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PERCEPTIONS OF LAND ABANDONMENT IN THE SWISS ALPS AND THE ROLE OF REGIONAL NATURAL PARKS IN REVITALIZING THEM

Mónica Revuelta Albero & Alice Viala

Master of Science in Agroecology

Abstract: Agricultural and natural ecosystems are major shapers and products of a landscape; over time, the perception of interactions between the two has evolved significantly. In recent years, there has been a growing recognition of agriculture's dual role in sustaining both human livelihoods and natural habitats, signaling its potential significance in nature conservation efforts. Moreover, the phenomenon of land abandonment has emerged as a pivotal trend influencing landscapes, particularly in mountainous regions. By exploring local actors' perceptions of land abandonment within the Trient Valley, a mountainous are in the Swiss Alps currently in the process of becoming a Swiss Regional Natural Park, this study establish a groundwork for understanding the role that Regional Natural Parks can assume in supporting tl agricultural sector to reverse or prevent land abandonment (LA). A reflexive photography approac combining a photo taking activity, interviews and group discussions, in two distinct segments of study was applied. One part focused on understanding local farmers' perception of LA through their activities and how Regional Natural Parks can support them. The other part focused on how the potential Regional Natural Parks in the Trient valley can engage non-farmers in the mitigation of LA, by studying their perception of this phenomenon, of its possible mitigation and of their potential role in the latter. It underscored the necessity for collaborative efforts among stakeholders, drawing on local engagement, ecological considerations, and cultural preservation as guiding principles. This study found that Regional Nature Parks can counter land abandonment by fostering understanding, supporting various revitalization strategies and revitalizing the importance of agriculture and cultural heritage among locals and visitors, thus aligning themselves with their overarching objectives of conservation, biodiversity enhancement and sustainable development.

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Abbreviations

FOEN   Federal Office for the Environment

LA   Land abandonment

LR   LR

PCI   Problems centered interviews

PVT   Parc de la Vallée du Trient

RNP   Regional Natural Park

RPA   Reflexive Photography Approach

IUCN   International Union for Conservation of Nature

QCA   Qualitative Content Analysis

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1. Introduction

The global food system, from the production to the consumption of food, is currently facing environmental, social, and economic challenges (FAO et al., 2022; Gladek et al., 2017). Many studies outline the need for a transition within the global system to be able to sustainably support the world population in the long term (Gladek et al., 2017). The relationship between agriculture and nature is a crucial aspect of the current food crisis (Perfecto & Vandermeer, 2010). Agriculture is one of the main human activities involved in the high levels of extinction rates, linking the biodiversity crisis to the food one (ibid). At the same time, humans rely on nature to produce food, energy, and fiber. This study contributes to the field of Agroecology by exploring ways in which the harmonization of nature and agricultural activities can take place through the focus of the phenomenon of land abandonment (LA) in mountainous regions and their revitalization with the help of a Regional Natural Park (RNP).

Agroecology is a growing social movement and an integrative discipline of research which studies and redesigns food systems towards sustainability in the ecological, economic, and social domains (Dalgaard et al., 2003). It encourages the study of sites or integrated regions of agricultural production from a holistic perspective. The ecosystems of interest are seen at their multiple levels of organization, where hidden properties, resulting from the interactions of the specific components of the ecosystem, emerge as one zooms out (Gliessman, 2014). The system is seen as a whole, a form of single organism which functions thanks to its components (see Figure 1). Agroecology is thus a way of tackling challenging, chaotic and wicked problems which lack clear solutions and involve multiple stakeholders (Head & Alford, 2015). The use of an agroecological lens seems relevant to study LA, as this phenomenon is the result of a myriad of complicated economic, social and environmental factors and involves multiple actors each with their own point of view and interests (MacDonald et al., 2000).
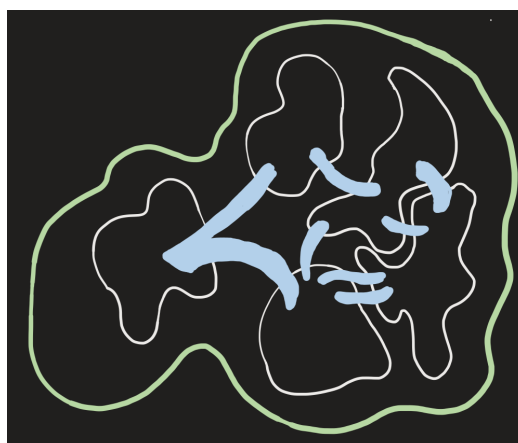
Figure 1 The food system (green) with its components (white) and interactions (blue) (Own figure)

In a 2018 report for the European Commission, Perpiña Castillo et al. referred to LA as "still a topical issue" (p.1) expected to impact 11 percent of the European Union agricultural land (20 million hectares) between 2015-2030. One quarter of the predicted LA is expected to take place in

mountainous areas, as mountain ranges across Europe have what is considered undesirable climate and terrain environment for agriculture (Perpiña Castillo et al., 2018). It is thus relevant to study LA in mountainous regions as the latter are directly impacted. Some aspects of this phenomenon are already well studied, such as its drivers and consequences (Perpiña Castillo et al., 2018; Fayet et al., 2022). The opportunities abandoned lands represent for nature conservation through afforestation have been outlined in the literature (Fayet et al., 2022); although land restoration efforts only concern a minor part of the abandoned lands (Perpiña Castillo et al., 2018). The majority of abandoned lands are expected to remain unused, in the absence of any cultivation on them in the upcoming years (Perpiña Castillo et al., 2018). A gap in knowledge has been identified regarding ways to mitigate abandoned farmlands through agriculture, while conserving nature.

