion is the theoretic assessment of potential negative side effects and interdependencies with other instruments and processes. Particularly for this criterion, the significance of the assessment is rather limited due to the complexity of interactions between the multitude of regional development instruments. E.g. in the case of the national housing aid, the effects of this instrument depend on its funding guidelines (new construction vs. existing housing stock) and the macroeconomic framework. If interest rates in the regular money market are already low, a further impact on land resource demand through this instrument is

not likely to be measurable. On the other side, if funding guidelines of housing aid are too strict, individuals will avoid taking advantage of these state subsidies and again, an impact on land resource demand will not be detectable.

Expected outcomes in regard to the criterion effectiveness include:

- Direction of effect => Is the instrument capable of avoiding negative effects in the sense of the instrument's objectives
- Type of effect => Can the range of possible effects be controlled by the instrument?
- Acceptability => Is the process easy to steer or are outcomes heavily depending on local circumstances?
- Perpetuity => Is the instrument having a long-lasting effect?

Assessment of the instrument's effectiveness

Ranking	0	1	2	3	4
Explanation	Criteria not applicable	Instrument is fulfilling one of these outcomes	Criteria not applicable Instrument is fulfilling two of these outcomes	Instrument is fulfilling three of these outcomes	Instrument is fulfilling four of these outcomes

6.6.2 Results

The results of this qualitative assessment are presented at two levels, the level of the individual criterion and the level of the aggregated five criteria.

Results at the level of single criteria assessments

Depending on the question or task in focus, instruments are differently appropriate to address these specific tasks. The statistics of the instrument assessments allow to draw conclusions on the aptitude of different instrument categories in view of specific criteria. Furthermore, in Annex VI the highest-ranked instruments are presented for each criteria individually.

The following five graphs (cp. Fig. 6.16 - Fig. 6.20) illustrate how instrument categories have been rated in regard to the assessment criteria of relevance, acceptance, implementation, feasibility and effectiveness.

Spatial planning instruments display the most direct relevance for the issue of land resource management, while economic instruments, laws and regulations and voluntary approaches and agreements feature an almost identical degree of direct relevance (cp. Fig. 6.16).

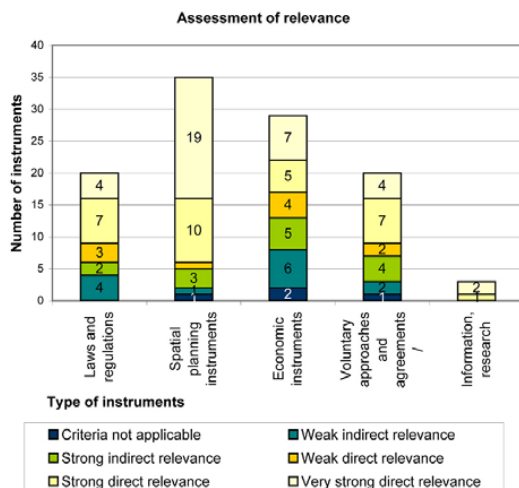


Fig. 6.16: Assessment of relevance

Apart from the category of information and research, spatial planning instruments display the highest share of ratings in the highest category in regard to acceptance, followed by voluntary agreements and economic instruments (cp. Fig. 6.17). Not

surprisingly, laws and regulations feature a rather low rating in regard to acceptance.

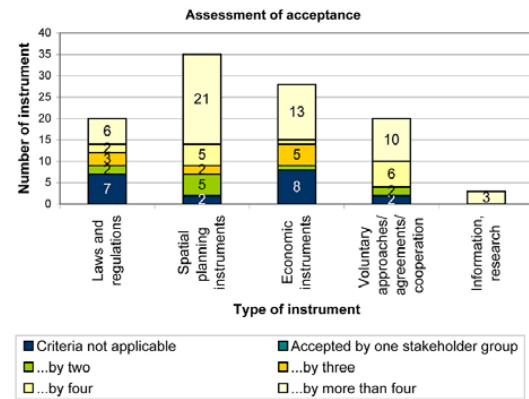


Fig. 6.17: Assessment of acceptance

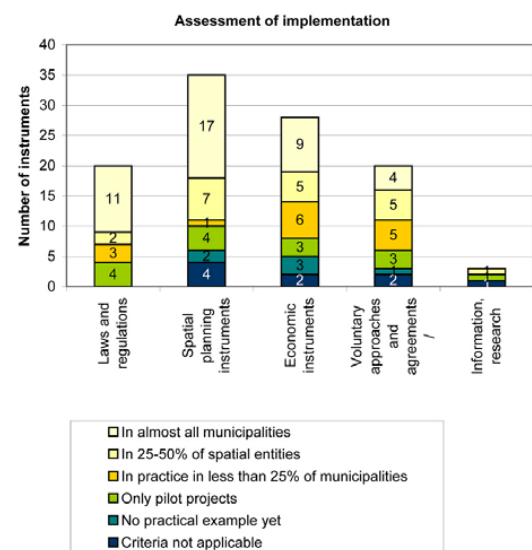


Fig. 6.18: Assessment of implementation

In regard to implementation, legal instruments are featuring the highest share of “implementation in almost all municipalities” (cp. Fig. 6.18). Voluntary approaches and agreements, on the other hand, are disproportionately often composed of instruments that are in a pilot stage or practised in less than 25% of all municipalities.

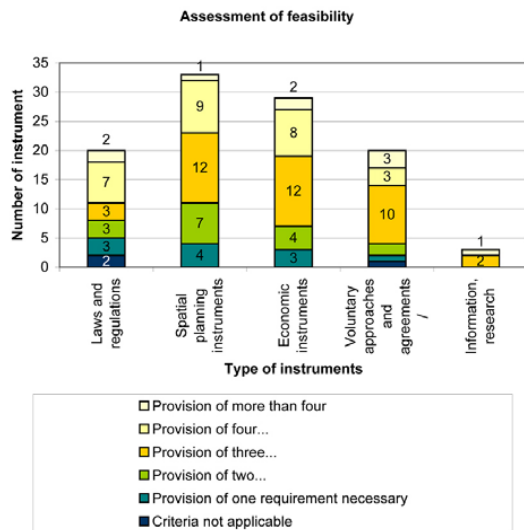


Fig. 6.19: Assessment of feasibility

Except legal instruments (and instruments of information and research), more than half of the instruments from the remaining categories are requiring less than three preconditions (cp. Fig. 6.19 and Ch.6.6.1).

In the course of the assessment, legal and spatial planning instruments have been assessed to be most effective in terms of fulfilling more than two objectives simultaneously.

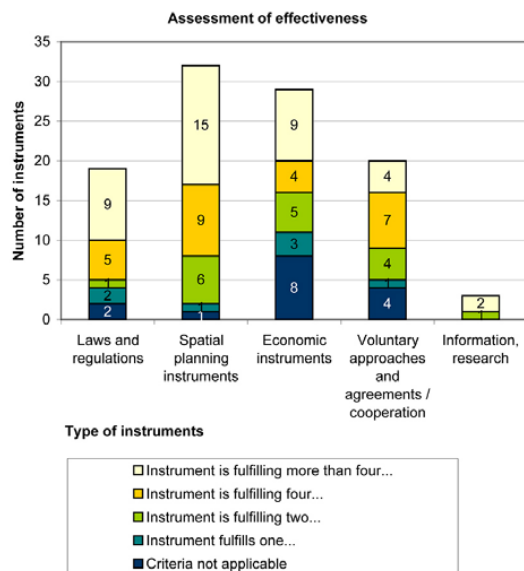


Fig. 6.20: Assessment of effectiveness

Grading scores of instrument types

The graphs displaying the distribution of grades for each category of instruments are featuring different overall characteristics (cp. Fig. 6.21, Fig. 10.2, Fig. 10.3, and Fig. 10.4).

Particularly the criteria of relevance and implementation feature a rather steady distribution across the grading scale, while acceptance, feasibility and effectiveness feature rather different class size for different grades.

Spatial planning instruments seem to be most directly addressing the issue of land resource management, while economic instruments are displaying a rather expressed weak relevance Fig. 6.21).

The feasibility of instruments was assessed according to the number of preconditions that need to be fulfilled for their implementation. Most instruments require three or more preconditions, most notably spatial planning, economic and legal instruments (cp. Fig. 10.1). In regard to the degree of implementation, spatial planning instruments, economic instruments and voluntary approaches are most broadly implemented (cp. Fig. 10.3). The effectiveness is particularly high in the case of spatial planning instruments, voluntary instruments as well as economic instruments.

Generally, only few instruments from the database are limited to one single objective; most feature two or more potential objectives (cp. Figure 10.4).

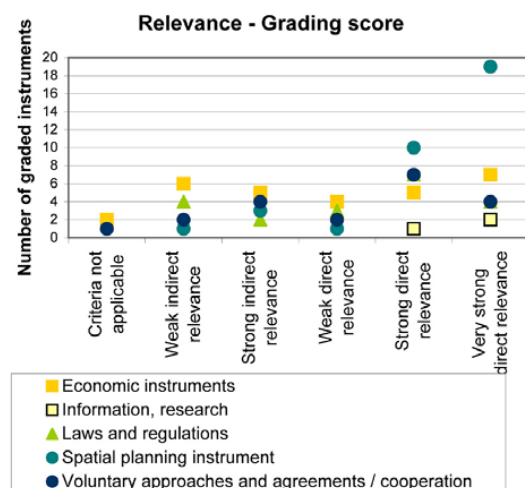


Figure 6.21: Relevance grading score

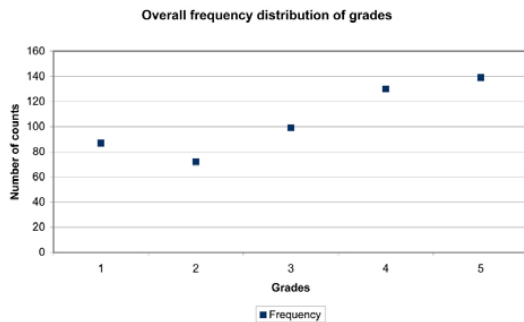


Figure 6.22: Overall frequency distribution of instrument grades

The analysis of the frequency distribution of grades for each individual category revealed that instruments are above-average scores compared to the overall mean score in the field of relevance. While the criteria of acceptance and implementation are reaching high scores at the top end of the grading scale, their medium grades are rather low. The opposite is the case for the criteria of effectiveness, which is scoring very low at the top end of the scale, but are reaching high levels in the upper middle of the grad-

ing section. The criteria of feasibility is the only criteria where high grades (4 and 5) are indicating a rather difficult implementation as they represent instruments that require more than three preconditions.

Results for aggregated criteria

Summarising all five assessment criteria, the maximum rating of an instrument would be 24 points. Reaching this score would indicate that the respective instrument ideally fulfils all five criteria. The highest score of 21 points, has been achieved by nine instruments. These highest-ranking instruments of the analysis, reaching either 20 or 21 points, are displayed in Fig. 6.23. The fact that differences even within these best-ranked instruments exist in regard to fulfilment of various criteria underlines that individual situations require a specific selection of appropriate instruments.

Additionally, for each criteria, Annex VI provides an overview of the best-ranked instruments.

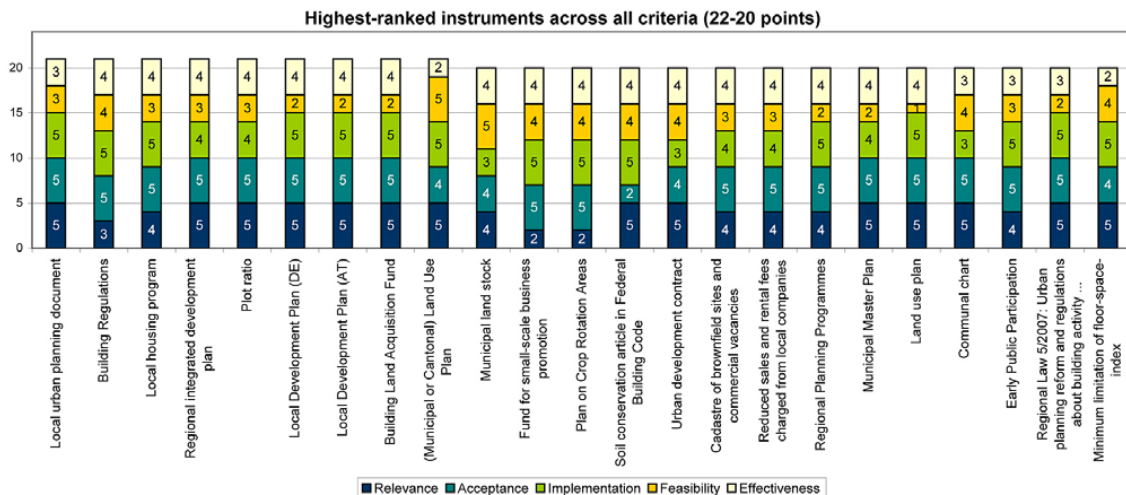


Fig. 6.23: Highest-ranked instruments across all criteria

6.6.3 Perspectives for a specific assessment

As the baseline assessment does not cover all criteria of interest, it would be desirable to amend this assessment with further criteria. Such criteria could be transparency, participation, sustainable development, control of success, effectiveness and transferability. However, these criteria turned out to be difficult to assess for several reasons pointed out in the following.

Transparency

Key questions: Are the outcomes of the instruments transparent for outsiders? To what degree are the outputs and outcomes of the instrument as well as the processes used in implementation observable to the public?

Challenge: These questions could be described only in a textual way. The entries in the database are not sufficient to estimate the outcomes of the instruments, an assessment could only base on the entries in the fields "strength and weakness".

Participation

Key question: Who is able to participate? Are all relevant stakeholders involved?

Challenge: The database already contains information on responsible authorities of each instrument and stakeholders which are additionally involved. The first of the above mentioned questions is therefore already answered with the restriction that the range of participants could differ from case to case and is not strictly related to a specific instrument, but depends more on the way it is implemented in each individual case. A ranking similar to the criteria in the first assessment is thus more difficult.

The critical point is to find an answer to the second question whether all relevant stakeholders are involved. Giving a well-grounded estimation on this point is not possible on the basis of the database entries. The global and linear assumption that the more stakeholders are involved, the better the instrument (and therefore a possible ranking) is not appropriately addressing the fact that some instruments are not based on the participation of a multitude of resorts and interest groups, but are designed for experts and

well-defined, limited development goals.

Sustainable development

Key question: How does the instrument contribute to sustainable development?

Challenge: The contribution of each single instrument to the broad field of sustainable development is not easy to estimate. Primarily this would postulate that sustainable development objectives are defined in a way that allows instrument effects to be assessed in that respect. Secondary it depends among other factors strongly whether an instrument is implemented rather insufficiently or in an ideal way.

Additionally some instruments can have effects in different directions in regard to the desired outcome. It is e.g. possible that a local development plan is very restrictive in terms of land take and urban sprawl; in this case it is significantly contributing to sustainable development, whereas in other cases it may facilitate urban sprawl and is therefore contradictory to sustainable development. A generally valid assessment of an instrument's contribution to sustainable development is thus not possible.

Control of success

Key question: Is it possible to monitor the outcomes of the instrument when implemented?

Challenge: The outcomes of an instrument are not clearly assessable, as in most cases several factors influence regional development. It is often not possible to distinguish the effects of a single instrument from other effects and circumstances like for example the economic development or demographic changes etc.

Transferability

Key question: Is it possible to transfer the instrument from one area / problem to another? Is it possible to transfer it from one country to another?

Challenge: The rating of transferability would need a detailed knowledge about the implementation preconditions in several ways from the legal framework to the institutional and financial resources needed. This information is not given in the database.

