

Exploring cultures and environment in the Biosphere Entlebuch

USYS TdLab Transdisciplinary Case Study 2022

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Imprint

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1 Introduction

The UNESCO Biosphere Entlebuch (UBE) near Lucerne, Switzerland, is known for its numerous peatlands and karst landscapes. The area was declared a UNESCO Biosphere just over 20 years ago. Since then, the UBE has been dedicated to sustainable activities and in 2011 it was promoted by UNESCO to a model biosphere for the world. According to UNESCO's criteria, biosphere reserves must not only protect biodiversity, but also satisfy the demands of a rising human population, both culturally and environmentally. It is in this setting, at the intersection of culture and environment, that the Transdisciplinary Case Study 2022 took place.

The Transdisciplinary Case Study (tdCS) at ETH Zurich, organized by the Transdisciplinarity Lab (TdLab), is a problem-oriented and research-based course. The tdCS begins with a real-world problem and strives to provide findings that are useful to the local community while pursuing various learning objectives (for example, designing and implementing scientific research in a real-world context). During the spring semester of 2022, 14 students met weekly to develop their research projects, to prepare their field work and applied it within a 2.5-week block in Schüpfheim in the UBE after the semester ended. A local advisory panel identified eight subjects arising from the overarching theme "culture and environment" as the starting point for the student's work and examined the students' first project ideas to ensure relevance for the UBE region. In what would become four groups, the topics that arose from the meetings with an advisory group were developed into concrete research projects with a strong connection to the interests of the local community of Entlebuch.

Different interactions with experts in cultural studies, arts-science, and artists were an important component of the tdCS 2022. The collaboration between the scientific, technological, and social sciences, as well as with the humanities and arts, is critical to understanding and tackling global concerns and the necessary societal adjustments. Two of the ETH groups directly collaborated with or exchanged their results with students from the Zurich University of the Arts (ZHdK), whose projects are included here alongside the research projects of the tdCS.

1.1 About Entlebuch

Entlebuch is a region in the Swiss Canton of Lucerne and spans seven municipalities with 16 863 inhabitants (LUSTAT, 2022) and is known for its pre-alpine peatlands (Figure 1) and karst landscapes (Figure 2). In 2001, the area was officially recognized as a UNESCO Biosphere (UBE, 2022), after the concept was developed in the region and the funding was discussed and approved in community assemblies. The UNESCO Biosphere Entlebuch is thus the first biosphere reserve that was created in a bottom-up process (Coch, 2008)..



Figure 1
Restored peatlands in UBE.

Peatland landscapes of national significance encompass more than a quarter of the UBE's area. There is no other place in Switzerland with as much nationally protected peatland in such a small area as in Entlebuch. All UNESCO biospheres consists of three zones (Figure 3). Valuable peatlands compose the UBE's protected core zone (8% of total area). Extensive land use, primarily alpine farming and selective forest management, is allowed in the surrounding buffer zone (42%). Environmentally friendly economic growth such as sustainable agriculture, forestry and tourism is permitted and encouraged in the valley (transition area, 50%), where the majority of the region's residents live and work (Coch, 2008).



Figure 2
Karst landscape in Sörenberg, UBE. Source: © UNESCO Biosphäre Entlebuch.

UBE has been crowned as a model for UNESCO biosphere reserves after the first 10 years of existence because of its professional management structures, successful project implementations and the wide array of management fields. It is especially known in the world network of biosphere reserves for its local products, the tight and diverse network with local actors and its participative elements in management (UNESCO Biosphere Entlebuch Association of Municipalities, 2021). UNESCO biosphere reserves are more than just protected landscapes; they balance economic, ecological, cultural, and social values in close partnership with the local population (Knaus, 2017). In addition to its focus on biodiversity protection and assistance for local economies, regional development, tourism, education, and research the UBE promotes culture. Despite being a major part of the Entlebucher's identity and promoted by various management activities, the topic of culture had up until now received little attention in research, so the management of UBE and the TdLab at ETH Zurich together decided to make it a part of the theme for this year's case study course.

1.2 About the Case Study

The tdCS is a course given at the Department of Environmental Systems Science Transdisciplinary Lab (TdLab) of ETH Zurich. The course brings students from different backgrounds and disciplines together to work on real-world problems. The course is designed specifically for students from various fields. The goal is to create a dynamic research and learning experience, where students themselves steer the process. This teaching style creates room for creativity and is especially useful when working in a real-world setting, because it allows students to apply the knowledge they acquire at the university in a real-world context. Four lecturers, each with different and complementary academic backgrounds, actively supported the students throughout the project.

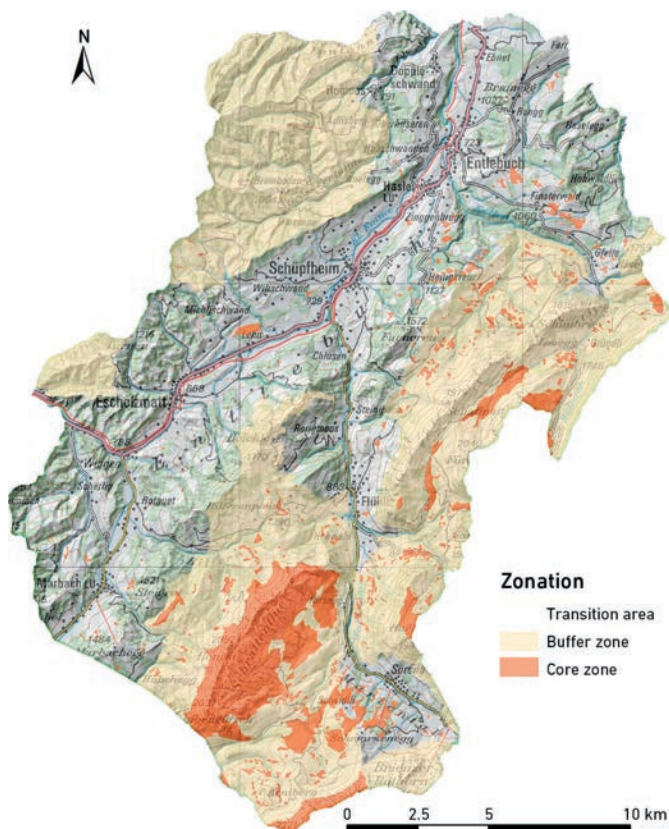


Figure 3
Zonation Map of the UBE. Source: © UNESCO Biosphere Entlebuch and Swisstopo.

