Assessing the Landscape in the UNESCO Biosphere Entlebuch. An Exploratory Research Study

Master Thesis by

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Abstract

Urbanization, industrialization, and changes in land-use practices are leading to rapid landscape changes, loss of biodiversity, impacts on scenic beauty and to damage of valuable cultural landscapes around the world. The incorporation of aesthetic considerations in landscape planning and development has frequently faced critics due to its lack of a practical theoretical basis and the absence of public involvement. The UNESCO Biosphere Entlebuch (UBE) represents an ideal example of a typical Swiss rural landscape undergoing the effects of natural and human driven changes. This study presents an exploratory approach for assessing the scenic quality of these landscapes through a participatory procedure with local stakeholders. The study explored and tested new ways for assessing the landscape scenic quality in a systematic way by incorporating the local community into the landscape planning process. The first step of the study was meant to find a way to make a rapid and simple landscape classification of the UBE. Using expert knowledge and geographic information systems (GIS) data, a set of homogenous landscape units was generated. The following step consisted in designing and testing a perception-based assessment with a sample of local residents. A web-based survey was conducted by assessing a variety of UBE landscape scenes making use of photographs and photomontages. The use of internet pointed out to be a simple and practical tool for conducting a landscape' perception assessment. The analysis of the responses suggest that there is a general trend from locals to prefer natural and well maintained agricultural landscapes rather than urbanized scenes, although relevant inter-group differences can be seen between farmers and non-farmers towards more natural and forested areas. At the same time, landscapes with dispersed forests and showing open areas seem to be more attractive than landscapes with closed forest stands. Interestingly the management of agricultural areas appeared as a determining factor among farmers when evaluating the landscape appeal. A number of comments shared in the survey suggest that there may be a negative attitude from part of the agricultural community towards the current amount of protected areas and land-use restrictions. The maintenance of man-made structures, urban sprawl, urban legislation and land use practices were also some of the main issues of concern mentioned throughout the survey. The proposed methodology tested in this study provides information that can be used for supporting the landscape planning and participatory processes in the UBE and in other similar contexts. The level of participation and interest expressed by the participants in the survey shows a positive sign from part of the community for getting involved in the landscape development process.

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1. Introduction.

Urbanization, industrialization, and intensive agriculture are leading to rapid landscape changes, losses of ecological capacities, biodiversity, impacts on scenic beauty and in damage to valuable cultural landscapes (Bastian et al. 2006). Increasing concerns regarding the impacts of human development on the scenic quality of the landscapes is highlighting the need for implementing more practical and inclusive scenic quality assessments in the decision-making process of land planning and policy development (Daniel 2001; Ramos 2004; Valencia-Sandoval et al. 2010; Dakin 2003; Buchecker et al. 2003). The UNESCO Biosphere Entlebuch (UBE) represents an ideal example of a typical Swiss rural landscape undergoing the complex dynamics of natural and human driven changes. Land use practices have been shaping these landscapes for hundreds of years and efforts for protecting and rehabilitating this region have been aimed for decades (Bauer et al. 2009). Threats such as the intensification of agriculture, urban sprawl, land abandonment, degradation of traditional landscape elements and changes in the use of land due to market drivers need to be addressed in the developmental strategies of the region (Hammer 2007). Addressing these challenges will require obtaining the necessary information regarding the landscape condition in order to support the decision making process. At the same time, it will be important to take into account the landscape perceptions and preferences of the locals into the planning process (Hall 2008). The number of landscape changes that will probably take place in rural areas like the Entlebuch in the next decades will also demand from the management rapid and simple assessment procedures for evaluating possible future landscape scenarios (Hunziker & Kienast 1999). The present study looks into these challenges and proposes a methodological tool for assessing the perceived scenic quality of the landscape through a participatory process with local stakeholders.

Fig. 1 Bleichle, panoramic view from UBE (Panoramio, 2011).

1.1. The Biosphere landscape development (Background).

As required by the UNESCO Man and Biosphere (MAB) program, and by sound management principles, the UBE management is applying monitoring procedures in order to evaluate the outcomes and impacts of its measures on the development of the society, economy, and nature including the scenic quality of the region. With regards to the landscape, the UBE management created a regional landscape strategy, which intends to support and guide the landscape development in the upcoming future with long-term oriented measures meant to enhance the landscape multi-functionality. In the strategy a special attention has been given to the aesthetic quality and cultural meaning of the

landscape. As these landscapes are highly valued in Switzerland also because of its traditional cultural appeal, measures meant to protect them need to be considered in parallel to the regional developmental needs. The Biosphere reserve concept and the UBE landscape strategy can be used as a framework to guide and reinforce sustainable oriented projects meant to preserve its cultural heritage and ensure the protection of its natural ecosystems while providing economic opportunities to the local community. The designation of the site as a biosphere reserve helps in raising awareness among stakeholders, towards a sustainable landscape development and a more balanced relation between man and the environment. For these reasons the UBE can be referred as an interesting study area for exploring into new ways of assessing the quality of the landscape, as it encompasses a protected area with the explicitly stated purpose of bringing together ecological purposes with economic and social purposes (Wallner et al. 2007).

According to UNESCO the biosphere reserve is intended to fulfill 3 basic functions, which are complementary and mutually reinforcing: conservation, development, and logistic. Contributing to the conservation of landscapes, ecosystems, species and genetic variation; fostering economic and human development which is socio-culturally and ecologically sustainable; and providing support for research, monitoring, education and information exchange related to local, national and global issues of conservation and development (Unesco 1996).

Within the World Network of biosphere reserves, the UNESCO Biosphere Entlebuch represents a pre-alpine landscape covering 394 km², corresponding to around 1% of Switzerland's total land area (UBE-Management 2011). The Biosphere is formed by eight municipalities: Doppleschwand, Entlebuch Escholzmatt, Flühli, Hasle, Marbach, Romoos and Schüpfheim, with a total population of around 17,000 people. Agriculture and tourism are the main economic sectors, with the first representing one third of the economy (UBE-Management 2011). In accordance with the UNESCO stipulation and under Swiss criteria, the UBE is composed by three management zones (see Appendix 7.1) with different levels of protection depending on the impact of human activity (UBE-Management 2011); a core area [8%], buffer zone [42%] and a development zone [50%]. An important portion of the territory is under protection schemes at the national and cantonal level; in terms of landscapes, at the national level these include Napfbergland, Schrattenfluh, Flyschlandschaft Hagleren-Glaubenberg-Schlieren, and Pilatus, which are part of the federal inventory of landscapes and natural monuments (Hammer 2007). Mire landscapes of national importance and particular beauty are also a relevant visual component of the UBE territory, with more than one quarter of the Biosphere area designated as Nationally-protected moor landscapes (Hammer 2007).

Tourism is considered a very important player in the present and future of the Biosphere and more attention to the consequences that landscape changes may have on this sector is essential, as great part of the local community rely on this activity (UBE-Management 2011). The ecological and scenic quality of the area can influence positively or negatively not only on the local's livelihood, but on whether it is a landscape worth of visiting or not. According to Fairweather & Swaffield (2002) tourism is intimately related to the experience of landscape. Hence the potential impacts of landscape changes on the perceived scenic quality need to be addressed within the landscape strategy and a scenic quality assessment can provide the Biosphere's management with a meaningful instrument for guiding the regional development plans.

1.2. Visual landscape assessment in the context of a participatory process.

A Landscape quality assessment is an important step in environmental planning and management (Daniel & Meitner 2001), and an integral component of any regional development plan (Ramos 2004). The incorporation of aesthetic considerations in landscape planning and development has frequently faced critics due to its lack of a practical theoretical basis and the absence of public involvement (Gimblett et al. 1987). The "landscape quality" we refer to in this case is derived from an interaction between biophysical properties of the landscape and the effects of those properties on the human viewer. There are different approaches to landscape quality assessments (Zube et al. 1982; Daniel 2001), with two main streams that have been developed in different contexts: The expert-based approach which translates biophysical features of the landscape into formal design parameters intended to be universal indicators of landscape quality, and the perception-based approach where features of the landscape are treated as stimuli that evoke aesthetically relevant psychological responses through perceptual and cognitive processes (Daniel 2001).

Building consensus through communal decision making schemes is replacing the opposing paradigms of expert and perception based assessments (Daniel 2001). As mentioned by Buchecker et al. (2003), a sustainable landscape development does not only require protection, but also and maybe most of all the participation of all the stakeholders in shaping the landscape. People living inside protected areas often think that their own development and subsistence opportunities are threatened by protective measures (Zube 1986). As a consequence of such misunderstandings the UBE developmental goals can face conflicts with the interests of some local stakeholders. Although the involvement of the community in landscape assessments has proved to be relatively blocked partly because of poor participatory approaches and weak communication strategies, new ways of encouraging local residents in taking part of the landscape planning are needed (Buchecker et al. 2003). The MAB program can serve as a framework for exploring into new ways of fostering the community involvement in the landscape assessment process. As participatory approaches are becoming more relevant in environmental decision-making, there is a growing need to implement more effective ways of communication with the "non-expert" audience (Appleton et al. 2002).

In the fields of human geography and environmental psychology, the landscape is conceptualized as "place" and can carry a broad range of meanings that vary widely across individuals and social groups (Williams & Patterson 1996). Resource management has often failed to capture the full range of meanings the public often ascribes to the landscape. Professionals guiding a landscape planning process need to consider that people's judgments about a landscape are influenced by more than just their aesthetic perceptions. Relevant factors behind judgments are also their values, history, knowledge, personal interests and life situations (Soliva & Hunziker 2009), hence a better understanding of these factors will enrich the landscape planning process. Decision makers also need to be better informed about attitudes towards the landscape among the different stakeholder groups as identifying social and demographic differences in relation to landscape preferences will provide a broader set of principles for guiding the landscape development (Howley 2011).

A very important trend and likely risk in the rural areas of Switzerland has to do with the expanding changes in land use practices. The intensification of agricultural practices on highly

productive land and, at the same time, marginalization of low productivity areas followed by spontaneous reforestation, seems to be a growing trend in Switzerland and in central Europe (Hunziker & Kienast 1999). These changes will have implications on the scenic quality of the landscape. Another relevant topic for the UBE landscape development has been the introduction of ecological compensation areas. One of the main environmental policies involving the rural landscapes in Switzerland in the last decades has to do with the introduction of compensation areas in the agricultural lands. The ecological quality of the landscape in this region has been under pressure for a long time, mainly because of the loss of habitat, habitat fragmentation, and intensification of agricultural practices. Compensation areas can help conserving and restoring some deteriorated areas and finally benefiting biodiversity. However its aesthetic implications on the landscape remain largely unknown. As the need for agricultural land and forest land is decreasing in some areas, the re-wilding of landscapes has become a discussed topic of landscape change in Switzerland (Bauer et al. 2009). Taking in consideration the public opinion is crucial to ensure the public acceptance of future decisions concerning landscape management. The scenic landscape assessment is an important development tool for the UBE landscape planning; it helps to get a clearer picture on the differences in landscape perception between all the land users. This is essential in order to bring together the public expectations and the perceptions within the stakeholder groups and find a common ground for implementing possible measures.

1.3. Aims and questions addressed in the thesis.

The study area of this project is the UBE perimeter, as shown in Appendix 7.1. Inside the area, the UBE management plans to implement a set of repeated landscape quality assessments that should complement the already installed indicator based landscape monitoring. Based on available data, scientific literature and expert advice, a first approach to such a landscape assessment is designed and tested in practice.

The aim of this work is to provide the UBE with a systematic, reliable and practical assessment method for evaluating within a participatory approach the visual quality of the landscape in the UBE. The project explores new ways for assessing and monitoring the landscape and intends to enhance the level of involvement of local residents in the landscape development. It is also meant to be easily adaptable to different contexts in the future. The main research questions addressed in the thesis are:

a. How to classify the landscape in order to obtain a representative set of homogenous landscape units?
b. How to assess the UBE landscape in the context of a participatory approach?

It is important to mention that the primary language used for this research project was English but all the queries and surveys with experts and local residents were carried out in German. The expert query and perception based assessment have been translated to English while some information in which the literal meaning of words is necessary are shown in the original language. This project was executed within a period of 6 months and during the autumn - winter season, which limited the possibilities of doing extensive field work and collecting proper visual material for the scenic quality assessment. Nevertheless testing and implementation of possible procedures and alternatives for the UBE scenic assessment were

possible by using existing photographs. In the next chapters a detailed explanation of the methods conducted is described.

2. Methods.

To meet the objectives of elaborating a systematic landscape assessment the method to be developed was divided into a series of steps. The first phase of this project was meant to make a rapid and simple expert-based landscape classification of the UBE. A landscape classification is an essential prerequisite for doing the landscape assessment (Blankson & Green 1991). A first glance into the regional data available and possibilities of working with local experts from the region was discussed with the management of the UBE. The outcome of the landscape classification is a map with homogenous landscape units from a visual point of view and relevant viewpoints needed for assisting the perception based assessment.

In order to assess the landscape in a representative way a number of UBE landscape scenes were needed. Identifying key viewpoints is a primary function of a visual impact assessment (Ramos 2004), the monitoring of the UBE landscape needs a reliable way of assessing areas sensible to potential visual impacts and landscape changes in space and time. The key viewpoints serve as a basis for capturing (through pictures) landscape scenes for a photo-based assessment but also as a base-line for monitoring the landscape in the future.

Combining the expert knowledge and geographic information systems (GIS) data, a set of maps with a general landscape classification of the Biosphere was generated. The landscape units served as platform for the second phase of the project (i.e., a perception-based assessment) and provided useful spatial information regarding the composition and configuration of each landscape unit. Based on a set of photographs and photomontages, a participatory procedure for assessing the scenic quality of the landscape via a web-based survey with the local stakeholders was tested. The main purpose was to find positive and negative correlations between the stakeholder's preferences and different landscape features.

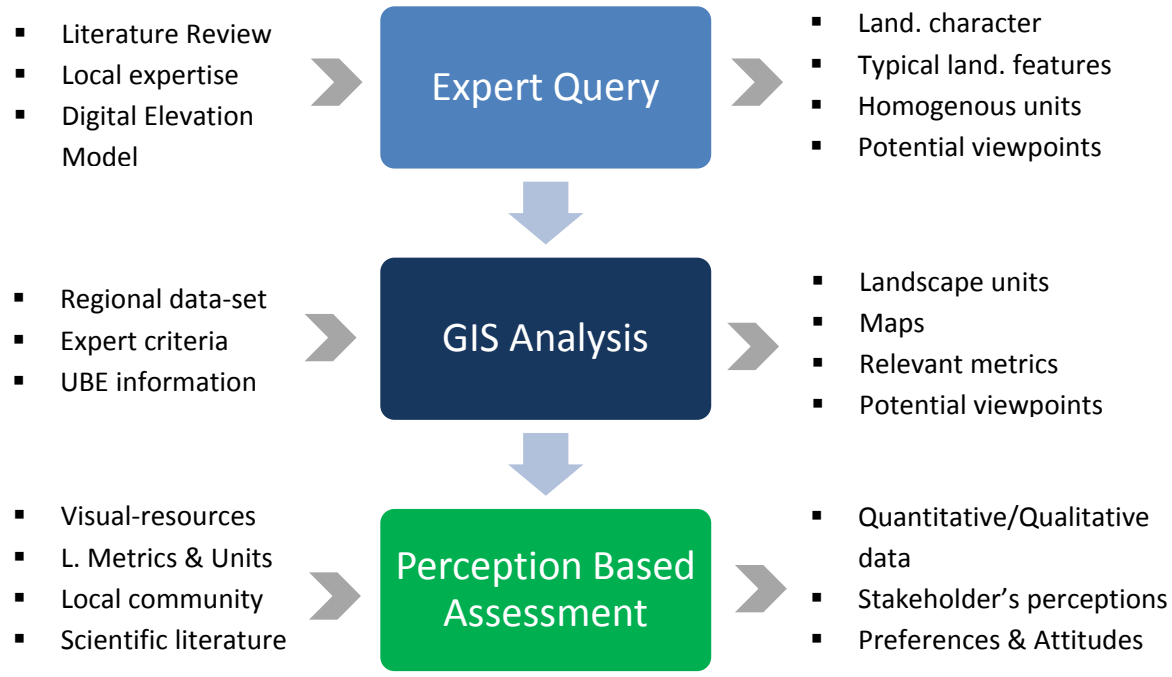


Fig.2 Structure of the landscape assessment procedure. Left column: inputs, right column: outputs.

2.1. Landscape characterization based on expert criteria.

Adequate spatial reference units are necessary for the sampling, analysis and assignment of data when doing a landscape classification (Bastian et al. 2006). In a first step to obtain a rapid and practical classification of the Biosphere's landscapes a query for local experts was designed. The query was based on the kind of information needed to obtain a set of homogenous landscape units. Including the criteria of local experts presented many advantages in terms of time and quality of the information provided. Experts were asked first to describe characteristics and features that make landscapes generally special. In a second section of the query they were asked to dissect a map of the UBE into 8 different landscape types by hand, followed by a brief description for each landscape type and the landscape elements characterizing them. The map provided to the experts was a digital elevation model (DEM) showing the main road system and settlements for facilitating a better orientation of the participants. An explanatory model of how the map should be dissected was provided too. The experts were also asked to place on the map possible viewpoints that would capture especial scenes of the Biosphere. Participants were also asked to indicate one viewpoint for each landscape unit and a general viewpoint that would capture a typical UBE landscape. The query was first tested with two students in order to see the level of difficulty and the time required to complete the exercise. The query is shown in Appendix 7.2.

After discussing the possibilities of contacting local experts with the Biosphere management, a query was sent to 9 experts through the UBE management office. Experts came from the fields of tourism, nature protection, consultancy, and the Biosphere's coordination. An important criterion considered for choosing the experts was the background and their relation to the landscape and environmental field. The queries were sent via mail from the UBE management and a deadline of two weeks was given for sending back the answers.

The answers received were transcribed to a standard format and then analyzed. Special attention was given to the words used to describe landscape features and for naming the landscape types. All the answers were compared in order to find agreement areas between the experts. Landscape types could be characterized based on relevant typical features described by the experts (e.g. topographic characteristics, vegetation cover, land use, etc.). Each landscape type was named by following the same procedure of selecting the most used names assigned for each type between the experts.

In a following step all the dissected maps were overlaid in order to delineate core landscape units (i.e. landscape types in which all experts agreed). The purpose of delineating the core areas was to obtain a reference unit with relatively homogenous properties and specific characteristics that would differentiate them from each other. Finding areas which are homogenous in visual terms is a common initial step followed in a landscape visual assessment (Angileri & Toccolini 1993). These units were analyzed in a next step in terms of landscape metrics using the regional GIS data. In a later stage the units could serve as reference areas for the perception based assessment in an effort to represent all the different UBE landscape types through photographs. Finally all the viewpoints proposed by the experts were registered in a GIS layer and in Google-Earth with the aim of testing different tools and setting a basis for defining potential viewpoints on the field in future assessments.

2.2. Defining homogenous landscape units, combining GIS data and expert criteria.

The following step of the assessment was enriched by the combination of GIS data and expert criteria obtained from the query. GIS technologies provide a useful means for handling large spatial data sets and offers an ideal tool for monitoring and assessing the landscape (O'Neill et al. 1999). The UBE management offered the possibility of having access to extended regional data regarding land cover and other relevant spatial information from the area. In a first step a careful look into the information available was conducted. The GIS regional data-base was provided by the canton Luzern, the information was directed mainly for the UBE development and included a wide range of data like protected zones, forest cover, road systems, ecological compensation areas, protected mires, fen areas, slope and other relevant land-cover information.

The main purpose of the GIS data analysis was to obtain relevant information in terms of landscape composition and configuration of visually important land cover types with relation to the previously defined landscape units. This could be done using indicators generated from the GIS analysis. Landscape indicators such as metrics inform us on the state of landscape properties and changes, and can be derived from GIS databases (Kienast et al. 2007). The landscape indicators of the GIS analysis considered for the visual assessment came partly from the descriptions made by experts in the initial query and from a selection of the most meaningful indicators based on the data available. General metrics such as slope, proportion of forest cover (Fig. 4), urban density, and percentage of compensation areas were considered in the GIS analysis. The software used for working with the GIS data was ArcGIS 10.

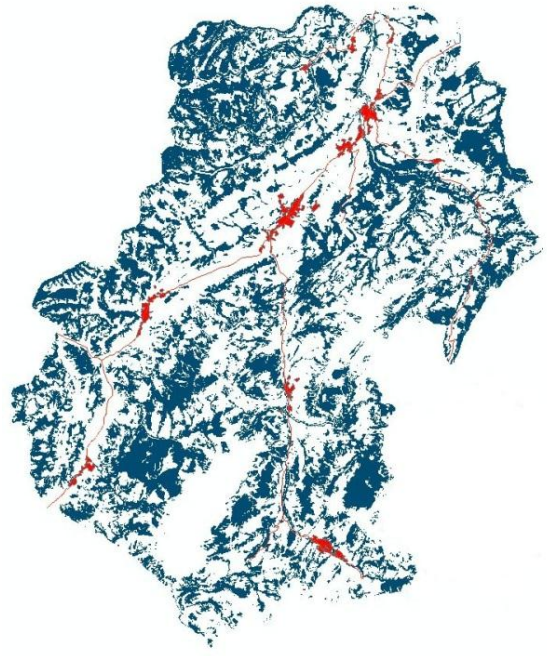


Fig. 3 Land-cover data: UBE forest cover (blue) and main urban settlements (red). Data source: GIS Canton Luzern and Swisstopo (JA100120).

According to Brabyn (1996) it is important that the landscape character is classified in order to have a frame of reference, he states that the classification can be used for monitoring landscape change and determining patterns, and considering that it is used for visual

evaluation, it “must differentiate classes that may vary in perceived quality”. Estimating landscape metrics from the data available was useful for a more reliable interpretation of the results from the expert query, on the basis that using landscape indicators can provide a useful framework for assessing the landscape properties (Bolliger 2007).

2.2.1. Mapping and characterization of landscape units.

Quantitative features could not be obtained from the expert query, thus it was necessary to complement the results with the GIS data. Using a DEM layer, the core landscape units were generated as polygons with ArcMap (Figure 4). The polygons were transformed to “feature class” in this way it was possible to extract data within each landscape unit using the “geo-processing” tool from ArcMap.