Regarding nature conservation, to bring international consistency in the classification of the various protected areas in the world, the IUCN published guidelines in 1994, which are recognized by many international conventions (Lausche, 2011; Stolton et al., 2013). It distinguishes six categories of protected areas according to their main objective in terms of conservation, which cover a broad spectrum of human and nature interactions: from the conservation of nature without or with strictly limited human interactions (category Ia), to areas which focus on conserving nature through human interactions (category V and VI). Within the latter, some human activities are promoted as part of nature conservation; and agriculture is one of them. RNPs are usually classified under category V in Europe and Switzerland (Wiesli et al., 2022) ; and represent interesting areas of study for agroecologists to explore ways in which nature can be conserved while supporting sustainable livelihoods through agriculture.

2. Rationale of the study

2.1 Literature review

2.1.1 Agriculture at the interface of human and nature

Nature and productive land use, including agricultural ecosystems, exist in a larger spatial and ecological context which forms the landscape (Gliessman, 2014). A landscape is not merely a physical space but the product of a physical environment, including people's perceptions, and experiences of that environment (FOEN, 2020). It can be defined in broad conceptual terms "as an area delineated by an actor for a specific set of objectives. It constitutes an arena in which entities, including humans, interact according to rules (physical, biological, and social) that determine their relationships" (Sayer et al., 2013, p.2).

Agricultural and natural ecosystems are major shapers and products of a landscape. The two ecosystems differ in terms of their structural and functional characteristics, as well as on their reliance

on humans (Gliessman, 2014). *Agricultural* ecosystems are intrinsic to humans. They rely on the culture of humans to exist. The word agriculture literally means "the culture of the fields" in Latin. *Culture* can be defined as "that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by [wo]man as a member of society" or, more poetically, "a blanket of comfort that gives meaning to lives" (Tylor, 1871; Davis, 2009).

Cronon (1995) defines *nature* as a reflection of a person's beliefs and desires. What can be defined as natural or unnatural depends on the eyes of the observer. In the Minority World, *nature* is often defined as extrinsic to humans, opposed to civilization (Vining et al., 2008). The sense of profound disconnection between humans and nature grew after the Enlightenment, the industrialization and urbanization (Vining et al., 2008). The Enlightenment enforced the feeling of domination of humans over nature through the increasing importance given to science and its empirical approach to nature. It enhanced humans' abilities to control and modify nature. Industrialization and urbanization further alienated humans from nature, moving them away from the land-based economy (Franklin, 1999; Cronon, 1995; cited in Vining et al., 2008). Paradoxically, the conquest of nature, combined with its alienation, gave rise to the vision of nature as sacred. Regulations were put in place to protect what was considered pristine land from human influence (Vining et al., 2008). Agricultural landscapes could therefore not be part of the protected pristine areas.

Pristine lands were selected by their ecosystems' uniqueness or the rareness of the species in them. The idea and designation of protected areas came in the early industrial revolution with the establishment of the Yellowstone National Park in Wyoming, in 1872. It began the movement of institutionalizing nature conservation giving rise to Nature Reserves and National Parks all over the world (McNeely & Pitt, 1985). Over the last century, conserving nature through regulations which protect delimited zones has been the common strategy (Wezel & Jauneau, 2011). Although it was a first essential move to raise awareness about the importance of natural ecosystems and the need to conserve them, it created serious conflicts with local populations, as indigenous people were not considered part of the protected ecosystem. Worse, protected area designations have been used in some cases as an excuse to displace indigenous people from their traditional territories or restrain their traditional activities (Colchester, 2003).

In 1980, the IUCN published the *World Conservation Strategy* in which conservation efforts target more than pristine ecosystems. In this document, *conservation* is defined as "the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations" (p.18). Furthermore, in the *Millenium Ecosystem Assessment* of 2005 initiated by the United Nations, which assessed the impact of humans on the environment, the focus expanded to the general ecosystem functions of the protected area with a larger landscape vision. Since agricultural landscapes are the most important form of human land use worldwide, they were finally considered an important element of an

ecosystem, delivering a service for humans inside a protected region (Reid et al., 2005). This change brought to light the debate on the cohabitation of nature conservation and agricultural activities. At their extremes, that is, when agriculture is conceived as having the sole purpose of producing a maximum amount of food for humans, and nature as a place where wild nature thrives in the complete absence of humans, the two ecosystems are incompatible. Both cannot cohabit in the same environment. The spread of industrial agriculture around the world, heavily relying on external inputs, is indeed a major driver of the biodiversity crisis which threatens nature conservation (Baudron et al., 2021). Nevertheless, there are also natural ecosystems which rely on agricultural ones, including endemic species of pastures.