All these criteria are to be considered as options for further work with the database.

6.7¹⁰ Instruments and indicators

Originally, it has been envisaged to select instruments based on data and indicators within the test regions. Due to heterogeneous conditions found in test regions, constraints of data availability and data analysis, this turned out to be not feasible. However, the relation between instruments and indicators and starting points for linking these two elements is outlined in this chapter.

In the context of instruments for steering regional development, indicators are supposed to support the selection and application of suitable instruments in the following respect:

- Do regional or local conditions suggest the application of a specific instrument? For instance, a high amount of inner-urban brownfields would suggest the installation of a municipal brownfield cadastre.
- To which extension is a specific instrument already applied? How is the dissemination of the specific instrument? This could be indicated for example by the share of municipalities applying a specific instrument.
- What is the regional or local impact of applying a specific instrument? Is the instrument effective and successful? An increasing floor-space-index in a municipality following the application of an instrument may indicate positive effects of applying the respective instrument..

Difficulties in the assignment of indicators to instruments are expected particularly...

- due to the fact that instruments do not always have an explicit direction of their effects. This means that an instrument itself may have effects in different directions, depending on the way it is put into action. A zoning map may be implemented with low or high site density according

to the objectives of the municipality. It is self-evident that the effect in terms of land resource management can thus be different.

- Even though the implementation is carried out in a way supporting the municipalities' objectives, an instrument may be applied in a "strong" or "weak" manner, such as a simple zoning map or a qualified zoning map.

The assignment of indicators for instruments is discussed alongside selected examples. The selection of these examples bases among others on the following considerations.

Spatial reference of instruments

The instruments collected and analysed in the framework of DIAMONT are designed for different administrative units and geographical levels. Most of the instruments are prepared for the application on the regional or local level. Other instruments such as taxes or laws are installed on the level of the federal state or even on national level. This also affects the subject of indication, which needs to refer to the administrative level. For instance, it can only be verified on the national level whether the German national land use target has been achieved, so far no regional objectives have been defined quantitatively. However, the necessity of applying a local building order is determined by the framework conditions within a single municipality.

Thematic focus

Though all instruments of the DIAMONT database deal with land resource management, their thematic focus differs widely. On the one hand, regional or municipal spatial planning instruments often pursue a holistic approach considering the requirements and problems of various policy fields such as trade, commerce and industry, agriculture and forestry, environment, recreation, transport, etc.. They usually define a multitude of different objectives and guidelines for land use within their respective scope. This hinders a general assessment of their effectiveness and basically requires a detailed analysis of their aims and regulations. On the other hand, instruments such as building orders, brownfield cadastres or inter-mu-

¹⁰ Chapter 6.7 is contributed by Bosch&Partner GmbH (Konstanze Schönthaler & Stefan v. Andrian-Werbung).

municipal business parks have a very definite purpose. Hence they offer rather precise starting points for indicating the pre-conditions and the impacts and effectiveness of the instrument application.

Regarding the focus of land resource management, instruments dealing with the local level were chosen for a first qualitative estimation of indicators:

- Building order (Laws and regulations)
- Allocation of municipal compensation funds for redevelopment of brownfields (Economic instruments)
- Greenfield development charge (Economic instruments)
- Regional pool of commercial areas / industrial parks (Voluntary approach)
- Cadastre of brownfield sites and commercial vacancies (Information and research)

6.7.1 First suggestion for indicators

Some indicators elaborated in DIAMONT WP7 in the context of the main issue “Urbanization – Local centres and their hinterland between competition and cooperation” may contribute to describing the general conditions for an application of instruments such as:

- Land resource demand for development
- Efficiency of land use
- (Change of) Average real estate prices
- Increase of development areas in design-

nated zones of potential natural hazards
The change of indicator values over time can provide some basic information on possible effects of the instruments as outlined below.

In many cases, the indication of impacts and effectiveness of instruments requires a more detailed analysis below the level of a single municipality. In order to analyse causes and effects, it would be necessary to have information down to single building lots. It is yet unclear if data of this specificity are collected and available.

General positive effects	Indicator idea
Reduction of land resource demand	Change of the relation of built-up area (inner zone – “Innenbereichsfläche”) to not built-up area (outer zone – “Außenbereichsfläche”)
Reduction of derelict building lots	Change of area of derelict housing, commercial and industrial areas
Intensification of use of designated residential areas	Relation of increase of housing space in flats and houses to increase of area used for housing

Some first ideas for the support of instruments through indicators and respective fields of indication are displayed in Tab. 6.3 and Annex VII.

Indication of	Indicator idea
Building order	
Local / regional situation	Demand for building land displayed by the level of real estate prices
	Migration of population to the surrounding municipalities
Present implementation	Number of enacted and realised building orders
Envisaged effects	Change of number of unused building lots in areas with building orders
Allocation of municipal compensation funds for redevelopment of brownfields	
Local / regional situation, envisaged effects	Percentage of area of inner-urban brownfield sites to total inner zone
Present implementation	Administrative units where compensation funds for redevelopment of brownfield sites are installed
Greenfield development charge	
Required conditions	Height of charged fee
Present implementation	Number of municipalities with an installed system of charging the fee
Envisaged effects	Demand for building land displayed by the level of real estate prices
Regional pool of commercial areas/industrial districts	
Local / regional situation	Demand for building land displayed by the level of real estate prices
Present implementation	Number of regional pools of commercial areas
	Number of municipalities participating in regional pools
Envisaged effects	Relation of the change of area used for commercial purposes before and after the installation of the pool
Cadastre of brownfield sites and commercial vacancies	
Local / regional situation	Percentage of area of inner-urban brownfield sites to total inner zone
Present implementation	Number of municipalities with an installed cadastre
Envisaged effects	Percentage of area of inner-urban brown field sites to total inner zone

Tab. 6.3: Indicator ideas for instruments

6.7.2 Constraints for indicator application

Data availability

The main sources of information concerning land use, construction and related topics on municipal level are official statistics. They provide information describing the general developments, such as population development, labour market, municipal finances, etc.. Furthermore, official statistics also offer data directly related to spatial planning issues such as land take for development, land take for housing and commercial development, building permits, the situation on housing, etc..

Thus, official statistics can contribute to describe the general conditions for applying instruments within a municipality and – to some extent – also their impacts and effectiveness. Concerning the discussion of suitable indicators and data to evaluate the effectiveness of instruments, a major difficulty consists in the specificity required. Apart from being aware what processes are taking place, it is also necessary to know where they are happening. For instance, a municipality uses a building order to promote construction in inner-urban areas. Within the following years, the number of building permits and the number of apartments built does not change compared to the times before applying the regulation. The regulation

would only prove successful, if the construction activity actually took place in the inner-urban areas.

The use of Geographic Information Systems (GIS) for municipal spatial planning could perspectively provide more accurate data on land uses. The GIS could store all necessary information related to single land parcels, e.g. current land use according to statistical definitions, regulations concerning land use, etc.. The changes of land uses and building activities could be easily captured and regularly analysed in order to observe the development of the municipality and also to answer questions related to the application of instruments. But even if GIS will be increasingly disseminated among municipalities, it is questionable whether GIS will be used in a standardised way. So this data source will possibly prove helpful to analyse individual municipalities, but unlike official statistics, it will not provide a standardised and complete data basis for the whole area of investigation.

Evaluation

The use of indicators in the context of instruments could imply steps of evaluation. This refers in particular to the question of the effectiveness of instruments. With respect to an indicator-based evaluation, some general options exist, including:

- Ex-ante/ex-post-evaluations: Within one region or municipality, a comparison of the situation / development e.g. concerning land resource demand before and after the installation of the instrument could be carried out;
- a comparison to (political) objectives: Given the existence of objectives related to the use of an instrument, the current state and development could be evaluated compared to target values or the probability of achieving objectives at a fixed date in the future;
- a comparison to averages on regional or federal state level: Given that indicators base on a harmonised data source, comparisons could also be drawn between the state / development of the municipality and higher spatial levels. But as conditions often vary strongly between municipalities and regions, this compari-

son might not prove meaningful.

Regarding these options the evaluation as such is not the problem, but the question of cause and effect. Changes in land uses are caused by manifold influences, which are often beyond the steering effects of instruments. This refers e.g. to the general economic situation, the real estate prices, etc.. The evaluation of effects and effectiveness of instruments therefore requires a detailed analysis of the individual case.

6.8 First bottom up feed back to selected instruments

6.8.1 Selection of instruments for DIAMONT test regions

In the course of the first DIAMONT-workshop, partners raised the issue of land development problems in their respective test regions and discussed potential conflict-prone issues and tensions in regard to regional spatial development (cp. DIAMONT WP10/11 report). On the basis of these locally-voiced problem fields, respective instruments have been selected from the database that are addressing these issues in other spatial contexts.

Idrija

In Idrija (SI), stakeholders identified a lack of suitable construction land, isolation and different views on development as major obstacles to sustainable land resource management. In this context, it is advisable to assess, promote and activate brownfield potentials and to clarify what needs are expressed by referring to isolation and insufficient accessibility. In general, the issue of accessibility goes beyond traffic infrastructure and also includes the chances of online or mobile services. Furthermore, draining effects of improved traffic infrastructure for local businesses and services need to be considered.

By opting for opening up infertile farm land for development, locals struck a very sensitive issue in view of sustainable land resource management. Awareness needs to be raised for the spatial consequences of converting agricultural land to urban land (disperse settlements, infrastructure costs, provision of public services etc.). In a participatory planning process, the needs of the individual to find affordable land for housing would have to be balanced against other objectives of sustainable land resource management.

Problem	Instrument
Lack of suitable construction land	Cadastre of brownfields and commercial vacancies Building order Urban redevelopment measure Building.-land-acquisition-fund
Isolation and accessibility	Counter for consolidated procedure
Different views on development between municipality and industrial companies	New mountain plan Regional development plan
Opening up infertile farm land for construction	Standardised formula for assessing "organic development" for residential areas

Tab. 6.4: Development problems and respective instruments, Idrija

Waidhofen

In Waidhofen (AT), problems related to the availability of land for commercial and housing development – despite the process of demographic change – have also been identified by stakeholders. Strategies to address these problems include an assessment of inner-urban potentials and ways to politically promote them.

According to workshop participants, inner-urban neighbourhoods are suffering a decline while at the same time, suburban fringes are constantly growing, intensifying the traffic burden in the region. These divergent processes require strategies to improve the attractiveness of inner-urban neighbourhoods for families, singles and elderly, most notably strategies to provide affordable housing in the city centre. Further development of greenfield sites should be accompanied by an assessment of organic development needs of the urban region in regard to housing. In general, the motives behind peoples' wishes for bigger plots and larger accommodation units (privacy, recreation, green areas) need to be assessed and taken into consideration in urban planning. Urban Redevelopment Measures and Urban Development Contracts proved to be further valuable instruments to increase the attractiveness of inner-urban neighbourhoods and to provide affordable housing. The assessment of organic development needs and the identification of likely and municipally desirable levels of growth over

the next 20 years could also lead to rezoning of residential land to agricultural land in future land use plans. Considering the structural surplus of zoned development land in land use plans of Alpine municipalities (particularly CH, DE, AT), this issue requires effective addressing. Rezoning itself is a strongly disputed process within municipalities. Land owners affected by rezoning measures are usually strongly opposing this instrument, as it leads to significant devaluation of their land. Depending on whether the respective plot is already designated development land in Land Development Plans, the municipality is by law required to compensate land owners according to the loss of value related to rezoning.

Problem	Instrument
Lack of building land	Cadastre of brownfields and commercial vacancies
Demographic decline in inner-urban neighbourhoods and suburban growth	Urban Redevelopment Measure Municipal Density Models Urban Development Contracts Assessment of Organic Development Needs
Growing land demand despite stagnating population	Minimum limitation of floor-space-index
Steep land price gradient from center to outskirts	Municipal Density Models (as mandatory requirement in Local Development Plans) Assessment of Organic Development Needs
Co-operation only on "soft" issues (tourism, elderly, transport etc.)	Regional pool of commercial areas Land use plan on regional level
Rezoning of land zoned for development to agricultural land	Assessment of Organic Development Needs Rezoning of residential area to agriculture land in land use plan

Tab. 6.5: Development problems and respective instruments, Waidhofen

Gap

In Gap (FR), the discussion of rural-urban linkages and the issue of compensating urban centrality vs. rural contributions revealed a dichotomy between these two spatial categories. A strategy to address this polarised situation would be to develop a regional scheme of balance and compen-

sation that takes into account both centrality costs as well as public benefits provided by rural areas. The existing instrument of regionally pooling commercial areas would in this case have to be further developed in regard to balancing other external effects such as culture, recreation, natural hazard prevention, ecological compensation etc. The inner-urban accommodation potential is for the case of Gap estimated for additional 15,000 inhabitants. However, local stakeholders fear that a further densification would cause serious traffic congestion. Thus, the extension of housing capacity - based on activation schemes for inner-urban development potentials (building order, taxation of real estate based on market value, allocation of municipal compensation funds for brownfield redevelopment) – would require simultaneous efforts to establish a more frequent and comfortable public transport system. Considering resulting higher user densities and frequencies, an increased inner-urban population density would allow a much more efficient, competitive and thus economic public transportation system to be installed.

Problem	Instrument
Compensation of urban centrality vs. compensation of rural contributions	Regional balancing schemes in the sense of the Regional pool of commercial areas
Inner-urban development potential of Gap is 15,000 additional inhabitants, but once realised traffic congestion would be created	Building order Taxation of real estate based on market value (currently not foreseen by the legal framework) Allocation of municipal compensation funds for redevelopment of brownfields
Local land use planning documents ineffective in limiting excessive land resource demand	Tradeable land use permits (currently not foreseen by the legal framework) Regional Planning Stricter law enforcement of violations of existing land use plans

Tab. 6.6: Development problems and respective instruments, Gap

The fact that local land use plans are not flexible enough to contain excessive land resource demand – as reported by workshop participants – implies that ad hoc decisions prevail in local land use planning.

Apart from strengthening regional planning, procedures facilitating a broader perspective and involvement of regional stakeholders are deemed necessary.

Following WS1, the discussions were focused on defining spatial orientations to make local urban planning documents more consistent, and support all initiatives which could result in more efficient management of land resources (e.g. establishing 'communal farms' in Gap to maintain agricultural areas, rehabilitation programmes of ancient housing, extending the urban public transport perimeters off Gap limits, etc) - all of which requires more effective cooperation between communes and notably with the core city.

Tolmezzo

Like in Gap, stakeholders in Tolmezzo (IT) addressed the lack of an integrated and systemic vision and respective comprehensive planning tools for spatial development as well as institutional ineffectiveness in land management. In this sense, the basis for sustainable regional development is a certain degree of common understanding of development objectives and steps that need to be taken. To that end, a public commitment of all relevant stakeholder groups in regard to sustainable land resource management could be a starting point for more tangible measures.

According to the first workshop, tensions exist regarding cross-sectional issues of lacking representativeness in the political process. Furthermore, stakeholders voiced dissatisfaction with transparency of the political process on local level. This issue, however, represents a cross-sectional policy field, which requires instruments of participation and information dissemination across all policy fields.

Surprisingly, the issue of mountain-specific models for service provision has most prominently been discussed in Italy. Possible strategies include decentralisation strategies at all spatial levels, including retail, mobile services, "sportello unico", new decentralised approaches to primary education, energy generation water supply and waste water treatment.