Florian Knaus is a senior lecturer at ETH Zurich and the scientific coordinator of the Entlebuch UNESCO Biosphere Reserve. He is specialized in nature conservation, agriculture, and rural sustainable development.

Michael Stauffacher is an adjunct professor, senior researcher, and co-director of the TdLab at ETH Zurich. His research is always problem-oriented, whereby close collaboration with societal actors is of central importance.

Bianca Vienni-Baptista is Group Leader 'Cultural Studies of Science' and Lecturer at the TdLab at ETH Zurich. She works in the field of anthropology of science, focusing on the study of collaborative knowledge production processes.

Pius Krütli is a senior researcher at and co-director of the TdLab at ETH Zurich. His teaching and research focus on the collaboration between science and society on sustainability issues, particularly in countries of the Global South.

The **TdLab (Transdisciplinarity Lab)** at the department of Environmental Systems Science (USYS), a teaching and research group at ETH Zurich, teaches and researches in a transdisciplinary way. This means that not only researchers with different backgrounds and expertise are involved, but also partners from practice.

Transdisciplinary research is fundamental to this, as is an intense engagement with local partners from the public and private sectors, as well as civil society. Researchers from different disciplines interact and work together with actors from the local community in a combined research and learning experience.

Four groups were formed at the beginning of the Spring semester 2022, all defining their own study. The first of the four groups worked on landscape perception, replicating a study from 20 years ago. With the aim of identifying the most valued places in the UBE, they conducted their own survey and found that a few places recurred as being perceived as the most valuable. The second group tackled the theme of soil understanding and found that there are clear but different perceptions of soil among grass-land farmers in the UBE. What perceptions of soil is present in an

area is important to understand how soil health can be maintained and promoted. The third group explored the reasons for the low number of organic farms in the UBE. The group identified that the reasons for converting or not converting to organic farming in the area are multiple and nuanced. The fourth and final group sought to understand how young people in the UBE view the region and its future. They were able to demonstrate that young adults have rich ideas about the future of Entlebuch. All groups were tied together by the common theme of "culture and environment" and their projects were directly influenced by the advisory group.

The advisory group has been an important piece of the puzzle in this year's course. The group consisted of 17 people from varying backgrounds and with different links to the UBE (see Annex), with the aim of ensuring that the projects carried out are relevant to the region and to make the theme of "culture and environment" framed with respect to the region's characteristics. The group met before the start of the course to explore what the overall and multifaceted theme would actually address based on the local context. This resulted in eight general themes which the students then fleshed out in their respective studies. A few weeks into the course, the student groups presented their research projects to the advisory group. The advisory group provided critical and very valuable feedback on the projects, which the students were



Figure 4
The students and lecturers of the Transdisciplinary Case Study 2022.

then able to integrate into their process. At the end of the project, the advisory group met again in November 2022 to discuss the conclusions reached by the studies and how these should be addressed in the future.

At the final event in Schüpheim in June 2022, the results of the four research projects were presented to interested parties, including the advisory group. In the following chapters, the process of developing each study and its result is presented in closer detail.

1.3 Exchange with the arts

Since this year's case study had the overarching theme of "culture and environment", collaborating with scientific disciplines that touch upon both culture and environment was important for the success of the course. Therefore, meetings and discussions with experts in cultural studies, the arts and artists were organized throughout the course.

Already in the second week of the semester, Prof. Dr. Boris Previšić from the Institute Cultures of the Alps at the University of Lucerne gave a lecture on the topic of cultures. Students could also ask and reflect on their research topics in the light of cultural studies, which broadened the scope of how to approach the identified questions. Students were later given feedback from Boris Previšić on their research plans.

Throughout the course, the student group has met and exchanged ideas with students from ZHdK's Master in Transdisciplinarity program under the guidance of ZHdK faculty Prof. Irene Vögeli and Prof. Patrick Müller. Under the coordination of Mira Hirz, Maximilian Grünewald and Bela Rothenbühler, the founders of the art project Anthropos Ex, workshops were held on-site in Heiligkreuz, where students have been able to discuss ideas and approaches to answering questions related to Entlebuch (Figure 5). Through various exercises, both theoretical and practical, students from both ETH and ZHdK were challenged together to devise and explore the relationship between humans and nature. In one session, for example, they had to come up with ways to put nature at the center of a theatre performance. These exercises were carried out in mixed groups, with students from ETH and ZHdK from a wide range of backgrounds, with the aim of stimulating creative thinking and cross-disciplinary collaboration.

The ETH and ZHdK students also spent the whole of the second of the two block weeks together, discussing and exchanging their progress and findings. Throughout the semester, the students were encouraged to have more frequent interactions with one another, which ultimately resulted in two of the ETH groups having links and interchanges with ZHdK students.

In the following, the different studies are presented.



Figure 5
Workshops led by Anthropos Ex.



Figure 6
Students in Heiligkreuz.

2 Valued landscapes

Chapter based on the works of Ziyu Guo, Louise Humbert and Rebecca Humborg

The UNESCO Biosphere Entlebuch must adhere to strict laws and regulations that govern how the region is managed and developed. In particular, three complementary functions must be fulfilled: conserving landscapes, biodiversity and ecosystems; development by fostering sound economic development that is both ecologically and socio-culturally sustainable; and logistical support by encouraging research and education (UNESCO, 2017). Having the goal of running decision making processes around these functions in a participative manner, the local population's needs, knowledge and perception needs to be taken into account. This is key in engaging and further developing constructive initiatives. It is for example of interest to find out and evaluate the local population's view on the Entlebuch's landscape: what is valuable to conserve and what is desired to improve? It is in this interest that this group's project started: the values of the UBE as perceived by its residents.

2.1 The idea

A study and a map produced in 2000 by Walther (2000) provided the inspiration for addressing these issues. Back then, the question asked was which places people of the Entlebuch perceive as most beautiful. And, as seen in figure 7, clear patterns appeared that to some extent correspond with the zonation map (Figure 3). The CogniMap below was the result of a study on perceived beauty in UBE. The participants were asked to circle the areas they perceived as most beautiful, creating a consensus map where areas that were chosen most frequently have the darkest shade of red and the ones chosen less often are increasingly light.