The definition of nature as something extrinsic to humans is further questioned by Crutzen's (2006) idea that we have entered the Anthropocene. The Anthropocene is a new geological epoch where human activities have become significant geological forces (i.e., land use changes, deforestation and fossil fuel burning) which influence the wildest form of nature (Crutzen, 2006). If we stick to the definition of nature as anything untouched by humans, wild nature on this planet no longer exists, as humans have grown to the point where every ecosystem is influenced by them. Every ecosystem is influenced by humans, although at a different intensity and by either direct or indirect influences. For example, humans have both a direct influence on the agricultural ecosystem through their farming activities as well as an indirect one on the surrounding ecosystems. Moreover, it is important to note that agriculture is not only intrinsic to humans, but also to nature, sitting at the interface of both, humans and nature. Agricultural ecosystems vary in their type of reliance on human interference. According to Gliessman (2012), an ecosystem continuum exists, where the more an agricultural ecosystem achieves natural ecosystem-like characteristics while maintaining a harvest output, the more sustainable the
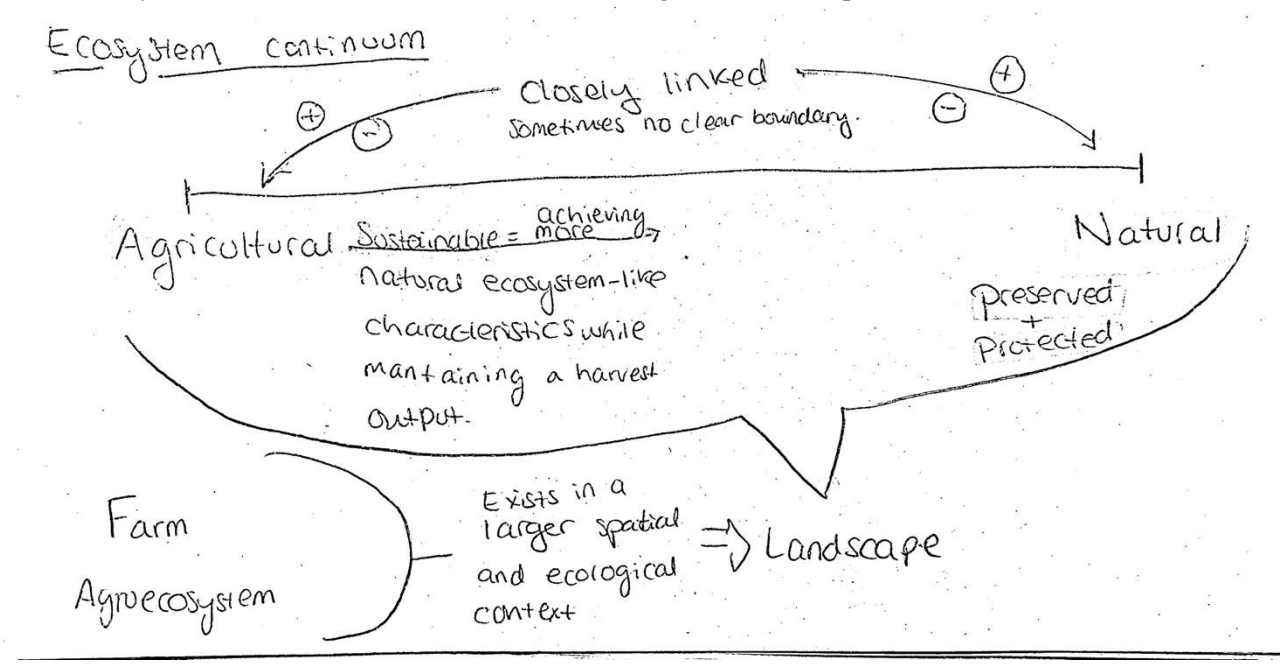
Figure 2. The farm ecosystem continuum (adapted from Gliessman, 2012).

system is likely to be (Figure 2). That is, the more an agricultural system resembles a natural ecosystem, the more sustainable it becomes. The system will require less human input and interference and will better sustain itself to meet "the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 8).

Land sparing and land sharing are two strategies for the cohabitation of land management for biodiversity conservation and commodity production. The two are not mutually exclusive but have often been presented in polarized debates (Fischer et al. 2014). *Land-sparing* is a segregation concept which sees land management for conservation as separate from farmland, while both are intensified. The land required for farming is supposed to decrease due to the higher yields, resulting in the protection of other natural habitats from agricultural expansion (Phalan et al., 2011). *Land-sharing* is an integration concept which "involves integrating biodiversity conservation and food production on the same land, using wildlife-friendly farming methods" which boosts densities of wild populations on farmland and decreases yields (Phalan et al., 2011 p.1). This land management strategy proposes to use the minimum of external inputs and incorporates patches of natural habitat within farmlands, increasing the total size of the farmland (Krebs et al., 1999; Green et al., 2005).

Debates on how to harmonize agricultural activities with biodiversity conservation are not completely new, as they can already be seen in the discourse of ecologists thirty years ago. Pimentel et al. (1992) study, for example, argues that human-managed ecosystems are biodiversity hotspots. More particularly, the authors argue that agricultural systems determine the effectiveness of protected areas by providing the landscape context. Another example is the larger case of ecologists in the 1990s who address the issue of a rising global food demand and the wish or rather need to produce it at a minimal cost to biodiversity. Some of these scientists include Kendall & Pimentel (1994) again and Goklany (1998) who noted a comparable benefits of land-sparing over land-sharing by intensifying agricultural land use rather than expanding its land cover. Currently, scientific papers advocating for land-sparing also seem to be more prominent in the published literature or at least some authors have prematurely concluded that the debate has been resolved in favor of land sparing (Kremen, 2015). Although land-sharing advocates are less present in academia, they still exist and keep on questioning the land-sparing strategy.