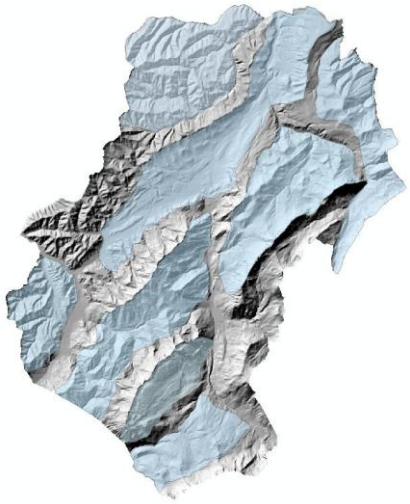


Fig. 4 UBE Landscape Units from ArcMap. Data source: GIS Canton Luzern and Swisstopo (JA100120).

The areas left outside the core units where not subject to analysis, as the landscape classification was aimed to support the visual assessment, the representative units should serve as a reference of homogenous landscape types in visual terms. With the purpose of identifying the units in an easy way a tag-name was assigned to each type according to the names used by the experts in the query. The general composition of each unit and spatial configuration of its patches, such as the forest cover could be determined with the use of extraction tool of ArcMap (see Appendix 7.3.1). The extraction process was repeated for all the feature classes of interest, finally each landscape unit had a number of metrics that could be quantified based on the GIS data. One of the most valuable metrics for the GIS analysis was the P*roportional abundance of each class*. According to McGarigal (2002) this is one of the simplest and most useful landscape metrics that can be derived, it is expressed as the proportion of each class relative to the area. The main feature classes used for the classification were:

- Forest cover
- Built-areas
- Ecological compensation areas
- Road-network
- Slope

These particular classes were selected because they described diverse aspects of the landscape and were appropriate for comparing the units from a visual point of view. Each feature class extracted was analyzed based on the quality of information it could offer to the landscape quality assessment (i.e., how relevant the class could be for the perceived visual quality of the landscape unit). After generating all the landscape metrics of interest for each unit, a chart was built with the purpose of comparing the metrics and characterizing the different landscape units. For a meaningful interpretation of the landscape metrics, a translation of the feature class to proportion-per-area was calculated (see next figure). The landscape metrics obtained could be compared with the information described by the experts for each landscape unit. This was a simple way of matching the perceived qualities of each type described by the experts with the more "objective" landscape indicators generated from the GIS data (see Appendix 7.3).

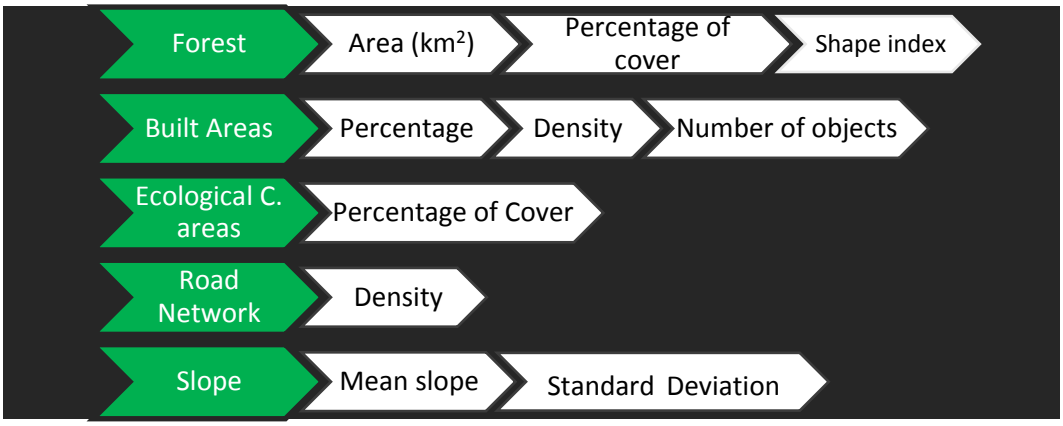


Fig. 5 Metrics derived from feature classes.

In addition to the estimation of metrics related to the proportional abundance of classes, a forest configuration index was calculated for each unit. According to Palmer (2004) generally, the configuration metrics have weak correlations with scenic value, however this study included a configuration metric due to the relevance of the forest on the UBE landscape. The spatial configuration is much more difficult to quantify and refers to the spatial arrangement of patches within the class or landscape (McGarigal 2002). Shape characteristics and patch patterns can be related to the overall landscape heterogeneity (Bolliger 2007); and the landscape heterogeneity can be an important factor in determining visual aesthetic quality (de Val et al. 2006). As the Entlebuch region is typically characterized by forest-patch mosaics it was of interest for this study to include a measure related to the spatial arrangement of forest patches into the landscape analysis. The GIS data used for estimating the shape metric could be based on the forest polygon information (e.g., perimeter of patch, patch area and number of forest patches). McGarigal (2002) mentions that one of the most common ways of measuring shape complexity is based on the relative amount of perimeter per unit area, usually indexed in terms of a perimeter-to-area ratio. The forest shape index was estimated using the next formula:

Forest Shape Index = Forest Edge Length / Total Class Area

In a final step the landscape units were compared in terms of metrics to see if a differentiation and characterization of each landscape unit was possible. The landscape units that could not be clearly differentiated from others in terms of metrics were excluded because its characteristics could be represented in other similar unit.

2.3. Identifying key viewpoints and a set of representative scenes.

With the purposes of testing the viewpoints proposed by the local experts and collecting a sample of pictures for the visual assessment and landscape monitoring, a field visit was done at the end of October. Due to the limited time available for visiting all the viewpoints only a sample of points could be tested. An extensive field analysis for finding optimal viewpoints would require several weeks and a team in order to cover all the areas of interest. Nevertheless several proposed viewpoints were visited and others were established during the field surveillance. A set of photographs were taken from some of the potential viewpoints in different directions and the viewpoints were recorded in UTM coordinates. Although there was clear sky during the day, a slight presence of fog in the area affected the visibility of the landscape. Furthermore at this season of the year (autumn) the colors of forests and pastures were already changing making it difficult to capture proper visual material for the assessment. Although these conditions affected the visual quality of the photographs taken, it was important to test the relevance of some viewpoints and locate them in the proper areas where a higher quality of information can be obtained from the viewsheds.

Fig. 6 UBE Landscape captured in the field visit.

Although the viewpoints were established first on maps, afterwards they were assessed on the field. Aspects such as the accessibility or visibility from each viewpoint cannot be assessed without inspecting the area of interest carefully and sampling the best possible points through photographs. The viewpoints visited were located in the peripheral areas and high elevation points of Schüpfheim and Entlebuch (Appendix 7.4.1). During the field surveillance more than 120 diverse photographs and panoramas were taken from different viewpoints in the study area (Appendix 7.4.2). The relevant viewpoints were recorded in UTM coordinates and registered in Google Earth. Information regarding the orientation of the photos taken and the main features shown were included in a report chart with the photo-data-base. Important features for selecting the viewpoints were the accessibility, the quality of visual information provided in the viewshed and the context of the location in regard to potential future obstruction due to forest growth or urban expansion. The pictures were taken with a Canon EOS 400 with 18-55mm lenses in automatic mode at the eye level. Mid-range and long-range distance pictures were captured with the intention that photographs could represent features at different landscape scales. Landscape elements such as farmhouses, abandoned buildings and a wind turbine were photographed as well.

These elements could also be subject of the visual quality assessment. At the same time the material collected needed to present negative visual aspects from the landscape in order to measure their impact on the scenic quality.

The next step consisted in finding additional visual material for the perception based assessment. The use of photographs in visual landscape assessments has been a widely used method in the landscape perception research field (Kaplan 1985; Angileri & Toccolini 1993; Clay & Daniel 2000; Fairweather & Swaffield 2001; Kaplan & Kaplan 1989; Soliva & Hunziker 2009; Dearden 1984). According to Daniel (2001), visual landscape assessments based on photographic representations have closely matched the results of direct landscape experience assessments. The use of photographs from local residents could represent also an opportunity for increasing the level of involvement of the locals in the landscape development plan. The photo-data-base for the assessment was not only based on the material taken in the fieldtrip, as only a small portion of the UBE could be visited and the quality of the images was not appropriate due to the reasons mentioned before. A practical and free-of-charge web-platform used in this project with the purpose of obtaining complementary photographs was Panoramio. Panoramio is a geolocation-oriented photo sharing website integrated in Google Earth. Web users can upload their photographs and locate them on the map. Using this tool presented many advantages for this particular study, first because the missing photographs representing the UBE landscape units could be easily obtained, and second because the fact of obtaining samples from external users could avoid the bias of the researcher being the one selecting all the landscape scenes to be assessed. At the same time the use of this tool could present some disadvantages for the assessment e.g., obtaining a number of non-standardized photos (different sizes, resolutions, colors), difficult to know whether the pictures were located with the right coordinates or not, there are extensive regions that have no photos uploaded especially areas with low accessibility, and areas with lower levels of internet users will probably have less chances of having photographs uploaded. Nevertheless a set of useful pictures taken with clear skies and representing diverse UBE landscapes could be found through Google Earth and were included into the photo-data-base. In a final effort to obtain photographs of missing areas and landscape features, the UBE management could assist the project with a number of photographs that enriched the quality of the visual material available for the perception-based assessment.

Careful attention was given to the selection of the photographs to be rated in the perception based assessment. The quality of information that the photographs could provide for the landscape assessment was a main consideration taken when doing the selection process. The most relevant photographs were transformed to a standard size and then discussed with members of the UBE management. Including the criteria of experts with good knowledge of the area could help in the selection of more representative pictures of the different UBE landscape types. The purpose of this step was to select photographs that would represent in the best way the visual properties of each landscape unit. In addition to this, other photographs were selected in order to complement missing landscape types and scenes that were not represented in the set of landscape units. This was the case for mire landscapes and urban settlement scenes.

2.4. Photomontages as a tool for assessing future landscape scenarios.

In order to complement the visual material for the perception-based assessment with other visualization technics, we decided to test the use of photomontages for assessing possible future scenarios in the UBE. Hunziker & Kienast (1999) suggest that the validity of using photo assessments is not affected by the use of simulated visualizations. A set of five different photomontages showing possible landscape scenarios was elaborated. The photo-editing software used for producing the visualizations was Adobe Photoshop. A first set of photomontages showed the village of Shüpfheim with a hypothetical urban expansion, higher density of buildings and dispersed urban elements in the slopes were added to one of the photographs obtained from the UBE management (Fig. 7). The growing expansion and dispersion of settlements has been one of the main topics of concern regarding the landscape development in the UBE (Hammer 2007). The photomontages could represent a useful tool for assessing the reaction of local stakeholders to possible landscape development scenarios in the UBE.

Fig. 7 Photomontage representing an urban expansion scenario.

The second photomontage was meant to assess the visual implications of the increasing natural reforestation of abandoned areas, already occurring in some landscapes of the UBE. A series of pictures showed different levels of forest regrowth in a natural area inside the UBE (Appendix 7.4.3). It is important for the landscape management of the UBE to assess the ecological and aesthetic consequences of possible changes in forest patterns. Understanding better the perceived visual consequences of different levels of forest growth on the locals can be a useful instrument for implementing measures and supporting the decision making process in the UBE management. Similar studies where respondents were shown images representing scenarios of different stages of spontaneous reforestation have been done in Switzerland. Hunziker & Kienast (1999) investigated whether lay people perceive land abandonment and spontaneous reforestation as a loss or a gain and developed a prototypical technique for assessing the aesthetic implications of reforestation scenarios with the use of photomontages. In a similar study, Soliva & Hunziker (2009) made use of photomontages for analyzing how local stakeholders assess the visual and non-visual aspects of different landscape scenarios in a Swiss mountain area.

A third photomontage showed a picture from an area with different types of houses. In the original photograph a number of elements that can have potential negative visual implications were shown. One was a “modern” cubic metallic building in the middle of traditional houses and a group of abandoned containers on the sides that didn’t fit the

character of the surrounding landscape. The edited pictures showed the same scene but with some elements removed and others screened with vegetation (Appendix 7.4.3). The purpose of this photomontage was to know better the impact these landscape elements have on the scenic quality of the area and, at the same time, what difference the implementation of mitigation measures such as vegetative screening (i.e. using plants as visual barriers to hide the exposure of "disturbing" structures) can make.

As the number of pictures that can be used in the perception-based assessment is limited, some pictures and photomontages had to be excluded and only the most relevant included. Nevertheless with the purpose of providing the UBE management with more visual material for future assessments, three more photomontages were designed with the aim of testing the presence-non-presence of important landscape elements for the scenic quality of a rural landscape. All the examples are presented in the Appendix 7.4.3.

2.5. Perception based assessment.

With the purpose of integrating the local community's opinion into the landscape development program, an exploratory and participative method for assessing the landscape visual quality was designed and tested. The procedure was based on the experience collected from previous landscape research studies and explored ways of using novel technology for its implementation. As a rule, landscape planning goals in rural areas can only be achieved with the involvement of the local actors, particularly farmers (Luz 2000). This is why the methodology aimed to collect the opinion and perceptions of local stakeholders through a perception-based assessment. The procedure designed needed to follow a coherent criterion in order to provide the UBE with a reliable and scientific methodology. Based on some of the technical requisites used by Angileri & Toccolini (1993) for developing their landscape visual assessment, five guiding conditions for the development of this assessment study where followed:

1. A certain level of objectivity.
2. Ease of application.
3. Use of currently available tools and resources.
4. Provide useful information for the UBE management.
5. Limited costs.

Perception-based methods usually apply different survey-research and psychological scaling methods to obtain quantitative measures of perceived landscape aesthetic quality (Daniel 2001). Many of these methods are based on choices, rankings or ratings of landscape photographs provided by samples of the public interacting with the landscape (Daniel 2001). As this project was not explicitly a perception landscape assessment but more an exploratory study for the landscape development plan of the UBE, the direction of the survey depended on the relevance of the information it could provide to the UBE management.

A number of diverse ways of conducting the assessment could be followed. Among the different options considered for carrying on the perception-based assessment the most feasible for this study were the following:

- Organizing panel discussions with the local communities.

- Sending surveys to the local residents by post.
- Conducting a web-based survey.
- Combining panel discussions and web-based surveys.

After discussing advantages and disadvantages as well as the time and budget available with the UBE management, the web-based survey was selected. This method allowed us to incorporate a relatively novel tool into the landscape assessment. Experiments using the Internet as a medium for conducting landscape perception assessments have been already conducted (Rogge et al. 2007; Roth 2006). Previous studies on the use of the Internet in landscape perception research have shown that there is no significant difference in the validity of data collected by standard surveys and by Internet surveys (Wherrett 1999). In other similar study, Roth (2006) concluded that internet surveys can be a cost-efficient, objective (on group level), reliable and valid instrument to gather data for landscape quality assessments.

Today plenty of new web-based platforms for building surveys are available on the Internet. In order to test the best option, a quick overview of the possibilities offered by some of the websites available online was conducted. Not all of the revised web-services offered a tool for uploading pictures into the surveys. This study required a professional internet platform capable of supporting visuals and text at the same time, offering a high level of freedom for designing the survey and allowing multiple layout forms. After conducting a revision of a number of online websites offering this kind of service, SurveyMonkey was chosen as it suited better our research needs. Potential advantages of using this platform were: its ease and practical way for building surveys, many photographs could be uploaded in the same survey, wide range of options for designing the questionnaire, easy to test and get feedbacks, the data collected could be managed in a practical way, participants didn't need to install plug-ins or special software, and it required just a link-code in order to access the survey. The main potential disadvantage presented by this method was that the target sample would require access to internet in order to fill the survey and this systematically excluded those potential participants with no access to internet services.

2.5.1. Designing the survey.

The kind of survey conducted for the UBE needed to address actual topics of importance regarding the landscape development in the region. Relevant issues such as the introduction of ecological compensation areas, forest growth, urban sprawl, land use practices, and general aesthetic changes of the landscape were evaluated through the photographs selected for the survey. A special strength of using photo-questionnaires is its capacity to provide information on a broad spectrum of needs (Kaplan & Kaplan 1989). In this way we could evaluate relevant landscape features or issues of concern expressed in the photographs and obtain a more refined basis of opinion from the participants. The type of scaling method chosen for this survey is known as "Likert" scale. Alreck & Settle (1994) describe this type of scale as "a form of opinion or attitude measurement". As the study required to measure several items per photograph this method could assist with a more flexible basis for designing the survey. The Likert scale states the issue or opinion and obtains the respondents' degree of agreement or disagreement, it is common in research because of the power and

simplicity of the format (Alreck & Settle 1994). After consulting with researchers on this field the appropriate number of scaling points that should be employed for this particular case, a five-point agreement scale including a neutral middle point was adopted.

A set of statements was built and tested in a first stage in order to know better the best way of formulating the issues of concern for the assessment. The items stated were based on the following themes: Landscape "beauty", density and types of buildings, density and distribution of forests, perceived amount of "natural" areas, landscape elements, and land use. Depending on the type of information that could be obtained from the different photographs, statements were selected for the picture evaluated. Ecological compensation areas could be potentially assessed linking them with the perceived amount of natural areas presented in the photograph. The statements formulated for the survey were the following:

1. This is a beautiful landscape (applied to all the pictures presented)
2. There is too much forest in this landscape
3. I find too many buildings in this landscape
4. The type of buildings fit well into this landscape
5. I find enough natural areas in this landscape
6. The forest distribution fits well into this landscape
7. I find too many streets in this landscape
8. I find enough agricultural land in this landscape
9. The land is used too intensely in this area
10. The hedgerows fit well into this landscape
11. The electric poles fit well into this landscape
12. The new buildings fit well into this landscape
13. This is a unique landscape

The survey started with a short paragraph explaining the extent, purpose and relevance of the study to the respondents. The statements selected for the landscapes were shown below each photograph (see Fig. 8). The instruction expressed "Please tell us to what extent you agree or disagree with the statements listed below for the landscape shown in the picture". With an easy and quick way for filling in the survey, participants could advance through the different pages. A condition for advancing to a next stage was to give an answer to all the statements. Comment boxes were added to each photograph at the end of the page as an optional item. In this regard, participants were asked to share any comment they had concerning the landscape presented. Using comment boxes could represent a practical way of collecting opinions and complementing the survey questionnaire with more qualitative data. Residents were presented a set of 12 different landscapes; the size of the photographs used in the survey was 640 x 426 pixels.

Two parallel surveys were carried out at the same time. The two surveys were identical with exception of the three replaced photomontages, calling them version A and B. Conducting two parallel surveys would enable us to compare the responses of the participants towards the different scenarios represented in the photomontages.

The internet platform allowed us to carry out multiple surveys at the same time; the only inconvenient could emerge when bringing together the data of the responses of the non-photomontages for the analysis. The survey was first tested with university students in order to measure the time required, the level of difficulty, and the overall functioning of the procedure. Comment boxes were also added to the test-version of the survey in order to get feedbacks from the respondents. Testing the survey proved to be a helpful step as some statements, visual layouts and survey forms could be reshaped in order to improve the quality of the inquiry. The survey was conducted in German as it is the mother tongue language in the region. In order to motivate local residents to participate in the survey, three tickets for a free ski-pass in Sörenberg (one of the main touristic destinations for winter sports in the Entlebuch) were offered as a prize.

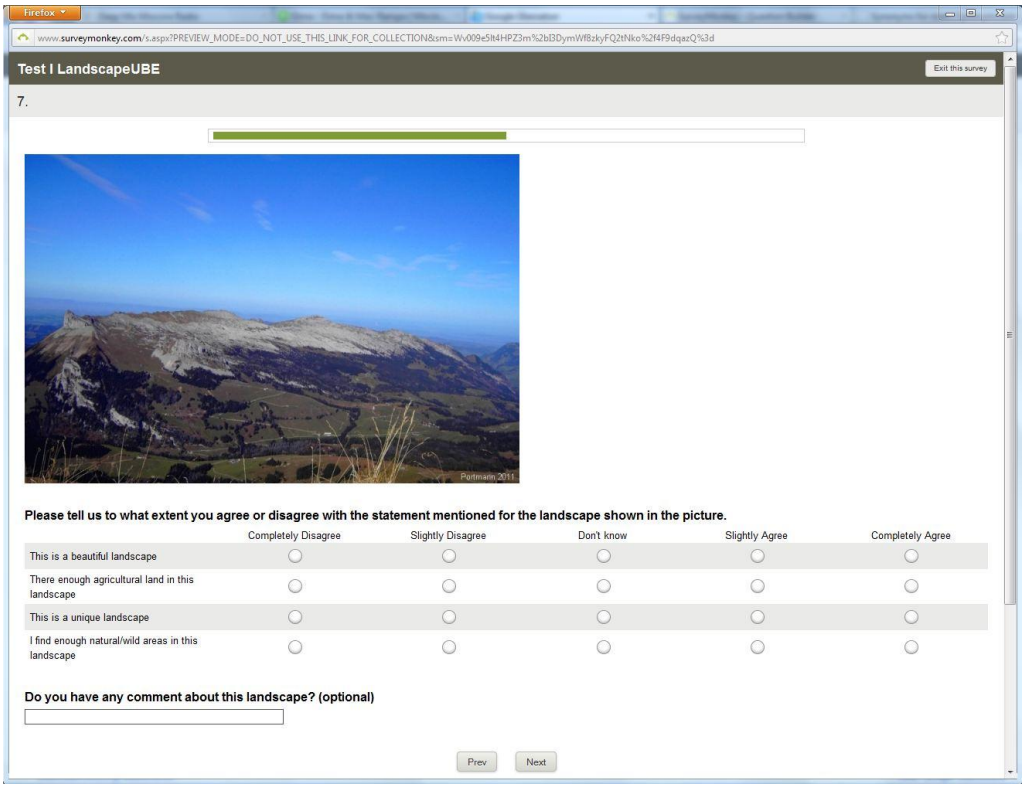


Fig.8 Snapshot of web-based survey (surveymonkey.com, 2012).

In addition to the landscape assessment, socio-demographic information was gathered: respondents were asked about gender, age, occupation area, place of residence, type of living area (i.e. urban, urban periphery, countryside), and the medium where they found the survey (i.e. via mail, newspaper, UBE website). A final comment box was included for an overall feedback of the assessment, participants were given the option to share general concerns about the development of the UBE landscapes and the survey. Respondents who opted to participate in the ballot of the prize offered were asked to leave a phone-number or e-mail address for contact in case they would result winners.