With this as a base, this group aimed to recreate and develop this map 20 years after by conducting a survey specifically asking about which places in UBE are perceived as valuable in different aspects. The group aimed to identify places valuable for their

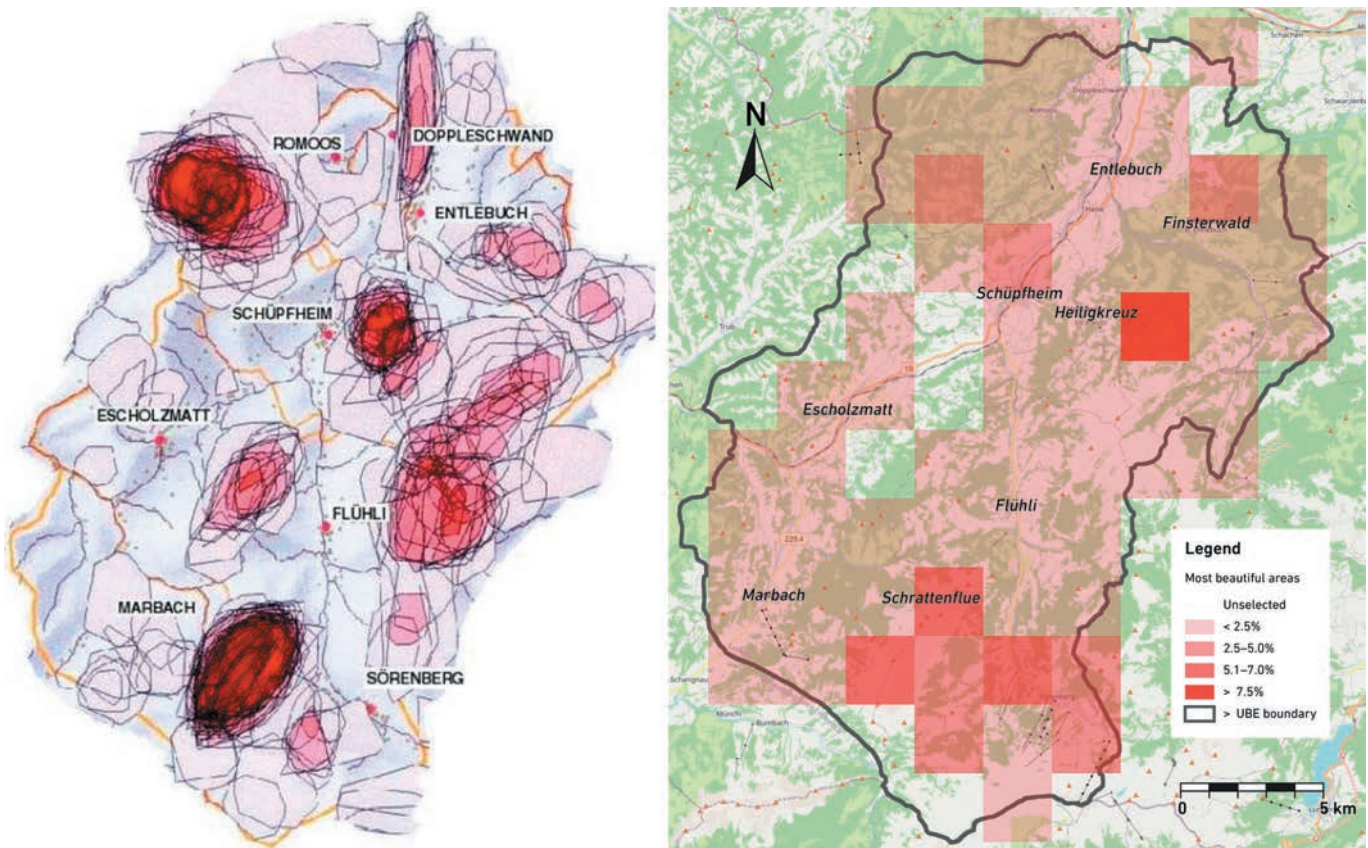


Figure 7

Left: CogniMap representing the areas perceived beautiful in 2000 (Walther, 2000) (n=98). Right: Map representing the most beautiful areas selected by the participants (n=58).

beauty, places that are characteristic of the UBE, places valuable for their culture, places that are valued as family-friendly, places that are suitable for sports activities, and places with good potential for businesses to establish. And importantly, has anything changed compared to the survey conducted 20 years ago?

2.2 The study

To find out how Entlebuch is perceived by its inhabitants, a survey was created. The UBE was sorted into 82 equally large squares on a map and distributed along with cross-box questions about each category. The group distributed the survey both digitally and in person, by encouraging people to participate outside shops and in Schüpfheim town center, handing out flyers and by advertising in the local newspaper. The collected information from 72 respondents was then entered into Excel for analysis and maps were created using GIS tools.

GIS stands for **Geographic Information Systems** and is a computer software used to store, analyze, and visualize data that has a geographical location. In other words, GIS links data to a map.

The results of the survey show that Heiligkreuz, Schrattenfluh and places around Sörenberg were most often chosen as beautiful (Figure 7). At the same time, Sörenberg and the communities around it were also perceived as the most affected by humans, in the sense that they were somehow deprived of their natural beauty. Thus, the town centre of Sörenberg is seen as most affected, but the areas around it are considered very beautiful. Landscapes considered characteristic of the Entlebuch are dominated by mountains, forests and meadows, especially in Heiligkreuz and the Schrattenfluh. It is also mountains, pastures, meadows and forests that are the most prominent elements in landscapes perceived as beautiful. In terms of cultural identity, it is mainly villages that are singled out, including Schüpfheim, Entlebuch, Doppleschwand and Sörenberg. For outdoor activities and sports such as hiking, cycling and skiing, Schüpfheim, Heiligkreuz, Marbachegg, Schrattenfluh and Salwideli are mentioned.

In comparison to the previous study in 2000, the Napf region and the mountain range of Schimberig, Schafmatt and Fürstein are mentioned less often as valuable for their beauty. This may be because of the spatially non-representative sample (very few persons from Doppleschwand and Romoos filled in the survey). Heiligkreuz and Finsterwald are, on the contrary, mentioned less as affected or impacted than 2000 and the cultural importance of Heiligkreuz was mentioned frequently (Figure 7).

Looking at the obtained results overall, summarized in figure 8, the values attributed to the landscape can be divided in roughly two fields: The first field combines values attributed to places that are perceived as beautiful, characteristic for the region and convenient for recreation and leisure. The second field encompasses places that are perceived as culturally valuable, and suitable for economic development. These places are typically village centers and do not correlate strongly with beauty. This is illustrated in a heatmap showing correlations between the different classifications (Figure 8).