Moreover, the idea of conserving nature through agriculture is in line with the IUCN definition of *protected areas*: "A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values" (Lausche, 2011 p.8). When looking at the meaning of some terms present in the latter definition as explored by Stolton et al. (2013), agriculture can be in line with protected areas as follows. The term *conservation* implies the maintenance of ecosystems, including the ones where domesticated and cultivated species thrive. Furthermore, agriculture is also part of the term *ecosystem services,* as it provides food for people. Lastly, traditional agriculture, that

slowly evolved with people through time in tune with the surrounding environment, is conformed with the term cultural values (Butler Flora, 2014). This form of agriculture allowed the conservation of a specific biodiversity, named agrobiodiversity by creating specific habitats over time for the surrounding fauna and flora (Altieri & Koohafkan, 2008). Traditional agriculture is closely linked to culture, as it includes not only the production of food and fibers, but also the ritual and ceremonies around it, shaping cultural values. In short, agriculture, and more specifically traditional agriculture can be an important element of conservation within some protected areas.

2.1.2 Land abandonment and revitalization potentials

Land abandonment is a major land-cover change phenomenon that is present worldwide (Munroe et al., 2013). The definitions of LA are multiple and vary according to the chosen focus (e.g., social or agronomic) (Pointereau et al., 2008). Nevertheless, LA can be defined as a phenomenon that occurs when, intentionally or unintentionally, humans stop all activities on agricultural land in a given area (Levers et al., 2018). Without human intervention, over time, abandoned lands lead to semi-natural landscapes with spontaneous vegetation successions (Fayet et al., 2022). The causes of LA are diverse and complex, a mix of context specific, socio-economic, agricultural and environmental factors (MacDonald et al., 2000). This dynamic process of LA can have both negative and positive effects on the cultural heritage and on the services that wildlife or ecosystems provide to people (ecosystem services) of the affected area (Levers et al., 2018); depending on the area itself and the lens through which it is observed (Fayet et al., 2023).

LA has been a predominant trend, shaping rural landscapes in Europe since the 1950s, impacting areas to different degrees (Flury et al., 2013; Lasanta, 2017). Some regions are typically more prone to be affected than others, with mountainous areas being a great example (MacDonald et al., 2000; Perpiña Castillo et al., 2018). Mountainous areas have been defined with different geomorphometric parameters and thresholds (Körner et al., 2021). One of the most common methodologies is the one developed by Kapos et al., (2000), which focuses on specific topographic criteria (Kholer & von Siebenthal, 2019).

Agriculture in mountainous areas of Europe has been declining drastically since the last century (Soliva et al. 2008; Flury et al., 2013). In general, this decline has been driven by globalization, where mountain agriculture is not able to compete with lower land productivity (Soliva et al., 2010; Flury et al., 2013). LA is, therefore, more flagrant in mountainous regions, where it often has undesirable repercussions, being associated with a loss in ecosystem services and cultural heritage (Soliva et al., 2008; Soliva et al., 2010; Queiroz et al., 2014; Levers et al., 2018). In those landscapes, agriculture has been a key element of identity for mountain communities, shaping the management of their cultural landscape, particularly through pastures (Soliva et al., 2008; Mack et al., 2013). The decrease in agricultural activities results in a drastic landscape change, as closed forests take over

abandoned fields such as pastures (Soliva et al., 2010). It also threatens traditional ways of living of mountainous communities. Finally, the disappearance of a mountainous low input traditional farming menaces the agrobiodiversity that co-evolved with such activities (Mack et al., 2013; Queiroz et al., 2014).

Different possible future trajectories exist for the abandoned lands: (1) returning to agricultural use, (2) re-vegetation, and (3) urban transformation (Varotto & Lodatti, 2014; Fayet et al., 2022). Trajectories (1) and (3) always require the active involvement of humans to reach the desired landscape outcome. Trajectory (2), can also involve humans, but can likewise be achieved through a passive process, letting the fauna and the flora take over the landscape without human intervention. The perception of LA, negative or positive, varies according to the societal group and region facing such a phenomenon as well as of the trajectories of future landscape (Ruskule et al., 2013, van der Zanden et al., 2018).

Currently there is no defined temporal criteria to define abandoned lands (Pawlewicz & Pawlewicz, 2023). It is not clear when a land stops to be considered abandoned and when it can be considered, for example, forest, if afforestation has taken place (Fayet et al., 2022; Pawlewicz & Pawlewicz, 2023). This dilemma, coupled with the general discourse of nature conservation previously mentioned, has led to disagreement about the desired future of abandoned land and potential management: when, if ever, is abandoned land stop being considered abandoned and starts being considered natural land? The trajectories for abandoned land should be context specific, and if the default one (i.e., spontaneous vegetation succession) is not expected to bring desirable outcomes, the institutional and socio-economic environment needs to favor the desirable changes (Fayet et al., 2022).