Problem	Instrument
Lack of a holistic, systemic vision and comprehensive planning tools	Municipal land policy resolution Public commitment of relevant stakeholders against increasing land resource demand and urban sprawl Land use plan
Lack of adequate land for development	Cadastre of brownfields and commercial vacancies Municipal land stock

Tab. 6.7: Development problems and respective instruments, Tolmezzo

Sonthofen

The workshop in Sonthofen (DE) focused on issues of economic development in regard to land management in the test region. In this regard, the limited land potential for settlement and infrastructure was identified as a key obstacle. Limitations of development are perceived due to restrictions through flood protection and conservation whereas settlement development and these restrictions are seen as antagonistic. Competition prevails between municipalities for the location of businesses from one municipality to the other within the region.

Real estate prices are considered to be too high, especially to meet housing needs of the local population. In this respect, inner-urban densification potentials should be assessed as well as ways to promote them for municipalities. From the perspective of sustainable spatial development, the objective to reduce real estate prices requires a concept in which locations this should be accomplished. These areas should be situated within or close to built-up areas and accessible with public transportation.

Problem	Instrument
Limited land potential for settlement and infrastructure	Cadastre of brownfield potential and commercial vacancies
Natural hazards limit potential for new development	Regional pool of commercial areas
Real estate prices are too high and should be reduced	Building order Taxation of real estate based on market value Urban Development Contract Housing Aid

Tab. 6.8: Development problems and respective instruments, Sonthofen

Traunstein

Workshop participants in Traunstein (DE) shared a common perception of the problem of land resource demand in the region and the need to address it more effectively. However, individual housing and shopping preferences of the region's residents and competition between spatial entities on municipal, regional and international level (region is located next to the Austrian border) for additional residents and business relocations are perceived to pose major obstacles to effectively addressing the issue on a regional level.

On the basis of this feedback from regional stakeholders, three types of instruments have been discussed in the second workshop round. First and as a basis for further action, a common vision needs be drafted for the region in regard to management of land resources. In regard to broad participation and representativeness of this process, instruments such as public commitments by stakeholder groups and awareness campaigns pose feasible options.

Secondly and to improve the knowledge base for land management decisions, inner-urban potentials could be assessed on municipal level and demand for future inward migration in times of demographic change and business relocation needs to be realistically assessed. Municipalities need to be provided with instruments to activate inner-urban potentials and need to comprehensively apply them.

Problem	Instrument
Housing preferences and inner-urban potentials	Awareness campaigns Review of housing subsidies Building order
Knowledge base for land management decisions	Cadastre of brownfields and inner-urban potentials
Inter-municipal competition	Inter-municipal land use planning Regional pool of commercial areas

Tab. 6.9: Development problems and respective instruments, Traunstein

In order to address and sustainably modify inter-municipal competition in the region, a strategy appears to be necessary that

encourages co-operation and specialisation among municipalities.

Summary

Participants in the first round of DIAMONT-workshops described a wide range of development problems related to the availability and the management of land resources. Generally, a functioning response network to these development problems would consist of four pillars:

- Instruments that establish a knowledge base regarding land demand and inner-urban potentials,
- instruments to activate land in appropriate places,
- instruments that establish a regional balancing mechanism based on inter-municipal co-operation,
- instruments that balance the interests and needs of different stakeholder groups through participatory processes.

6.8.2 Requirements from the second feed back from stakeholders

Within the second DIAMONT workshops, local stakeholders have been confronted with instruments from the database. Based on their feedback, the following section is formulating requirements for further development of instruments from the local perspective.

In general, local stakeholders strongly supported the idea of intensified regional cooperation and the establishment of appropriate institutional framework conditions. In many cases, the regulatory framework is missing to activate local initiative in this respect.

Regional cooperation structures could facilitate the establishment of competitive spatial entities capable of efficiently managing regional development. In countries where municipal reforms are somewhat lagging behind, voluntary cooperation represents a step through which the local level can adapt to and anticipate future development. Intensified and institutionalised regional cooperation could also contribute to coordinating sometimes inconsistent spatial plans drafted by different spatial levels.

In this context, workshop participants from Italy raised the issue of legitimacy of these voluntary cooperation schemes. The issue of transparency and democratic legitimacy of these processes needs to be considered to meet the requirements of sustainability and good governance within these cooperation structures.

Furthermore, workshop participants from various Alpine countries called for improvements in the information base for land use decisions. It was argued that data that is already available should be put to use for local decision makers as well disclosed to the public.

Beyond these general requirements, individual workshops produced specific feedback to the following instruments:

- **Regional Plan of Commercial Areas:** This instrument was deemed to be the more attractive, the more municipalities join and enter plots into the pool. It requires external moderation to overcome inter-municipal competition and rivalry.
- **Differentiation of Housing Aid:** In Waidhofen, efforts are undertaken to differentiate housing aid to areas that are deemed suitable for settlement expansion.
- **-Regional Land Use Plans:** In Germany, the idea of regional land use plans was rejected by local stakeholders on the grounds that municipalities are too different to achieve a common basis. Apart from that, the political process was considered to be too complex.

6.8.3 Deficits of instrument categories

The confrontation and discussion of instruments in different test regions, with different problem fields and cultural environments allows general observations of deficits regarding different instrument categories.

Rules and regulations

The rules and regulations in the DIAMONT database are mainly representing the legal framework for spatial planning instruments and other instruments and measures for land resource management such as pre-

emption of land plots. Much easier than the identification of deficits in single framework laws is the identification of missing laws.

To give an example: Tradable land use permits on municipal level (similar to CO₂-certificates) would be an appropriate tool to limit zoning of building land to a reasonable extent on a larger spatial entity (e. g. at the level of a federal state), but it needs to be substantiated by a legal framework for its obligatory use (cp. paragraph “economic burdens and incentives”).

The building order as an example for a rather concrete regulation is considered to be useful by planners, but is not applied very often, because it is seen as a direct intervention in the property rights of the individual land owner – an act which politicians and stakeholders prefer to avoid. Consequently, the deficits in such cases – as already mentioned – are more based on lack of application and implementation than on deficits of the instrument itself.

Spatial planning

- **Limited time and spatial perspective in municipal planning**

Municipal planning is understood as serving the needs of the municipal residents, but the perspective of relevant stakeholders is in most cases limited by legislative periods. Environmental effects of increasing land resource demand for settlement and infrastructure are a result of slow processes taking place over long periods of time. Small, apparently insignificant land use changes on local level enfold in cumulative way substantial negative environmental effects.

Furthermore, municipalities are not obliged to assess their land policy in regard to effects beyond the municipal territory. The 3rd Alpine Report (CIPRA 2007:224) comes to the conclusion that a paradigm shift is necessary in regional planning, “...a greater regional perspective, which self-confidently implements regional policy and thus creates a balance to those driving forces of globalisation that contribute to strengthening agglomerations and weaken peripheral regions”. This emphasises again the need for strengthening inter-municipal

co-operation for the benefit of factually functional entwined regions like the labour market regions in the DIAMONT project. This deficit has also been identified in the Swiss Spatial Development Report 2005 (ARE 2005b:109f; ARE 2005a:29), which suggests to modify spatial planning instruments in regard to:

- » Inter-cantonal draft of Cantonal Guiding Plans (Kantonale Richtpläne) in functionally integrated territories,
 - » strengthen regional planning in Switzerland by making it binding for public authorities,
 - » mandatory co-ordination of municipal land use plans (Kommunale Nutzungsplanung) with neighbouring municipalities,
 - » review of existing building zones by cantonal and federal authorities,
 - » quotas for building zones and urban land area,
 - » requirements for the accessibility of urban areas by public transport,
 - » introduction of minimum land use coefficients.
- Structural weakness of landscape and nature conservation aspects

In the process of balancing economic, social and environmental aspects, economic advantages of land development appear to be much more tangible (tax revenues, jobs, housing units) than the calculation of related damages to complex ecosystems. Even though soil and landscape conservation is a matter of public interest, it is not of immediate concern to the local population.

- Lacking incentives for an economical and considerate use of land and soil resources

For relevant stakeholders such as municipalities and private investors, not enough effective incentives exist to make efficient use of land resources and rehabilitation of inner-urban derelict land financially attractive.

Economic burdens and incentives

When balancing the effects of the overall political framework in regard to economic incentives and burdens to sustainable land resource management, the general impression is that supportive and opposing framework conditions are counteracting each other's effects. While certain instruments are in place that promote inner-urban rehabilitation, others are having an effect in the opposite direction by subsidising commuting to work and commercial and private greenfield development.

In theory, market-oriented instruments (tradable land use permits, tradable transport permits etc.) are an effective supplement to regulatory instruments when addressing negative processes of spatial development. However, necessary legislative and institutional frameworks need to be established on supra-regional and national level that allow these instruments to be applied locally. E.g. local ceilings for land resource demand can only be calculated on the basis of regional and national development objectives such as national targets on limiting land resource demand.

Voluntary approaches

The assessment of the existing scope of voluntary and co-operative approaches to regional development in the Alpine region is revealing a commonplace - the more binding the instrument, the less frequently it is applied. While examples of shared responsibilities in water supply and waste water treatment, medical care and public transport are quite common, good examples of voluntary but binding inter-municipal commitments in regard to spatial development are virtually not existing.

Information and research

Only four instruments in the field of land resource management have been found that fall under the category of information and research. Assuming that the awareness of the policy field of land resource management and particularly the issue of land resource demand is crucial for the success and acceptance of respective measures, this instrument category holds a significant potential.

Several spatial development programmes on federal state and regional level foresee for municipal planning that existing (mostly inner-urban) potentials for development need to be utilised before developing greenfields. Judging from the degree of implementation of existing instruments for assessing potentials such as municipal cadastres on brownfields and building gaps, this information is only rarely available and updated on municipal level. It can be assumed that an improved information base on potentials within the urban fabric would modify certain land use decisions in Alpine municipalities.

6.8.4 Proposal for further development or new design of instruments

Based on the compilation and assessment of regional development instruments in regard to land resource management, the following cross-sectional needs for action are proposed:

Strengthening the implementation of existing instruments

Considering the variety of instruments theoretically applicable in the Alpine region, there appears to be an implementation deficit rather than a lack of instruments (REGALP 2004). The case of municipal land use plans illustrates this situation. Legally required in all Alpine municipalities, they are nonetheless only sporadically applied and updated in the sense of a strategic local development instrument.

Accomplishing spatial planning objectives through combination with other instrument categories

According to most spatial planning documents, planning objectives are supposed to be accomplished through spatial planning instruments. Experience however teaches that in most cases, spatial planning documents and instruments are not effective and flexible enough to comprehensively implement these objectives and thus need to be accompanied by other types of instruments, such as economic incentives, economic sanctions, participation, awareness campaigns etc.

New definition of the role of municipalities

In the course of labour division and increasing length of trips over the last decades, the perimeter of daily activities and of the Alpine population's living environment as a whole has steadily been expanded. People live in one place, shop in another and commute to a third nearby town. Leisure and recreation further expand the perimeter of everyday activities.

Despite these processes, municipalities presently are still the key and utmost decision making level in spatial development in the Alps. This role was forged and had relevance under conditions prevailing in the early and middle 20th century. Some adjustments have taken place since, such as municipal reforms in France, Switzerland and Germany, but nonetheless it is striking that policy issues of an increasing supra-local relevance continue to be mainly addressed on local level.

New challenges of supra-municipal nature have emerged, including demographic change, economic globalisation, climate change or natural hazard management which increasingly override single municipalities' abilities, budgets and problem-solving competencies. Being aware that transitions of competencies from municipal to regional level are a conflict-prone political process, it nonetheless seems to be mandatory in view of sustainable regional development in the Alps.

Strengthening of regional levels and introduction of more binding statements and commitments

Currently, there seems to be a regularity that the higher the spatial level of planning, the more noncommittal are statements and stipulations of respective document.

Voluntary initiatives are effective insofar as they go beyond mandatory requirements and experiment with new approaches, but nonetheless a framework of binding regulations on regional level is considered to be essential. This regional framework could include competencies for land use planning, commercial and business relocation and urban development.

Strengthening of a climate of “land-awareness” among political stakeholders

Siedentop et al. (2007b) assumes that a climate of “land-awareness” - meaning that politicians are sensitised for the issue, are aware of related problems and ways to solve them - is positively influencing decisions made on local level. In this context, a screening of parliamentary documents of Germany’s federal states in view of terms related to land resource demand illustrates that the issue is undergoing the typical process of the “issue-attention-cycle” , with a significant peak in 2002 and a slight decline since (ibid.).

Monitoring the development of land resources and policy efficiency

A constant monitoring of the stock of land resources and the corresponding qualities of their economic, social and environmental services is necessary as information base for a sustainable steering of land resources. This monitoring may be even more relevant for Alpine municipalities due to their limited land resources for infrastructure and settlement and special benefits of land resources.

Reliable and well selected indicators and a sufficient database will be indispensable for such a monitoring. Both has been discussed and presented in the course of DIAMONT activities in work packages 7 and 8. The fact that lack of data has in many cases impeded these efforts emphasises the need for common efforts to provide sufficient data or process existing data in a way that allows to use them on an Alpine-wide level.

The establishment of regular reporting at the level of international organisations such as the OECD, European Union and Alpine Convention with its recently published first Report on State of the Alps (RSA) illustrate that these efforts are feasible and beneficial.

7 The DIAMONT data base

The workflow within the DIAMONT project made it necessary to provide a way to document and store information that has been collected in the course of the project. The development of a project database has thus already been anticipated at an early stage of the project. Consequently, an in kind contribution by the Bavarian State Ministry for Environment, Public Health and Consumer Protection (StMUGV) allowed the implementation of a professional server-based online database.

Objectives for the data base are...

- to store relevant contents of the DIAMONT project such as indicators, data and instruments
- to describe this information on indicators and data as meta data
- to provide public access to information as far as legal restrictions permit.

Simultaneously, the Permanent Secretariat of the Alpine Convention (PSAC) initiated the first Report on the State of the Alps, which required quite similar documentation of its data. The data collected and processed within this project of the Alpine Convention is understood to be a first input for the System for the Observation and Information of the Alps (SOIA). As DIAMONT has been envisaged to provide support to the Alpine Convention as well as to SOIA, it is obvious that efforts are joined and synergies between the data documentation for data used within the DIAMONT project and the first RSA (cp. Fig. 7.1) are exploited. The database structure will therefore be compatible in relevant structures with the envisaged SOIA database of the Alpine Convention. This is safeguarded by an early and steady information exchange between DIAMONT and SOIA activities.

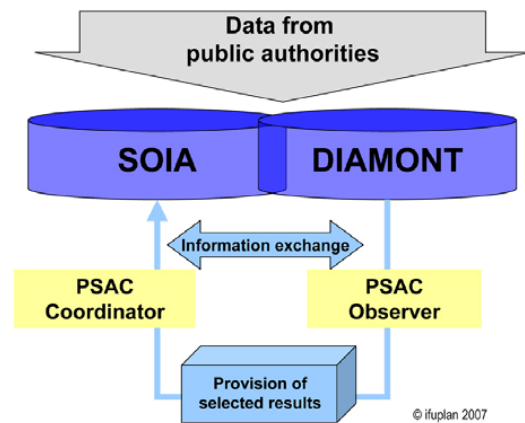


Figure 7.1: Cooperation between DIAMONT and SOIA data base activities

7.1 Basic structure and functionalities

The Bavarian State Ministry of the Environment, Public Health and Consumer Protection (StMUGV) contributes to DIAMONT by operating an xml¹-database to store results of WP 7 to 9, including indicators, data and metadata as well as instruments. The background of this database is the publicly accessible ministry's online-"Catalogue of Environmental Objects" (Umweltobjektkatalog²), already storing a multitude of different environmental information e.g. on protected areas or waste treatment equipment, but also links and addresses for further information. The DIAMONT database is built on the systematics and structure of this catalogue and is hosted by the StMUGV for public and/or for restricted access.