2.3 Main takeaways

Through the survey, a strong attachment of local people to the whole region became visible. Most participants were reluctant to point out areas with less beauty, as they perceive all places in the UBE as beautiful. The areas that were pointed out as valuable most frequently correspond quite well with the core area of the UBE zoning and moreover, perceptions were very comparable to an earlier survey conducted on the region. Some changes seem to have appeared though, for example with the significance of culturally valuable areas such as Heiligkreuz emphasised. Future, and more qualitative, research is needed to gain deeper understanding of these potential changes and patterns.

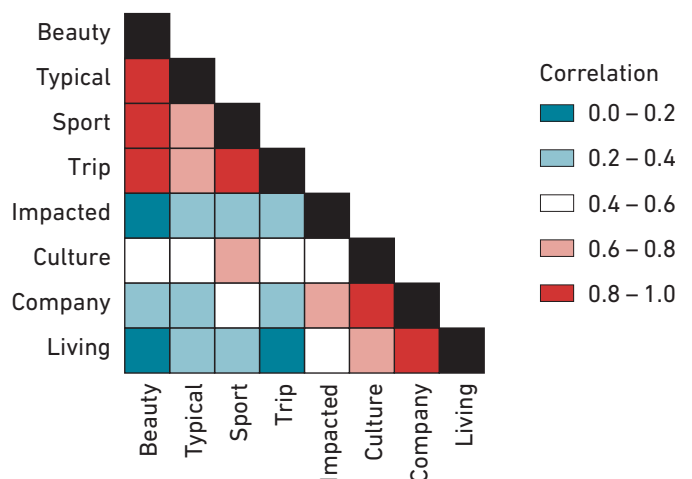


Figure 8 Heatmap representing the correlation of values attributed to different places in the landscape by local people. 1 = full overlap while 0 = no correlation at all.

3 Listening to soil

Chapter based on the works of Tonghui Li, Jania Mackenthun and Mónica Revuelta Albero

Soil is a non-renewable resource that cannot be recovered in a human lifetime. Unsustainable ways of using and managing land can lead to soil degradation. Therefore, it is incredibly important to understand how more sustainable ways of using the land can be achieved to ensure long-term usability of the soil. According to soil threat assessments, present agriculture techniques in Switzerland will not ensure soil fertility in the long run (Hagedorn et al., 2018). Technological advances and research are part of moving towards more sustainable practices, but ultimately it is up to the individual farmers to take care of their own soil. Hence, managing soils in general requires the understanding of knowledge, practices and perceptions individual farmers have about soil. Such studies that examine qualitatively how farmers view soil and how this in turn influences farmers' decision-making are rare, and this group wanted to contribute to filling this knowledge gap.

3.1 The idea

The idea for this project is based on the themes that the advisory group had come up with before the start of the course. The group discussed how people's need to use the land, through for example farming, leads to the creation and shaping of habitats. Or in other words – how landscapes develop through human activities. At the first meeting with the advisory group, the project's idea was discussed focusing on investigating what factors influence the decisions farmers in Entlebuch make and whether farmers' understanding of the land could be a factor to explain such decisions. The project concept was well received and in an effort to increase basic knowledge about grassland farmers' understanding of soil, this study was developed.

3.2 The study

This study was conducted through qualitative interviews with six different, organic or IP-Suisse certified, grassland farmers in Entlebuch. The interviews lasted for two hours and were divided

into two parts. In the first part, farmers had the opportunity to listen to their soil, using the "Sounding Soil" bioacoustics equipment (Figure 9). Participants were asked to choose places on their farm where they would like to listen to the soil. This element was intended to start conversation and draw attention to the soil, the "Sounding Soil" triggered reflection on the role of soil. It worked very well as a guide into talking about the soil during the second, and more central, part of interview.

The **Sounding Soil bioacoustics equipment** is a piece of listening equipment generously provided to the group by Biovision as part of their sounding soil project, developed by Marcus Maeder. The Sounding Soil enables the listener to hear the soil, by inserting acoustic sensors directly into the earth. The porous nature of soils causes sound by scattering, reflecting, breaking, and bending any sound waves that travel through the soil (Maeder et al., 2019).



Figure 9
Sounding Soil bioacoustics equipment. To the left is the Sounding Soil in the field (Maeder et al., 2019), to the right is the main body and the probe sensors.

The basic question of the interviews was "Can you please walk me through the role that soil has played throughout the history of your farm?" This was then followed up with an open discussion between the farmer and interviewer. The resulting interviews, that had been aided by the preceding use of the "Sounding Soil" equipment, led to the creation of three stories, so-called narratives, around soil. The three narratives highlight the overall stories given by these grassland farmers to explain what soil means to them. The study was enhanced by the work of Xu Ye, a ZHdK student, who illustrated the experience (Figure 10). The three narratives that became apparent were: *The farm as a business*, *The ecological laboratory*, and *The farm as a garden*.

In *The farm as a business*, farmers laid emphasis on efficiency using the soil. They carefully assess inputs and outputs demonstrating that the farm is a company with investments and returns that must be balanced. In this context, the main reason to maintain soil health is to continue to be able to farm the land and get returns from it. The farmers are at the center of the ecosystem, because



Figure 10
A farmer listening to their soil. Illustration by Xu Ye.

it is their responsibility to ensure that there is a good harvest and therefore their responsibility to ensure that the soil is fertile and arable for this purpose.

In *The ecological laboratory* the farm is a place where science happens, and where a logical, scientific reasoning of soil health is dominating. This informed perspective fosters a strong belief about how to best conserve soil life and what it means to sustainably manage it – at its core is the strive to maintain soil health.

The last narrative, *The farm as a garden*, contains a more spiritual view of the soil. In these stories, the soil is to be treated with respect and is recognized as the fundament for the entire ecological system that is farming. Essentially, the soil is a self-regulating system that does not need humans to thrive. The farmer themselves is, in this view, a part of a system that acts in harmony.

3.3 Main takeaways

As the three different narratives show, unique and distinctive ideas about soil could be identified. And, importantly, despite previous assumptions of having little understanding of soils due to the high amount of farmers with conventional management, the interviewed farmers showed understanding of soil and a certain attachment to it. This attachment manifested in different ways, as the narratives so clearly illustrated. Moreover, all of the farmers spoke of and underlined the importance of soil sustainability. They were concerned about the life of the soil and how to maintain healthy soil in the future. These findings were largely facilitated by the use of the Sounding Soil listening equipment, as the activity emphasized the focus on soil and opened up for further discussion on the topic. However, no farmers farming by conventional methods were interviewed. Because of this, the narratives do not include their perspective and the results cannot be seen as entirely representative. Nonetheless, the study shows how this type of equipment and method can generate both new and interesting results.