2.1.3 Importance of sense of place and perceptions

People's experience in natural environments can determine the way they interact and act towards it. Schroeder (2002) brings forward the idea that people's feelings towards nature affect their concerns over land management in their region. For 15 years, he carried out open-ended, qualitative surveys. In these surveys people are asked about their special places and what they mean to them. Dwyer, Schroeder and Gobster note "the very personal ties that members of the public have towards forests, and the deep psychological, social and cultural roots of this attachment" (Vining & Tyler, 1999, p.22). Schroeder introduces the concept of *special places* as a setting or a place which takes a particular importance for someone due to an emotional or highly valued aesthetic experience. The emotional aspects in it brings the conservation topic to a higher dimension: the person develops an attachment to their special place, increasing their will to protect it. As emotions are involved, the issue becomes personal. If their special place is threatened or disturbed, they may experience strong emotions such as grief or anger. For research purposes this represents a real challenge as people's emotions are often "difficult to define, categorize and explain in precise, logical terms but it is still important to recognize their significance

and to consider how they might be affected by resource management and development policies" and vice-versa (Schroeder, 2002, p.9).

Understanding locals' perceptions towards nature and LA can help institutions concerned with conservation better target and tune out their actions and approaches to the local context, thereby increasing their effectiveness. The areas that are particularly valued by locals for aesthetic, practical or emotional reasons in a particular natural environment may be better understood and protected. This dimension is also one which is lacking in the debate on land-sparing and land-sharing and might be an important aspect tilting the playing field in favor of the land-sparing strategy.

2.2 Context of the study

2.2.1 Swiss Regional Nature Park

In Switzerland, three categories of parks exist: National Parks, Regional Nature Parks and Natural Peri-Urban Parks (Ordonnance sur les parcs d'importance nationale, 2007). This thesis focuses on Regional Nature Parks (RNP), which are implemented in rural areas with high natural and landscape or scenic value. RNPs were introduced in 2007 in the Swiss Federal legislation and fall under the category V of Protected Landscape IUCN (Ordonnance sur les parcs d'importance nationale, 2007; Wiesli et al., 2022). RNPs emerged due to the shift in the perception of protected areas happening in Europe in the 1990's, mentioned in section 1.1, a shift from protecting small-scale areas, to protecting entire landscapes, while balancing human and nature. Contrary to National Parks and Nature Reserves which align with the land-sparing concept, RNPs are rather aligned with the land-sharing concept.

The main objectives of RNPs are as follows: conservation and enhancement of biodiversity and landscape; strengthening sustainable economic development; environmental awareness and education; and management, communication, and territorial guarantee (Ordonnance sur les parcs d'importance nationale, 2007). RNPs management approach is a mixture of a bottom-up - communes apply for the label and come up with projects that fit within the overall objectives of RNPs - and a top-down approaches - the Federal Office for the Environment (FOEN) validates or not the accreditation on behalf of the Confederation (Ordonnance sur les parcs d'importance nationale, 2007; Gerber, 2018). For a territory to obtain the label of *Park of national importance RNP,* first, a feasibility study must be conducted to ensure that the region meets specific requirements, the main ones being the acceptance of the project by locals and possessing a high natural and landscape value. If successful, four years are allocated for the development of the project, including its management scheme and fundings. Once the management plan and funding request are accepted by the Confederation, the park obtains a temporary label *RNP candidate*, that allows the project to receive financial aid from the confederation and the canton to pursue its development. Towards the end of this development phase, the proposal to establish the park is voted by the inhabitants of the candidate park's territory. If the vote is positive, the FOEN

issues the label Park of national importance RNP to the territory, after ensuring that the charter meets all requirements. The management phase can then begin. The status of RNP is provisional, as every decade the work accomplished is evaluated by the FOEN, and the population can be asked to vote again. Local actors are thus key to shape the project according to the landscape feasibility and their interests.