2.5.2. Survey realization.

The survey was conducted in the last week of January 2012 and was available online for a period of two weeks. The participants targeted in the survey required to be a representative sample of all the UBE stakeholders. The UBE management assisted with their official website and with an important number of contacts. A list of e-mail addresses from the Cantonal Authorities of Lucerne was used for spreading the survey via mail to an important number of the agricultural community. A school helped us spreading the survey to a number of students from the region. At the same time personnel from the UBE management helped in spreading the survey to contacts from Entlebuch they knew. Another part of the sample could find the survey on the official UBE website. In order to reach a broader sample of the local community who couldn't be contacted directly, a newspaper advert was published in the weekly journal of the Entlebuch (Entlebucher Anzeiger). The advert showed a photomontage and explained briefly the idea of the assessment and landscape development concerns for the UBE management, readers were invited to participate in the initiative by visiting the UBE official website (see Appendix 7.5.1). The residents contacted by mail were provided with a link code that took them directly to the web-based survey. As there were two simultaneous surveys, all the people contacted by mail was divided equally in two groups and provided the respective links to form A and B. The online link was replaced after some time in order to have a more balanced number of respondents for both surveys. The survey data could be monitored during the implementation and collected progressively for a later analysis.

2.6. Analysis of survey data.

Preference ratings can be analyzed in several different forms (S. Kaplan & Kaplan, 1989). For this study descriptive statistics were used for analyzing the data collected from the questionnaires. The data was first gathered, in a second step organized and then transformed in order to process it using computer-based software SPSS. All the comments were gathered and organized for a careful analysis. The fact of using a Likert scale in the questionnaires limited the use of advanced statistical tools for the analysis because ordinal data cannot be treated as interval-level data. As mentioned by Alreck & Settle (1994) This type of scale present difficulties and problems associated with analysis and interpretation. Nevertheless descriptive statistics were useful for interpreting the responses obtained and the questionnaire results could be complemented with the comments shared by the respondents. Regression analysis and parametric-tests were not possible to apply with the type of scale used, the results were shown in terms of frequencies and percentage distributions and a series of response-tables that could be self-explanatory were built in order to interpret the responses for the landscapes assessed. An overall analysis of best ranked and worst ranked pictures in terms of "beauty" (i.e. visual quality) was done as an initial stage. Means and standard deviation were used only as an assisting tool for analyzing the responses, giving values from -2 to +2 to the agreement scale. Photographs' responses were analyzed individually and then compared with others.

In an effort to obtain more useful information regarding group differences in preferences and potential scenario responses, a series of crosstabs were generated. Important

information can be obtained by comparing the preferences of different groups (Kaplan & Kaplan 1989). This study was particularly interested in knowing better the perceptions and attitudes of farmers and non-farmers toward relevant landscape features. Studies on perception of rural landscapes are recommended to separate the general public into farmers and non-farmers as farming background appears to be an obvious influence factor on landscape perception (Van den Berg & Koole 2006; Rogge et al. 2007).

3. Results.

The order of the results shown is the same followed in the implementation of this research study. As this is an experimental prototypical study meant to provide an applicable systematic platform for assessing the landscape, most of the findings are shown in a practical and easy communicative way. Tables, maps and images present some of the main findings. In the Annex section a more detailed overview of the results is included.

3.1. Expert query.

From the nine queries sent to the experts, five responses were received back. It can be assumed that the extension and difficulty of the query together with the lack of incentives for filling it affected the level of responses received. One of the respondents described the task as “difficult” and stated that he was not an “adequate expert” for the type of task. Topography and vegetation cover appeared to be a common feature for characterizing the landscape with experts regularly mentioning geological formations and forest distribution. Other regular descriptions included land use characteristics, pastures, man-made elements, distribution of settlements, type of buildings and water courses forming the landscape.

The results of the dissected maps showed a trend for using the mountain ridges and topographical transitions for delineating the landscape types. However some borders were not related to the DEM shapes and could probably be more associated to the changes in land use/cover perceived by the respondents. Interestingly most of the homogenous landscapes delineated by the experts matched relatively closely when overlaid. This was the case for regions such as the main valley of Entlebuch, Schrattenfluh, Sörenberg, Marbach, Hilfere and Napfgebiet (Fig. 9).

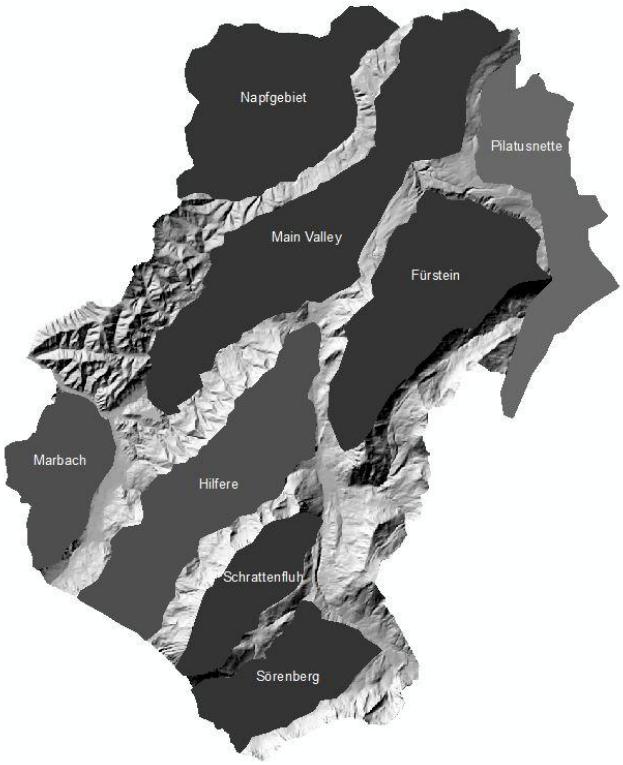


Fig.9 Landscape units. Data source: GIS Canton Luzern and Swisstopo (JA100120).

Some of the names assigned for the landscape types were common or similar in most of the cases between the different experts. The toponyms written most of the times came from the name of the main villages, municipalities, and traditional names used for referring to this areas. Many of the viewpoints proposed were located in high elevation points and mountain ridges. Viewpoints assigned for capturing typical landscapes generally pointed landscapes showing the Schrattenfluh or either the main valley of Entlebuch. The table below shows common names assigned to the landscape units and the most relevant descriptions made for each type by the local experts.

Landscape Units	**Main qualitative descriptions, features, and elements**
Napfgebiet	Hilly, irregular, wild, meadows, forested valleys, dispersed farms, woods.
Main Valley	Open valley, development area, industries, intensive land use, crops, settlements, roads, forested flanks (Beech & Spruce), farms, farmhouses, railway, river, wind turbine, fruit trees.
Marbach	Gentle and soft hills, flat valley, pastures, farms, no settlements, cable-cars
Hilfere	Rough terrain, steep hills, pastures, meadows, forests (Spruce), dispersed settlements, bark-beetle trees, creeks.
Schrattenfluh	Sharp, exposed rock, Karst-formation, unique.
Sörenberg	Shaped by people, grasslands, forests (pine & spruce), tourism infrastructure, many bogs and fens, ski lift, holiday houses.
Fürstein	Highly elevated, unknown, open rocks, mire landscapes, dispersed settlements, forests and fens, creeks.
Pilatuskette	Steep, pre-alps, dispersed settlements.

Tab. 1 Main landscape unit' characteristics mentioned by local experts.

The expert query provided a useful description of the different landscape types in the UBE and practical information that could serve as a starting point for building up the landscape assessment. The criteria used by the experts for classifying the landscapes appeared to be consistent between all the respondents. A higher number of experts taking part of the query can raise the reliability of the method but would probably complicate the finding of agreement areas for mapping homogenous landscapes, a reason why it can be better to limit the number of experts when using this method. Considering the experimental approach of this technique, the results draw attention to the validity of using local experts for carrying-on a landscape characterization and obtaining in a practical way a number of homogenous landscape units.

3.2. Landscape types and metrics.

Fig. 9 shows the final result from the digitalized landscape units. The digitalization of the converged maps with the use of ArcMap enabled the chance of extracting specific landscape metrics within the landscape unit areas. The eight units presented relevant differences in terms of landscape metrics, although *Pilatuskette* was the less distinguishable among the

units. Many of the descriptions made by the local experts correspond to characteristics represented in the metrics. The descriptions made by experts in relation to the topography, forest cover, and urban composition can be related with the resulting metrics. The tables below show the resulting metrics for each unit, for a better visualization of the metrics, a scale of colors was assigned to the most relevant values obtained (Tab. 2).

Landscape Unit	Built-area (%)	Urban Density	Built Objects	Roads (%)	Eco-comp.A. (%)	Mean Slope	Slope Std. Deviation
Napfgebiet	0.3	15.0	564	0.58	3.5	33.5	19.9
Marbach	0.5	5.3	88	0.66	7.3	33.1	19.5
Main Valley	1.9	64.3	3400	0.64	3.9	18.0	15.1
Hilfere	0.2	9.9	355	0.45	8.5	26.4	16.7
Schrattenfluh	0.0	1.7	24	0.29	4.1	27.0	16.0
Sörenberg	0.2	7.5	134	0.34	36.7	19.2	14.4
Fürstein	0.2	10.9	385	0.42	9.5	21.3	16.3
Pilatuskette	0.2	11.1	300	0.48	9.7	22.4	17.7

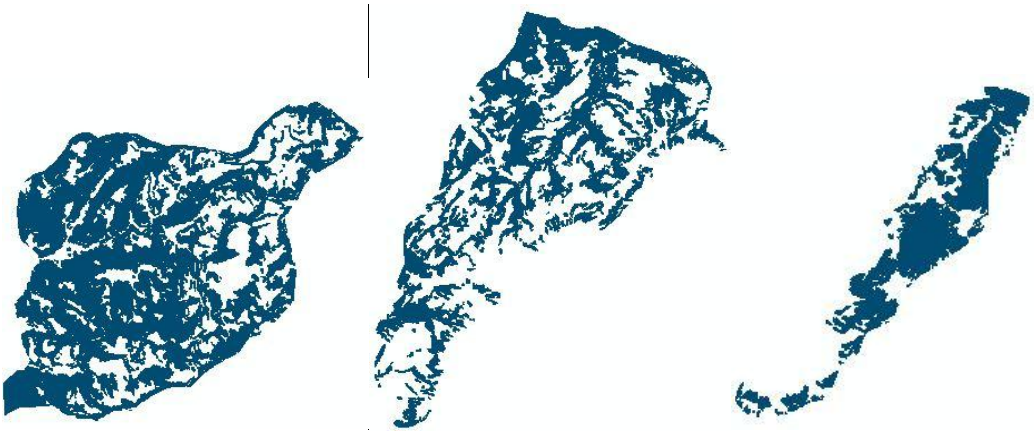
Tab. 2 Landscape unit metrics, the scale of colors highlight stronger values (darker blue) and similar values among units. Note: Urban density is expressed as number of objects per area.

The percentage of roads was not necessarily related to the urban density, *Marbach* with one of the lowest indices of urban density presented the highest percentage of roads per area. *Sörenberg* shows a high extension covered by ecological areas in comparison to the rest of the units; the compensation areas shown in the table included raised bogs and this cover type is characteristic from the region. The landscape units with the highest slope variation were *Napfgebiet* and *Marbach*. *Schrattenfluh* can be described as the more "pristine" area taking into account its protected condition, with the lowest metrics in terms of built-areas. When comparing the metrics of *Fürstein* and *Pilatuskette* is evident a high degree of similarity, reason why one of them (*Pilatuskette*) had to be excluded for the later stage.

Landscape Unit	T. Area (Km2)	Forest (Km2)	Forest (%)	F-Shape Index
Napfgebiet	37.7	26.5	70	15.4
Marbach	16.7	7.5	45	11.1
Main Valley	52.9	10.2	19	5.2
Hilfere	36.0	17.4	48	9.6
Schrattenfluh	13.8	4.0	28	5.6
Sörenberg	17.9	5.0	28	8.7
Fürstein	35.4	12.8	36	9.3
Pilatuskette	27.1	12.8	47	9.3

Tab. 3 Metrics related to forest composition and configuration.

Tab. 3 shows metrics related to the forest characteristics, mainly the percentage of forest cover and the shape-index. The regions with the highest percentage of forest cover appear to be also more complex in forest configuration as they present a superior shape-index. It was possible to distinguish forest spatial characteristics between the different landscape units from the metrics obtained with GIS. In order to visualize in a better way these patterns a map with the forest patch patterns for each unit is shown in the annexed section (Appendix 7.3.1), below is an example of three different patch configurations and the corresponding estimation of the shape-index.



Napfgebiet **15.4** Fürstein **9.3** Schrattenfluh **5.6**

Fig. 10 Shape-index of forest patches. Data source: GIS Canton Luzern and Swisstopo (JA100120).

The overall result of the GIS analysis proved the feasibility of obtaining quantitative landscape descriptors based on the criteria from local experts. It is an important result for this study that the opinion of local experts could be integrated successfully into the landscape classification. The descriptions made by the experts in the query could give a better understanding of how the UBE landscape is visually characterized and how its appeal is perceived in terms of composition and configuration.

3.3. Representative scenes.

Fig. 11 shows the set of photographs chosen for the perception-based assessment. The photographic material collected in the field assisted the project with a wide range of landscape types and features. Nevertheless just two photographs from the field set were chosen for the second stage. Most of the material selected came from the photographs provided by the UBE management. It was not possible to find high quality photographs in terms of weather conditions and seasonality. Some of the pictures needed further editing for removing disturbing elements in the foreground or improving aspects related to color balance and contrast. As seen in Fig. 11 the color balance and contrast of the samples was not homogenous between the different photographs. The process of selecting the photographs proved to be challenging because of the limitations with the material available. Doing an extensive field photo-inventory seems necessary in the future in order to get a better range of material for landscape assessments and monitoring.

Fig. 11. Set of landscapes selected for the photo-based assessment.

Photo 1 represents the landscape unit of *Sörenberg* and shows a pasture mixed with forest, typical and non-typical farm houses and a mountainous background. **Photo 2** shows a mire landscape, the place is located in *Sörenberg* as well. As mire landscapes are one of the most relevant landscape scenes of the UBE a sample needed to be included in the quality assessment. **Photo 3** represents *Fürstein* and shows a mountain landscape with forests and pastures. **Photo 4** belongs to *Hilfere* and is taken from a high elevated viewpoint; relevant features that can be seen are the forest patch distribution, landscape configuration and trees affected by bark-beetles. **Photo 5** shows the village of Schüpfheim, the scene represents a typical settlement from the UBE. At the same time it served as basis for producing the urban-expansion photomontage. **Photo 6** represents the *Main Valley* unit, important features are the type of houses shown and land use features. **Photo 7** shows the *Schrattenfluh* eastern flank, a well-known landscape of the UBE. **Photo 8** represents *Marbach* and captures a variety of landscape patterns, forests, roads, and houses. **Photo 9** represents *Napfgebiet*, the scene was taken from a viewpoint obtained in the field test. **Photo 10** shows an urban area, the village of Entlebuch. This particular scene was included as a dense urban area was not represented in the rest of the pictures and needed to be tested in the assessment. **Photo 11** shows a typical remote landscape, extensive fens in the foreground and a forest in state of natural regrowth. This picture served for building the forest-regrowth photomontage. **Photo 12** is a scene from Shüpfheim periphery, it was captured during the field work, the picture shows elements that can be ranked as negative in visual terms and could represent an

unwanted scenario for landscape development. A photomontage was built from this scene removing part of the potentially disturbing elements with vegetative screening. All the photograph samples can be seen in more detail in the Appendix section.

3.4. Web-based assessment.

A total of 216 responses were gathered after closing the online survey, a number higher than expected given the general low level of participation in such initiatives (Knaus, personal communication). Most of the respondents were reached by mail, with only 15 participants finding the survey via the newspaper advert and 2 on the UBE website. Around 400 mails were sent to farmers with a response rate of over 25%. From the mails sent to the students of a local school 33 answers were received. Tab. 4 shows the main socio-demographic characteristics of the sample. Farmers and handcrafters represented up to 52% of the background sample, students were the second largest group followed by the business sector.

Gender		
	Frequency	Percent
Male	115	53.2
Female	101	46.8
Total	216	100

Age		
years old	Frequency	Percent
< 20	35	16.2
21-30	21	9.7
31-40	55	25.5
41-50	60	27.8
51-60	35	16.2
> 60	10	4.6
Total	216	100

Background		
	Frequency	Percent
Farmer	97	44.9
Handcrafter	16	7.4
Industry	7	3.2
Banks/Business	21	9.7
Tourism	8	3.7
Environment	2	0.9
Teacher	12	5.6
Student	33	15.3
Retired	1	0.5
Housewife	9	4.2
Other	9	4.2
Total	216	100

Residence		
	Frequency	Percent
Doppleschwand	6	2.8
Entlebuch	35	16.2
Hasle	15	6.9
Romoos	16	7.4
Schüpfheim	54	25
Escholzmatt	48	22.2
Flühli	14	6.5
Sörenberg	3	1.4
Marbach	16	7.4
Other	9	4.2
Total	216	100

Area Type		
	Frequency	Percent
Village	29	13.4
Village_Periphery	39	18.1
Farmhouse	148	68.5
Total	216	100

Tab. 4 Main socio-demographic data collected in the perception-based survey.

The two parallel surveys were relatively balanced in the number of responses collected with 105 participants in survey A and 111 in survey B. The results of the socio-demographic data also show that great part of the residents sampled live outside urban settlements. More than 68% of the respondents live in farmhouses which may be related to the high number of farmers sampled. In terms of representativeness, the urban residents were not well represented in the survey sample. This may have implications for part of the preference results as place of residence has been found to have a significant impact on landscape preferences (Howley 2011; Van den Berg & Koole 2006). The only medium for reaching the urban residents was through the newspaper advert which didn't have enough impact for attracting more participants. Nevertheless the sample obtained is an important composite of stakeholders of the UBE as it covered a wide variety of the diverse local groups (e.g., age classes, economic sector, and place of residence) and it can provide with a better understanding of the local's landscape preferences and group differences in preferences useful for strengthening the UBE landscape development plan.

Over 170 comments were shared by the respondents, 130 comments regarding features of the landscapes presented in the photographs and 42 general opinions about the survey and issues concerning the landscape development of the UBE. The high frequency of comments shared is an important result for the type of method used in the survey. Comment-boxes appeared to be a useful instrument for complementing the questionnaire data and providing a communication space for participants for expressing their concerns. A number of different types of comments related to the landscape characteristics, elements, land use practices, preferences and even conflicts could be gathered. Participants expressed their interest on the assessment and others welcomed the future use of such participatory procedures. The type of information obtained from the comments did not only help for interpreting better the perception-based assessment but also for strengthening the qualitative data and

providing a direct input from part of the local community into the landscape development plan. A complete overview of the original comments can be found in the Appendix 7.6.2. The nomenclature used in the following sections for referring to pictures and statements is explained in the Appendix 7.5.2.

3.5. Preferences and trends.

From the results of the questionnaires (Appendix 7.6) it is possible to distinguish common trends in the answers to the statements. Some of the answers show a marked level of agreement or disagreement in which most of the respondents tend to concord in regard to the statement presented. Tab. 5 shows the results for statement **q1** "this is a beautiful landscape", in this example photos **1**, **5B** and **11B** showed a clear trend toward using the "completely agree" (2) scale side. A different example is the case of photo **10** where the responses were much more ambiguous as the answers were dispersed through all the scale. In order to assist the interpretation of the responses an estimation of means and standard deviation was calculated for all the responses using SPSS (Appendix 7.6.1). Although the type of ordinal scale shouldn't be analyzed with such statistics it appeared to be useful for understanding better the overall trends of the responses. A value of -2 to +2 was assigned to the agreement scale. Based on this the most preferred landscapes in terms of visual quality (**q1**) were: photo **11b** (natural forest), photo **1** (*Sörenberg*), and photo **5b** (*Shüpfheim*). Worst rated landscapes were: p**12a** (Shüpfheim periphery), p**10** (Entlebuch urban settlement), and p**5a** (Urban expansion photomontage).

Q1	-2	-1	0	1	2
Photo 1	0	0	1	19	80
Photo 2	1	10	5	23	61
Photo 3	1	1	2	22	74
Photo 4	0	5	7	37	50
Photo 6	1	7	7	45	40
Photo 7	2	4	6	22	65
Photo 8	0	1	5	32	62
Photo 9	1	1	5	35	58
Photo 10	10	29	18	29	15
Photo 5A	7	17	12	41	23
Photo 5B	0	1	4	28	67
Photo 11A	1	1	3	17	78
Photo 11B	0	0	1	16	83
Photo 12A	10	30	26	24	10
Photo 12B	3	20	18	39	21

Tab. 5 Responses for statement q1 ("this is a beautiful landscape") expressed in percentages. Note that -2 = completely disagree and 2 = completely agree.

As Tab. 5 shows, respondents generally rated both the more natural and the well managed agricultural landscapes as beautiful. The fact that the landscapes are being rated only by local residents could have a significant effect on the way they answered specially on **q1**. Place attachment plays an important role when it comes to landscape preferences (Kaltenborn & Bjerke 2002). The answers of the worst rated landscapes in terms of beauty also show a considerable higher trend to use the neutral point of the scale for these cases. This may suggest less willingness from local's to rank one of their landscapes as "not beautiful" and a

preference for using the "I don't know well" neutral option instead. The affective bond between local residents and the Entlebuch can be seen also in a number of comments expressing e.g. "Entlebuch is a unique beautiful landscape" or "the Entlebuch scenery is close to my heart". Most of the best rated landscapes presented natural and well preserved scenes with mountains in the background (e.g. **11a**, **1**, **11b**, **3**), while urban built areas non-related to agricultural landscapes resulted between the worst rated scenes. However there was an exception to this pattern as photo **5b** showing the village of Shüpfheim was a relatively well ranked urban scene this could be influenced partly by the high number of respondents coming from this municipality and also by the attractiveness of the foreground. Interestingly the results for the photomontage of Shüpfheim (**5a**) based on the same photograph showed a sharp drop in landscape preference in comparison with the ratings of **5b**. The hypothetical scenario of urban expansion appeared to have a strong negative impact in terms of perceived visual quality. On the other hand the worst rated scene was photo **12a**, in this particular case the corresponding photomontage (**12b**) was rated higher for **q1**, suggesting that the removal of "unsuitable" buildings or vegetative screening of disturbing structures may have a meaningful positive impact in the perceived visual quality of such sites.