Classes and data base access

The DIAMONT database manages several different levels of data (cp. Fig. 7.2, organised in so-called "classes". The classes already in use are "Indicators" and "Phenomena", where all indicators and phenomena from WP 7 are documented, and "Instruments", where all instruments of WP 9 are stored. By the end of the DIAMONT project, the classes "data" and "Metadata on specific data sets" will provide the data and metadata documentation for WP 8.

¹ Extensible Markup Language, used to encode documents and serialise data for data sharing via the internet.

² Cp. www.uok.bayern.de.

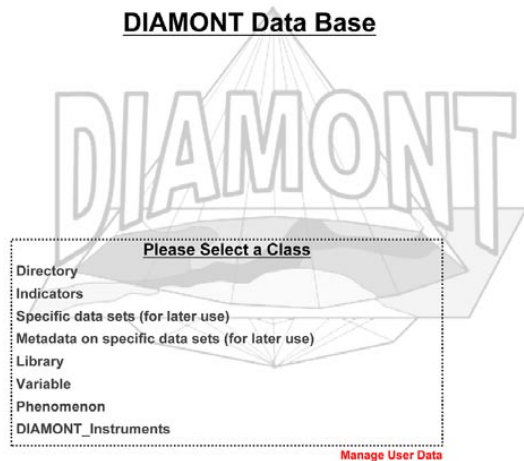


Fig. 7.2: The selection of a database class

Access to the database from the internet is restricted, but all partners of the DIAMONT-project received an individual login, which allowed several users to simultaneously work on the database. Each partner can feed the database and comment entries of the other partners. In return, these comments are visible for all, but they can only be edited by the respective author. This facilitates a permanent exchange (besides meetings and e-mails) during the working process instead of only exchanging final results.

Basic structure for indicators and data

Results of the Working Group “Environmental Objectives and Indicators” (WG EOI) of the Alpine Convention constituted the starting point for the development of the DIAMONT database. In its final report to the Alpine Convention, the WG EOI proposes a set of indicators as well as a respective metadata structure (WG EOI 2004), which reflects data documentation structures in different European reporting systems. Starting from the needs within DIAMONT, three different metadata documentations are comparatively analysed by ifuplan, following a proposal of the Permanent Secretariat of the Alpine Convention. This database structure includes:

- the structure of the WG EOI,
- the database used for the study “Mountain regions in Europe” (Nordregio 2005) and
- the database study of the network of Alpine Protected Areas (ALPARC).

The analysis delivered as a result the

proposal of a first database structure, which was presented by ifuplan at a meeting of DIAMONT partners in December 2005 at the Bavarian Ministry for Environment, Public Health and Consumer Protection (BaySt-MUGV) in Munich.

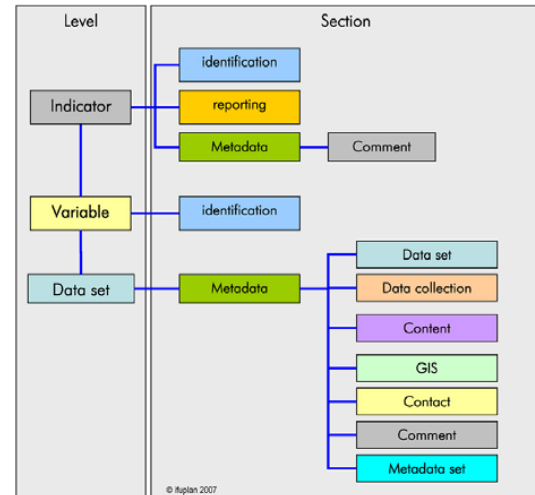


Fig. 7.3: Basic structure of class indicator and data

Class Indicator

In the class “indicator” the indicators collected and described within WP 7 are presented. Based on the first structure, the database structure has been further elaborated by DIAMONT partners Bosch&Partner GmbH and ifuplan according to the needs of the DIAMONT project. In particular the documentation was enlarged at the indicator level to give a better documentation of the theoretical framework within DIAMONT consisting of “main trends”, “pillars” of sustainable development, “phenomena” and “dimensions”. The objective was to give a documentation and working environment for the description of indicators collected for DIAMONT (for details cp. Schönthaler&von Andrian-Werburg 2007).

Class data

The class “data” is dedicated to Alpine-wide data, collected at municipal level (LAU 2 according to the NUTS). These data collected within DIAMONT are in many cases subject of legal restrictions for dissemination, user rights for third parties or other constraints, as these data have been bought on a purchase basis by responsible project partners or have been delivered by project partners from other projects but being subject to

similar restrictions. Data presented in the DIAMONT data base are therefore in many cases calculated results not underlying these restrictions, derived from harmonised and processed original data sets. The data set structure provides the information which is proposed as information on the data sets in the database.

The metadata structure provides most of the information proposed as metadata for the data sets.

Class Instruments

The class “instruments” contains the documentation of instruments for sustainable regional development and is presented as major subject of WP 9 in Ch. 7.2.

Search and print functionality

For the search of single instruments or groups of them, a search mask is implemented (cp. Fig. 7.4), offering search functions according to country, type or subtype, certain spatial levels (national, regional, local etc.) and even a full text search.

Fig. 7.4: The search mask

In case users prefer to read print-outs instead of an online-documentation, the instrument-database offers the possibility to create a PDF from each single instrument using the “show print version (PDF)” in the upper right corner of the form.

7.2 The database class “Instruments”

One of the main goals of WP9 is to compile instruments to steer sustainable regional development (cp. Ch. 3.1). As each partner holds deeper insights in the country-specific planning and regional development system, ifuplan as WP-leader for WP9 coordinates the partners to contribute to this collection

of instruments for their respective country or region and uploads the majority of German instruments. A database form-sheet has been developed to accomplish a standardised documentation of each single instrument. This form (cp. Fig. 7.5) contains the following six sections for description:

- **General data:** This section provides basic information on the respective instrument (title in English and native language). Further information about the country, spatial level (national to local), type and subtype (see chapter 6.2), a short description, general objectives of the instrument, general objectives in keywords, responsible body/ies, stakeholders involved and a reference to the source is given, ending with a general assessment of strengths and weaknesses of the instrument by the author of the entry.
- **Metadata:** This section includes the name of the author and the date of the entry as well as the author and date of the first analysis of the instrument (see chapter 6.5).
- **Implementation:** The legal status (mandatory or not), the extension of the instrument (in classes (from all municipalities to pilot status), a comment and the type of monitoring is estimated in this section by the author of the instrument entry.

Fig. 7.5: Screenshot from the database-form (part 1: General data)

- Characteristics: This field contains pre-conditions for the implementation of the instrument, its period of validity and a general comment from the author of the entry. If available it is foreseen to supplement the instrument description with a best practice example. A best-practice example includes its title and an abstract in English, usually written by the author of the instrument entry, as local best practice examples are in general only documented in the native language. Additionally to this abstract, further files (either in English or in the language of the respective country where the instrument is applied) can be uploaded to the database server, providing additional information to interested stakeholders. It is also possible to add several best practice examples to each instrument.
- Assessment: These assessments of various aspects of instruments are explained in detail in chapter 6.5. They are carried out by ifuplan as WP-leader.
- Group comments: This last section allows each user to comment the entries of other authors.

Altogether, 20 fields of entry are describing the instruments in the database. To structure the partners' contributions, several fields are formatted as multiple choice fields or offer a selection of entries (e.g. concerning the country, spatial level, type, subtype etc.). All partners fed their instruments directly into the database.

8 Perspectives for Future Steps

Constraints and shortcomings

Lacks for specific development problems

From the comprehensive, Alpine-wide approach, several shortcomings arise in view of this work package. In regard to thematic scope of instruments, we have intentionally excluded instruments without immediate relevance for the issue of land resource management. Therefore, the collection of instruments should not be regarded as comprehensively reflecting the range of regional development instruments in the Alps. Considering the diversity of development paths that Alpine municipalities are currently undergoing, individual regions might be facing different policy issues that could not be reflected in the compilation carried out within this work package.

In-depth analysis of instruments based on field experiences

As outlined above, the assessment of instruments is not intended to replace a more in-depth analysis of each individual instrument. The advantage of the brief analysis presented in this report is that it has been carried out in a uniform way based on secondary literature and information provided by the project partners. To meet the requirements of a detailed evaluation, however, this assessment would need to be substantiated by first-hand-experience from the field based on a coherent structure.

Future steps

Data base promotion

This report has provided an Alpine-wide assessment of regional development instruments at different geographical scales – from national level down to the sub-municipal level (e.g. building order). A dynamic database on regional development instruments has been established, which provides the opportunity to update and modify instruments on a continuous basis. To put this database to use, a significant amount of promotion effort is necessary to communicate it to local and regional stakeholders.

Update and extension of the data base on instruments

In its current state, the database represents merely a snapshot of the situation at the point in time of the project. Thus, to make full use of the dynamic options such a database provides and to track recent changes and further evolution in regional development instruments (implementation of innovative instruments, best practices, expiry of instruments etc.), efforts should be undertaken to ensure it is updated and amended on a regular basis.

Amendment of further policy fields to the database

Despite the selection of the cross-sectional issue of land resource management, crucial policy fields of regional development remain that are not covered by respective instruments in the database. Looking ahead, the transnational approach and exchange of regional development would be enhanced if further policy fields could be supplemented in the database.

Encouragement of quantitative basement for demand-driven resource management

“New policy interventions to counter sprawl could be focused on the need to supplement the logic of the market and be based on demand-driven rather than supply-driven management.” (EEA 2006:38)

Particularly regions that are facing economic decline and/or outward migration are tempted to address this downward spiral of decline with generous zoning of new construction land for commercial and residential purposes. The underlying expectation of this supply-driven strategy is that eventually businesses and residents will fill up these areas. Thus, and according to the DIAMONT compilation of instruments of land resource management, land use decisions in the Alps are until now not obliged to base on a quantitative assessment of demand. By not taking into consideration this important information, options for sustainable land resource management are often not recognised and by far not sufficiently weighed in the decision-making process.

New challenges for land resource management

The system of regional development, its challenges and opportunities, is not static and thus subject to constant change. What is perceived to be of major importance today and in the near future might play a comparably minor role in ten or twenty years from now. Therefore, a general objective of regional development is to remain anticipative and responsive to changing framework conditions. In this sense, an efficient use and management of land resources that safeguards future options is at the core of a responsive spatial development scheme.

In the public debate, possible outcomes of climate change dominate nowadays, and it seems worthwhile to pay major attention to this field. In this discussion, however, other major trends with significant implications on spatial development have temporarily taken a back seat, but remain nonetheless virulent. Demographic change, (amenity) migration, and fragmentation of spatial development continue to pose challenges to regional development and have to be addressed effectively and efficiently through appropriate instruments.

Climate change adaptation strategies

Overwhelming evidence is suggesting that climate change will continue to be a driving force for changing framework conditions of regional development in the Alps well into the next century. Sporadically, instruments have already been developed and are being applied to address related challenges such as mitigation and adaptation of settlement and infrastructure to natural hazards, adaptation of public infrastructure (hospitals, care homes, education facilities) to changing climate conditions (particularly heat), adaptation strategies in (winter)tourism, water supply in the Southern Alps etc..

However, there still continues to be an obvious and urgent need of disseminating new approaches, appropriate instruments and best practices across national borders and into every region of the Alps.

Yet, parallel to the incrementalistic approach of disseminating best practices, the dimension of climate change effects on the Alps

also requires a new conceptional framework for spatial development. In this context, the Climate Declaration that the Alpine Conference adopted at its IX. Meeting in Alpbach (AT) in 2006 calls for adaptation strategies in the field of land use planning and co-ordination of spatial planning measures as well as for Alpine-wide exchange of experience on adaptive measures. The Alps as an early-warning-system for climate change effects are thus in the position to develop, implement and export innovative policy instruments of spatial development to cope with climate change.

Demographic change

Effects of demographic change, ageing of population, growing population in metropolitan regions versus the out-migration of peripheral rural areas, as well as amenity migration of the wealthy segments of society will require consistent policy objectives and effective management practices for the Alpine Space to balance regional development and land resource management.

Sharpening competition of land use conflicts

Land resources for settlement and infrastructure are scarce in the Alpine area. Besides space, the economic potential of soil appears as a neglected resource that is predicted to regain importance in face of strong competition for land and soil quality. A strongly increasing demand for productive soil to produce biomass for food, energy and as industrial high-tech raw material is forecasted (Weber & Seher 2006). Under these conditions, land use conflicts will be intensified, particularly as productive land is limited to specific natural and topographic conditions. Yet, it will also open up new development options for regions and landscapes, requiring a careful assessment of benefits and risks.

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I Abbreviations

AC	Alpine Convention
AMGI	Anton Melik Geographical Institute, SI
ARE	Federal Office for Spatial Development (Amt für Raumentwicklung), CH
AT	Austria
BayStMLU	Bavarian State Ministry for Spatial Development and Environment (Bayerisches Staatsministerium für Landesentwicklung und Umweltfragen)
BayStMUGV	Bavarian State Ministry for Environment, Health and Consumer Protection (Bayerisches Staatsministerium für Umwelt, Gesundheit und Verbraucherschutz)
BfN	Federal Nature Conservation Agency (Bundesamt für Naturschutz), DE
BVMBS	Federal Ministry of Transport, Building and Urban Affairs (Bundesministerium für Verkehr, Bau und Stadtentwicklung), DE
CBD	Convention on Biological Diversity
CEMAGREF	CEntre national du Machinisme Agricole, du Génie Rural, des Eaux et Forêts, FR
CEMAT	European Conference of Ministers responsible for Regional Planning
CH	Switzerland
CIPRA	Commission Internationale pour la Protection des Alpes (Internationale Alpenschutzkommission)
DE	Germany
DIACT	Délégation interministérielle à l'aménagement et à la compétitivité des territoires (Interministerial Agency for Spatial Planning and Competitiveness), FR
DIAMONT	Data Infrastructure for the Alps – Mountain Oriented Network Technology
EC	European Community
ESDP	European Spatial Development Perspective
EURAC	European Academy Bolzano, IT
FIG	International Federation of Surveyors
FR	France
ICT	Information and Communications Technologies
IT	Italy
LAU 2	Local Area Unit 2 (replacing NUTS 5 as technical term for the municipal level)
LI	Liechtenstein
LSVA	Mileage related heavy vehicle toll
MIV	Motorised Individual Traffic
NGO	Non-Government Organisation
NUTS	Nomenclature des unités territoriales statistiques (Nomenclature of Territorial Units for Statistics)
ÖIR	Österreichisches Institut für Raumplanung
PDF	Portable Document Format
PM10	Particulate matter < 10 µm
PPP	Public-Private-Partnership
PSAC	Permanent Secretariat of the Alpine Convention
RSA	Report on the State of the Alps
SECO	Federal State Secretariat for Economic Affairs (Staatsekretariat für Wirtschaft), CH
SI	Slovenia
SOIA	System for Observation and Information of the Alps
UBA	Federal Environmental Agency (Umweltbundesamt), DE
UIBK	University of Innsbruck, AT
UNCEM	National Union of Mountain Municipalities, Communities and Authorities, IT
WG EOI	Working Group Environmental Objectives and Indicators
WHO	World Health Organisation
WP	Work Package