4 Organic farming

Chapter based on the works of Sofia Aalbu, Gráinne Burrows, Celine Christl and Aman Karwasra

Agriculture is one of the major ventures in the UBE, generating about 23% of the economic output in the region, which is well above the national level. Of all farms in Entlebuch, only approximately 8.5% is certified organic (UBE, 2022), making the region a stark outlier in comparison to seemingly similar areas and Switzerland as a whole, with 16.5% share of organic agricultural land. In the UNESCO Biosphere Val Müstair in the canton of Graubünden, 80% of agriculture is organic and in a UNESCO Biosphere in Salzburg, Austria, close to 50% of farms are certified organic (Humer-Gruber, 2016). Closer to Entlebuch, in Obwalden, 30% of farms are organic. Furthermore, Switzerland has a high consumption of organic products per capita, and it is steadily on the rise. The amount of land farmed organically has increased with close to 55% over the past 10 years (FiBL & IFOAM, 2021). However, this varies quite a lot depending on sector, as seen in table 1. Certain products, such as organic eggs and vegetables, have a high market share while others, particularly meat and meat products, have a very low share.

Industrial, energy-intensive agriculture leads to high environmental, social and economic costs. A transition to organic farming could mitigate these. It is therefore of importance to unravel why farmers choose not to convert.

Table 1
Organic shares for retail sales values (euros) for select products in Switzerland 2019 (Source: FiBL & IFOAM, 2021).

Product	Share of organic market per product (%) in Switzerland
Bread and bakery products	26.1
Eggs	28.7
Fresh Vegetables	23.1
Fruits	17.5
Meat and meat products	6.2
Milk and dairy products	11.0
> Cheese	7.6
> Milk	24.6

4.1 The idea

The idea to tackle this particular issue came already after seeing what the advisory group had discussed and asked for in their first meeting before the course started. The issue of the low number of organic farms in the region was clearly identified as something that several people from the cantonal authorities and local community wanted answers to. Students quickly realized that the information available on the subject could not adequately explain this trend, especially as the canton of Graubünden showed completely different statistics although the regions should be broadly comparable. With this in mind, the group set out to answer the question: why is the number of organic farms in Entlebuch so low?

4.2 The study

To answer the question of why the number of organic farms is comparatively low in Entlebuch, this group conducted qualitative interviews with both organic and conventional farmers in the region as well as with experts within the field of organic farming. A total of nine interviews were held during the two block weeks in Schüpfheim, five of them being with farmers and four with experts. A policy review and a comparison with the canton of Graubünden was also conducted. The reason being that Graubünden has the highest proportion of organic farming in Switzerland. While the regions are topologically similar and pre-Alpine to Alpine, they have quite different climatic conditions and contrast sharply in terms of organic farming.

Incentives to convert to organic farming exist. Policy incentives include measures that allows for maintaining farmers' income with a lower density of production, thus leading to a reduction of overall farm-related emissions. To spur this, the main governmental incentive for farmers come through federal subsidies. In addition to these, the canton of Lucerne offers interest-free loans to farmers in transition to organic production to aid with the cost of converting.

The second main incentives are market based. This study's findings suggest that the market for organic products still has room to grow. However, the profitability of organic products varies and there seem to be a lack of sales channels for organic products.

While organic crops like cereals and strawberries are perceived as very economically profitable for farmers in Switzerland generally, the hilly, wet nature of the Entlebuch region means that they are difficult to grow. And production suitable for these conditions, prominently grassland-based produce such as milk, cheese, and meat, have a significantly smaller share of the market. In this context, managing the invasive species *Rumex obtusifolius*, commonly known as Bitter Dock, is also mentioned as a barrier to transitioning as it is difficult to get rid of without the use of herbicides.

While there is market potential, particularly for cattle and dairy, there is a feeling that Entlebuch "missed the boat" with terms of time, particularly when contrasted to its organic agricultural role model of Graubünden. There appears to be a "tipping point" at which the acts of a certain number of pioneering farmers flow over into mainstream practice and philosophy; this has long occurred in Graubünden but has only just begun in Entlebuch. The cantonal authorities in Lucerne have up until recently not promoted organic farming, whereas the governmental consultancy services in Graubünden pushed for organic farming early on. Entlebuchers' self-identification as primarily producers, which thrived at the same time as Graubündeners began to regard themselves as organic pioneers, appears to have stuck. This is not to say that organic farmers are not producers, but that the interviewed conventional farmers in Entlebuch might hold values of what it means to be an organic farmer that they themselves do not identify with. Organic standards with lower thresholds on animal density per hectare and hence lower outputs are thus in conflict with farmers' perception of themselves, as organic farming is perceived as more than a mode of production. Those farmers who have converted to organic upheld that it has been a personal decision rather than one driven by external pressure or even encouragement from national, cantonal or regional authorities.

The study found that there is not one single reason as to why the proportion of organic farms in UBE is so low, but several explanations might help to understand this persistent trend: high density of animal husbandry, in particular pigs; types of crops suitable to be grown in the area; regulations from BioSuisse that require entire farms, rather than individual outputs, to be organic; the seeming saturation of the organic market; a lack of market channels; a gap between the real and believed economic cost of transitioning

to organic farming; a lack of knowledge on the information and resources available to farmers that might accelerate a transition; and a subsidy scheme that does not pressure to change.

4.3 Main takeaways

The project on organic farming shows that there is not only one reason not to convert. Factors such as path dependency and timing seem to play a role in maintaining the current situation. If the canton wants to increase the proportion of organic farms in Entlebuch, the group's findings suggest that realistic expectations of the potential for organic farming is key – a shift will likely not happen without structured effort. Understanding the local conditions for transitioning from conventional to organic farming is essential, both in terms of the environmental preconditions and the cultural background and values held in the region. There are real barriers that exist in transitioning and tackling these is of great importance to help farmers make the change. To maximize the potential that the region has, the information gap needs to be bridged, sales channels need to be set up, and the economic benefits of organic farming need to be clarified to the farmers in the region.



Figure 11
Landscape in UBE, taken in connection with one of the interviews.