The results show that the mire landscape (photo **2**) and photo **11b**, were rated as the most "natural" as was expected. Considering the sample composition we can assume that the high number of participants with an agricultural background also influenced the overall ratings toward the more natural landscapes, this results are later discussed when comparing farmers and non-farmers preferences. According to Howley (2011), farmers have been found to respond negatively to wild unmanaged nature scenes which could be attributable to their different interactions and experience with the landscape. This can be corroborated with the low ratings from farmers for photo **3, 11a** and **11b**, which presented unmanaged settings in more natural areas, and complemented by related comments made by farmers for this scenes stating e.g. "too much natural area" or "these landscapes should not get out of control". However this scene was between the best ranked among students. The age class *<20* rated this photograph as the most beautiful landscape after photomontage **11a**, and non-farmers also rated it higher than farmers. The results for photographs **2**, **3**, **6**, **11A**, **11B**, and **7** represent a good example of the diversity of opinions between groups specially toward natural landscapes, as mentioned by Howley (2011) and Van den Berg & Koole (2006), preferences differ significantly among different groups of the population, in this study important inter-group differences could be found among the age classes and farmer-non-farmer groups (see crosstabs in Appendix 7.6).

3.5.1. Forest density and distribution.

The responses for the statements **q2** and **q6** regarding the forest density and distribution appeared to be relatively ambiguous at the time of analyzing the answers. In general, the results for the statement "I find too much forest in this landscape" show that the disagreement of the item prevailed in all the cases. The results show also that there was no significant correlation between the forest density (q2) and the perceived visual quality (q1). For example photo **3** was perceived as the most densely forested landscape but still one of the best rated in terms of beauty. In the case of statement **q6** referring to the forest distribution, respondents found photos **2**, **8** and **11b** as landscapes with a "better" forest distribution. These landscapes presented dispersed clusters of forest mixed with open areas. This result concord with the results of

previous studies that have found a preference for natural appearing landscapes with a mixture of open and forested land (Palmer 2004; Kaplan 1985). Interestingly the lowest rated landscapes in terms of forest distribution were photo **3** and **4**. These two scenes are contradictory as photo **3** presents more uniform compacted forest stands while photo **4** shows a highly fragmented forest with complex narrow patches. The results of item **q6** suggest that there may be a medium level of forest patchiness that is more desirable from the visual point of view.

The forest regrowth photomontages **11a-11b** could provide clearer results for making inferences regarding the preferences for forest patterns. Photo **11b** was the best overall rated landscape in terms of beauty, while the photomontage **11a** which showed a hypothetical future forest regrowth scenario was ranked slightly lower. Tab. 6 shows the differences in the results for the statements **q2** and **q6** between the two scenarios. The moderate changes made to the forest density and configuration in the photomontage **11a** appeared to influence the perceptions of landscape attributes considerably. The forest growth represented in the photomontage also pointed out to be a concerning topic to some locals; comments like "the growing stand of the forest is not good" or "it's a pity, in a couple of years this beautiful meadow will be overgrown with forest" were stated in regard to photomontage **11a.**

Statement	photo	-2	-1	0	1	2
There is too much forest in this landscape	11a	51	25	11	10	2
	11b	60	33	3	4	0
The forest distr. fits well into this landscape	11a	1	9	13	41	36
	11b	0	9	1	35	55

Tab. 6 Results of q2 and q6 for the forest growth photomontage, expressed in percentages.

The responses for these photomontages show again a trend for liking more open forests with lower density of trees rather than closed forest stands. This result may be in accordance with the findings of previous studies. Hunziker & Kienast (1999) for example concluded that a medium degree of reforestation is most desirable for viewers. In this case the statements **q2** and **q6** where useful to detect changes on the perceived visual character of the landscape when changing forest properties. At the same time relevant differences in inter-group perceptions could be found in these photomontages. As it shows a near natural landscape, farmers rated the landscape beauty of **11a** and **11b** lower than non-farmers, although the meadow in the foreground could still represent a valuable landscape for grazing. Important differences were also found in the age-class ratings for statement **q1**. Surprisingly the young-class (i.e. students) preferred **11a** to **11b** in terms of beauty. This is an interesting exception to the general pattern of preferences for open forests. As shown in Tab. 7 the young-class also tended to rate higher than elders their preference for this landscape.

P11a_q1	age class	-2	-1	0	1	2	Total
	15-20	0	0	0	6	94	100
	21-40	3	0	3	16	79	100
	41-60	0	2	4	22	71	100
Total		1	1	3	17	78	100

Tab. 7 Age-class differences in preference toward the forest growth scenario (q1, Photo 11a).

3.5.2. Density and type of buildings.

Statements **q3** and **q4** made reference to the density and type of buildings presented in the landscape scene. The overall results of statement **q3** show that Photo **10** and **5a** were rated as the most densely urbanized as expected. The statement proved to be subjective and unclear to be assessed specially in urban scenes. Respondents frequently expressed as "normal" that a settlement can have "too many buildings" and that buildings are necessary. The photomontage **5a** and **5b** represented again the most useful mean for interpreting this type of statements. Statements **q1** and **q3** were strongly affected when comparing the results of photo **5b** and **5a** that represented an urban expansion scenario. The photomontage **5a** decreased in perceived beauty in a significant proportion, and the perceived density of buildings increased sharply between the two scenarios. The statements regarding type of buildings **q4** and amount of natural areas **q5** show important differences as well (see Appendix 7.6). An interesting finding was that the impact of the photomontage on statement **q1** appeared to be lower in the young class (students) than in the rest. In the case of the young class the difference in perceived beauty between the two scenarios appeared to be relatively low, while for the older classes the impact of urban expansion on perceived beauty varied in a significant proportion.

Statement	photo	-2	-1	0	1	2
This is a beautiful landscape	5a	7	17	12	41	23
	5b	0	1	4	28	67
I find too many buildings in this landscape	5a	6	20	8	41	26
	5b	23	41	9	23	4
The type of buildings fit well into the landscape	5a	15	25	15	35	10
	5b	3	18	8	50	21

Tab. 8 Results of q1, q3 and q4 for the urban expansion scenarios.

The results of statement **q4** showed that the most disturbing type of buildings were found in photos **12a**, **10** and **6**. It can be assumed from the comments that big industrial buildings and abandoned structures seem to matter to the local's perceptions on visual quality. Photo **6** shows a number of partially abandoned farm buildings which could have a negative impact in the ratings as comments stating "too many unused buildings" or "the old disused buildings should be demolished" suggest that the condition of such buildings is an issue that matter to them. In other examples respondents made reference to the colors of roofs or buildings (e.g., "I am bothered by the red roofs" or "the blue building is too dominant"). The results of photomontage **12b** were relevant as they show the impact that some built structures can have on the visual environment. For **q1** the vegetative screening of visually disturbing structures made in photomontage **12b** improved the visual quality moderately. However statement **q4** was strongly influenced; this suggests that the type of buildings hidden with plants have a considerable impact in the visual quality of this landscape. Some of the comments regarding this scene expressed "The brown block is disturbing" or "this is probably an ideal example of how new buildings shouldn't be legally approved". The appearance of the buildings was a frequently mentioned topic among the survey and it shows the importance of including it into

the landscape strategy of the UBE. Landscapes that were negatively rated in **q1** were also negatively rated in **q4**.

3.5.3. Land use.

The results of preference ratings given to statements **q1**, **q8** and **q9** show the relevance of the land-use topic in the survey. The results from **q9** suggest that intensive use of land is not realistically perceived, for this statement disagreement prevailed strongly among most of the respondents. Considering that a major part of the sample were farmers, results reflect mainly the interest of this stakeholder group when asked about land use practices. Surprisingly for photo **1**, which showed an intensely used meadow in the foreground, **q9** obtained the lowest rating. Respondents disagreed strongly that the land was being used intensely, one particular comment made reference to the landscape stating: “nice clean and well-kept lawns and pastures”. In this regard Van den Berg and Koole (2006) mention that farmers have an aesthetic preference for well managed settings and this can be sustained in this study by the high number of comments making reference to the land-use practices, management of forests and pastures, or the overexploitation of some areas. Agricultural land can also be understood as a display of the farmer’s knowledge, values and work ethic, and thus farmers appreciate well managed landscapes (Rogge et al., 2007). It is evident from the results obtained that well-kept landscapes tend to be rated as more beautiful, photo **1** is a good example supported by the results of the photomontage **11a,** for which the forest regrowth (that can be interpreted as a lack of maintenance) affected negatively the ratings on perceived beauty specially for farmers.

The opinions gathered suggest that there is a shared concern from part of the farming community in regard to the land-use limitations due to environmental protection and the constraints implemented by the authorities for decreasing the intensification of land use practices. In contrast to the comments stated from the agricultural stakeholders the study could find also a number of opinions calling for more natural areas, less intensification of agriculture, and more landscape protection regulations. This highlights the importance that land-use practices have on the landscape development of the UBE and the existing differences of values between the stakeholders.

3.5.4. Perception of natural areas.

Respondents generally perceived the amount of natural areas as “enough” in most of the cases as Tab. 9 shows. This can be explained partly by findings suggesting that rural residents tend to display lower preferences for wilderness landscapes (Van den Berg & Koole 2006). The best rated landscapes for this statement were photo **2** and **3**. Photo **2** showed the wildest landscape of the survey. For the case of the photomontages **5a-5b** and **11a-11b** the answers show that the forest growth affected slightly negatively the perception of natural areas, while the urban expansion affected in a meaningful proportion the perceived amount of natural areas. In regard to the meaning of “natural areas” it is clear that at least for the agricultural community natural areas are linked to ecological compensation areas and land-use

intensity. The crosstabs of age-classes for **q5** (Appendix 7.6) suggest that for young people the meaning of natural may be more related to the amount of forest in the landscape. An overall antipathy of the agricultural community toward natural areas is clearly seen when analyzing the results of the crosstabs between farmers and non-farmers (Appendix 7.6). Considering that natural areas may be perceived as a limitation to their use of the land, comments emphasizing that there were already "more than enough" natural areas were repeatedly stated. Curiously for photo **7** that showed a scene of the UBE core-zone one of the respondents stated "this landscape is an exaggeration of natural areas".

Statement q5	photo	-2	-1	0	1	2
I find enough natural areas in this landscape	1	5	6	3	36	51
	2	0	0	3	20	76
	3	0	4	7	35	54
	4	0	7	9	41	42
	6	2	11	10	42	35
	7	1	4	2	30	64
	8	1	6	7	43	42
	9	2	8	10	44	36
	5a	10	38	11	29	12
	5b	5	21	13	35	26
	11a	2	0	2	19	77
	11b	0	2	2	15	81

Tab. 9 Overall responses for the statement q5, expressed in percentages.

Tab. 10 shows an example of the differences on ratings for natural areas made by farmers and non-farmers for two of the landscapes scenes evaluated. In the case of the mire landscape (photo **2**)**,** farmers rated slightly strongly the perceived amount of natural areas than non-farmers, while for photo **6,** that showed an agricultural landscape, the inter-group difference was more significant. The crosstabs of all the landscapes rated (Appendix 7.6) show the same pattern with regard to the inter-group differences on the perceived amount of natural areas. A possible explanation to this may be the fact that the agricultural community is more reluctant to the idea of having natural areas in their working environment while for others having more natural areas wouldn't represent a problem as their relationship with this type of landscape is different.

P2_q5	background	-2	-1	0	1	2	Total
	Farmer	1%	0%	0%	18%	81%	100%
	Other	0%	1%	5%	22%	72%	100%
Total		1%	1%	3%	20%	76%	100%

P6_q5	background	-2	-1	0	1	2	Total
	Farmer	0%	6%	10%	36%	48%	100%
	Other	3%	15%	10%	48%	24%	100%
Total		2%	11%	10%	42%	35%	100%

Tab. 10 Background crosstab for q5 of two relatively natural scenes.

The answers for **q10** which referred to the hedgerows present in the landscape (photo **6**) were rated higher than expected. Most of the respondents thought the

hedgerows fitted well in the landscape, even the farmer group although less strongly than others. This can represent a relatively positive attitude toward an important ecological element for enhancing the quality of habitats in farming areas. Interestingly in this photograph several comments were shared making reference to the bad management of the hedgerows of the slope. The overall results regarding natural areas have meaningful implications for the UBE management as they show a marked negative attitude from part of the stakeholders toward the presence of natural areas. Farmers have been found to have a predominantly functional perspective on landscape and regard land as a productive resource for supporting basic human needs for shelter, food or timber (Swanwick 2009). The answers of the statement **q5** and some of the comments shared may suggest that the survey could be perceived by the sampled land-users as an instrument of the UBE for introducing more natural areas in the future, which eventually could have influenced the responses.

3.6. Relevant landscape features.

The results of the photomontages **12a**-**12b** reflect the significant visual impact that disharmonic landscape elements can have on the perceived visual quality. Ratings for statements **q1** and **q4** denote the impact that the appearance of some buildings can have on the perceived visual quality. Beside the results of the photomontages it was useful for this stage of the assessment to gather a number of opinions making reference to landscape elements as they can provide valuable information for the UBE landscape planning. Renovation or replacement of “old” and “unused” buildings was mentioned several times, while calls for a better and more flexible regulation on the appearance of buildings were stated too. The growing dispersion of settlements was also mentioned by a number of respondents, one particular comment stated “the family houses chaos in de village edges is not well planned, it harms the landscape”.

There were other interesting findings in regard to landscape features. Some of the landscapes presented showed forests that were partly affected by the “bark-beetle” with trees having no leaves or in a decaying state. This appears to impact in a considerable way the visual quality of the landscape, some respondents complained about the state of the forest and its implications on the landscape. One respondent for example suggested that he would rate the landscape beauty higher if the forest would be healthier, other stated “for me the landscape is affected by the bark-beetle”.

Another important landscape element repeatedly mentioned in photo **1** was the electric power pole. For a number of respondents it was disturbing, but apparently it didn’t affect significantly the overall rating of this scene as it was the second best rated even though it showed the electric poles in the background and bark-beetle affected forests. Other important features mentioned throughout the survey were the high amount of asphalt roads, the colors of some buildings, and light pollution. Kaplan et al. (2006) found out that some cultural features such as electric lines, roads, and agricultural equipment had significantly detrimental effects on visual quality of landscapes and farms. Implementing a better management and regulation of such elements would help enhancing the visual quality of the UBE landscapes. Overall it seems valuable to ask the locals about landscape

preferences on elements, solutions and agreements can be found, especially when a number of landscape features turn out to be of common concern between the locals.

4. Discussion.

4.1. Landscape classification.

The results from the first stage revealed that consulting local experts about landscape characteristics can be a rapid, practical and reliable way of classifying the landscape into homogenous units. Bringing together the expert criteria with the GIS data available enabled us to obtain a quantitative description of relevant spatial characteristics through the estimation of landscape metrics. For this assessment the units obtained were useful for selecting photographs that could represent the different landscape types in the UBE. The landscape classification method developed can also serve as a platform for future projects in the Biosphere related to landscape assessments and monitoring.

Conducting the query with local experts was also relevant for the participatory-oriented approach of the project. Although the expert criteria may not represent the local community or a particular stakeholder group, experts can be regarded as locals with enough knowledge of the region for performing a landscape classification task. The results of the maps dissected by local experts revealed a relatively high level of agreement between all of them in regard to the delineation of homogenous landscape units. The number of units assigned in the task may also influence the level of detail of the classification map. For this study we thought that 8 units would be enough for classifying the landscape, although this number is still dependent on the criteria used by the experts and the diversity of landscapes that the study area may have to the eye of the experts. It would be of interest for this methodology to repeat the same task in the future with a broader sample of locals, experts and non-experts, and compare the criteria used by the different groups for dissecting a map into homogenous units.

The resulting metrics from the GIS analysis showed that it is possible to characterize and differentiate the landscape units proposed by the experts in terms of composition and configuration with metrics. Thus working with the regional GIS database was a useful approach that supported the landscape classification task and appeared to be a practical tool for complementing the expert criteria. There is an abundant number of studies on landscape perceptions relating different landscape indicators with scenic preferences (de Val et al. 2006; Lamb & Purcell 1990; Ode & Miller 2011; Hunziker & Kienast 1999). Although a rough idea of preferences on density of forests and distribution patterns was obtained from the results of the survey, no direct correlations between the metrics estimated (e.g. forest shape index or percentage of cover for each landscape unit) and the landscape preferences were conducted. It is important to consider that this study was not a strict landscape classification or landscape perception research and representing the landscape metrics on the scenes assessed was not considered in the selection of the visual material. As mentioned before, the method described for the classification was more exploratory-oriented. The fact that there is not enough literature available up to date in regard to such landscape classification methodologies may be a disadvantage at the moment of comparing the validity of the procedure conducted. Nevertheless the results from this stage were helpful for the

assessment procedure and the main aims (i.e. obtain a set of homogenous landscape units in a systematic and reliable way) were achieved within the short period of time required to complete the project. The methodology developed can also be used as a reference for similar studies in other regions. In some cases GIS data-bases may not be available but still the landscape units can be obtained from the expert query as revealed here, facilitating the conduction of the landscape assessment.

4.2. Visual material.

The selection of visual material for the survey was one of the main weaknesses of the presented methodology as a number of limitations affected the quality of the material available. The photographic samples collected during the field visit were useful for testing and proposing new viewpoints although they could not be fully integrated into the landscape assessment. An optimal step for this particular assessment would have been to take an extensive set of photographic material on the field in order to count with an appropriate visual data-base. A large photographic inventory can be useful for conducting future perception-based assessment in this region. Different approaches to the selection of images for photo-based assessments have been taken in the landscape research field. Dakin (2003) used in an empirical research study a method named "self-directed photography", where participants rather than the researcher chose the photographs and features to be evaluated. Other studies use a similar method called visitor-employed photography as an experience-recording technique used to measure human perceptions of different natural environments (Cherem 1983). These methods can also represent a good alternative for obtaining visual material in future assessments in the UBE.

The present study collected visitor photographs, using a Google Earth based photo-sharing tool (Panoramio) which appeared to be a practical way for complementing the visual data-base. The photographic material available on the web is already abundant but it should become more extended as internet use keeps growing. It might be of interest for the landscape research field to look into these tools as self-directed photos can be easily accessible through the internet and the geo-location tool may enhance the potential uses of such material for landscape related studies. The selection of photographs conducted for the survey was done with the help of personnel from the UBE management in order to represent with a better criteria the landscape units to be assessed. The final set of images for the survey could be presented in black and white mode to avoid the variability of colors and changing weather conditions but the purpose of the project needed to consider color matters and the results from the survey showed that the colors of some landscape features and man-made structures may be of relevance when rating the scenic quality.

Including photomontages into the photo-based assessment pointed out to be highly useful. A number of important inferences such as preferences for forest patterns, reaction to urban expansion and impact of man-made structures were possible only due to the comparison analysis of the scenarios presented in the photomontages. Using visual simulations as a tool for assessing potential future scenarios appeared to be a fruitful means for this research as pointed out in previous studies (Soliva & Hunziker 2009; Hunziker & Kienast 1999; Tress & Tress 2003).

4.3. Web-based survey.

A relevant methodological achievement of this study was to conduct the perception-based assessment through a web-based platform. Using such media allowed us to reach in an easy way a broader sample of stakeholders in a short time and at very low costs. This was possible mainly because we could gather a number of e-mail addresses from local residents provided by the UBE management. Using an open web-based platform allowed us to have access to different stakeholder groups although they were not proportionally represented (e.g. an important group not well represented were the urban residents). It is worth also to mention as a weakness that local residents with no access to internet are excluded from taking part in the procedure and a broader contact data-base for enhancing the participatory processes in the UBE is still missing. This highlights the importance of building a wider bank of contacts (i.e. a bigger inventory of e-mail addresses representing all stakeholder groups) for future consultation processes when using this means. The method should be considered for future consultations with the community in regard not only to landscape management but general environmental or developmental matters. Over 93% of the participants who started the survey completed all the required steps. This may tell that the task of fulfilling the survey was not boring neither difficult and is a positive sign considering the relatively long extension (between 15-25 minutes) of the inquiry.

It is a relevant finding of this study to show how useful and practical can be the use of web-based surveys for community consultations and research in general. The method represented also a positive approach to landscape research as quantitative and qualitative data could be collected at the same time, complementing the quality of information provided by the respondents and strengthening the reliability of the survey conducted. The objectivity and validity of internet-based methods for assessing landscape perceptions, tested by Roth (2006), and partly reaffirmed in the present study shows promising potential. The MAB concept can represent an opportunity for testing and improving such procedures as pointed out in this project. Future studies should include also non-residents in the assessment. It would have been worth in this case to have also the participation of non-residents or potential visitors in order to have a better understanding of general landscape perceptions. At the same time it is of interest for the Biosphere's reserves to include the views of tourists into the landscape assessment.

4.4. Landscape Preferences.

The results of the perception-based assessment suggest that there are a variety of cultural factors and assumptions behind the viewer's valuations of landscape scenes as pointed out in previous studies (Soliva & Hunziker 2009; de Val et al. 2006; Bauer et al. 2009). For some respondents the productivity of the landscape was more important while for others the natural appeal appeared to be relevant when evaluating the landscape. This example points out the necessity of understanding better the diverse stakeholder's preferences in order to bring together the differences and implement measures that can help achieving the UBE developmental goals while taking in consideration the locals' views.

The majority of respondents revealed a trend to like more natural landscapes instead of urbanized scenes. The best rated landscapes were mainly natural looking scenes or well-maintained farmlands. There has been an accumulation of evidence supporting the position

that viewers generally express a positive response to naturalness in landscape images (Van den Berg & Koole 2006). The degree to which a scene is “natural” seems to be one of the most important positive predictors for landscape preference (Rogge et al. 2007). As the results showed, we can assume this pattern was also evident in this study (specially for non-farmers) although the high number of respondents with an agricultural-background might have affected negatively the ratings of landscapes that look “too natural” as could be seen in the results of the mire landscape (photo 2). At the same time agricultural landscapes with a well-maintained appearance were among the most preferred. In this regard we can assume, from the results obtained from the group-crosstabs, that farmers and non-farmers may use different criteria when rating a landscape. As suggested by Natori & Chenoweth (2008) farmers probably have stronger normative criteria for how a rural landscapes should look, and their emphasis is placed on management. A number of comments shared by farmers also point out to the relevance given to the maintenance of the land and an apparent antipathy to scenes overtaken by forests or showing abandoned structures. Positive ratings in terms of beauty given to some landscapes showing intensely used land could be found in some of the responses. In a similar study, Hall (2008) also found a liking for intensive arable landscapes that appear to be well-managed and productive. Responses for statement q9 suggest that there may be also misunderstandings from part of the locals in regards to what an intense use of land is.