II Selection of Land Resource Management

Main Trends	Increasing land resource demand	Lack of available land for development	Traffic	Declining economy	Demographic decline and outmigration	Insufficient public services	Effects of climate change	Fragmented spatial development on local scale	Social segregation	Absorption into greater urban zones => loss of local steering competence	Representativeness of phenomenon across development problems
Phenomenon Comprehensive list of WP 7											
Provision of central and administrative functions	x			x	x	x		x		x	6
(Bad) Provision of business-related services	x			x	x	x		x		x	6
(Bad) Provision of educational services	x			x	x	x		x	x	x	7
(Bad) Provision of public transport	x		x	x	x	x		x	x	x	8
High density of communication infrastructure				x							1
High attractiveness of town as place of residence	x		x						x	x	4
Coupling of economic and population growth to space consumption	x										1
Increasing competition of land use	x	x	x				x	x	x	x	7
Increasing land resource demand for infrastructure and settlement	x	x	x				x	x	x	x	7
Lack of recreational areas	x	x	x				x		x		5
Loss of landscape diversity	x	x									2
Fragmentation of green areas	x	x	x							x	4
Loss of typical natural habitats of Alpine valleys	x										1
Declining species diversity	x										1
Limited financial options on municipal level (Orig. „Financial squeeze of the municipality)	x	x		x	x	x	x	x		x	8
Strong functional interrelation between municipalities	x	x	x			x		x		x	6
(Strong) labour market	x	x	x	x	x			x	x	x	8
Unemployment		x		x	x		x	x	x	x	7

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Phenomenon Comprehensive list of WP 7											
(Low) importance of branches of high added value and high innovative potentialities										x	1
Low importance of branches of high added value and high innovative potentialities		x		x	x						3
(Low) qualification of labour force				x	x				x		3
Unfavourable age structure				x	x		x		x		4
Population growth in the core city	x				x	x		x	x	x	6
Urban renewal									x	x	2
Low potential for social interactions				x					x		2
Low participation in democratic processes									x	x	2
Health			x			x	x				3
Impairment of human health by noise (WP7)			x								1
Low healthiness of urban lifestyle											0
Bad air quality	x		x								2
Cultural relevance	x				x					x	3
Low interest in cultural attractions									x		1
Gender inequity					x	x		x	x		4
Decreasing river water quality											0
High dependency on water importation							x				1
Low water absorbing capacity	x										1
High waste generation	x										1
Soil sealing in areas, where open spaces are already rare (WP7)	x	x	x							x	4
Loss of fertile soils (Delphi)	x	x	x								3

Main Trends	Increasing land resource demand	Lack of available land for development	Traffic	Declining economy	Demographic decline and outmigration	Insufficient public services	Effects of climate change	Fragmented spatial development on local scale	Social segregation	Absorption into greater urban zones => loss of local steering competence	Representativeness of phenomenon across development problems
Phenomenon Comprehensive list of WP 7											
Loss of fertile soils (Delphi)	x	x	x								3
Loss of retention area and flooding area for rivers by infrastructural development and soil sealing (Delphi)	x	x	x				x				4
Damages to Alpine scenery due to uncontrolled urban sprawl (Delphi)	x	x						x		x	4
Coalescence of traditional villages into suburban areas (Delphi)	x	x						x	x	x	5
Usage of hazardous zones for construction (WP7)	x	x	x				x				4
Concentration of economic power and entrepreneurial oriented decisions in agglomerations (WP7)	x			x				x	x	x	5
Sum	28	16	15	13	13	9	10	15	18	22	

III Sustainability aspects of land resource management

Pillar "Cross-sectional phenomena"	Pillar "Ecology"	Pillar "Economy"	Pillar "Society"	Pillar "Institutions"
Increasing competition of land use and	Loss of landscape diversity	Limited financial options at municipal level	Lack of recreational areas	(Bad) Provision of educational services
Increasing land resource demand for infrastructure and settlement	Loss of typical natural biotopes of Alpine valleys	(Strong) labour market	Impairment of human health by noise (WP7)	Provision of central and administrative functions
	Fragmentation of green areas	Strong functional interrelation between municipalities	Bad air quality	
	Low water absorbing capacity	Unemployment	Population growth in the core city	
	High dependency on water importation	Importance of branches of an urban economy	Unfavourable age structure	
		Coupling of economic and population growth to space consumption	(Bad) Provision of public transport	
		(Bad) Provision of business-related services	High attractiveness of town as place of residence	
			Provision of public and private services for daily life	

IV List of instruments

Instrument Name	Country	Spatial Level	Type
Cost-effective fees for technical infrastructure	AT	local	Economic instruments
Housing aid (Wohnbauförderung)	AT	federal state	Economic instruments
Fund for small-scale business promotion (= Wirtschaftsförderungsfonds)	AT	federal state	Economic instruments
Tyroleean Administrative Agency for Goal 2 Programme	AT	federal state	Economic instruments
Revitalisation of old buildings (= Revitalisierungsfonds)	AT	federal state	Economic instruments
Building Land Acquisition Fund (= Bodenbeschaffungsfonds)	AT	federal state	Economic instruments
Tyroleean law of regional planning (TROG, Tiroler Raumordnungsgesetz)	AT	federal state	Laws and regulations
Rezoning of residential area to agriculture land in land use plan	AT	local	Spatial planning instrument
Local Development Plan (= Bebauungsplan)	AT	local	Spatial planning instrument
Land use plan (= Flächenwidmungsplan)	AT	local	Spatial planning instrument
Regional Planning Programmes	AT	federal state	Spatial planning instrument
Employment Pact Tyrol (Beschäftigungspakt Tirol)	AT	federal state	Voluntary approaches and agreements / cooperation
Legal agent of nature conservation (Landesumweltanwalt)	AT	federal state	Voluntary approaches and agreements / cooperation
Regional Planning Association (= Planungsverband)	AT	regional	Voluntary approaches and agreements / cooperation
Cantonal Guiding Plan (= Kantonaler Richtplan)	CH	federal state	Spatial planning instrument
(Municipal or Cantonal) Land Use Plan (= Nutzungsplanung)	CH	local	Spatial planning instrument
Plan on Crop Rotation Areas (= Sachplan Fruchtfolgeflächen)	CH	national	Spatial planning instrument
Decentralised technical infrastructure (water, waste water, energy)	DE	local	Economic instruments
Consideration of extent of soil sealing of land parcels in the assessment of waste water fees (= Einbeziehung des Versiegelungsgrades in die Bemessung der Abwassergebühr)	DE	local	Economic instruments
Deregulation of building-related parking site requirement (= Befreiung von der Stellplatzpflicht)	DE	local	Economic instruments
Tradeable land use permits (= handelbare Flächenausweisungskontingente)	DE	federal state	Economic instruments
Taxation of real estate based on market value (= Bodenwertsteuer)	DE	national	Economic instruments
Land use tax (= Flächennutzungssteuer)	DE	national	Economic instruments
Greenfield Development Charge (= Neuerschließungsumlage)	DE	national	Economic instruments
Allocation of municipal compensation funds for redevelopment of brownfields (= Landeszuweisungen zur Nutzbarmachung von Brachflächen)	DE	federal state	Economic instruments
De-sealing concepts and programmes (= Entsiegelungsprojekte und Programme)	DE	local	Economic instruments
Cadastre of brownfield sites and commercial vacancies (= Brachflächen- und Leerstandskataster)	DE	local	Information, research

Instrument Name	Country	Spatial Level	Type
Public commitment of relevant stakeholders against increasing land resource demand and urban sprawl (= Bündnis für Flächensparen)	DE	federal state	Information, research
Information campaign on land use changes	DE	regional	Information, research
Circular Flow Land Use Management (Flächenkreislaufwirtschaft)	DE	national	Information, research
Soil conservation article in Federal Building Code (= Bodenschutzklausel im BauGB)	DE	national	Laws and regulations
Building order (= Baugebot)	DE	local	Laws and regulations
Urban Redevelopment Measure (= Städtebauliche Entwicklungsmaßnahme)	DE	local	Laws and regulations
Standardized formula for assessing „organic development“ for residential areas (= Berechnungsvorschrift des „organischen Entwicklungsbedarfs“)	DE	local	Spatial planning instrument
Minimum limitation of floor-space-index (= unteres Limit der Geschossflächenzahl)	DE	local	Spatial planning instrument
Municipal land use plan (= Flächennutzungsplan)	DE	local	Spatial planning instrument
Local Development Plan (= Bebauungsplan)	DE	local	Spatial planning instrument
Landscape Plan (= Landschaftsplan)	DE	local	Spatial planning instrument
Alpine Plan (= Alpenplan)	DE	federal state	Spatial planning instrument
Regional land use plan (Regionaler / Interkommunaler Flächennutzungsplan)	DE	regional	Spatial planning instrument
Municipal density models (= Dichtemodelle)	DE	local	Spatial planning instrument
Early Public Participation (= vorgezogene Bürgerbeteiligung)	DE	local	Voluntary approaches and agreements / cooperation
Municipal land policy resolution (= Bodenpolitischer Grundsatzbeschluss)	DE	local	Voluntary approaches and agreements / cooperation
National land use target	DE	national	Voluntary approaches and agreements / cooperation
Municipal land stock (= Kommunale Bodenbevorzugung)	DE	local	Voluntary approaches and agreements / cooperation
Municipal eco-land-account (= Kommunales Ökokonto)	DE	local	Voluntary approaches and agreements / cooperation
Inter-municipal business parks	DE	local	Voluntary approaches and agreements / cooperation
Regional pool of commercial areas/industrial districts (= Regionaler Gewerbeflächenpool)	DE	regional	Voluntary approaches and agreements / cooperation
Urban development contract (= Städtebaulicher Vertrag)	DE	local	Voluntary approaches and agreements / cooperation
Compensation for non realization of parking bays (Participation pour non réalisation d'aires de stationnement)	FR	local	Economic instruments
Local taxes raised with the profit of the communes and the intercommunal cooperation structures (Taxes locales perçues au profit des communes et de leurs groupements)	FR	local	Economic instruments
Local tax of equipment (Taxe locale d'équipement-TLH)	FR	local	Economic instruments
Direct financial supports from communes to companies (Aides financières directes des communes aux entreprises)	FR	local	Economic instruments

Instrument Name	Country	Spatial Level	Type
Reduced sales and rental fees charged from local companies (Aides des collectivités locales à l'immobilier d'entreprises)	FR	local	Economic instruments
Urban pre-emption right (Droit de préemption urbain - DPU)	FR	local	Laws and regulations
Pre-emption right of the SAFER (corporation for land planning and rural development)	FR	regional	Laws and regulations
Specific urban planning regulations in mountain communes (Dispositions particulières d'urbanisme pour les communes de montagne)	FR	local	Laws and regulations
Building permits (Permis de construire ou déclaration de travaux)	FR	local	Laws and regulations
Declaration of public utility (Déclaration d'utilité publique - DUP)	FR	local	Laws and regulations
Legal building density limit (Plafond légal de densité)	FR	local	Laws and regulations
Declaration of intent to alienate (Déclaration d'intention d'aliéner - DIA)	FR	local	Laws and regulations
Regional integrated development plan (Schéma de Cohérence Territoriale - SCOT)	FR	local	Spatial planning instrument
Local urban planning document (Plan local d'urbanisme - PLU)	FR	local	Spatial planning instrument
Communal chart (Charte communale)	FR	local	Spatial planning instrument
Protected agricultural zone (Zone agricole protégée - ZAP)	FR	local	Spatial planning instrument
Urban transit plan (Plan de déplacements urbains - PDU)	FR	local	Spatial planning instrument
Concerted development zones (Zones d'aménagement concerté - ZAC)	FR	local	Spatial planning instrument
Local housing program (Programme local de l'habitat - PLH)	FR	local	Spatial planning instrument
Plot ratio (Coefficient d'occupation des sols - COS)	FR	local	Spatial planning instrument
Local land development agency (Etablissement public foncier local - EPFL)	FR	regional	Voluntary approaches and agreements / cooperation
Contrat de Pays - Pays contract	FR	regional	Voluntary approaches and agreements / cooperation
Municipal plan of protection and management of the natural, agricultural and forest spaces (Schéma communal de protection et de gestion des espaces naturels, agricoles et forestiers)	FR	local	Voluntary approaches and agreements / cooperation
Programmed operation of improvement of housing (Opération Programmée d'Amélioration de l'Habitat - OPAH)	FR	local	Voluntary approaches and agreements / cooperation
Public establishment of intermunicipal cooperation (Établissement public de coopération intercommunale - EPCI)	FR	local	Voluntary approaches and agreements / cooperation
ATO District Plan (Piano d'Ambito)	IT	regional	Economic instruments
Municipal Waste collection Tax (TARSU - Tassa sui rifiuti solidi urbani)	IT	local	Economic instruments
Municipal Tax on Estates (ICI - Imposta Comunale sugli Immobili)	IT	local	Economic instruments
Counter for Consolidated Procedure („Sportello Unico per le Attività Produttive“)	IT	local	Economic instruments
Rural Development Plan - „PSR (Piano di Sviluppo Rurale)“	IT	regional	Economic instruments

Instrument Name	Country	Spatial Level	Type
Regional Law 1/2006: Principles and fundamentals of „Region-Local bodies interfacing system“ within the federal region Friuli Venezia Giulia	IT	regional	Laws and regulations
Regional Law 16/2006: land property rationalization and agriculture promotion	IT	regional	Laws and regulations
Regional Law 5/2007: Urban planning reform and regulations about building activity and landscape	IT	regional	Laws and regulations
Regional Law 33/2002 - Friuli Venezia Giulia's Mountain Districts (former Mountain Communities)	IT	regional	Laws and regulations
LR 20/97 Local public transport planning in the Region of FVG	IT	regional	Laws and regulations
Building Regulations (Regolamento edilizio)	IT	local	Laws and regulations
Municipal Master Plan (Piano Regolatore Generale)	IT	local	Spatial planning instrument
River Basin Plan (Piano di Bacino)	IT	regional	Spatial planning instrument
New Mountain Plan - „Nuovo Progetto Montagna“	IT	local	Spatial planning instrument
Regional (Federal) Spatial Plan (= Piano Territoriale Regionale PTR)	IT	federal state	Spatial planning instrument
Regional (Federal) Power Plan (Piano Energetico Regionale PER)	IT	federal state	Spatial planning instrument
Friuli Venezia Giulia Regional (Federal) Development Plan 2006-08 (Piano Regionale di Sviluppo PRS)	IT	federal state	Spatial planning instrument
Building Programme (Programma di fabbricazione)	IT	local	Spatial planning instrument
Local Action Plan - „Piano di Azione Locale“	IT	local	Spatial planning instrument
Stakeholder Commission (Conferenza dei servizi)	IT	federal state	Voluntary approaches and agreements / co-operation
AGEMONT Ltd (Agency for the Economic Development of Mountain Areas of FVG Region)	IT	local	Voluntary approaches and agreements / cooperation
Local Forums, Watershed Partnerships and other Stakeholders Councils	IT	local	Voluntary approaches and agreements / cooperation
Memorandum of Understanding for the Protection and Conservation of the Architectural-Historical Heritage	IT	regional	Voluntary approaches and agreements / cooperation
Compensation for use of building land (= Nadomestilo za uporabo stavbnega zemljišca)	SI	local	Economic instruments
Building Land Development Fee	SI	local	Economic instruments
Environmental tax for environmental pollution caused by waste water discharge	SI	national	Economic instruments
National Housing Programme	SI	national	Economic instruments
Slovenia's Development Strategy (Strategija razvoja Slovenije)	SI	national	Information, research
Spatial Planning Act (= Zakon o urejanju prostora)	SI	national	Laws and regulations
Nature Conservation Act (= Zakon o ohranjanju narave)	SI	national	Laws and regulations
Construction Act (= Zakon o graditvi objektov)	SI	national	Laws and regulations
Promotion of Balanced Regional Development Act (= Zakon o spodbujanju skladnega regionalnega razvoja)	SI	national	Laws and regulations
Regional Development Programme (Regionalni razvojni program)	SI	regional	Spatial planning instrument
National Development Plan 2007-2013 (Državni razvojni program 2007-2013)	SI	national	Spatial planning instrument