2.2.2 Case study: Le Parc Régional Naturel candidat de la Vallée du Trient, de l'Arpille à la cime de l'Est

The candidature of the Trient Valley, in Switzerland, to become a RNP offers a perfect terrain to study the identified gap in knowledge, that is, the mitigation of abandoned farmlands through agriculture, while ensuring the conservation of nature. LA has been very present in the Alps regions, coupled with a decrease of 85% of the share of the population working in agriculture from the beginning of the 20th century to the 1970s (Flurry et al., 2013). Many studies have outlined the issues associated with LA in the Swiss Alps (Soliva et al., 2010; Mack et al., 2013; Queiroz et al., 2014; Levers et al., 2018). Furthermore, some of the park's projects revolve around LA which is predominant within the region (Barras et al., 2021). The Valley of Trient Regional Nature Park, from the Arpille to the Cime de l'Est, is located in the southwestern Swiss Alps, in the Wallis canton as shown on Figure 3. To make reading easier, through this document we will refer to the park under study as PVT (Parc de la Vallée du Trient).
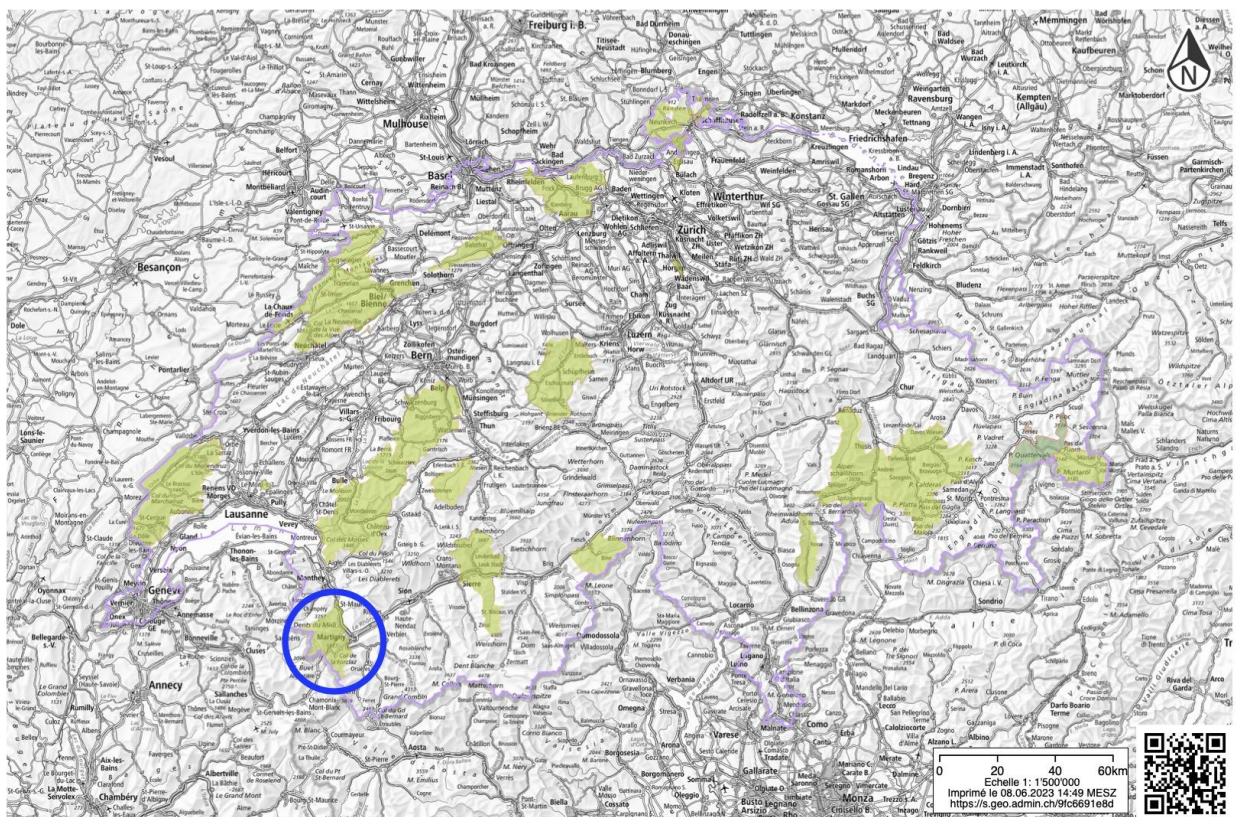
Figure 3. Map outlying the different RNPs in Switzerland (in green), circled in blue is the PVT.
(Office fédéral de topographie swisstopo, n.d.a)

The PVT covers seven communes as outlined in Figure 4 (Saint-Maurice, Evionnaz, Vernayaz, Martigny-Combe, Salvan, Finhaut, Trient), extending over an area of 222km2 and comprising about 12 000 inhabitants in 2021 (Barras et al., 2021; Pillonel, 2022; Parc Naturel Régional de la Vallée du Trient, 2023a). All the communes are considered mountainous communes by the Swiss Federal Office, as more than 50% of their surface is classified as mountain zone (i.e., above 800m of altitude) (Kohler & von Siebenthal, 2019).
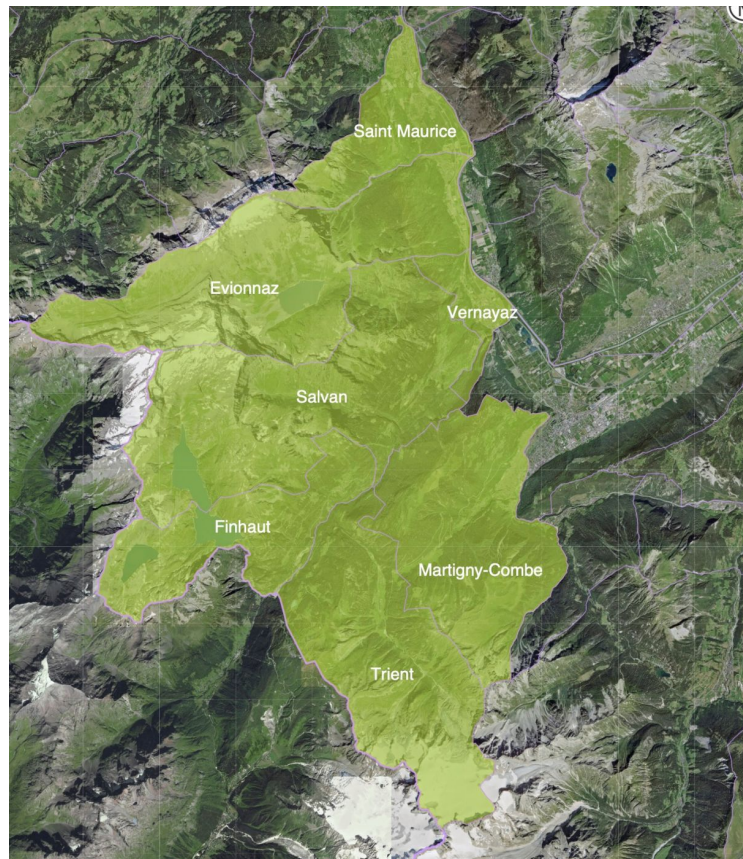
Figure 4. Map of the communes falling under the PVT. (Office fédéral de topographie swisstopo, n.d.b)