The results related to the amount of natural areas also reflected an important difference between the farmers and non-farmer groups. Unaffected residents can see more easily the advantages of conserving natural areas while those who are directly affected by changes see it less attractive (Tress & Tress 2003). For a part of the agricultural community it seems that natural areas are perceived as a direct menace to their subsistence, a considerable number of comments stated that there were “more than enough” natural areas already. On the other hand there were also supporters of the idea of protecting and introducing more natural areas.

In the case of the photomontages 11a and 11b, the forest regrowth scenario was assessed slightly less positively than the original forest state suggesting that viewers prefer a landscape with open forest rather than a closed stand as mentioned in the results section. This result is similar to the findings of other studies were partially forested landscapes are rated more highly than landscapes where vegetational succession has developed into a closed forest (Soliva & Hunziker 2009; Hunziker & Kienast 1999). Again for this case the background influenced the rating of both scenarios with farmers tending to dislike more strongly the forest regrowth scenario.

It is relevant for the UBE management to know in more detail certain features of the landscapes that seem to be of high importance to the local residents. The maintenance of traditional buildings, type of constructions, farmland management appeal, state of forests and urban expansion are among the main factors that need to be considered in the future landscape development strategy. The present study has taken a first step in assessing the general landscape preferences from a part of the local community. It is not possible to satisfy all the stakeholder groups at the same time as preferences have been proved here to be diverse and sometimes contradictory. The dialog between the different stakeholders and the inputs from such landscape studies should support the landscape planning process.

4.5. Stakeholder's attitudes towards the landscape development.

It is an important contribution of this study to gather a sample of the different opinions and views about the UBE landscapes from a number of stakeholders. The diversity of views collected can serve as a basis to understand better the attitudes of land-users toward different issues of interest for the landscape management of the UBE and help in developing a better communication strategy between the community and the Biosphere's management. People's attitudes are influenced by a number of different factors, especially age, social and economic status, ethnic origin, familiarity, place of upbringing and residence, particularly whether urban or rural, and, perhaps most importantly, environmental value orientations (Swanwick 2009). We can assume that a part of the agricultural community revealed a negative attitude towards the restoration of natural areas or introducing more compensation areas. This study makes emphasis on this stakeholder group as it is a key land-user and thus the most influential on the landscape changes. The UBE management will face a challenging task when communicating and negotiating agreements with part of the farming community, a well-conceived participatory process for the landscape development can make an important difference at the time of implementing measures. The acceptance of ecological-oriented measures may depend on the way they are communicated but also on a change of attitudes from the more reluctant sector of the community. In order to assist negotiations over disputed issues regarding protected areas, it is essential to understand local residents' perceptions and their reasoning (Wallner et al. 2007). According to Bauer et al. (2009) the assessment of attitudes of the people involved with the landscape is an important step that should be considered at the start of any participatory process related to landscape management.

It was also fruitful in practical terms that the assessment not only included preference ratings but at the same time a space of opinion from which it was possible to get important information that tell more about the attitudes of a sample of local stakeholders. In general we can assume that attitudes toward the conservation and improvement of natural areas are diverse and sometimes can even be considered as polarized. More balanced views can also be found, e.g. some respondents pointed out the necessity of improving the natural quality of the landscapes and controlling the urban expansion and land use practices through better regulations. Although the responses toward natural areas may show strong differences of attitudes, in general terms the assessment outcome also shows a positive attitude of locals toward having a more active participation on the future landscape development through the interest revealed when taking part of this study. Hence the results of this assessment can be useful as they may open a door for enhancing the dialogue between the different parts in order to reach potential agreements through participatory processes that can eventually match the UBE developmental aims in the upcoming years.

4.6. Methodological issues.

Combining different methods in this study enabled us to complement approaches and explore new ways of conducting a landscape assessment in the context of a Biosphere reserve through a participatory process. Testing the methodology designed served as a base for understanding better what things shouldn't be done and what can be improved in future assessments. Conducting panel meetings with local residents for discussing such issues can

be an alternative for assessing landscape matters and even for a classification process. If different stakeholders discuss the ways of classifying their landscape into homogenous areas on a map, a more representative outcome of landscape types can be achieved. The use of panels could also be applied for selecting the visual material with the criteria of a representative group of local residents. Participants can also be invited to bring their own photographs and discuss the relevant issues of the landscape development that should be included in a later web-based assessment. This can improve in a simple way the challenging step of selecting the photographs and designing the inquiry.

The results of the present study should be taken with caution as the assessment conducted had an exploratory approach. Contacting respondents mainly via e-mail addresses also limited the possibilities of having a more representative sample. However the results of the perception-based survey still can represent a valid input to the landscape planning process of the UBE. The sample size of the web-based survey was relatively big when compared to the normal sample sizes of other landscape preference studies. Furthermore the main stakeholder group which in this case is the agricultural community was well represented in the sample. One of the main limitations of the survey conducted was the statistical analysis which couldn't be done in more detail due to the nature of the rating system used. In this regard it can be a better approach to combine different rating systems, e.g. the attractiveness of the landscapes could have been evaluated with a numerical rating scale (e.g., from 1 to 6) instead of the Likert scale used. This would have enabled us to conduct a more detailed statistical analysis (i.e. apply parametric tests, ANOVA analysis, or check inter and intragroup correlations), and test the reliability of the responses. Although the Likert scale presents advantages for asking targeted questions (e.g., about forest configuration or amount of natural areas), it proved to be an unfriendly method for interpreting responses. However its simplicity might save time when carrying on the data analysis and also provide landscape managers with results that can be better understood by the general public.

Improvements on the type of items stated are needed as some of the statements included in the survey proved to be ambiguous and in some cases didn't appear to fit into the landscape scene presented in the photograph. Statements like q2 (amount of forest) or q9 (intense use of land) should have been formulated in a different way as they were unclear for some respondents (e.g., one particular comment stated "how can a landscape have too much forest"). The introduction of the survey should have emphasized that the evaluation was not about the photographs themselves but rather ask respondents to imagine being present in the landscape depicted in order to answer the questions. These experiences should be considered in future assessments in the Biosphere and this study may be a useful referential example for designing such inquiries.

4.7. Practical implications

The results of the present study have some implications for the future landscape development of the UBE. Several stakeholders and land planners can make use of this type of information in order to understand better the impacts that certain decisions can have on the landscape and the relevance local residents give to a number of visual features. Decision makers in both the environmental and agricultural sectors need to be better informed about the landscape preferences and attitudes toward the environment among the different land-user groups. It is important that the agricultural community is also aware of the interest of

other groups in conserving and restoring natural areas and vice-versa. This study can serve as a baseline for starting a participatory process with the different local stakeholders involved, policy makers and the UBE management. According to Rogge et al. (2007) policies concerning landscape development should incorporate appropriate incentives of communication and generate modes of understanding between different stakeholders. Direct interaction and face to face contact among stakeholders can produce important results (Kaplan & Kaplan 1989). In this regard it can be seen from the results of the present study that there is a marked opposing trend from a specific stakeholder group toward expanding ecological conservation areas. Any conservationist or restorative measure will need the support of the farming community. Wallner et al. (2007) recommend integrating the planned conservation measures with regional land-use practices and regional economic development issues in order to minimize conflicts between the management and local residents.

There is a growing need to understand residents' perceptions of their everyday landscapes (Hall, 2008). At the same time the managers of protected areas need to understand better and know more about the background of local people's judgments on landscapes (Wallner et al. 2007). In this regard the outcome of this assessment supports the landscape development strategy of the UBE with a number of views and opinions about scenic preferences from different local stakeholders. It is important when dealing with landscape management that all stakeholders are included in a participatory process and that a thorough assessment of the attitudes of the involved actors towards nature conservation and restoration is done at the start of the process (Dearden 1984). One of the main aims of the UBE is to protect biodiversity, restore degrading ecosystems and preserve the cultural landscape. As the Entlebuch is a particularly traditional rural landscape where agriculture is part of the cultural heritage and is well expressed on the visual appeal of the landscapes, there is a major challenge in joining all these components together in order to achieve the UBE developmental goals. The lack of understanding can obviously be a potential cause of tensions and conflicts when a landscape strategy development for a region is dominated only by experts (Rogge et al. 2007). The inclusion of ecological compensation areas, urban construction regulations, improvement of land use practices and enhancement of natural areas are some of the most important landscape challenges the UBE will face in the upcoming years. One of the tasks that the UBE management may need to implement as suggested by Tress & Tress (2003) should be to teach people to reflect about the future of their landscapes.

Beside the information provided by the study for the UBE development plans there are also relevant findings for the landscape research field in general. The use of internet for conducting a landscape assessment proved to be a promising approach. Comment boxes were used more than expected by the participants throughout the survey and complemented the landscape valuations facilitating at the same time the interpretation of the different stakeholder's views. Based on the experiences collected through this assessment, it is recommendable for future studies to combine different techniques and exploit advances in communication' technologies (e.g., online survey services, digital media) for the conduction of landscape assessments. The final outcome of the study suggests that it is possible to combine expert and perception based approaches in a participatory framework within a relatively short period of time, at low costs, and in a simple way. Important lessons

could be learned with regard to the methods tested and hopefully it can serve as a referential framework for other Biospheres around the world.

5. Conclusion.

The proposed methodology tested in the study contributed with a number of practical experiences that can help for a possible improvement of the planning process and participatory approach of the UBE. Although the present work was more a methodological study with an exploratory approach, the results already provide the UBE management with useful information regarding attitudes and preferences of local residents toward landscape matters. The comments collected throughout the survey might provide a better understanding of some of the concerns and arguments used by locals when evaluating a landscape scene. At the same time the information supplied by the perception-based assessment can enrich the decision-making process with regard to environmental and landscape planning. The method proposed represents a model of reference for future consultation processes in the UBE. Using a web-based platform for conducting the perception-based assessment has pointed out to be a practical and promising means for implementing future assessments and consultation processes for different purposes. The procedure developed shows potential to be applied in similar contexts where simple and reliable participatory assessments are required. However there were certain methodological limitations that should be improved in future assessments. Reaching a more representative sample of local residents, improving the inventory of visual resources and complementing the perception-based assessments with panel discussions will be a helpful step for future procedures.

From the analysis of the responses we can conclude that there is a general trend from locals to prefer more natural and well maintained agricultural landscapes, although relevant inter-group differences can be seen between farmers and non-farmers towards the more natural and densely forested areas. Farming background and age pointed out to be among the most relevant socio-demographic factors influencing landscape perceptions. This suggests that the different interactions between residents and the landscape may partly determine how they perceive their environment and how they may react to future landscape management measures. Man-made structures also appeared to be among the most important elements influencing (positively or negatively) the perceived scenic quality of the landscape. Landscape planning should take into consideration the aesthetic appeal of new buildings and the maintenance of abandoned infrastructure, ensuring that the new built elements can stand in harmony with the surrounding space. Urban sprawl and land use practices were also some of the main issues of concern mentioned throughout the survey. Caution should be taken when communicating and dealing with topics related to ecological compensation areas and management of natural areas as they pointed out to be sensible topics among the agricultural community.

The monitoring of visual resources in the UBE should take into consideration some of the scenic matters collected in the assessment. Using photographic methods for documenting such cultural landscape and assessing scenic changes can be a suitable monitoring tool for the UBE. Methods such as repeat-photography can be used after defining a broader set of viewpoints. In this regard the viewpoints tested in the assessment may serve as a methodological basis that can be expanded in order to cover the viewsheds that are more vulnerable to potential scenic changes. Urban peripheries, abandoned lands, and intensive agricultural landscapes should be areas of

interest for a landscape monitoring scheme. At the same time the monitoring can be complemented with the local community opinion through repeated inquiries. Evaluating time-lapsed photographs and discussing possible landscape changes with local stakeholders can be one alternative. The UBE landscape strategy needs to integrate coherently ecological, socio-cultural and economic aspects of the landscape in the monitoring and planning processes in order to achieve successfully the regional development goals.

Future landscape assessments should also support the UBE's ecological aims, serving as a complementary tool for improving the management, conservation and restoration of the landscape as well as helping in the development of better communication strategies. They also should reflect the values and functions the society attaches to the landscape. As differences in perceptions may eventually lead to different actions taken toward the landscape special attention must be given to the way information is managed between the UBE management and the land-users. It will be important to communicate effectively the advantages and economic opportunities of enforcing a sustainable landscape development for the future of the region. Finally it would be worth to further develop similar assessments in the UBE. The Biosphere reserve presented a well suited case study for conducting such procedures. Future assessments should help in educating and informing better the local community about the importance of considering the environmental and scenic impacts of present actions on the future appeal of the region. Local actors need to be well informed and aware of the multi-functional roles of their landscapes. A remarkably positive result of this study is the interest shown by the participants from the local community for discussing such issues and taking active part of the survey, expressing concerns and suggesting solutions.

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6.1. Photographs used in the assessment.

Photo 1: Schoemaker Maarten; 2011. Oct. 2006. From *www.panoramio.com*, on December 26th 2011. http://www.panoramio.com/photo/3198870.

Photo 2: UBE Website December 2011, Moorlandschaftinder.

http://www.biosphaere.ch/de.cfm/natur/offer-NaturUBE-Moore-list.html

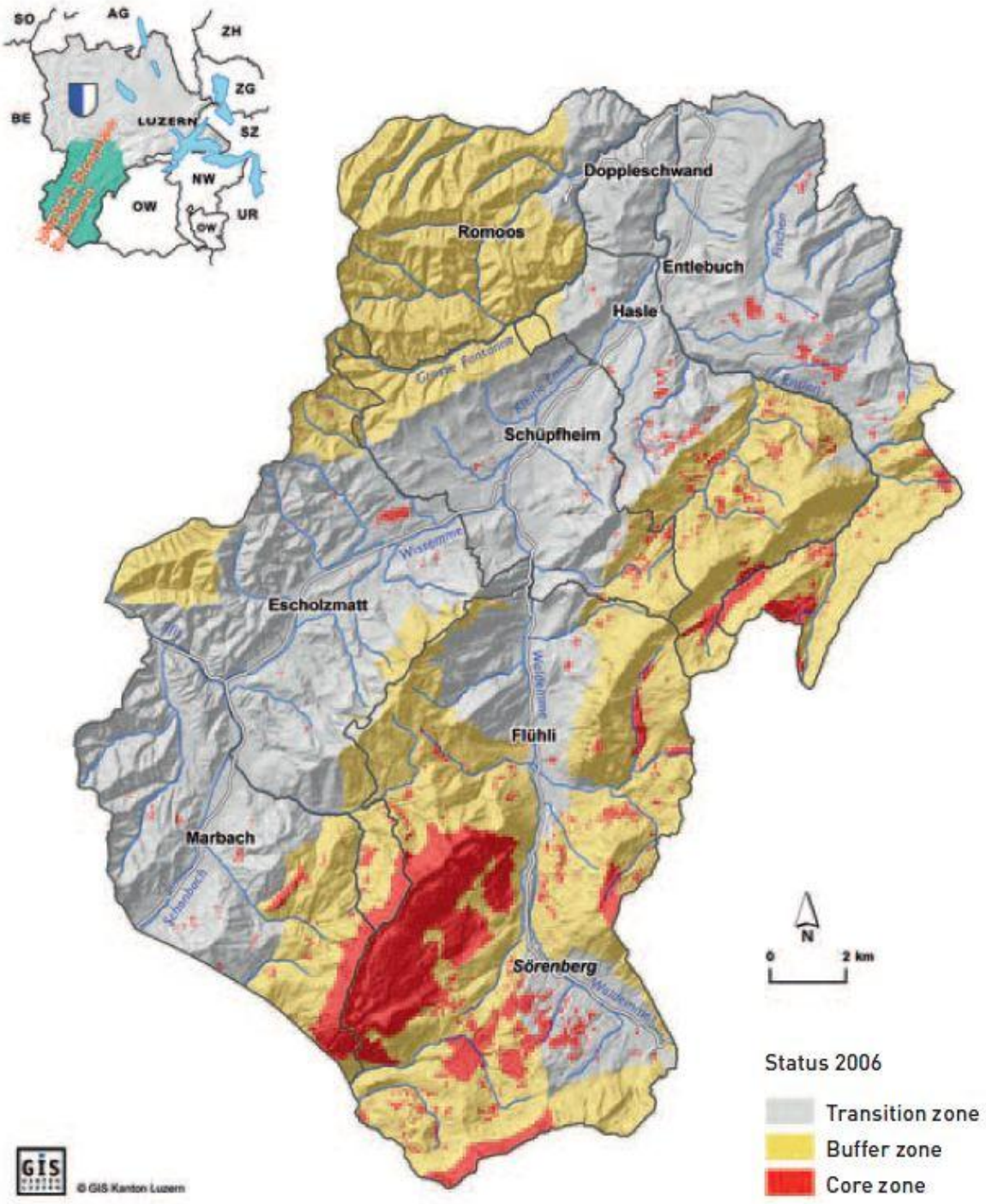
Photo 3, 4, 5, 7, 10: Portmann 2011. UBE Management.

Photo 6, 8, 11: Knaus Florian, 2011. UBE Management.

Photo 9, 12: Cobo Emilio, 2011. ETH Zürich.

7. Appendix.

7.1. UBE Zonation map.



Source: UNESCO Biosphere Entlebuch

7.2. Example of the expert query.

October 2011

Landscape Assessment

UNESCO Biosphere Reserve Entlebuch

As part of the UBE participatory monitoring framework we are introducing this year a landscape assessment study in order to assess the visual quality of the different landscapes within the reserve. Your participation will provide initial information regarding landscape typologies. In this inquiry you are asked to answer a set of questions and fill-in a map attached with the questionnaire. An example of how to proceed is provided. We are grateful for your participation and interest in the UBE Landscape Assessment process.

1. Personal Information

Name: _____

Institute: _____

Age: _____

Gender: _____

Profession: _____

Place of origin: _____

Place of residence: _____

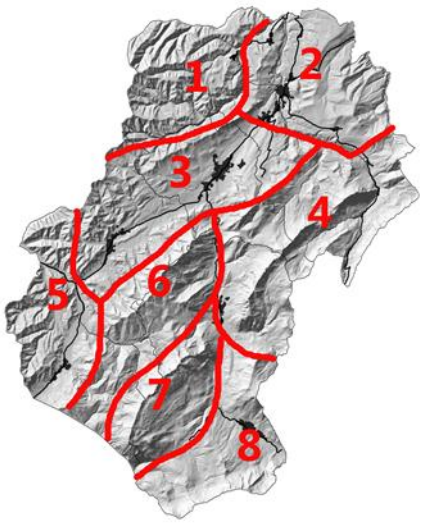
2. Answer briefly the next questions.

a) Mention landscape elements or characteristics that you consider make landscapes special, unique or typical in general.

_____
_____
_____
_____

3. Use the map and table attached:

a) Dissect the map on the next page in **eight** +/- homogeneous landscapes. These landscapes should be adjacent to each other. Give each landscape a number from 1 to 8. See an example in the figure below. The explanatory map shows the main urban areas and roads, the topography model should help you to orientate and locate the border of your landscape types.



b) Identify in the map **one** viewpoint (use "**x**") for each landscape that you would use to capture a good scene of it. Finally draw **one** viewpoint (use "**z**") that would capture a special scene of Entlebuch in general. Draw the points in the same map and show with an arrow in which direction you would take the picture.

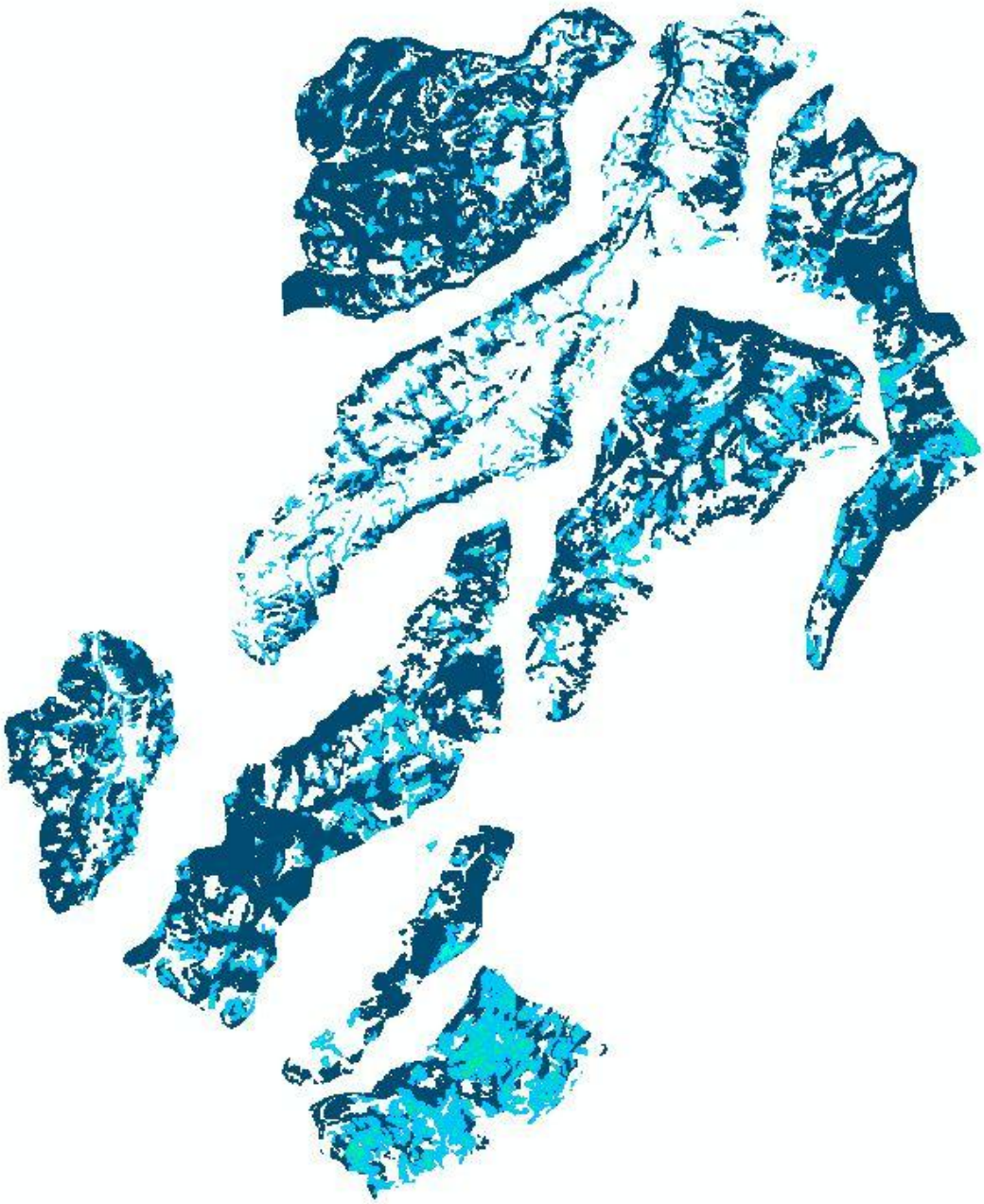
c) Describe the **eight** landscape types that you distinguished when classifying the landscapes: Give each landscape a short name, add a short description of its characteristics and name typical landscape elements that configure the landscape type.