Instrument Name	Country	Spatial Level	Type
Regional Conception of Spatial Development (= Regionalna zasnova prostorskega razvoja)	SI	national	Spatial planning instrument
Spatial Development Strategy of a Municipality (= Strategija prostorskega razvoja občine)	SI	local	Spatial planning instrument
Municipal Spatial Order (= prostorski red občine)	SI	local	Spatial planning instrument

V Best practice

Country	Name of the instrument	Title of best practise
AT	Rezoning of residential area to agriculture land in land use plan	Municipality of Zwischenwasser (AT), Rezoning of residential area to agriculture land
AT	Building Land Acquisition Fund (= Bodenbeschaffungsfonds)	Business park of Aldrans/Sistrans/Lans
AT	Regional Planning Association (= Planungsverband)	Association for regional plannings of Aldrans, Sistrans and Lans
AT	Regional Planning Programmes	Regional Planning Programme Agricultural Priority Areas in the region 54 „Vorderes Zillertal“ (Raumordnungsprogramm Landwirtschaftliche Vorrangflächen in der Kleinregion 54 „Vorderes Zillertal“)
AT	Revitalisation of old buildings (= Revitalisierungsfonds)	Contest „Styrian Landmarks 2006“ (= Steirische Wahrzeichen 2006)
CH	Plan on Crop Rotation Areas (= Sachplan Fruchtfolgeflächen)	Monitoring of Crop Rotation Areas in the Canton of Aargau
DE	Municipal land policy resolution (= Bodenpolitischer Grundsatzbeschluss)	Municipality of Jengen „Municipal management of land resources“, Gemeinde Jengen „Kommunales Flächenressourcenmanagement“
DE	Standardized formula for assessing „organic development“ for residential areas (= Berechnungsvorschrift des „organischen Entwicklungsbedarfs“)	Project on experimental urban construction (ExWoST) by the German Federal Office for Building and Regional Planning on „municipal residential area concepts“ / „Kommunale Wohnraumkonzepte“
DE	Deregulation of building-related parking site requirement (= Befreiung von der Stellplatzpflicht)	Point-system for calculating costs for provision of parking facilities in Baden-Württemberg
DE	Municipal density models (= Dichtemodelle)	Density model as part of the Greater Karlsruhe Land Use Plan
DE	Building order (= Baugebot)	Traunsteiner bzw. Weilheimer Modell
DE	Urban Redevelopment Measure (= Städtebauliche Entwicklungsmassnahme)	Freiburg-Vauban
DE	Allocation of municipal compensation funds for redevelopment of brownfields (= Landeszuweisungen zur Nutzbarmachung von Brachflächen)	Brownfield Development Compensation Fund, Federal state of Northrhine-Westfalia
DE	Municipal land stock (= Kommunale Bodenbevorratung)	Active land policy, Municipality of Weyarn
DE	Municipal eco-land-account (= Kommunales Ökokonto)	Ecological land account on regional level, Regional Association Ruhr
DE	Cadastre of brownfield sites and commercial vacancies (= Brachflächen- und Leerstandskataster)	1. „Industrial carousel“, Municipality of Bretten 2. Brownfield cadastre, Municipality of Dueren
DE	Public commitment of relevant stakeholders against increasing land resource demand and urban sprawl (= Bündnis für Flächensparen)	Treaty against urban sprawl (= „Bündnis zum Flächensparen“)
DE	National land use target	National Sustainability Strategy „Perspectives for Germany“, Nationale Nachhaltigkeitsstrategie „Perspektiven für Deutschland“
DE	Inter-municipal business parks	Inter-municipal industrial zone „Gewerbepark Steigerwald“
DE	Decentralised technical infrastructure (water, waste water, energy)	Decentralised Urban Infrastructure System DEUS 21-Project „Am Römerweg“, Municipality of Knittlingen, DE
DE	Municipal land use plan (= Flächennutzungsplan)	1. Regional Land Use Plan Frankfurt 2. Regional Land Use Plan Urban Region Ruhr (Städteregion Ruhr)

Country	Name of the instrument	Title of best practise
DE	Local Development Plan (= Bebauungsplan)	Eco-housing development, Municipality of Flerden, Switzerland (Ökobauzone Flerden)
DE	Regional land use plan (Regionaler / Interkommunaler Flächennutzungsplan)	1. Regional Land Use Plan Frankfurt 2. Regional Land Use Plan Urban Region Ruhr (Städteregion Ruhr)
DE	Early Public Participation (= vorgezogene Bürgerbeteiligung)	Internet-based citizen participation in the city of Esslingen
DE	Information campaign on land use changes	Landscape changes in Upper Allgäu and Tannheimer Tal (Landschaftswandel im oberen Allgäu und Tannheimer Tal)
DE	De-sealing concepts and programmes (= Entsiegelungsprojekte und Programme)	Municipal contest for de-sealing and urban greening of industrial areas and private backyards / Municipality of Karlsruhe (DE)
DE	Soil conservation article in Federal Building Code (= Bodenschutzklausel im BauGB)	Rejection of the building permit for the extension of the ski area „Mutterer Alm - Axamer Lizum“ in Austria on the basis of the Soil Conservation Article of the Alpine Convention
DE	Urban development contract (= Städtebaulicher Vertrag)	Munich's Social Development of Real Estate (= Sozialgerechte Bodennutzung SOBON)
FR	Regional integrated development plan (Schéma de Cohérence Territoriale - SCOT)	Schéma Directeur de la Région Grenobloise (SCOT)
FR	Local land development agency (Etablissement public foncier local - EPFL)	Etablissement public foncier de Haute-Savoie
FR	Municipal plan of protection and management of the natural, agricultural and forest spaces (Schéma communal de protection et de gestion des espaces naturels, agricoles et forestiers)	Schéma communal de protection et de gestion des espaces naturels, agricoles et forestiers de la ville de Gap
FR	Contrat de Pays - Pays contract	Contrat de Pays du Pays Gapençais
IT	Municipal Master Plan (Piano Regolatore Generale)	Oltris and Voltois Masterplan (Carnia, Friuli Venezia Giulia Region)
IT	AGEMONT Ltd (Agency for the Economic Development of Mountain Areas of FVG Region)	MBI PROJECT
IT	New Mountain Plan - „Nuovo Progetto Montagna“	INNOREF-STRASSE Project
IT	Local Action Plan - „Piano di Azione Locale“	Comunità montana della Carnia
IT	Building Regulations (Regolamento edilizio)	Building Regulation of the Municipality of Carugate
IT	LR 20/97 Local public transport planning in the Region of FVG	CALL ME: Transport on demand
IT	Memorandum of Understanding for the Protection and Conservation of the Architectural-Historical Heritage	Memorandum of Understanding for the Protection and Conservation of the Architectural-Historical Heritage of Carnia.

VI Ranking of instruments

Highest-ranked instruments (5) in regard to "Relevance":

- Municipal land policy resolution (= Bodenpolitischer Grundsatzbeschluss)
- Municipal density models (= Dichtemodelle)
- Building order (= Baugebot)
- Taxation of real estate based on market value (= Bodenwertsteuer)
- Allocation of municipal compensation funds for redevelopment of brownfields (= Landeszuweisungen zur Nutzbarmachung von Brachflächen)
- Minimum limitation of floor-space-index (= unteres Limit der Geschossflächenzahl)
- Rezoning of residential area to agriculture land in land use plan
- Tradeable land use permits (= handelbare Flächenausweisungskontingente)
- Public commitment of relevant stakeholders against increasing land resource demand and urban sprawl (= Bündnis für Flächensparen)
- National land use target
- Municipal land use plan (= Flächennutzungsplan)
- Local Development Plan (= Bebauungsplan)
- Landscape Plan (= Landschaftsplan)
- Alpine Plan (= Alpenplan)
- Regional integrated development plan (Schéma de Cohérence Territoriale – SCOT)
- Local urban planning document (Plan local d'urbanisme - PLU)
- Communal chart (Charte communale)· Protected agricultural zone (Zone agricole protégée - ZAP)
- Municipal plan of protection and management of the natural, agricultural and forest spaces (Schéma communal de protection et de gestion des espaces naturels, agricoles et forestiers)
- Plot ratio (Coefficient d'occupation des sols - COS)
- (Municipal or Cantonal) Land Use Plan (= Nutzungsplanung)
- Local Development Plan (= Bebauungsplan)
- Land use plan (= Flächenwidmungsplan)· Housing aid (Wohnbauförderung)
- Building Land Acquisition Fund (= Bodenbeschaffungsfonds)
- Municipal Master Plan (Piano Regolatore Generale)
- Spatial Development Strategy of a Municipality (= Strategija prostorskega razvoja občine)
- Municipal Spatial Order (= prostorski red občine)
- Compensation for use of building land (= Nadomestilo za uporabo stavbnega zemljišča)
- Building Programme (Programma di fabbricazione)
- Regional Law 5/2007: Urban planning reform and regulations about building activity and landscape
- Information campaign on land use changes
- Greenfield Development Levy (= Neverschliessungsabgabe)
- Soil conservation article in Federal Building Code (= Bodenschutzklausel im BauGB)
- Regional Law 33/2002 - Friuli Venezia Giulia's Mountain Districts (former Mountain Communities)
- Urban development contract (= Städtebaulicher Vertrag)

Highest-ranked instruments (5) in regard to “Acceptance”:

- Allocation of municipal compensation funds for redevelopment of brownfields (= Landeszuweisungen zur Nutzbarmachung von Brachflächen)
- Public commitment of relevant stakeholders against increasing land resource demand and urban sprawl (= Bündnis für Flächensparen)
- National land use target
- Municipal land use plan (= Flächennutzungsplan)
- Local Development Plan (= Bebauungsplan)
- Landscape Plan (= Landschaftsplan)
- Alpine Plan (= Alpenplan)
- Regional integrated development plan (Schéma de Cohérence Territoriale - SCOT)
- Local urban planning document (Plan local d'urbanisme - PLU)
- Communal chart (Charte communale)
- Regional (Federal) Spatial Plan (= Piano Territoriale Regionale PTR)
- De-sealing concepts and programmes (= Entsiegelungsprojekte und Programme)
- Cantonal Guiding Plan (= Kantonaler Richtplan)
- Memorandum of Understanding for the Protection and Conservation of the Architectural-Historical Heritage of Carnia
- Building Land Development Fee
- Building Regulations (Regolamento edilizio)
- LR 20/97 Local public transport planning in the Region of FVG
- Revitalisation of old buildings (= Revitalisierungsfonds)
- Municipal eco-land-account (= Kommunales Ökokonto)
- Decentralised technical infrastructure (water, waste water, energy)
- Plot ratio (Coefficient d'occupation des sols - COS)
- Local Development Plan (= Bebauungsplan)
- Land use plan (= Flächenwidmungsplan)
- Housing aid (Wohnbauförderung)
- Building Land Acquisition Fund (= Bodenbeschaffungsfonds)
- Municipal Master Plan (Piano Regolatore Generale)
- Spatial Development Strategy of a Municipality (= Strategija prostorskega razvoja občine)
- Building Programme (Programma di fabbricazione)
- Regional Law 5/2007: Urban planning reform and regulations about building activity and landscape
- Information campaign on land use changes
- Cadastre of brownfield sites and commercial vacancies (= Brachflächen- und Leerstandskataster)
- Regional pool of commercial areas/industrial districts (= Regionaler Gewerbeflächenpool)
- Urban transit plan (Plan de déplacements urbains - PDU)
- Local housing program (Programme local de l'habitat - PLH)
- Reduced sales and rental fees charged from local companies (Aides des collectivités locales à l'immobilier d'entreprises)
- Tyrolean law of regional planning (TROG, Tiroler Raumordnungsgesetz)
- Regional Planning Programmes
- River Basin Plan (Piano di Bacino)
- Pre-emption right of the SAFER (corporation for land planning and rural development)
- Public establishment of intermunicipal cooperation (Établissement public de coopération intercommunale - EPCI)
- Programmed operation of improvement of housing (Opération Programmée d'Amélioration de l'Habitat - OPAH)
- Local tax of equipment (Taxe locale d'équipement- TLH)
- Fund for small-scale business promotion (= Wirtschaftsförderungsfonds)
- Plan on Crop Rotation Areas (= Sachplan Fruchtfolgeflächen)
- Building permits (Permis de construire ou déclaration de travaux)

- Local taxes raised with the profit of the communes and the intercommunal cooperation structures (Taxes locales perçues au profit des communes et de leurs groupements)
- Employment Pact Tyrol (Beschäftigungspakt Tirol)
- Tyrolean Administrative Agency for Goal 2 Programme
- ATO District Plan (Piano d'Ambito)
- Local Forums, Watershed Partnerships and other Stakeholders Councils
- National Development Plan 2007-2013
- Stakeholder Commission (Conferenza dei servizi)
- Early Public Participation (= vorgezogene Bürgerbeteiligung)
- Building Regulations (Regolamento edilizio)
- Public establishment of intermunicipal cooperation (Établissement public de coopération intercommunale - EPCI)
- Fund for small-scale business promotion (= Wirtschaftsförderungsfonds)
- Plan on Crop Rotation Areas (= Sachplan Fruchtfolgeflächen)
- Municipal Tax on Estates (ICI - Imposta Comunale sugli Immobili)
- Municipal Waste collection Tax (TARSU - Tassa sui rifiuti solidi urbani)
- Regional (Federal) Power Plan (Piano Energetico Regionale PER)
- Environmental tax for environmental pollution caused by waste water discharge
- Building permits (Permis de construire ou déclaration de travaux)

Highest-ranked instruments (5) in regard to "Implementation":

- Municipal land use plan (= Flächennutzungsplan)
- Local Development Plan (= Bebauungsplan)
- Landscape Plan (= Landschaftsplan)
- Local urban planning document (Plan local d'urbanisme - PLU)
- Local Development Plan (= Bebauungsplan)
- Land use plan (= Flächenwidmungsplan)
- Building Land Acquisition Fund (= Bodenbeschaffungsfonds)
- Regional Law 5/2007: Urban planning reform and regulations about building activity and landscape
- Local housing program (Programme local de l'habitat - PLH)
- Tyrolean law of regional planning (TROG, Tiroler Raumordnungsgesetz)
- Regional Planning Programmes
- Early Public Participation (= vorgezogene Bürgerbeteiligung)
- Regional (Federal) Spatial Plan (= Piano Territoriale Regionale PTR)
- Cantonal Guiding Plan (= Kantonaler Richtplan)
- Building Land Development Fee
- Local taxes raised with the profit of the communes and the intercommunal cooperation structures (Taxes locales perçues au profit des communes et de leurs groupements)
- Employment Pact Tyrol (Beschäftigungspakt Tirol)
- Tyrolean Administrative Agency for Goal 2 Programme
- Minimum limitation of floor-space-index (= unteres Limit der Geschossflächenzahl)
- (Municipal or Cantonal) Land Use Plan (= Nutzungsplanung)
- Spatial Planning Act (= Zakon o urejanju prostora)
- Slovenia's Development Strategy
- Compensation for use of building land (= Nadomestilo za uporabo stavbnega zemljišča)
- Concerted development zones (Zones d'aménagement concerté - ZAC)
- Nature Conservation Act (= Zakon o ohranjanju narave)
- Friuli Venezia Giulia Regional (Federal) Development Plan 2006-08 (Piano Regionale di Sviluppo PRS)
- Soil conservation article in Federal Building Code (= Bodenschutzklausel im BauGB)