The PVT is still in the candidature phase of obtaining the RNP label. The referendum for its status will take place in 2024 (Parc Naturel Régional de la Vallée du Trient, 2023a). The main goal of this park is to promote the economic and social development of the communes (Parc Naturel Régional de la Vallée du Trient, 2023a). For that purpose, four axes have been developed as shown on Table 1 below:

Table 1. The four axes of the PVT (Parc Naturel Régional de la Vallée du Trient, 2023a)

Axis 1	Biodiversity and landscape	preserve, promote, and enhance biodiversity and landscape quality
Axis 2	Sustainable economy	create a living space and a sustainable economic ecosystem
Axis 3	Awareness and education	develop offers and knowledge on the natural and cultural values of the territory
Axis 4	Governance and communication	federate the actors, promote the territory, and ensure a quality management

The perimeter of the Trient Valley and the PVT's perimeter are not the same. Geographically speaking, the Trient valley is a transnational valley, with one third of its territory in France and two thirds in Switzerland (Barras et al.,, 2021). For administrative reasons, the PVT's territory excludes the French part of the valley and goes beyond the Trient Valley on the Swiss side (Finhaut, Salvan, Vernayaz and Trient), encompassing the communes of Saint-Maurice, Evionnaz and Martigny-Combe as well.

2.2.3 Agricultural context of the case study region

In the 1800s, the population of the Trient Valley lived off agriculture, almost in autarky (Perriard-Volorio, 1996). The inhabitants were self-sufficient regarding food and fiber production, and farmlands were equally divided between male and female heirs, which notably led to extensive fragmentation (Glatthard, 2014). They mainly had pastoral agricultural activities on the land, coupled with the cultivation of rye, oats, wheat, potatoes and hemp, in addition to various vegetables, and apple and cherry trees. The agricultural sector evolved greatly over the two last centuries, notably due to the diversification of job opportunities and increased productivity in lowlands due to mechanization (Perriard-Volorio, 1996; Fournier Nendez, 2003). The valley has attracted travelers since the XVIIIᵉ due to its strategic location, linking the Swiss Wallis canton to Chamonix in France. The construction of the railroad in the beginning of the XXᵉ, connecting the valley to the plain of Martigny and Chamonix, increased drastically the flow of Swiss and foreign travelers passing through the region (Perriard-Volorio, 1996; Sauthier, 2016). It resulted in the growth of the tourism sector, which brought a diversification in job opportunities for the inhabitants of the territory, such as in the hotel or banking sector. The two World Wars put an end to the tourism era of the Trient Valley. This decline greatly impacted the employment opportunities in the valley, and the inhabitants sought jobs in the lowlands.

Furthermore, the construction of various hydroelectric dams between 1925 and 1975 drove people away from agriculture (Guex, 2014; Rodriguez & Hirtz, 2014).

Nowadays, only ten percent of the park's territory is dedicated to agriculture, with 42 farms and 14 alpine pastures (Barras et al., 2021). The two predominant productions are pastures and vineyards. Four percent of the population works in agriculture, silviculture and/or hunting. The territory has been facing an abandonment of the agricultural lands since the XXe century, coupled with an increase in urbanization. Alpine pastures are particularly threatened by this phenomenon of LA with the overgrowth of the surrounding vegetation. In the past, this expansion of the forest was managed through consortia, a collective administration that regulated the use of various common goods, such as pastures, while focusing on their long-term conservation and optimal exploitation (Antonietti, 2022; Parc Naturel de la Vallée du Trient, 2023b). The decline of traditional agriculture coupled with the population getting engaged in the secondary sector - construction - and tertiary - tourism - led to a decrease in consortia management: people had less time to dedicate to community work. Nowadays, the farmers present on the PVT territory are mostly bearing on their own the responsibility of preserving agricultural land from vegetation overgrowth, which they find difficult (Parc Naturel de la Vallée du Trient, 2023b). This overload of work is part of the reasons why LA can be observed in many areas within the territory. As previously mentioned, some of the PVT's projects are thus focusing on LA, especially project 1.2., entitled "patrimoine paysager" (landscape heritage) and its first sub-project 1.2., "alpage et clairière" (alpine pasture and glades). The latter aims at fighting the closure of agricultural landscape and glades due to vegetation overgrowth by relying in part on voluntary work.

2.3 Research questions

As previously shown, the mitigation of abandoned farmland through agriculture while conserving nature is a topical issue. LA is a prevailing trend in Europe, linked with both cultural heritage and biodiversity changes. The mitigation of those abandoned lands is focusing on the afforestation trajectory for nature conservation, letting aside agriculture. However, agriculture should be considered when dealing with nature conservation as the two are intimately close. In order to fill that knowledge gap, the following research question will be explored: How can a RNP promote the agricultural sector to reverse or prevent LA? With the case study of the PVT.

This study is divided into two parts, as follows.

2.3.1 Perception of local non-farmers towards LA and its revitalization

As mentioned in section 2.2, some projects of the PVT rely on locals' volunteerism to help the farmers mitigate LA, as the latter cannot accomplish this task alone. It is thus relevant to investigate how non-farmers perceive this phenomenon, as well as its possible mitigation and their potential role in the latter.

In this part of the study, the researcher aims at answering the following sub-research questions: How do local non-farmers understand LA and LR? What solutions do they consider to revitalize the abandoned lands? Which roles do they see themselves having within the revalorization process?