5 Youth in Entlebuch

Chapter based on the works of Navya Itty, Yurun Jin, Tiphaine Mühlethaler and Aleksandra Wybieralska

The young population is most likely the primary change agent in ensuring a sustainable future. What is considered desirable futures by young people are especially important for sustainable futures since they allow for the construction of viable paths to these futures. Existing literature concerning youth has a significant gap that relates to future prospects and visions of youth. Young people are greatly influenced by context, the environment they grow up in and their views of these places (Donnellan Barraclough et al., 2021). If the aspirations of the young are produced relationally, in interaction with the society surrounding them, the role of UBE in shaping the aspirations and visions of the youth within the region is of great interest.

5.1 The idea

There are over 700 Biosphere Reserves in 124 countries, but there are little to no existing studies that concern how young people perceive life in biosphere reserves or how they contribute to the aims of biosphere reserves (Donnellan Barraclough et al., 2021). Understanding young future visions can help shape policy development and programs centered on them, their needs, and concerns. In this context, students designed their project with the goal of investigating young people's desired future of Entlebuch.

5.2 The study

The group conducted workshops with young people aged 18–25, a total of eight people participated in two sessions held during the first of the block weeks in Schüpheim. The workshop was based on a so-called "rich picture" exercise (Figures 12 & 13), in which participants illustrated their thoughts together on a large piece of

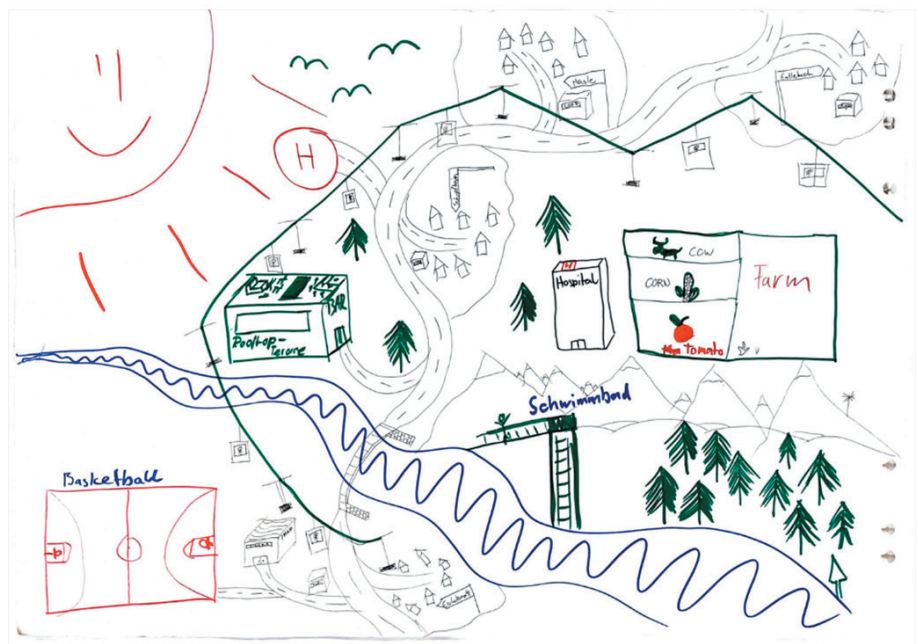


Figure 12
'Rich picture' of an ideal future of Entlebuch from Workshop 1.

paper after discussing guiding questions. This was used to spur discussion amongst the participants and used as the foundation for the subsequent structured conversations with the group of participants.

A plethora of subjects were discussed during the rich pictures exercise and following talks with the participants. Four prominent themes were identified by this research group: (i) culture, (ii) identity, (iii) environment, and (iv) community.

In the theme of culture, participants often mentioned tradition, on the one hand as something to preserve and on the other as a possible obstacle to development. It became clear through the rich picture exercise how tradition was constantly present, but



Figure 13
'Rich picture' of an ideal future of Entlebuch from Workshop 2.

especially in the context of how these traditions can be preserved and protected through innovative solutions such as renewable energy. The importance of places for leisure was also mentioned, as this is perceived as something that is in short supply in the region. Participants highlighted that places to meet would enrich their lives considerably and help to preserve the region by making it more attractive.

Identity also recurred frequently during the workshops. Identities participants linked to Entlebuch were peace, security, and nostalgia. Nature also plays a prominent role, both as binding the region together and creating an overall identity, and as something that should therefore be protected and preserved. This does not mean, however, as the theme of environment suggests, that the

region requires greater protection. Global environmental problems were not linked to the local environment, so solutions with a strong local connection and related to self-sufficiency were emphasized instead. These included local food markets and renewable energy, as a way to make the region more resilient.

Finally, aspects that can be linked to community were discussed. It became clear that participants would like to see that if they leave Entlebuch, they will return later in life and that they generally see the relatively high flow of out-migration from the region as a problem. Economic conditions and lack of infrastructure connections within the region is brought up as a hindrance for a strong-knit community.

5.3 Main takeaways

The *Youth in Entlebuch* show that the young people who participated in the project have a clear idea of the future of the re-

gion, both in terms of things to maintain and things to improve. The youth would like to see Entlebuch become more self-sufficient, which is clearly linked to environmental and sustainability issues. They would also like to increase access to leisure activities, restaurants, and places to gather. Consistently, this group finds that there is a strong sense of place and identity in Entlebuch – the participants hold a pride in the region. They also share a strong sense of belonging, something they carry with them from previous generations and are likely to pass on to the next. These findings can help inform development in the region, and pinpoint existing perceived problems as well as inspire solutions. As such, the group encourages more participation of youth in decision-making processes in Entlebuch.

6 ZHdK projects

The students from ZHdK, like the ETH students, have carried out projects based on Entlebuch within the framework of the master's Program in Transdisciplinary at ZHdK. Complementarily to the ETH group's overarching theme "culture and environment", ZHdK's theme took terms like "nature" or "ecosystem" as their starting point, mirroring the usual allocation of fields of competencies of a technical and an art university respectively. Under the title "Modelling Gaia" students researched the heterogeneous phenomena generated by the actions and interactions of many different agents, living and non-living, questioning nature-culture divides. In the following, the ZHdK students' projects are presented in brief.