- Regional Conception of Spatial Development (= Regionalna zasnova prostorskega razvoja)
- Specific urban planning regulations in mountain communes (Dispositions particulières d'urbanisme pour les communes de montagne)
- Regional Planning Association (= Planungsverband)
- Promotion of Balanced Regional Development Act (= Zakon o spodbujanju skladnega regionalnega razvoja)
- Declaration of intent to alienate (Déclaration d'intention d'aliéner - DIA)

Highest-ranked instruments (5) in regard to "Feasibility":

- (Municipal or Cantonal) Land Use Plan (= Nutzungsplanung)
- Promotion of Balanced Regional Development Act (= Zakon o spodbujanju skladnega regionalnega razvoja)
- Municipal Tax on Estates (ICI - Imposta Comunale sugli Immobili)
- Municipal land policy resolution (= Bodenpolitischer Grundsatzbeschluss)
- Municipal land stock (= Kommunale Bodenbevorratung)
- Allocation of municipal compensation funds for redevelopment of brownfields (= Landeszuweisungen zur Nutzbarmachung von Brachflächen)
- Urban pre-emption right (Droit de préemption urbain - DPU)
- Public commitment of relevant stakeholders against increasing land resource demand and urban sprawl (= Bündnis für Flächensparen)
- National land use target

Highest-ranked instruments (4) in regard to Effectiveness":

- Building order (= Baugebot)
- Municipal land stock (= Kommunale Bodenbevorratung)
- Building Regulations (Regolamento edilizio)
- Fund for small-scale business promotion (= Wirtschaftsförderungsfonds)
- Plan on Crop Rotation Areas (= Sachplan Fruchtfolgeflächen)
- Soil conservation article in Federal Building Code (= Bodenschutzklausel im BauGB)
- Municipal Waste collection Tax (TARSU - Tassa sui rifiuti solidi urbani)
- Urban development contract (= Städtebaulicher Vertrag)
- De-sealing concepts and programmes (= Entsiegelungsprojekte und Programme)
- Building Programme (Programma di fabbricazione)
- Alpine Plan (= Alpenplan)
- Cost-effective fees for technical infrastructure
- Local urban planning document (Plan local d'urbanisme - PLU)
- Local housing program (Programme local de l'habitat - PLH)
- Concerted development zones (Zones d'aménagement concerté - ZAC)
- Regional integrated development plan (Schéma de Cohérence Territoriale - SCOT)
- Plot ratio (Coefficient d'occupation des sols - COS)
- Cadastre of brownfield sites and commercial vacancies (= Brachflächen- und Leerstandskataster)
- Reduced sales and rental fees charged from local companies (Aides des collectivités locales à l'immobilier d'entreprises)
- Friuli Venezia Giulia Regional (Federal) Development Plan 2006-08 (Piano Regionale di Sviluppo PRS)
- Consideration of extent of soil sealing of land parcels in the assessment of waste water fees (= Einbeziehung des Versiegelungsgrades in die Bemessung der Abwassergebühr)

- Contrat de Pays - Pays contract
- Pre-emption right of the SAFER (corporation for land planning and rural development)
- Programmed operation of improvement of housing (Opération Programmée d'Amélioration de l'Habitat - OPAH)
- Information campaign on land use changes
- New Mountain Plan
- Greenfield Development Levy (= Neuerschliessungsabgabe)
- Local Development Plan (= Bebauungsplan)
- Local Development Plan (= Bebauungsplan)
- Building Land Acquisition Fund (= Bodenbeschaffungsfonds)
- Regional Planning Programmes
- Nature Conservation Act (= Zakon o ohranjanju narave)
- Municipal Master Plan (Piano Regolatore Generale)
- Urban transit plan (Plan de déplacements urbains - PDU)
- Regional Law 33/2002 - Friuli Venezia Giulia's Mountain Districts (former Mountain Communities)
- Land use plan (= Flächenwidmungsplan)
- Tyrolean law of regional planning (TROG, Tiroler Raumordnungsgesetz)
- Urban Redevelopment Measure (= Städtebauliche Entwicklungsmaßnahme)
- Tradeable land use permits (= handelbare Flächenausweisungskontingente)
- Building permits (Permis de construire ou déclaration de travaux)

VII Fields of indication, indicator ideas and possible data source for selected instruments

Building Order

Fields of indication	General conditions		Dissemination	Impacts and effectiveness
	Local / regional situation	Required organisational, structural, legal, financial conditions		Envisaged effects
	Areas designated for residential purposes are not sufficiently used	Potential analysis of building lots		Prevention of the designation of new residential areas
	Existing inner-urban brownfield sites and building lots	Local development plan for inner-urban areas		(Intensification of) Use of existing residential areas
	High pressure on the municipality to designate new residential areas, high demand for (new) building land	Establishing the preservation of open spaces as an objective of the municipal land use plan		Prevention of real estate speculations
	Scarcity of adequate inner-urban housing space			
Indicator ideas	Demand for building land displayed by the level of real estate prices		Number of enacted and realised building orders	Change of number of unused building lots in areas with building orders
	Migration of population to the surrounding municipalities			
Possible data sources	Official statistics on real estate prices		Municipal head organisations (e.g. of towns or municipalities); Research institutions (e.g. German institute for urban affairs)	Municipal GIS
	Official statistics on population - migration			

Allocation of municipal compensation funds for redevelopment of brownfields

Fields of indication	General conditions		Dissemination	Impacts and effectiveness
	Local / regional situation	Required organisational, structural, legal, financial conditions		
	Existing inner-urban brownfield sites, including also contaminated sites in inner-urban areas	Sufficient financial budget provided by the federal state / region to enable municipalities of low financial resources to use the instrument		Intensification of use in existing industrial, commercial and residential areas in inner-urban areas
	Low financial resources of the municipality	Legal anchoring of the instrument		Facilitating temporary uses and restoration
		Transparent and objective rules regulating the allocation of funds		
Indicator ideas	Percentage of area of inner-urban brownfield sites to total inner zone		Administrative units where compensation funds for redevelopment of brownfield sites are installed	Percentage of area of inner-urban brownfield sites to total inner zone
Possible data sources	Cadastral of brownfield sites and commercial vacancies, Municipal GIS, Official statistics on land use - unused housing, commercial and industrial areas	Statements of accounts of the authorities in charge	Ministries and authorities for building and spatial planning	Cadastral of brownfield sites and commercial

Greenfield development charge

Fields of indication	General conditions		Dissemination	Impacts and effectiveness
	Local / regional situation	Required organisational, structural, legal, financial conditions		
	Careless use of land resources and extensive designation of residential areas	Installation of a charge that is sufficiently high to develop steering effects		Increase of costs for new development areas
	Strong increase of development area and urban sprawl	Purpose-related use of the financial resources for the redevelopment of brownfield sites		Reduction of the demand for development area
		Legal anchoring of the instrument		Steering of development demand to inner-urban areas
		Implementation of a special purpose association for charging, administrating and distributing the funds		Raising of financial resources for redevelopment of brownfield sites
Indicator ideas	Cf. indicators for general problems of land resource management	Height of charged fee	Number of municipalities with an installed system of charging the fee	Demand for building land displayed by the level of real estate prices
Possible data sources		Statements of accounts of the authorities in charge	Municipal head organisations (e.g. of towns or lities); Research institutions (e.g. German institute for urban affairs)	Official statistics on real estate prices

Regional pool of commercial areas/industrial districts

Fields of indication	General conditions		Dissemination	Impacts and effectiveness
	Local / regional situation	Required organisational, structural, legal, financial conditions		
Fields of indication	General conditions		Dissemination	Impacts and effectiveness
	Local / regional situation	Required organisational, structural, legal, financial conditions		Envisaged effects
	Shortage of suitable areas for commercial development	Political will to cooperation and sharing of benefits and burdens		Reduction of land resource demand
	High competition between municipalities in the wider region	Implementation of a special purpose association		Marketing of commercial areas
	Low prices of commercial areas	Solution on the sharing of burdens and benefits, including the evaluation of provided land plots.		Wider range of appropriate land resources to supply commercial areas meeting the demand
Indicator ideas	Demand for building land displayed by the level of real estate prices		Number of regional pools of commercial areas	Relation of the change of area used for commercial purposes before and after the installation of the pool
			Number of municipalities participating in regional pools	
Possible data sources	Official statistics on real estate prices		Municipal umbrella organisations (e.g. of towns or municipalities); Research institutions (e.g. German institute for urban affairs)	Official statistics on municipal land use

Cadastre of brownfield sites and commercial vacancies

Fields of indication	General conditions		Dissemination	Impacts and effectiveness
	Local / regional situation	Required organisational, structural, legal, financial conditions		
	Existing inner-urban brownfield sites and commercial vacancies	Provision of financial resources required to install the cadastre		Opening up inner-urban potentials for development
	Lack of developed building lots	Provision of financial resources for the redevelopment of brownfield sites and the re-use of commercial vacancies		Reduction of land resource demand for development
		Link to instruments supporting the development of inner-urban areas, e.g. municipal compensation funds for redevelopment of brownfield sites, redevelopment of urban areas		
Indicator ideas	Percentage of area of inner-urban brownfield sites to total inner zone		Number of municipalities with an installed cadastre	Percentage of area of inner-urban brown field sites to total inner zone
Possible data sources	Municipal GIS, Official statistics on land use - unused housing, commercial and industrial areas		Municipal head organisations (e.g. of towns or municipalities); Research institutions (e.g. German institute for urban affairs)	Cadastre of brownfield sites and commercial vacancies