Nr	Landscape Type (short name)	Brief description	Typical landscape elements
1			
2			
3			
4			
5			
6			
7			
8			

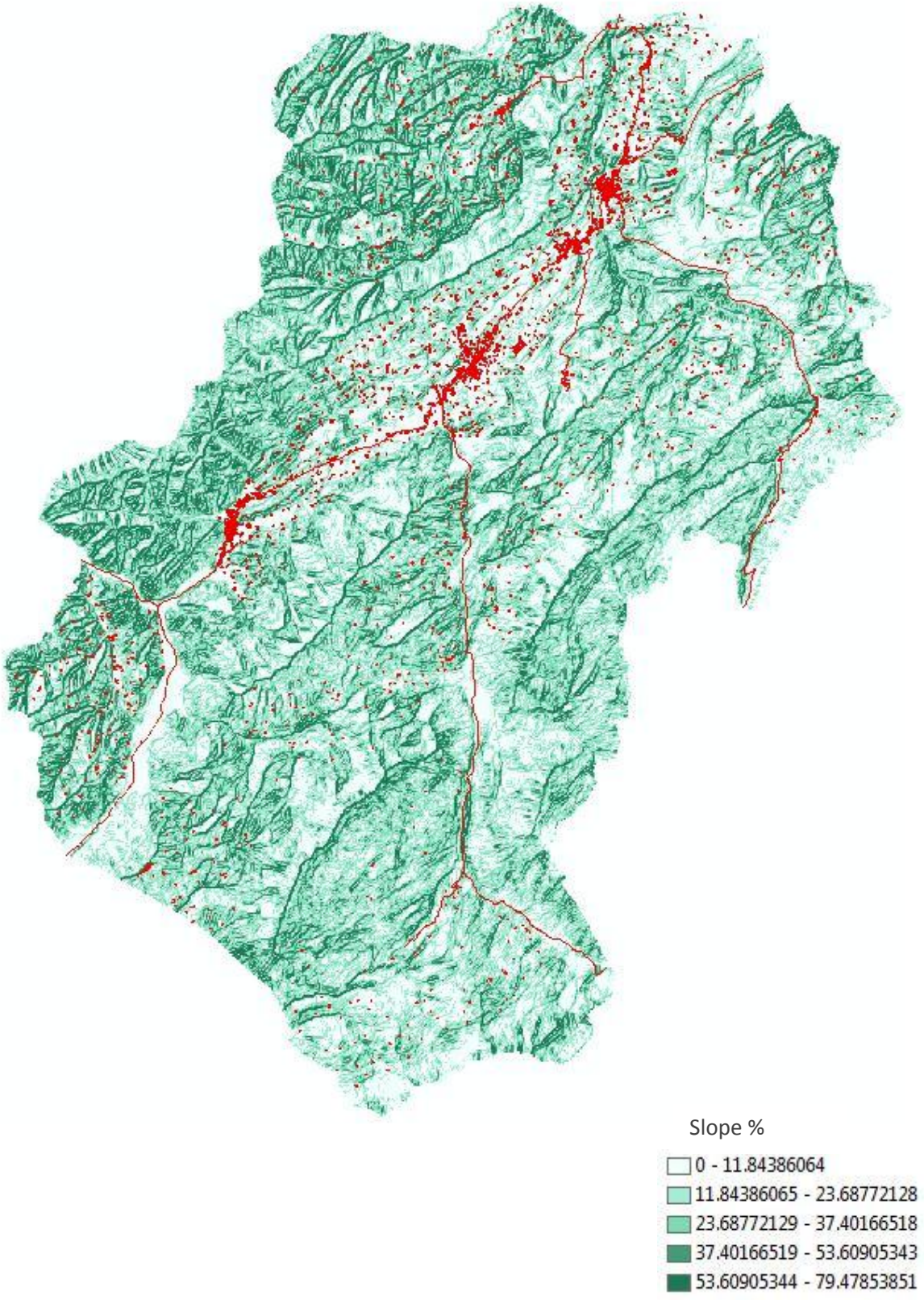
7.3. GIS Relevant character maps

7.3.1.Forest and Extensive-used areas

The following map shows the forest cover (dark blue) and compensation areas plus raised bogs and fens (clear blue) extracted for each landscape unit. Note the differences in cover area and distribution of patches that characterize each unit. Data source: GIS Canton Luzern and Swisstopo (JA100120).

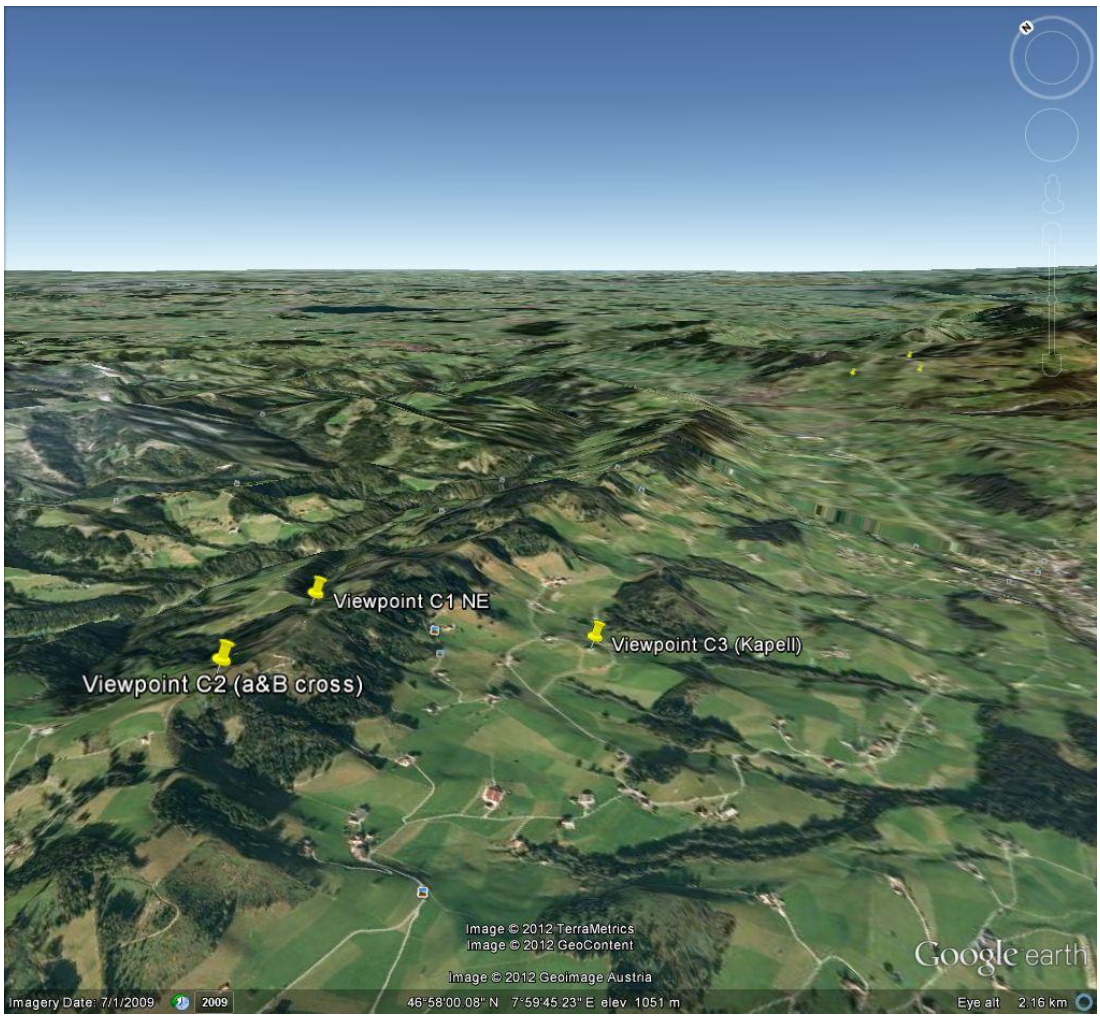


7.3.2. Slope variation map (green) and Built-areas (red). Data source: GIS Canton Luzern and Swisstopo (JA100120).



7.4. Photo inventory

7.4.1.Viewpoints and field data.



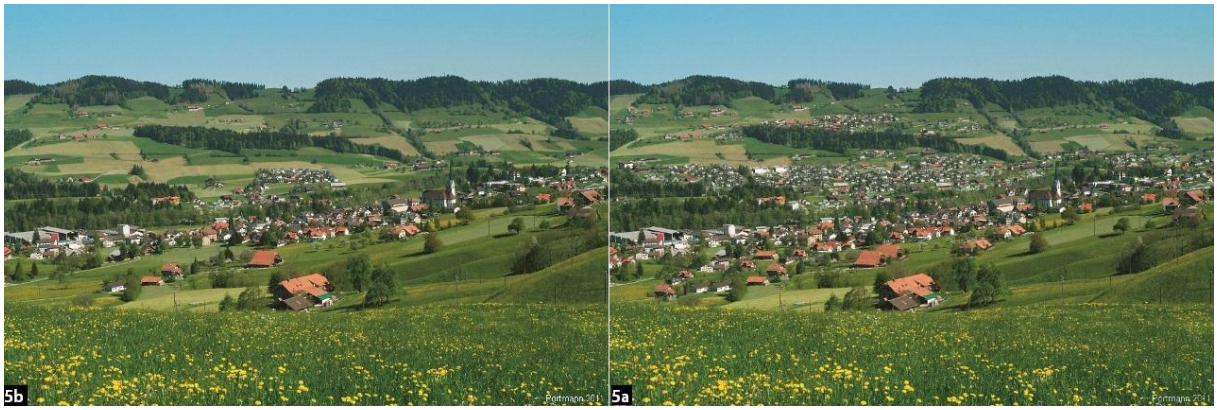
The Google Earth 3D view (above) shows some of the viewpoints collected on the field. The table below presents an example of the points recorded, including the photographs taken and a brief description of the orientation and features appearing in the landscape.

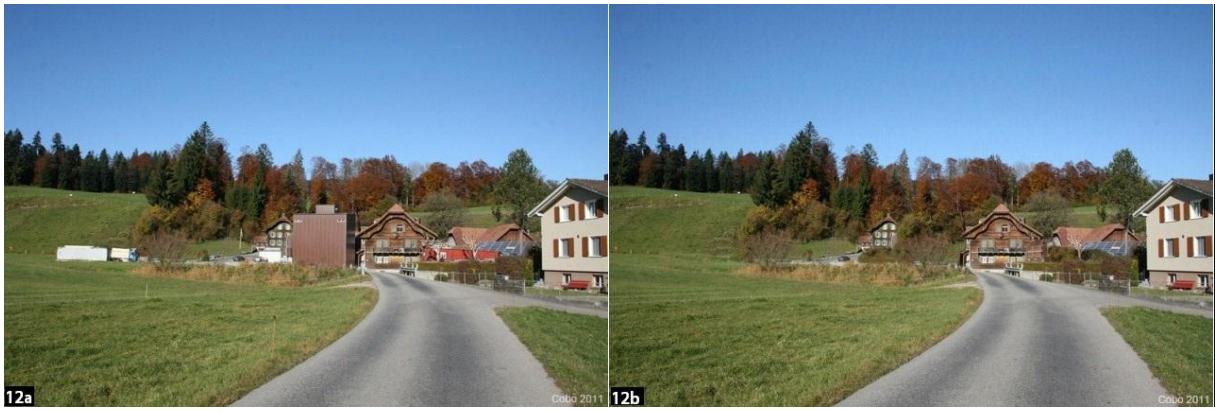
Viewpoint Test Data - November, 2011			
Views	UTM Coordinates (m)	Photograph #	Orientation and Description
C1	640971, 201261	4571	N Gross Fontanne, Hilly patchy scape
C2	640554, 200937	4576-81	W Färlisbach, S valley range, SE main valley
C3	641683, 200806	4590-91, 4591-93	SE Schupfheim, W flank farms Oberbach
C4	649393, 204232	4633	NE Feldmoos, open farm/forest plateau
C5	648813, 203770	4624-28	SE Sterli, Erlegrabe, open farm/forests
C6 p.	648439, 204300	4613	W Schupfheim, valley flanks
C7 p.	648515, 204214	4616-18	W flank of valley, Hasle, NE windturbine

7.4.2. Sample of photographs taken in the field visit.

The following set of photographs shows part of the material collected on the field. Most of the scenes came from the Entlebuch and Shüpfheim surrounding areas. The variety of colors in the vegetation of the landscape due to the season didn't allow us to use much of this material in the perception-based assessment.

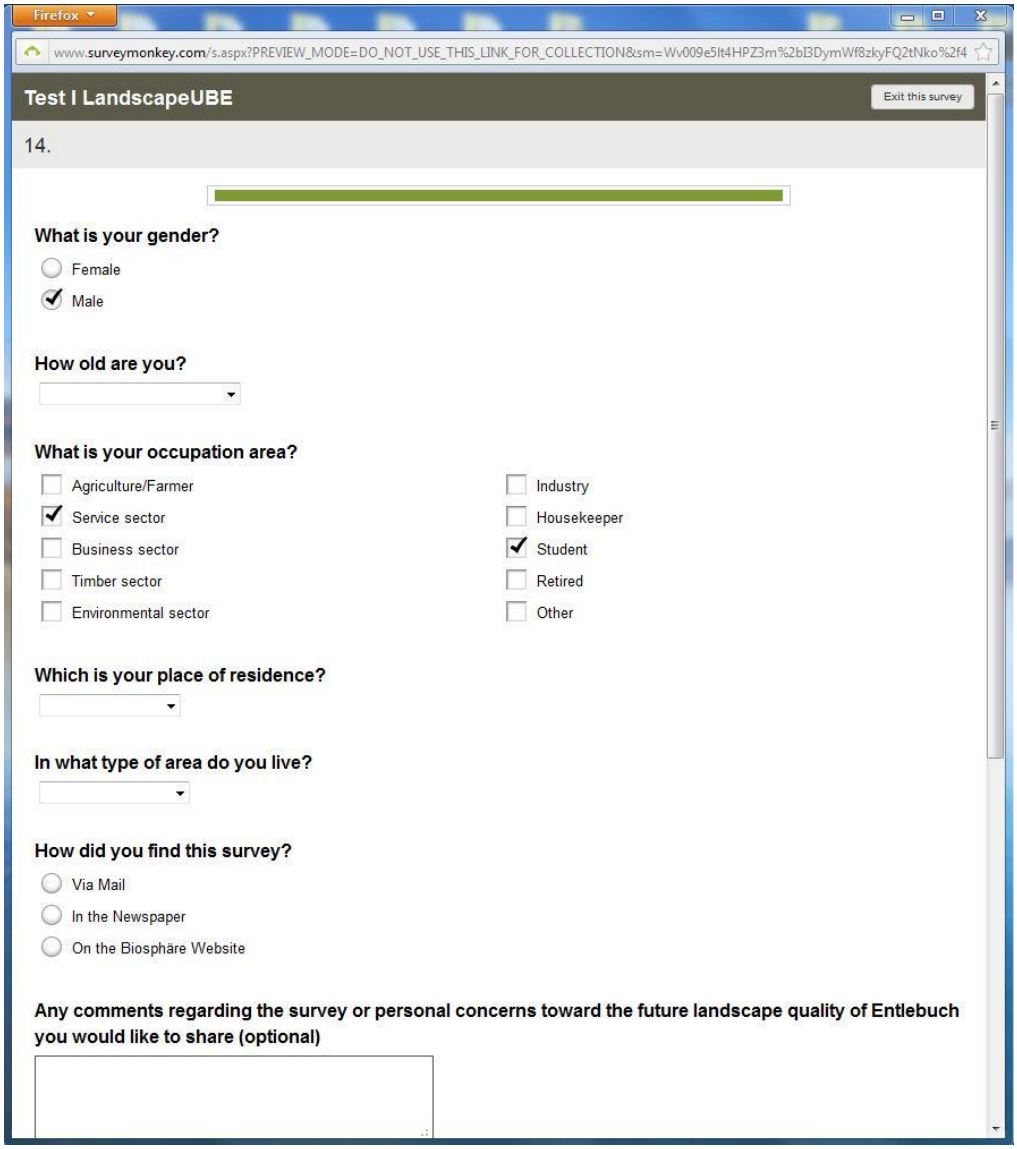
7.4.3.Photomontages.



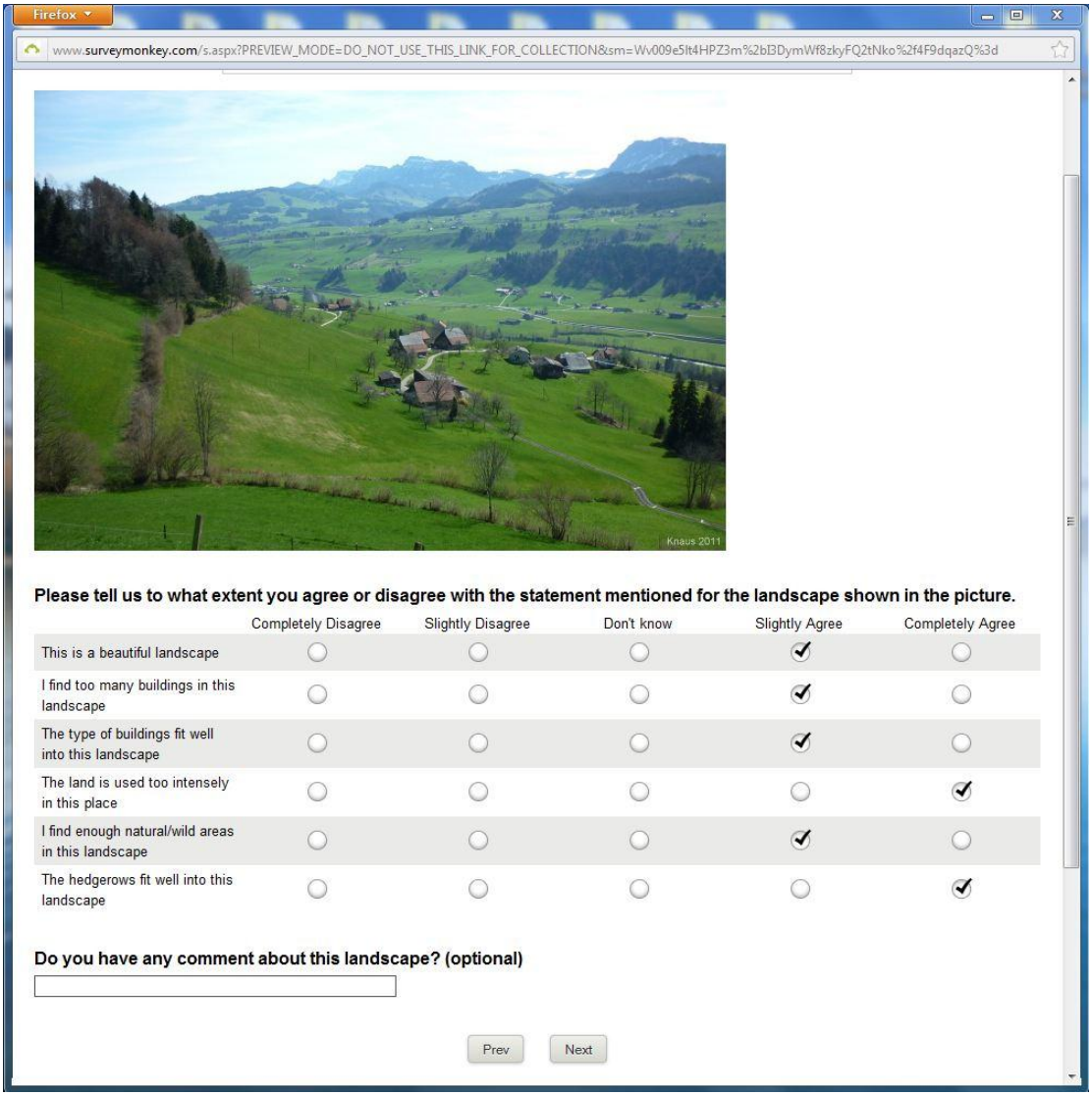


7.5. Web-based survey

The image below shows an example of the last page of the web-based survey, meant for gathering socio-demographic data.



The example below shows one of the landscapes rated in the web-based survey (Photo **6**).



7.5.1. Newspaper article in the Entlebucher Anzeiger, January 20th 2012.

Die Entwicklung der Landschaft mitgestalten

Region: Vorarbeiten zum Landschaftsentwicklungskonzept

Landschaften verändern sich. Wie weit dies geschehen soll, kann die Bevölkerung zu einem grossen Teil mitbestimmen. Eine Studienarbeit der ETH beschäftigt sich mit Vorstellungen und Meinungen der Einwohnerschaft der Biosphäre Entlebuch.