Thassiannira Araújo Sousa created a comic book like series of illustrations (Figure 14), telling the mythical tale of "Kraftort Heiligkreuz" (Heiligkreuz power spot, see <https://www.myswitzerland.com/en-ch/experiences/heiligkreuz-power-spot/>), located in the UBE. With speech bubbles left empty to encourage the reader to fill its content and tell their story – answering the question "How did the power come to Entlebuch?" Working on the mythical topic, the projects ask the question whether and how mythical tales, "Kraftorte" and connected pseudo-scientific practices like pendulum dowsing can lead to a sensitization for our relations to non-human beings.

Hannah Essler was inspired by the "Kraftbaum". While at the mythical tree, a seed was taken from it and then planted in a small plastic pot with a handle. Tackling interspecies relation and in trying to give the tree itself agency, a voice, Hannah Essler carried the small offspring of the Kraftbaum, a sycamore (*Acer pseudoplatanus*), for the whole duration of the spring – and for all we know, still – through her life and named him Ernst. In a collection of photographs (Figure 15) and postcards, as well as in a poetic text, Ernst was captured in varying places and situations, speaking for himself through Hannah Essler and the Instagram account (@kraftbaum_ernst).

Ye Xu created her project in direct relation to and in collaboration with the above presented second group of the ETH, "Listening to Soil", focusing on the perceptions of soil. During the block weeks, Ye Xu joined the group in interviews and sound sampling, and heavily contributed to the interpretation of the interviews. Besides the three narratives developed by the students from ETH, she proposed alternative ways of expression, through a more poetically captured language and through a visual illustration of one of the narratives (Figure 16). The different ways of knowledge production were a productive force in the interdisciplinary work of the group.



Figure 14
Snippets from the series of illustrations. Source: Thassiannira Araújo Sousa.



Figure 15
Ernst captured in different places. Source: Hannah Essler.

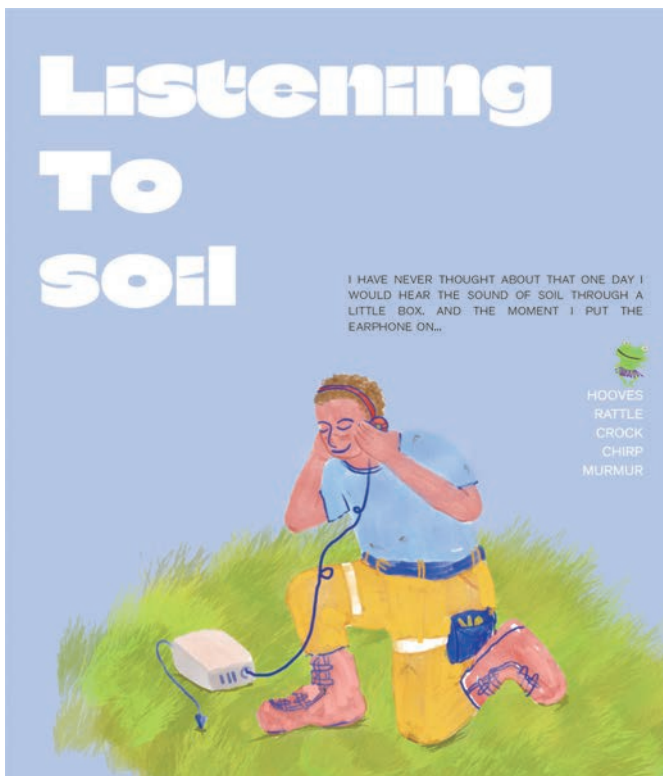


Figure 16
The visual illustration of one of the narratives. Source: Ye Xu.

Adrián Bracho and Jehisson Santacruz Giraldo chose to approach the only natural lake in Entlebuch, the Änggelaueneseeli. By recording video and sound, photographing, mapping, and collecting samples (Figure 17) of for example water, mud, and mosses, they aimed at bringing the lake back with them. The project was stimulated by sociologist Bruno Latour's studies on soil scientists, observing the soil's transformation when brought from the field (in South America) to the laboratory (in Paris). The respective translation processes – from Änggelaueneseeli to Pfarrheim Schüpheim – included ironic commentaries on the specific language of Entlebuch's tourist marketing.

Frédéric Bron and Judith Weidmann carried out a project with a walk at its core. They accompanied their participants on walks in Entlebuch, with the intention to, through walk and conversation, identify the individual's perception of the landscape's atmospheric qualities. The underpinning research interest focused on human and non-human actors' relations exceeding the human-subject and nature-object duality and normativity. The findings were compiled in a map, where places and stories were pinpointed together to illustrate the tales of local people (Figure 18). While the topic of landscape perception was similar as ETH's first group, the approach was strictly qualitative highlighting not only what landscapes and landscape elements people appreciate but also what feelings these landscapes provide to the observers ranging from pleasure to deep spiritual connections. As such, it shares many similarities with the first ETH group's project and can be seen as complementary by highlighting different parts of a common theme: understandings and perceptions of the landscapes of UBE.



Figure 17
Samples collected from the first visit to Änggelaueneseeli. Source: Adrián Bracho & Jehisson Santacruz Giraldo.

7 Connecting the studies

The overarching theme of this year's Case Study has been "culture and environment" and the four different projects demonstrate the breadth of ways in which this intersection can be studied. A strong link between the studies, albeit them being so different, appears when viewing them through the lens of culture.

The group working on landscape perception touched on the *cultural* dimension of landscapes and showed the important role culture plays in how landscapes are perceived and valued. The interviewees showed a high degree of coherence, suggesting a culture of landscape perception that includes personal, cultural, and fixed natural elements and a strong local identity to the Entlebuch as a region and biosphere. The group from ZHdK deepened this by looking into the interrelations between humans and landscapes as they attempted to figure out how these landscape perceptions affect the humans involved.

Furthermore, the group studying soil awareness explored *agriculture* and was able to use the technique of listening to soil as a tool for disentangling visions on the landscape and the soil. The study showed how different perspectives farmers can have about soil, and how these cannot necessarily be separated but build on each other and has its roots in the culture of farming. Similar to the study on landscape perception, this group tackled the physical element of soil and tried to identify different cultural appropriations of it. From the perspective of this group, there is an indication that it is important to identify these perspectives in order to develop targeted interventions to optimize how soil is managed also in relation to future landscape perspectives.

The study on organic farming, or the lack thereof, concerned a type of *bio-culture* – what cultural factors might underlie farming practices and land-use decisions. Here they found that lack of will, or economic incentives are not enough to comprehensively either

explain or understand why the share of organic farming in UBE is so low. Cultural backgrounds and trajectories seem to impact the configuration of land-use. The result of the study indicates that a nuanced picture of the situation, shaped by past and present, is needed to successfully support farmers and facilitate the transition to organic farming.