VIII Assessment results of instruments

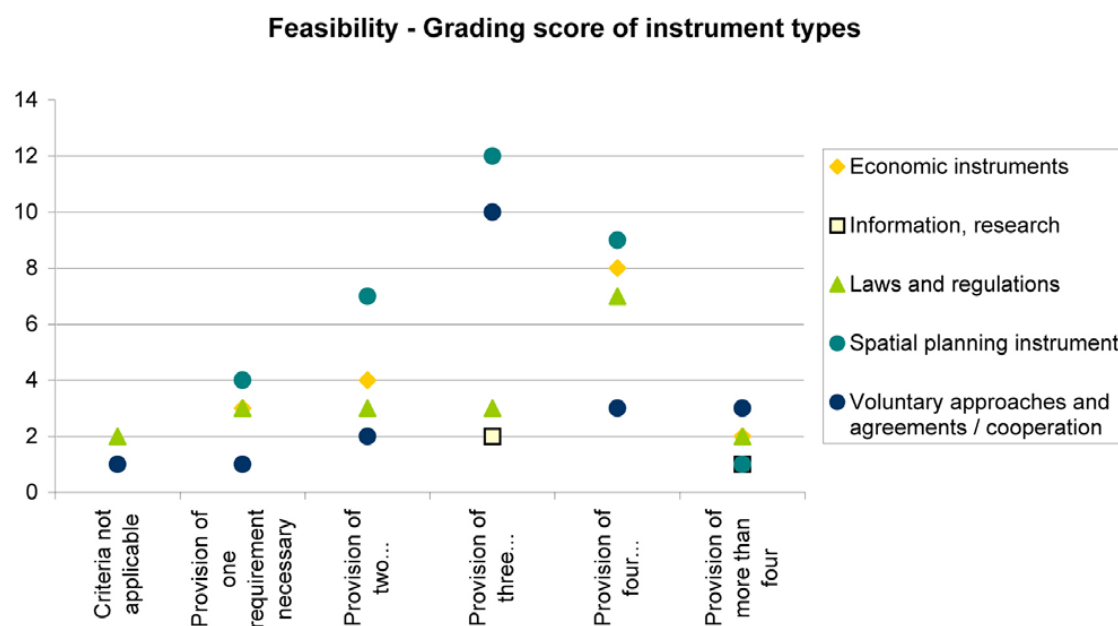


Fig. 10.1: Feasibility grading score

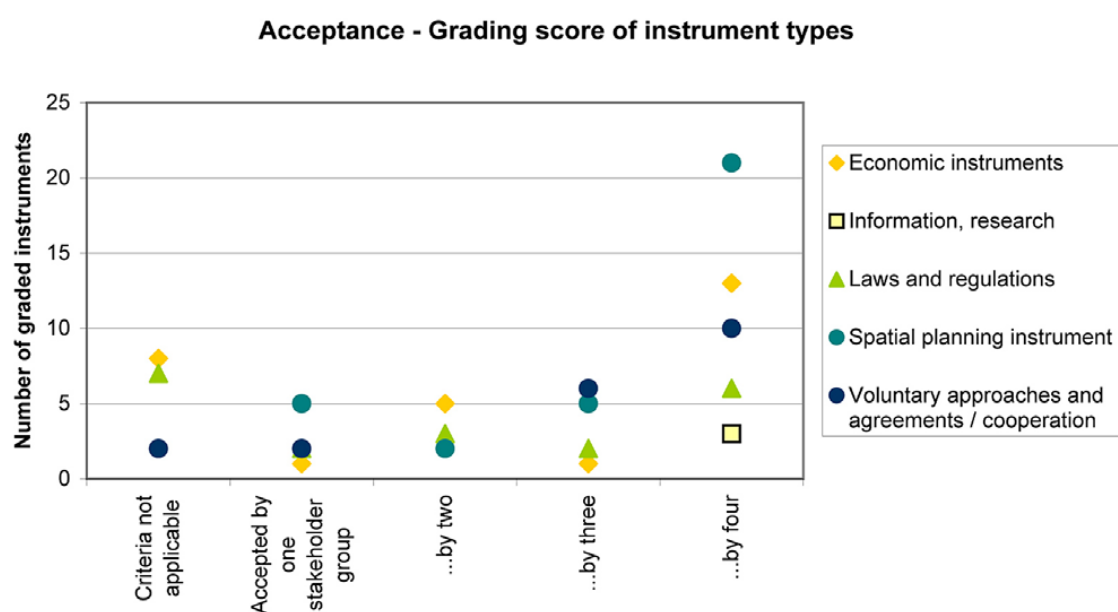


Fig. 10.2: Acceptance grading score

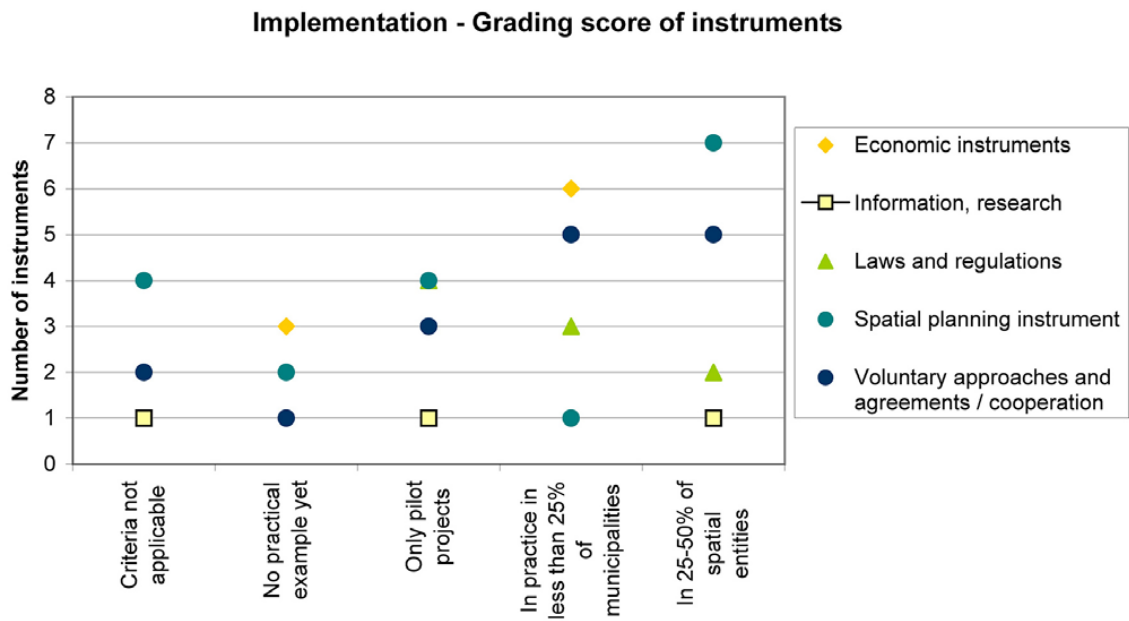


Fig. 10.3: Implementation grading score

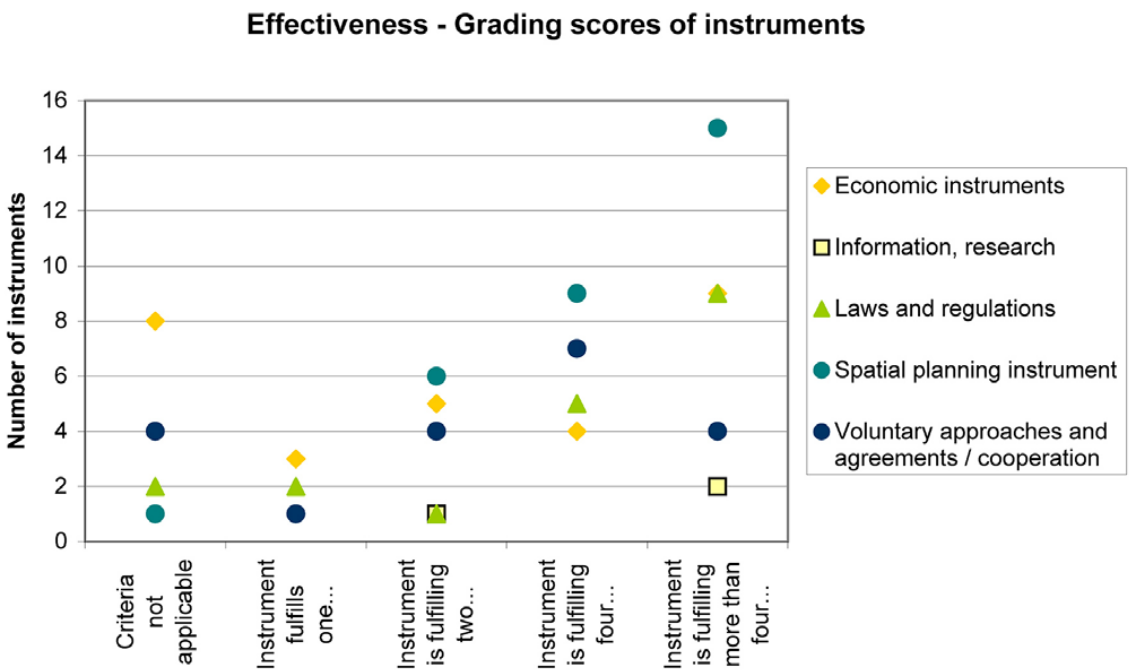


Fig. 10.4: Effectiveness grading score

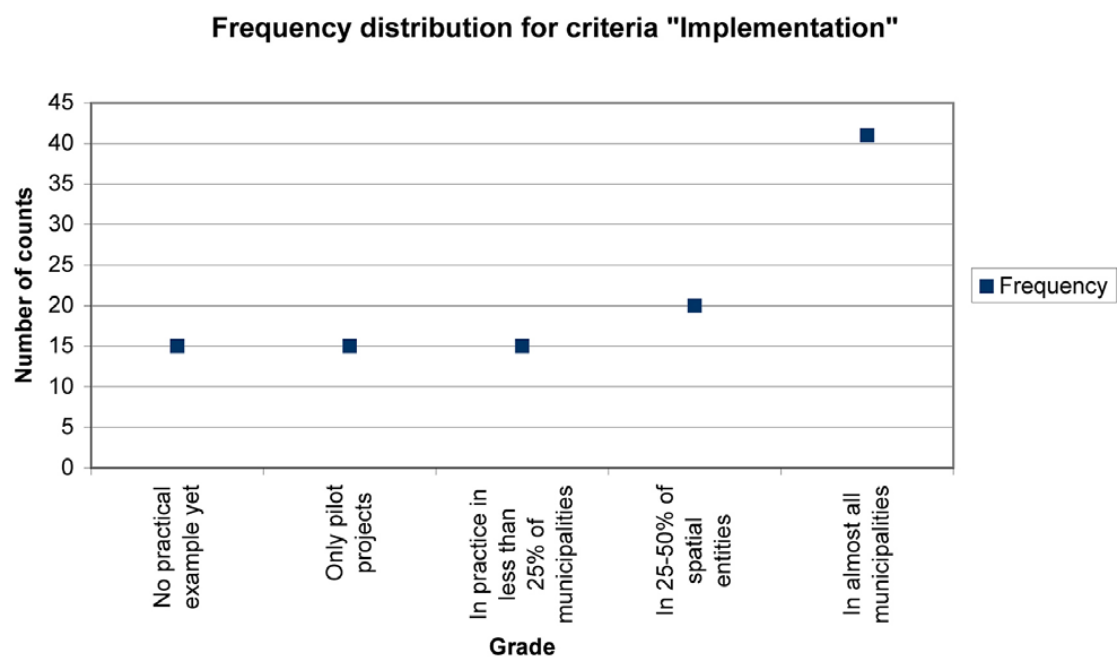


Fig. 10.5: Frequency distribution for criteria "Implementation"

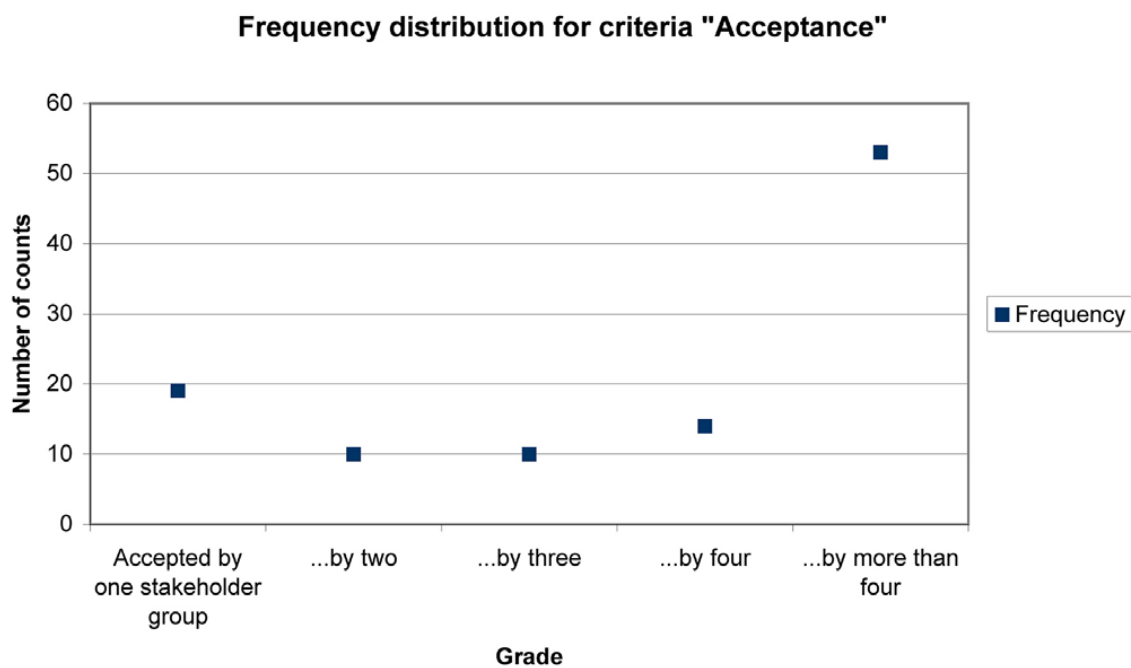


Fig. 10.6: Frequency distribution for criteria "Acceptance"

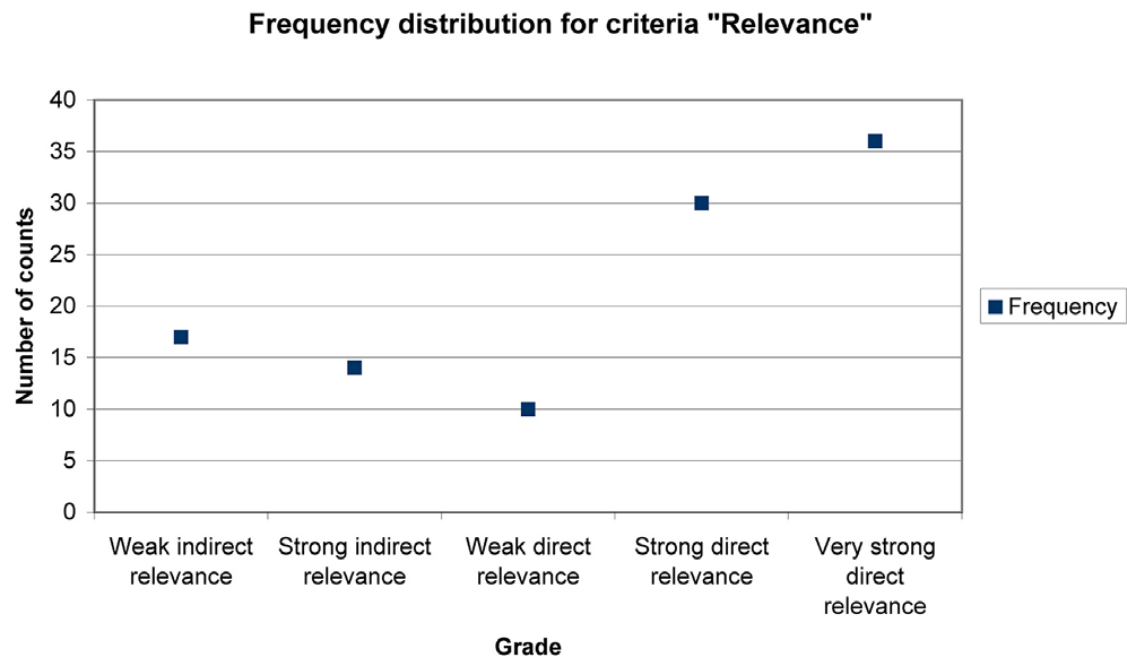


Fig. 10.7: Frequency distribution for criteria "Relevance"

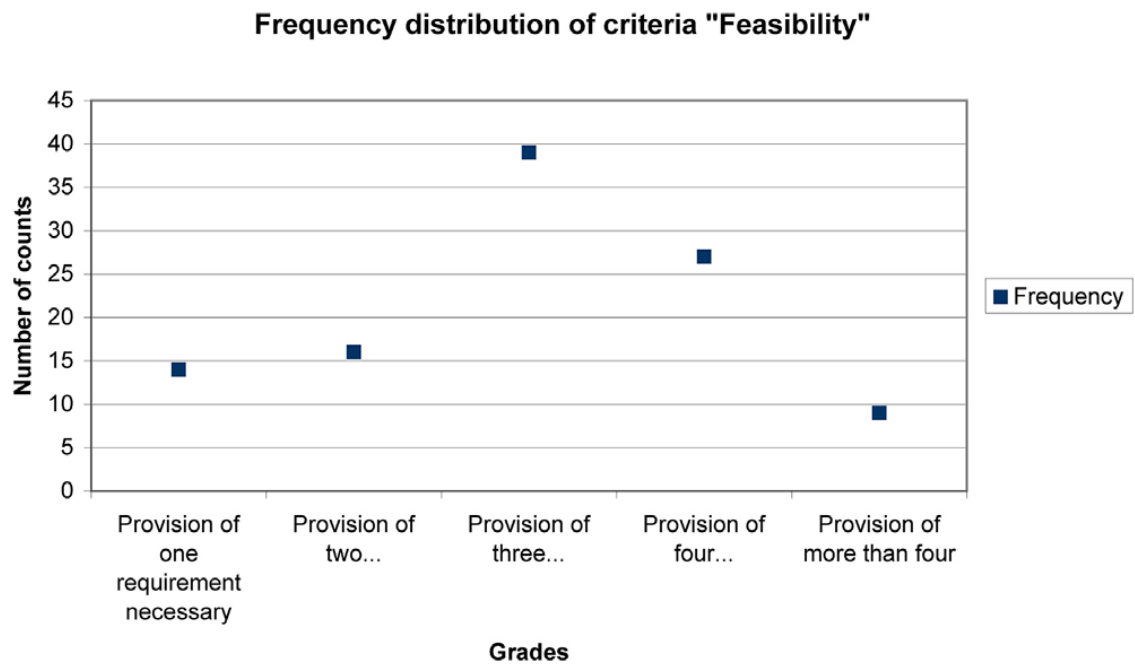


Fig. 10.8: Frequency distribution for criteria "Feasibility"

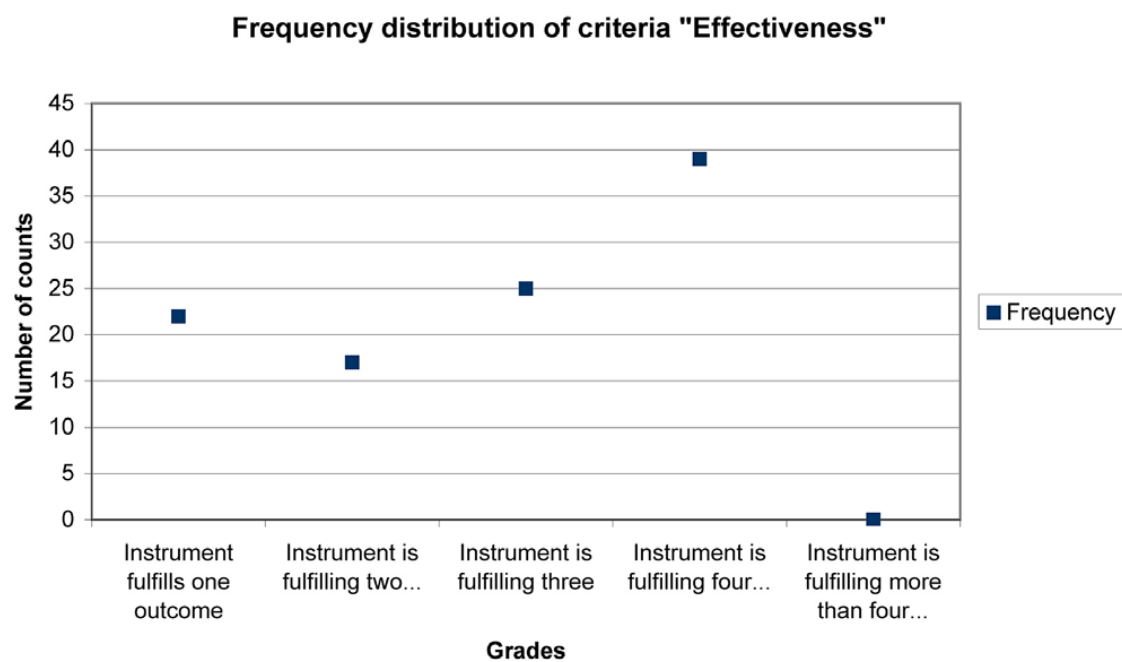


Fig. 10.9: Frequency distribution for criteria "Effectiveness"