Florian Knaus*

Umfrage mit Wettbewerb
Zur Erfassung der landschaftlichen Vorlieben der Entlebucher Bevölkerung braucht die UBE möglichst viele Meinungen aus der Bevölkerung. Dazu kann auf der Internet-Startseite der UBE (www.biosphaere.ch) eine kurze Umfrage ausgefüllt werden. Als Dank für die Teilnahme werden drei Tageskarten verlost, welche freundlicherweise von den Bergbahnen Sörenberg gesponsert wurden. [pd]

Die Landschaft ist wichtig in unserem Leben. Sie macht einen wichtigen Teil unseres Heimatgefühls aus. Die sanften Hügel und schroffen Flühe lassen es zum Beispiel viele Entlebucherinnen und Entlebucher wissen, dass sie zu Hause angekommen sind. Viele Leute sind mit Landschaften emotional stark verbunden: Sie wird lange auf Aussichtspunkten bestaunt und bietet sich als Postkartensujet an. Sie dient als Vermarktungsargument bei Hausverkäufen und sie ist der Hauptgrund für die Wahl von Ausflugsorten bei Sommertouristen. Auch im Entlebuch.

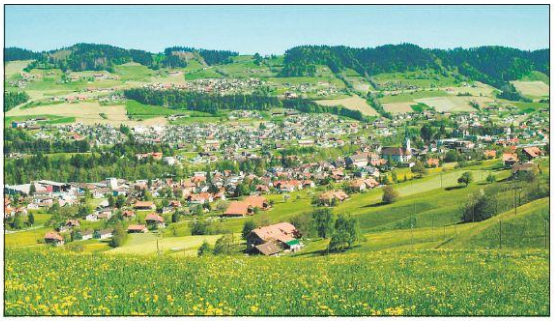
Schöne Landschaft sichern
Die Landschaft verändert sich jedoch laufend. Momentan steht sie insbesondere durch die schnell wachsende Siedlung unter Druck. Die Landschaft und ihre Schönheit langfristig zu sichern, dieser Aufgabe haben sich darum die Gemeinden, der Kanton und auch die Unesco Biosphäre Entlebuch verschrieben.

Im aktuellen regionalen Entwicklungsplan ist vorgesehen, dass in den nächsten Jahren im Entlebuch ein regionales Landschaftsentwicklungskonzept erstellt wird. Darin soll die Sicherung der Schönheit der Landschaft einen hohen Stellenwert haben. Dafür muss jedoch zuerst herausgefunden werden, was die Entlebucherinnen und Entlebucher an ihrer Landschaft schätzen und was ihnen missfällt.

Bevölkerung wird befragt
Als Vorarbeit für ein Landschaftsentwicklungskonzept wird darum im Moment eine Masterarbeit an der ETH Zürich durchgeführt. Sie soll Auskunft geben, wie die lokale Bevölkerung in die Ausarbeitung des Konzepts mit einbezogen werden kann. Die grösste Hürde dabei ist es, die persönlichen und darum meist sehr unterschiedlichen Ansichten zur Landschaft zusammenzubringen. Mit einer Umfrage soll darum testweise versucht werden, die landschaftlichen Vorlieben der Entlebucher zu erfassen (siehe Kasten).

Basierend auf den Umfrageergebnissen und anderen Vorarbeiten soll in den kommenden vier Jahren zusammen mit den Gemeinden und der Entlebucher Bevölkerung das Konzept erarbeitet werden. Mit der Umsetzung des Konzepts kann schliesslich sichergestellt werden, dass auch kommende Generationen eine schöne Landschaft als Heimat haben, was ganz der von der UBE propagierten Nachhaltigkeit entspricht.

* Florian Knaus ist als Koordinator Wissenschaft im Team der Unesco Biospäre Entlebuch tätig.



Wie soll sich die Landschaft verändern? Eine Bildmontage zeigt Schüpfheim in 30 Jahren, wenn voll und ganz auf die Karte Neueinzonung für Wohnbau gesetzt würde. [Bildmontage zVg]

7.5.2. Nomenclature.

The nomenclature used for referring to the statements in part of the results tabs is the following. Pictures are referred with numbers (e.g. P10_q3 = photo 10, statement q3).

q1. This is a beautiful landscape.
q2. There is too much forest in this landscape.
q3. I find too many buildings in this landscape.
q4. The type of buildings fit well into this landscape.
q5. I find enough natural areas in this landscape.
q6. The forest distribution fits well into this landscape.
q7. I find too many streets in this landscape.
q8. I find enough agricultural land in this landscape.
q9. The land is used too intensely in this area.
q10. The hedgerows fit well into this landscape.
q11. The electric poles fit well into this landscape.
q12. The new buildings fit well into this landscape.
q13. This is a unique landscape.

7.6. Survey responses.

In this section the overall results for all the landscapes assessed are presented, relevant crosstabs are also shown below the photograph rated. Note that the values assigned to the Likert scale are expressed with numbers (i.e. -2 = completely disagree, -1 = disagree, 0 = don't know well, 1 = agree, 2 = completely agree). The responses are expressed in **percentages**. N = 216

P1 Overall responses	-2	-1	0	1	2
This is a beautiful landscape	0	0	1	19	80
There is too much forest in this landscape	54	31	5	10	0
I find too many buildings in this landscape	52	39	3	5	2
The type of buildings fit well into the landscape	3	8	5	42	42
The land is used too intensely in this place	57	32	4	6	1
I find enough natural areas in this landscape	5	6	3	36	51

P1_q1	Background		-2	-1	0	1	2	Total
	Farmer	Count	0	0	1	14	83	98
		%	0	0%	1%	14%	85%	100%
	Other	Count	0	1	1	26	90	118
		%	0	1%	1%	22%	76%	100%

P1_q5	Background		-2	-1	0	1	2	Total
	Farmer	Count	8	5	1	25	59	98
		%	8%	5%	1%	26%	60%	100%
	Other	Count	2	6	5	53	52	118
		%	2%	5%	4%	45%	44%	100%

P2 Overall responses	-2	-1	0	1	2
This is a beautiful landscape	1	10	5	23	61
There is too much forest in this landscape	46	33	6	13	2
I find enough natural areas in this landscape	0	0	3	20	76
The forest distribution fits well into the landscape	3	8	9	42	39

P2_q1	Background		-2	-1	0	1	2	Total
	Farmer	Count	2	12	4	22	58	98
		%	2%	12%	4%	22%	59%	100%
	Other	Count	0	9	6	29	74	118
		%	0%	8%	5%	25%	63%	100%

P2_q1	age_class		-2	-1	0	1	2	Total
	15-20	Count	0	2	2	6	25	35
		%	0%	6%	6%	17%	71%	100%
	21-40	Count	1	9	5	22	39	76
		%	1%	12%	7%	29%	51%	100%
	41-60	Count	1	10	3	23	68	105
		%	1%	10%	3%	22%	65%	100%

P2_q5	Background		-2	-1	0	1	2	Total
	Farmer	Count	1	0	0	18	79	98
		%	1%	0%	0%	18%	81%	100%
	Other	Count	0	1	6	26	85	118
		%	0%	1%	5%	22%	72%	100%

P3 Overall responses	-2	-1	0	1	2
This is a beautiful landscape	1	1	2	22	74
There is too much forest in this landscape	36	30	7	19	6
I find enough agricultural land in this landscape	3	17	13	46	20
The forest distribution fits well into the landscape	3	15	12	46	24
I find enough natural areas in this landscape	0	4	7	35	54

P3_q1	Background		-2	-1	0	1	2	Total
	Farmer	Count	1	2	3	17	75	98
		%	1%	2%	3%	17%	77%	100%
	Other	Count	1	1	2	29	85	118
		%	1%	1%	2%	25%	72%	100%

P3_q1	age_class		-2	-1	0	1	2	Total
	15-20	Count	1	0	1	9	24	35
		%	3%	0%	3%	26%	69%	100%
	21-40	Count	0	1	0	15	60	76
		%	0%	1%	0%	20%	79%	100%
	41-60	Count	1	2	4	22	76	105
		%	1%	2%	4%	21%	72%	100%

P3_q5	Background		-2	-1	0	1	2	Total
	Farmer	Count	0	5	4	29	60	98
		%	0%	5%	4%	30%	61%	100%
	Other	Count	0	3	11	47	57	118
		%	0%	3%	9%	40%	48%	100%

P4 Overall responses	-2	-1	0	1	2
This is a beautiful landscape	0	5	7	37	50
There is too much forest in this landscape	35	40	8	13	4
I find enough agricultural land in this landscape	2	16	13	44	25
The land is used too intensely in this place	46	31	11	9	3
The forest distribution fits well into the landscape	3	12	12	47	26
I find enough natural areas in this landscape	0	7	9	41	42

P4_q1	age_class		-2	-1	0	1	2	Total
	15-20	Count	1	2	6	12	14	35
		%	3%	6%	17%	34%	40%	100%
	21-40	Count	0	2	5	33	36	76
		%	0%	3%	7%	43%	47%	100%
	41-60	Count	0	7	4	35	59	105
		%	0%	7%	4%	33%	56%	100%

P4_q5	Background		-2	-1	0	1	2	Total
	Farmer	Count	0	2	8	34	54	98
		%	0%	2%	8%	35%	55%	100%
	Other	Count	1	13	11	55	38	118
		%	1%	11%	9%	47%	32%	100%

P4_q9	Background		-2	-1	0	1	2	Total
	Farmer	Count	63	27	3	5	0	98
		%	64%	28%	3%	5%	0%	100%
	Other	Count	38	40	20	14	6	118
		%	32%	34%	17%	12%	5%	100%

P6 Overall responses	-2	-1	0	1	2
This is a beautiful landscape	1	7	7	45	40
I find too many buildings in this landscape	34	41	6	18	2
The type of buildings fit well into the landscape	3	14	9	47	28
The land is used too intensely in this place	37	37	9	14	3
I find enough natural areas in this landscape	2	11	10	42	35
The hedgerows fit well into this landscape	5	11	5	42	38

P6_q1	age_class		-2	-1	0	1	2	Total
	15-20	Count	1	5	4	16	9	35
		%	3%	14%	11%	46%	26%	100%
	21-40	Count	0	3	7	39	27	76
		%	0%	4%	9%	51%	36%	100%
	41-60	Count	1	7	4	42	51	105
		%	1%	7%	4%	40%	49%	100%

P6_q5	Background		-2	-1	0	1	2	Total
	Farmer	Count	0	6	10	35	47	98
		%	0%	6%	10%	36%	48%	100%
	Other	Count	4	18	12	56	28	118
		%	3%	15%	10%	48%	24%	100%

P6_q9	Background		-2	-1	0	1	2	Total
	Farmer	Count	52	32	6	7	1	98
		%	53%	33%	6%	7%	1%	100%
	Other	Count	29	48	14	23	4	118
		%	25%	41%	12%	20%	3%	100%

P7 Overall responses	-2	-1	0	1	2
This is a beautiful landscape	2	4	6	22	65
I find enough agricultural land in this landscape	6	15	9	42	28
This is a unique landscape	1	5	4	26	65
I find enough natural areas in this landscape	1	4	2	30	64

P7_q1	Background		-2	-1	0	1	2	Total
	Farmer	Count	0	6	6	26	60	98
		%	0%	6%	6%	27%	61%	100%
	Other	Count	5	3	7	21	82	118
		%	4%	3%	6%	18%	70%	100%

P8 Overall responses	-2	-1	0	1	2
This is a beautiful landscape	0	1	5	32	62
There is too much forest in this landscape	33	47	6	10	3
I find too many buildings in this landscape	45	46	3	6	0
The type of buildings fit well into the landscape	1	5	5	54	35
I find enough natural areas in this landscape	1	6	7	43	42
The forest distribution fits well into the landscape	0	5	7	55	33

P8_q1	age_class		-2	-1	0	1	2	Total
	15-20	Count	0	1	7	14	13	35
		%	0%	3%	20%	40%	37%	100%
	21-40	Count	0	1	1	23	51	76
		%	0%	1%	1%	30%	67%	100%
	41-60	Count	0	1	2	31	71	105
		%	0%	1%	2%	30%	68%	100%

P8_q5	Background		-2	-1	0	1	2	Total
	Farmer	Count	0	3	5	40	50	98
		%	0%	3%	5%	41%	51%	100%
	Other	Count	3	9	10	54	42	118
		%	3%	8%	9%	46%	36%	100%

P9 Overall responses	-2	-1	0	1	2
This is a beautiful landscape	1	1	5	35	58
There is too much forest in this landscape	33	44	7	13	3
The forest distribution fits well into the landscape	0	10	9	57	24
The land is used too intensely in this place	36	40	10	12	1
I find enough natural areas in this landscape	2	8	10	44	36

P9_q1	age_class		-2	-1	0	1	2	Total
	15-20	Count	2	1	3	14	15	35
		%	6%	3%	9%	40%	43%	100%
	21-40	Count	0	1	2	29	44	76
		%	0%	1%	3%	38%	58%	100%
	41-60	Count	0	1	6	32	66	105
		%	0%	1%	6%	31%	63%	100%

P9_q9	Background		-2	-1	0	1	2	Total
	Farmer	Count	51	40	2	5	0	98
		%	52%	41%	2%	5%	0%	100%
	Other	Count	28	47	19	21	3	118
		%	24%	40%	16%	18%	3%	100%

P10 Overall responses	-2	-1	0	1	2
This is a beautiful landscape	10	29	18	29	15
I find too many buildings in this landscape	9	18	11	42	21
The type of buildings fit well into the landscape	21	36	18	18	7
The land is used too intensely in this place	26	33	14	18	9
This is a unique landscape	22	36	21	13	7

P10_q1	age_class		-2	-1	0	1	2	Total
	15-20	Count	5	14	5	6	5	35
		%	14%	40%	14%	17%	14%	100%
	21-40	Count	9	19	15	25	8	76
		%	12%	25%	20%	33%	11%	100%
	41-60	Count	7	29	18	31	20	105
		%	7%	28%	17%	30%	19%	100%

P5a Overall responses	-2	-1	0	1	2
This is a beautiful landscape	7	17	12	41	23
I find too many buildings in this landscape	6	20	8	41	26
The type of buildings fit well into the landscape	15	25	15	35	10
The land is used too intensely in this place	27	30	9	25	10
I find enough natural areas in this landscape	10	38	11	29	12

P5a_q1	age_class		-2	-1	0	1	2	Total
	15-20	Count	2	1	1	10	4	18
		%	11%	6%	6%	56%	22%	100%
	21-40	Count	2	7	7	11	11	38
		%	5%	18%	18%	29%	29%	100%
	41-60	Count	3	10	5	22	9	49
		%	6%	20%	10%	45%	18%	100%

P5a_q5	Background		-2	-1	0	1	2	Total
	Farmer	Count	3	18	6	11	8	46
		%	7%	39%	13%	24%	17%	100%
	Other	Count	7	22	6	19	5	59
		%	12%	37%	10%	32%	9%	100%

P5b Overall responses	-2	-1	0	1	2
This is a beautiful landscape	0	1	4	28	67
I find too many buildings in this landscape	23	41	9	23	4
The type of buildings fit well into the landscape	3	18	8	50	21
The land is used too intensely in this place	35	32	10	19	4
I find enough natural areas in this landscape	5	21	13	35	26

P5b_q1	age_class		-2	-1	0	1	2	Total
	15-20	Count	0	0	2	10	5	17
		%	0%	0%	12%	59%	29%	100%
	21-40	Count	0	0	2	7	29	38
		%	0%	0%	5%	18%	76%	100%
	41-60	Count	0	1	1	13	41	56
		%	0%	2%	2%	23%	73%	100%

P5b_q5	Background		-2	-1	0	1	2	Total
	Farmer	Count	0	9	6	19	18	52
		%	0%	17%	12%	37%	35%	100%
	Other	Count	6	14	8	20	11	59
		%	10%	24%	14%	34%	19%	100%

P11a Overall responses	-2	-1	0	1	2
This is a beautiful landscape	1	1	3	17	78
There is too much forest in this landscape	51	25	11	10	2
The forest distribution fits well into the landscape	1	9	13	41	36
I find enough natural areas in this landscape	2	0	2	19	77

P11a_q1	Background		-2	-1	0	1	2	Total
	Farmer	Count	1	0	2	9	34	46
		%	2%	0%	4%	20%	74%	100%
	Other	Count	0	1	1	9	48	59
		%	0%	2%	2%	15%	81%	100%

P11a_q1	age_class		-2	-1	0	1	2	Total
	15-20	Count	0	0	0	1	17	18
		%	0%	0%	0%	6%	94%	100%
	21-40	Count	1	0	1	6	30	38
		%	3%	0%	3%	16%	79%	100%
	41-60	Count	0	1	2	11	35	49
		%	0%	2%	4%	22%	71%	100%

P11a_q5	Background		-2	-1	0	1	2	Total
	Farmer	Count	0	0	1	8	37	46
		%	0%	0%	2%	17%	80%	100%
	Other	Count	0	2	1	12	44	59
		%	0%	3%	2%	20%	75%	100%

P11b Overall responses	-2	-1	0	1	2
This is a beautiful landscape	0	0	1	16	83
There is too much forest in this landscape	60	33	3	4	0
The forest distribution fits well into the landscape	0	9	1	35	55
I find enough natural areas in this landscape	0	2	2	15	81

P11b_q1		-2	-1	0	1	2	Total
Farmer	Count	0	0	1	11	40	52
	%	0%	0%	2%	21%	77%	100%
Other	Count	0	0	0	6	53	59
	%	0%	0%	0%	10%	90%	100%

P11b_q1	age_class		-2	-1	0	1	2	Total
	15-20	Count	0	0	0	3	14	17
		%	0%	0%	0%	18%	82%	100%
	21-40	Count	0	0	0	7	31	38
		%	0%	0%	0%	18%	82%	100%
	41-60	Count	0	0	1	7	48	56
		%	0%	0%	2%	13%	86%	100%

P11b_q5	Background		-2	-1	0	1	2	Total
	Farmer	Count	0	1	0	2	49	52
		%	0%	2%	0%	4%	94%	100%
	Other	Count	0	1	2	14	42	59
		%	0%	2%	3%	24%	71%	100%

P12a Overall responses	-2	-1	0	1	2
This is a beautiful landscape	10	30	26	24	10
I find too many buildings in this landscape	7	31	18	31	12
The type of buildings fit well into the landscape	21	42	14	18	5
The new buildings fit well into this landscape	30	37	12	15	5
I find enough natural/wild areas in this landscape	6	19	15	39	21

P12b Overall responses	-2	-1	0	1	2
This is a beautiful landscape	3	20	18	39	21
I find too many buildings in this landscape	25	38	17	18	3
The type of buildings fit well into the landscape	6	21	14	41	18
I find enough natural/wild areas in this landscape	3	18	13	37	29

7.6.1. Overall mean values and standard deviation**.**

1	Mean	Std. Deviation
P1_q1	1.78	0.466
P1_q2	-1.29	0.97
P1_q3	-1.34	0.886
P1_q4	1.11	1.042
P1_q9	-1.38	0.891
P1_q5	1.25	1.052
2	Mean	Std. Deviation
P2_q1	1.34	1.008
P2_q2	-1.08	1.116
P2_q6	1.06	1.021
P2_q5	1.71	0.589
3	Mean	Std. Deviation
P3_q1	1.66	0.683
P3_q2	-0.71	1.313
P3_q8	0.62	1.098
P3_q6	0.75	1.071
P3_q5	1.4	0.777
4	Mean	Std. Deviation
P4_q1	1.32	0.849
P4_q2	-0.9	1.133
P4_q8	0.74	1.074
P4_q9	-1.1	1.082
P4_q6	0.83	1.036
P4_q5	1.19	0.896
6	Mean	Std. Deviation
P6_q1	1.17	0.9
P6_q3	-0.85	1.144
P6_q4	0.82	1.073
P6_q9	-0.94	1.11
P6_q5	0.97	1.032
P6_q10	0.99	1.131
7	Mean	Std. Deviation
P7_q1	1.44	0.948
P7_q8	0.72	1.188
P7_q13	1.48	0.852
8	Mean	Std. Deviation
P8_q1	1.55	0.652
P8_q2	-0.98	1.03
P8_q3	-1.29	0.826
P8_q4	1.18	0.813
P8_q5	1.2	0.897
P8_q6	1.16	0.763

9	Mean	Std. Deviation
P9_q1	1.47	0.74
P9_q2	-0.91	1.09
P9_q6	0.94	0.871
P9_q9	-0.99	1.036
P9_q5	1.06	0.963
10	Mean	Std. Deviation
P10_q1	0.11	1.253
P10_q3	0.48	1.257
P10_q4	-0.45	1.215
P10_q9	-0.51	1.29
P10_q13	-0.52	1.189
5a	Mean	Std. Deviation
P5a_q1	0.56	1.208
P5a_q3	0.61	1.229
P5a_q4	-0.01	1.267
P5a_q9	-0.37	1.382
P5a_q5	-0.04	1.247
5b	Mean	Std. Deviation
P5b_q1	1.61	0.62
P5b_q3	-0.56	1.181
P5b_q4	0.69	1.085
P5b_q9	-0.76	1.237
P5b_q5	0.56	1.234
11a	Mean	Std. Deviation
P11a_q1	1.7	0.664
P11a_q2	-1.13	1.101
P11a_q6	1.03	0.965
P11a_q5	1.7	0.695
11b	Mean	Std. Deviation
P11b_q1	1.83	0.402
P11b_q2	-1.49	0.761
P11b_q6	1.37	0.894
P11b_q5	1.77	0.571
12a	Mean	Std. Deviation
P12a_q1	-0.06	1.175
P12a_q3	0.11	1.179
P12a_q4	-0.56	1.151
P12a_q12	-0.73	1.187
P12a_q5	1.105	0.9499
12b	Mean	Std. Deviation
P12b_q1	0.55	1.11
P12b_q3	-0.64	1.126
P12b_q4	0.43	1.188
P12b_q5	0.72	1.153

7.6.2 Comments (in German).

LANDSCAPE ASSESSMENT UBE - Comments

JANUARY 2012

Part of the web-based assessment was designed to collect comments and thoughts regarding the landscapes shown in the pictures. Comment-boxes were added for each page and at the end of the survey a general text-box for feedbacks and concerns about the topic. Although filling the comment-boxes was optional, participants regularly shared their views and concerns, providing important information for the project and complementing the quality of data obtained from the Likert-scale questionnaire.