The last group studied the youth of Entlebuch and their *culture*. Just as in the broader study of landscape perception in UBE, a sense of pride in the region was present. Illustrative images and perspectives on the future emerged, with concrete ideas for how leisure spaces can positively impact the region, in addition, a very exciting combination of both respect and reverence for tradition. Visions of how modern technologies can develop the region without affecting its identity also emerged. Furthermore, the study gives clear indications that the "rich pictures" approach is effective in revealing the perception of the participants and that the format encourages discussion and creativity.

The problems addressed and approaches developed in the different projects show the wide range of topics associated with "culture and environment" in the context of the UBE. They also illustrate the potential of the adopted transdisciplinary approach, where different research fields and real-world actors come together in problem-solving providing a ground for innovative and creative research and creating a process of mutual learning between students, researchers, and the public. Given the limited data base and relatively low number of interviews, the studies may not reflect the full spectrum of perspectives and should not be viewed as representative of the region. The studies nevertheless gave a glance at the diversity of links between cultures and the environment in the UBE and lay the foundations for further research, collaboration, and ideas for management that will be continued in the future.

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Thanks to

The students really succeeded in their work, for which I would like to thank them sincerely. It was a pleasure to see how committed and responsible the students were in dealing with this challenging topic. Another thank you goes to the management of UBE, who supported our students as well as me time and again. Throughout the entire project, Florian Knaus actively helped the students, be it with ideas for content, contacts to all kinds of people in the region – without Florian, the case study would not have been possible. I owe another big thank you to Dr. Bianca Vienni Baptista and Dr. Pius Krütli, who supported me so much in running this course. We also benefited from great accommodation at the BBZN and HPA and a wonderful working space with professional kitchen at the Pfarreiheim Schüpfheim – the respective housekeepers and managers deserve a big thank you!

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Bela Rothenbühler. I am especially grateful to our partners from ZHdK, Prof. Irene Vögeli, Prof. Patrick Müller and their students, who made this case study a truly interdisciplinary experience.

Such courses in the real world only work thanks to the great support of our advisory group, for which I would like to express my sincere thanks. I was extremely impressed by their commitment and enthusiasm for the Entlebuch and the UBE, but also for our case study. Furthermore, I would like to thank all those in UBE who responded to surveys and interviews, provided input and feedback to our research and made this case study a truly impressive encounter in a lovely region of Switzerland.

The brochure is also meant to inform those in the region who could not be part of the project. There will be more opportunities in the years to come. Thanks to our collaboration with UBE, we will continue our research in the UBE – I am already looking forward to further exciting and inspiring encounters in the region!

Michael Stauffacher, responsible lecturer at ETH Zurich

Annex

A special thank you from the ETH student groups to the members of the advisory group (Table 2), who provided us with valuable insights and feedback before, during and after the project.

Table 2
Members of the local advisory group for the tdCS 2022.

Name	Origin / Function
Rita Kuster	Schüpfheim/Entlebuch, Head of Entlebucherhaus (Cultural Centre / Regional Museum) and member of the Cultural Fund Commission Lucerne West
Josef Küng	Schüpfheim, Editor Entlebucher Anzeiger, Schüpfheim
Christine Bouvard	Schüpfheim, acting mayor, president of the music schools
Claudia Hoch-Rieger	Entlebuch, former out-of-towner who is heavily involved, e.g., Brattig Commission, Friends of the Biosphere Association
Petra Hofstetter	Entlebuch, Pflugschaft Heiligkreuz, Entlebucher Operette, former chairperson UBE
Ruedi Tschachtli	Rector Agricultural School BBZN
André Liner	Consultant for organic farming at BBZN
Inger Muggli-Stokholm	Rector Kanti Schüpfheim
Philipp Muf	Head of Youth Work Schüpfheim
Linus Arnet	Jungwächtler, young musician and music teacher, Entlebuch
Eveline Stadelmann-Krummenacher	Yodeler, Escholzmatt
Hans Dieter Hess	Head of the Agriculture and Forestry Service, Canton of Lucerne
David Schnider	Owner of Heubödi, farmer, board member of Sörenberg-Flühli Tourism
Silvia Limacher	Druggist, Chrütlimacherin, excursion leader, local councillor, Flühli
Ruth Koller Unternährer	Member of the Culture Promotion Fund Commission, Lucerne West Region
Urs Felder	Schüpfheim, Regional Forester for the Canton of Lucerne
Stefan Bucher	Director of the wood forum Entlebuchy

TdLab's transdisciplinary Case Study 2022

The UNESCO Biosphere Entlebuch (UBE) is a region in the Swiss Canton of Lucerne. In 2001, the Biosphere Entlebuch was officially recognized by UNESCO for its valuable pre-alpine peatland and karst landscape. In addition to its unique landscape, the UBE is the first biosphere to be realized through a bottom-up process.

UBE's mission includes protecting biodiversity, supporting the local economy, promoting tourism and regional development, as well as promoting culture. The management of UBE and the Transdisciplinarity Lab (TdLab) at ETH Zurich jointly decided on the overall theme of the 2022 transdisciplinary Case Study (tdCS) course, a course that begins with a real-world problem and tries to give meaningful outcomes to the local community. The theme "Culture and environment" was defined, to clearly include culture in the course's purpose. Under this theme, between February and June 2022, students from ETH Zurich planned and carried out research projects, with the aim of investigating aspects related to the relationship between humans and nature. Four projects were carried out with the following focus: (i) perceived valuable landscapes in the region, (ii) grassland farmers' understanding of soil, (iii) reasons to convert or not to convert to organic farming and (iv) young people's future visions for UBE.

Before, during and after the course, an advisory group from Entlebuch has been involved in developing the research themes, evaluating the research process and taking advantage of the findings. Throughout, collaboration between the social sciences, natural sciences and the arts has taken place, with the aim of deepening and nuancing the understanding of the links between culture and the environment. Concretely, a student group from the ZHdK has worked with parallel projects under the complementary theme of "Modelling Gaia". Interaction between the two student groups was encouraged and led to interesting and valuable exchanges.

The different approaches and problems addressed in the different projects show the potential of the transdisciplinary approach, where different research fields and real-world actors come together in problem-solving. The studies demonstrate the diversity of links between cultures and the environment in the UBE and lay the foundations for future research, collaboration, and ideas for the development and protection of the region in the future.

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