[Question: Do you have any comment or question regarding this landscape? (optional)]

1 

- Mich stören die roten Dächer und der Strommasten.
- betr. gebäude ist schwer eine aussage zu machen, sind diese doch viel zu klein abgebildet.
- rote Dächer wirken störend
- Bei der Landschaft gefählt mir nicht die stehenden Tannen die vom käfer betroffen sind.
- Störend sind die Strommasten in dieser Landschaft.
- schöne sauber gepflegte Wiesen und Weiden.
- Sie Fragen nur nach Gebäuden, es hat aber noch eine durchführende Starkstromleitung und Stromstangen.Es gehört ja auch zu unserer Landschaft, es gehört auch zu unserem Fortschritt. und meistens ist es eine Preisfrage ob ich am Dach noch Details beachte oder es einfacher mache, dasselbe gilt doch auch bei Strom und Telefonstangen.
- das ist doch eine komplett natürliche Landschaft.
- harmonisch und strahlt Ruhe aus
- Starkstrohmleitung gefällt nicht!
- Foto von Sörenberg mit Blick Richtung Eisee/giswiler Stöcke
- Schönes Biosphäre Landschaft
- Mast der Hochspannungsleitung ist für mich Störend
- Es wäre schön, wenn es auf der Wiese 2 - 3 grosse Einzelbäume hätte.
- Natur pur
- Fettwiesen? Oder wurden die Farben intensiver gemacht?
- Die Käferfichten stören!!!
- Bei der ersten Frage habe ich eher zugestimmt, weil der Wald nicht ganz gesund ist, sonst hätte ich Stimme stark zu angekreuzt.
- Wenn etwas stört, dann der Strommast! Die Gebäude selber sind im Entlebucher-Stil gebaut!

2 

- eine der beiden Tannen rechts ist zuviel
- Ich denke hir ist der Lebensraum für wild. Gefählt mir
- Mich stört es sehr, wenn man in solch geschützten Gebieten nicht mal mehr Beeren sammeln darf.
- zuviel natürliches Gebiet
- diese landschaften sollten nicht überhand nehmen
- Es ist ein sehr schönes Bild aus unserem Entlebuch, ich liebe es, ich kenne jedoch auch der Aufwand, damit unsere Landschaft erhalten bleibt, braucht es unererseits viel Aufwand.
- Schöne Landschaft ist immer Ansichtssache. Dieses Bild und das vorherige können in keiner Weise miteinander verglichen werden und müssen als einzelne Bilder betrachtet werden.
- Die Perspektive, aus welcher dieses Bild gemacht wurde, ist sehr gut gewählt, es gefällt mir sehr.
- finde die Fragen nicht beurteilbar, zu kleiner Ausschnitt
- Hoffe dass dieses Biotop wegen dem Tourismus nicht leidet.
- Ich habe nicht so gerne "dürre Tannen oder Bäume"
- Nationalpark ähnlich

3 

- Bewaldung eher zu dicht LN geht verloren
- Kann es irgendwo zu viel Wald auf einer Foto haben? Es ist doch ein schönes grün
- Auf diesem Foto scheint mir, ist zuviel Weidefläche durch den Wald verdrängt worden
- Die Blacken sollten nicht sein
- der Vordergrund scheint etwas überdüngt zu sein
- schönes Wandergebiet

4

- Bild ist keine Biosphären-Werbung (zu verstückelt)
- ohne bewirtschaftung verwaldet unsere voralpenlandschaft. die waldgürtel sind aber auch für den wechsel des wildes sehr wichtig.
- Diese Aufnahme geht über ein so grosses Gebiet, dass man Details nicht richtig beurteilen kann.
- Vor nicht so langer Zeit hatte es in diesem Gebiet sehr viele dürre Tannen wegen des Borkenkäfers. Die meisten Waldbesitzer haben diese Bäume gefällt, trotz geringem Gewinn, was man leider nur von Privaten Waldbesitzern behaupten kann.
- Auf diesem Foto ist deutlich zu erkennen, was die Fehlgeschlagene Lotharstrategie des kantons Luzern bewirkt hat. Arbeit und Einkommen ist vernichtet worden. es wäre schade, wenn diese Höfe und Alpen verganden würden.
- Es gibt Gebiete die durch Schafe übernutzt sind, andere hingen verwalden
- Mann/Frau kann nicht alles extensivieren.
- Aufnahme zu weit weg

5a

- Fotomontage
- ist auch für in 30 Jahren eher unrealistische Fotomontage
- Wenn die Städter auch auf dem Land leben wollen wird es wohl in naher Zukunft in Schüpfheim so aussehen.
- Ist halt ein Dorf. Irgendwo müssen die Leute ja wohnen.
- An Schüpfheim gibt es nichts Gutes (Sorry)
- Handelt sich hier um eine Fotomontage, am Hang/Berg?
- DA es ein Dorf ist, stören die vielen Gebäude nicht!!!
- Zu viel Kulturland verloren
- Das Bild ist aus meiner Sicht sehr unrealistisch, da wir mit dem Rawi ein unglaublich zurückhaltende Bewilligungsinstanz haben. Bereits Umbauprojkete an bestehenden Bauten werden mit zuweilen auch völlig übertriebenden Auflagen versehen!!
- Fabrik wirkt störend, ist aber glücklicherweise nicht gross

5b 

- Im Vordergrund sehr schöne Löwenzahn-Wiese.
- zersiedelung! im talboden ist eine intensivere bewirtschaftung des landes für die bauern existenziell nötig. überdüngung!!
- In Zukunft wird es eine große herausforderung sein mit dem Boden schonend umzugehen. Immer mehr Leute auf gleichbleibender fläche zu verteilen.
- Sehr schönes Foto, viele intensive genutzte Heufläche.
- Satelittensiedlung Bienz ist störend. Altbauten auf der Landschaft müssten abgebrochen werden. Ersatzneubauten sollten einheitlicher sein und sich positiv auf das Erscheinungsbild der Landschaft auswirken. Heute haben eine zu grosse Vielfalt, respektive zuwenig einheitliche Vorgaben (z.B. 2/3 Holz bei Wohnbauten)
- In der Nähe eines Dorfes habe ich nicht die gleichen Ansprüche an natürliche Gebiete, wie an ein Bild Ausserhalb.

6 

- abgeholzte Hecken und Geilstellen in der Wiese
- Hecken sind zu klein, zu stark zurückgeschnitten
- Von Bergen bis zu saftigen talwiesen alles zu sehen. Gefält mir
- Für mich ein Typische Bild, jedoch habe ich ilder mit Hecken lieber wenn sie Blätter haben, oder langsam wieder "grünen".
- Beurteilung parteiisch, da mein Hof!
- Hecken würden schon passen, aber hier fehlt die selektive Pflege!!!
- alte EntlebucherHäuser, gute Vernetzungsprojekte
- Dieses Bild würde ich im Sommer wahrscheinlich ganz anders bewerten. Wenn alle Bäume auf diesem Bild Laub hätten..
- Die alten nicht mehr genutzten Gebäude sollten abgerissen werden.
- neue Gebäude, alte immer noch bestehend
- Zu viele ungenutzte Gebäude!
- Schade, dass es überall Asphalt-Strassen hat, auch zu den entlegensten Bauernhöfen

7 

- typisch Schrattenfluh
- Militäranlagen im Gebiet stören
- Der Wald sollte genutzt werden damit die Alpweide-Flächen nicht zurück gegen.
- waldgebiete sollte man nicht ungenutz und ungepflegt der Natur überlassen (Lothar)
- Die Alperschliessungsweg sind zuwenig harmonisch in die Landschaft eingebettet. Diese dürften keinesfalls mit Hartbelägen (Beton, Asphalt) ausgeführt sein.
- Ich bin sehr Glücklich die Schratte von Marbacher seite her anschauen zu dürfen!
- Weiss nicht, wie die zweite Frage gemeint ist.
- In dieser Landschaft ist es übertrieben mit natürlichen Gebieten
- schönste Kernzone der UBE
- Das Karstgebiet ist ja auch einzigartig!!

8 

- 2cm vom rechten Bildrand müssten weggeschnitten werden
- Waldflächen lassen sich doch nicht einfach anders in die Landschaft verteilen, oder?
- integrierte Landwirtschaft
- Hier tauchen schon wieder die störenden Asphalt-Strassen auf

9 

- Der Wald ist zu wenig grün (Waldsterben?).
- Wollen sie die Waldflächen abändern ?
- Das ist doch einfach unsere Landschaft in der Biospäre!
- auch Escholzmatt hat schöne Landschaften
- Im Herbst ist es nätürlich, das nicht mehr saftiges Grün vorhersch
- Steile Weiden im Hintergrund könnten evl. falsch oder zu stark genutzt werden

10 

- Das blaue Gebäude wirkt zu dominant.
- 5cm mehr nach rechts wäre viel schöner
- Diese Landschaft ist nicht einzigartig aber schön und zweckmässig, wie eine belebte und genutzt Landschaft sein sollte.
- zersiedelung
- Das ist ein Dorf, und da hat es viele Gebäude
- es braucht auch Industrie
- Schweizer Versand blau sticht ins Auge
- Zu einem Dorf gehören Gebäude !
- Ein Dorf darf sich entwickeln, mir gefällts auch wenn der Fortschritt anhält, auch das ist einzigartige Landschaft. Ein Dorf mit Höhenunterschied, fügt sich doch auch gut in unsere Landschaft ein.
- Das ist ein Bild welches vorallem ein Dorf zeigt. Die Landschaft ist nebensächlich.
- Fotomontage
- Das Dorf Entlebuch finde ich im allgemeinen, grundsätzlich sehr hässlich(mit Ausnahme von - ein paar historisch erhaltenen Bauten). Die Landschaft gefällt mir aber trotzdem.
- Ehemaliges Ackermanngebäude stört schon, vorallem weil es halb leer ist. Da die Schüpfheimer das Grundbuchamt geklaut haben :-(!!!
- Neue Überbauung mit Industrie, zukunftsorientiert ok.
- Es ist wiederum ein Dorf, und braucht daher die Gebäuden.(Arbeitsplätze, Steuerzahler)
- Irgendwo müssen die Entlebucher ja wohnen.
- irgendwo muss auch industrie sein
- In einer Kernzone hat es immer viele Gebäude!!?
- Störende Fabrik, wäre ok, wenn die Höhe kleiner wäre

11a 

- sehr schönes Bild
- auch Marbach hat schöne Landschaften.
- Die Landschaft ist sehr schön, aber der Aufwuchs vom Wald ist nicht gut!
- Wenn hier nicht ein Teil der Bäume und Tannen abgeholzt wird, ist in ein paar Jahren diese schöne Wiese mit Wald zugewachsen. Schade darum.
- wunderschöne Waldweide

11b 

- diese Landschaft ist super, sie so erhalten

12a 

- das ist keine landschaft, sondern hof areal
- oje schon wieder Schüpfheim !!!
- Zwangslage, Neuorientierung mit beschränktem Platz
- Der braune Block vorne links ist störend (2-3 Bäume pflanzen!)
- Der braune Kasten passt nicht in die Landschaft
- Alt und Neu passen hier sehr schlecht zusammen. Dies ist wohl ein Idealbeispiel wie man neue Gebäude nicht bewilligen darf.
- Solarzellen machen den schlechten Eindruck jedoch wieder wett

12B 

- Die Entlebucher Subventionshäuser sind einfach nicht schön. Diese Eternithäuser sehen billig und ungepflegt aus. Sowieso hat es viele verlotterte alte Häuser im Entlebuch, die man besser wieder umbauen würde und wohnlich machen anstelle verlottern lassen.
- Dieses Bild ist eine Fotomontage. Ich bitte Sie nicht solche Bilder für die Umfrage zu nutzen.
- Mühle fehlt!?? Bild kann leider nicht beurteilt werden!
- Auch Solarzellen passen in die Biosphäre! Gebäude sind nun mal in verschiedenen Zeitspannen entstanden.

GENERAL COMMENTS (original transcript in German)

[Question: Have a comment about the survey or other concerns regarding the landscapes in Entlebuch that you would like to tell us? (optional)]

Form B

- Die Landwirtschaft wird zu fest eingeschränkt durch die Aufrechterhaltung der Artenvielfalt. Die Landwirte können die nötigen Arbeiten nicht mehr mit Freude ausüben, wenn dauernd irgendwelche Regeln, Bestimmungen und Einschränkungen Ihr Arbeitsumfeld beeinträchtigen.
- Wunderschöne Photos haben mir wieder einmal mehr gezeigt, wie schön es doch im Entlebuch ist. Wichtig ist aber in Zukunft auch, dass der Mensch hier leben und arbeiten kann und darf und nicht nur die Natur im Vordergrund steht. Mit den Menschen die hier leben steht und fällt das ganze Projekt.Dafür braucht es auch Häuser, die dann halt nicht immer so perfekt in die Landschaft passen, und Industriebetriebe, die grosse Hallen benötigen.Aber schlussendlich darf man den Besuchern ja auch ein Gebiet zeigen, in dem gelebt und gearbeitet wird.
- Nicht jedes Bild vom Entlebuch ist für Werbung geeignet. Flusslandschaften fehlen
- Es ist schwierig, teilweise nur einen Ausschnitt zu bewerten, wenn einem das Gesamtbild eigentlich gut gefällt.
- Mehr natürliche Gebiete wäre toll. Ein Verbot für das Militär in unsere schöne Landschaft zu schiessen und ein Flugverbot der Militär Flugzeuge über das Entlebuch. Diese machen einen riesen krach und stört die ruhige Atmosphäre. Schönere Häuser und ein Konzept wie die Häuser etwas einheitlicher aussehen könnten wäre toll.
- Ist auf dem letzten Bild die Mühle Wicki ein Störfaktor, dass man diese auf dem Bild retouchiert. Ich gebe Ihnen gerne zu Bedenken, dass die Mühle rund 700 Jahre auf diesem Platz steht und somit eine der ältesten noch am selben Standort betriebene Mühle der Schweiz ist, worauf man sicher stolz sein kann. In alten Büchern, ist zu entnehmen, dass die Chratzere eines der ältesten Gewerbegebiete in der Region ist. Ich bitte Sie mir kurz zu erläutern, wieso auf diesem Bild retouchiert wurde. Danke. Guido Wicki Mühle Schüpfheim
- Im Entlebuch hat es genügend natürliche Flächen.

- die architektur im entlebuch hat ihre werte und linie vollständig verloren. alles wird dem funktionalen untergeordnet und die ästhetik (baukultur) hat keinen stellenwert mehr. dabei ist das eine kein widerspruch zum anderen.
- Das Entlebuch ist einzigartig schön. Geniessen wir dieses wunderbare Gebiet einfach.
- das Entlebuch ist eine einzigartige schöne Landschaft !
- Biosphäre Entlebuch ist eine gut sache. - Es braucht die Natur - Es braucht die Pflege - Es braucht die Bevölkerung - Es braucht auch Industrie - Es braucht kein Wolf, er hat zuwenig natürlicher Lebensraum.Wo ist da der Tierschutz für den Wolf? .
- Das heutige Raumplanungsgesetz schränkt Bauen ausserhalb der Dörfer stark ein. Um langfristig die Pflege der Landschaft auch in etwas abgelegeren Gebieten gewährleisten zu können, müsste auch für jüngere Generationen das Wohnen in solchen Gebieten attraktiv sein. Dafür wäre es extrem wichtig, dass Gebäude ohne aufwändige Vorschriften saniert oder erneuert werden könnten, dass für zwei Generationen Wohnraum erstellt werden könnte und dass Aussenschulen, ÖV auf Nebenstrassen etc. gefördert anstatt abgebaut würde.
- Es ist uns Landwirten im Entlebuch ein Anliegen, dass uns die Biosphäre bei unserer Arbeit nicht noch mehr einschränkt als es der Bund schon tut.
- Schöner als das Entlebuch jetzt ist, könnte man es gar nicht gestalten! Schauen und geniessen! Schöne Natur. Der Mensch gehört doch auch noch zur Natur, oder ist das schon vergessen worden?
- Die Alpen drohen in unseren Höhenlagen zu verbuschen, was sich negativ für den Tourismus auswirken wird. Hier sollte dringend Gegensteuer (auch politisch) gegeben werden!
- die Selbversorgung sollte im Entlebuch im Vordergrund stehen.Von Moor oder etensiv Wiesen allein kann man nicht leben.Ein vernüftiges Miteinader ist wichtig.
- Auf das äussere Erscheinungsbild der Bauten ausserhalb Siedlungsgebiet sollte vermehrte Beachtung geschenkt werden. Diese prägen das Erscheinungsbild unserer Landschaft. Der Werkstoff Holz müsste verpflichtend mit mindestens 2/3 in Erscheinung treten.
- Wir haben eine wunderbare erhaltenswerte Landschaft,auch für unsere Nachfolger.
- Eigentlich wurde mir nicht ganz klar was es an sich hatte, mit der so oft gestellten Frage nach dem Waldanteil. Natürlich hat es immer mehr Waldanteil, wenn wir den Waldrand zu wenig pflegen (Personenmangel, alles Andere ist wichtiger und bringt mehr ein) und die neue Methode von Pufferstreifen ördert doch diese Verwaldung.
- Wo liegt der Sinn hinter den bildern?
- Ich liebe es wild und voll von Wald! Kanadische Landschaften sind sehr inspirierend

Form A

- Die Landschaft im Entlebuch ist sehr schön wie sie ist. Abgestufte Bewirtschaftungsformen haben auch ihren Platz. Aber wir brauchen weiterhin sehr viel Intensives Grünland für unsere Tiere die Wertvolle Milch und Fleisch hoffentlich für die Region produzieren. Noch mehr Hecken und andere Ausgleichsflächen gehören dort hin wo die Tiere mit Lebensmitterln (Getreide Mais usw.) die für uns Menschen gedacht sind gefüttert werden. Unsere Tiere fressen Futtermittel! Aus der Region für die Region. Nichts mit Import aus Übersee und Anderen Monotonen Landschaften.
- Es ist schwierig, die verschiedenen Photos miteinander zu vergleichen. Es braucht alles. Schöne Naturgebiete und Moorlandschaften sind sehr schön, aber nur von diesen Gebieten können wir nicht leben. Es muss immer auch eine gute Nutzung möglich sein.
- Ich finde diese Umfrage etwas sehr sinnvolles, da man so den Leuten entnehmen kann, was ihnen gefällt und was nicht. Ich würde solche Umfragen auch in Zukunft begrüssen.
- Das Lanschaftsbild im Entlebuch liegt mir sehr am Herzen. Wäre schön, wenn die entlebucher Gemeinden Zonenpläne erstellen würden, in denen verdichtetes Bauen vorrang hätte. Das Einfamilienhaus-Chaos an de Dorfrändern ist nicht gut geplant. Es schadet dem Landschaftsbild!
- Inputs für die ETH !?? unsere Landschaft ist im Gleichgewicht. Frage; sind es die Betrachter auch? Gruss Pius

- Unsere Landschaft ist sehr schön. Wir müssen schauen, dass das Landwirtschaftsland nicht noch mehr zurück geht wegen Waldaufwuchs und Ueberbauungen!!! Auch gibt es mehr als genug Naturgebiete. Es darf nicht sein, dass die Bauern nur noch Landschaftsgärtner sind, sie sollen auch bewirtschaften können.
- Ich denke, dass die Zersiedelung im Entlebuch ein Problem ist und dass der ständigen Waldzunahme ein Ende gesetzt werden muss. Dies würde jedoch eine Verschärfung des Raumplanungsgesetzes und eine Lockerung des Waldgesetzes voraussetzen.
- Die Touristischen Aktivitäten der Natur anpassen dann haben Alle an unserer schönen Biosphäre Freude!!!
- Der Baustil der Häuser in den Dörfern sollte im ganzen Amt vereinheitlicht werden, Zurzeit kann jeder bauen, was er will, es hat keine Linie, gibt kein Konzept, was Fassaden angeht. Schade.
- Es ist schön zu sehen, dass alles irgendwie Platz hat, selbst ein Hang mit Einfamilienhäuschen in denen ich allerdings nicht wohnen möchte!
- Ich finde diese Umfrage sehr gut. Vielleicht sollte auch einmal eine Umfrage gemacht werden zu der Arbeit auf dem Bauernhof und die Arbeitsbelastung, da es finanziell immer schwiriger wird in der Landwirtschaft.
- Für Biosphäre zu intensiv (Land und Tier)
- Verdichtetes bauen muss gefördert werden. Nicht nur EFH Zonen
- ganz wichtig wäre es, wenn sofort was gegen die Lichtverschmutzung getan würde. Lichter von Firmen richtig montieren, so dass der Nachthimmel nicht unnötig beleuchtet wird. Stromsparen, indem die Lichter nach Mitternacht reduziert werden. Das wäre ein plus für die Biosphaere Entlebuch.
- Da mir die meisten Fotos bekannt sind, finde ich es schwierig die Fragen objektiv zu beantworten.
- Interessante Vergleiche
- Das Entelbuch ist eine unglaublich schöne Landschaft zu der man Sorge tragen sollte. Dennoch sehe ich die Schwiergigkeit, dass eine geordnete Wirtschaftsentwicklung genauso wichtig ist und bestehenden Anwohner die Möglichkeit gegeben werden sollte zumindest bestehende Bauten zu verschönern, auszubauen und zu erhalten. Ansonsten haben wir nur noch eine Touristenzone und eine Abwanderung stadtwärts.
- Es ist Unsinn, abgelegene Gebiete (Doppleschwand, Romoos, Finsterwald, etc.) zu überbauen. Im Tal soll nur verdichtetes Bauen erlaubt sein. Mehr Hecken, weniger asphaltierte Plätze, max. 70 km/h auf Strassen, Emmenuferweg aufwerten, Leinenzwang für Hunde auf Spazier- und Wanderwegen, Schneeschuhläufer disziplinieren, in Kernzonen max. 30 km/h, mehr Wald, parkähnliches Rückhaltebecken unterhalb Schüpfheim verbunden mit einem Steg mit dem Schwimmbad, etc. für Rückfragen: 041 484 18 66 Toni VONARBURG.
- Gute Auswahl der Landschaftstypen. Feststellung: wenig Naturräume in den Haupttälern Kl. Emme und Ilfis, viel Natur in abgelegenen Gebieten, noch wenig durchmischte Waldungen, teilweise viele positiv auffallende Kleinstrukturen, unangepasste Bauweise auf der (intensiv bewirtschafteten) Landschaft wie im Siedlungsbereich, ausufernde Siedlungen.
- Stoppt die Verbauung
- Die Fotografien sind wirklich wunderschön!