This part of the study is led by Alice Viala and will be referred to in the text as the non-farmers' study.

2.3.2 Perception of local farmers toward LA and its revitalization

This part focuses on understanding local farmers' perception of nature through their activities and how abandoned agricultural land affects them. As previously argued, locals' perception of their place in nature, and their understanding of what is natural or not, may help to better target conservation actions through agricultural activities. In this part of this study, the researcher is guided by the following sub-research questions:

How do local farmers perceive LA? How do they manage agricultural and natural systems through their activities? What is motivating them to do so? Do they feel the PVT could support them and how? This part of the study is led by Mónica Revuelta Albero and will be referred to in the text as the farmers' study.

3. Materials and Methods

In agroecology, the food system is first understood through experience by going out on the field. In this case, the researchers settled in the research site and spent the six months of master thesis work there. They explored abandoned trails and ruins of farms with locals, went on walks with the neighboring farmers and their goats, and spent time in community events to support local activities. Then, theory is engaged to interpret and help connect threads. The experiences from civic encounters in the field are expanded in pursuit of becoming effective agents of change within the agri-food system (Lieblein et al., 2012). The influences of the economic and political power structures of the current industrial food system on site are pointed out as well as alternative social structures and policy action (Gliessman, 2018).

The agroecologist researchers had two main aims. First, to grasp the perceptions of locals from La Vallée du Trient concerning land abandonment and its revitalization. Second, to understand how a Regional Nature Park can contribute to maintaining the agricultural sector of the valley alive. For these purposes, and as agroecologists with a will of conducting participatory action research, a reflexive photography approach was applied with both studied pools: local non-farmers and farmers. The researchers integrated ecological science into the academic disciplines of sociology, history and some agronomy and law, as well as into local knowledge systems to guide actions towards a sustainable transformation of our current agrifood system (Méndez et al., 2017). Here, ecological science is meant as ecological thinking where a holistic, systems-level understanding of food system sustainability is

required, an understanding of the elements in the system and the interactions among them (Gliessman, 2018).

The extended reflexive photography approach (RPA) applied in this study is built upon Dr. Stotten's PhD work. She worked with farmers from Central Switzerland to explore their landscape perception through an extended reflexive photography approach (Stotten, 2015b; 2018). Reflexive photography is a photovoice methodology in the field of qualitative research. It involves making the participants reflect on a subject through the activity of taking pictures (Wang, 1997). In more details, reflexive photography is an explorative participatory research tool first developed by the sociologist Harper (2012) and adapted by Dirksmeier (2012; 2015). It is used for scientific research to visualize spatial experience. Concretely, participants are asked to take pictures of their daily lives with a particular focus in mind and then reflect upon it through an interview. In this joint master thesis work, participants focused on land abandonment and how to mitigate it. Stotten (2018) extended the approach of reflexive photography by adding a group discussion with all participants at the end to reveal collective habitus among them and dive deeper into the subject of study. Even though this particular methodology has not been previously used in the field of agroecology, it was chosen for the following reasons.

Reflexive photography is a participatory action research methodology. In recent years, an increasing number of studies have outlined the importance of engaging stakeholders in a participatory manner to better design long-term strategies, an overriding objective in the domain of agroecology (Holifield & Williams, 2019; Knauss & Lisuk, 2022). Furthermore, apart from theoretical contributions of various fields, agroecology is strengthened by the integration of local knowledge systems which are where ecological, social and economic concepts and principles are applied (Ruiz-Rosado, 2006). It values all forms of knowledge and experience in the food system change towards more sustainable agroecosystems and natural resources base. This is why it is said that agroecology is a transdiscipline. RPA allowed the researchers to invite people from different backgrounds and disciplines to join and shape the study: an economist, a full time farmer, a teacher, a history student, a part-time farmer etc.

In general, pictures represent a great tool to bring out narratives from the participants when interviewed individually as well as from the group discussions with as little intervention from the researchers as possible. RPA enhances deeper reflections on the subject of interest among participants prior to the interview and allows them to better drive the discussion (Pauwels, 2015). RPA comprises a group discussion among participants to close the study. Here, participants share perspectives on the subject and discuss among them the reasons which are turning agricultural lands into abandoned ones and on ideas of actions to mitigate the LA phenomenon. This step of RPA is a key component of the study in the domain of agroecology as it aligns with its principle of action-oriented research.

The narratives from the interviews allows the researchers to understand the different perceptions of the local farmers and non-farmers on LA and its LR. As found by Kenfack Essougong et al. (2020), who studied farmers' perceptions on soil fertility management practices in Cocoa

Agroforestry Systems in Cameroon, it is important to understand locals' perceptions as they are drivers of agricultural practices. RPA allows the researchers to understand why certain agricultural practices are abandoned or modified in the valley.

The aforementioned characteristics of RPA and agroecology defend the researchers' choice for finding RPA appropriate for this study. Below in the following subsections, methods used to collect the data and analyze it are respectively presented for the four chronological sections of the study: the sampling strategies (3.2.1), the picture-taking activity (3.2.2); the problem centered interviews (3.2.3); and the group discussions workshops (3.2.4).

3.1 Sampling

A combination of maximum variation sampling and convenient sampling was used to gather both pools of participants. Convenient sampling is a commonly used strategy in photovoice projects since it has the advantage of being accessible, affordable and not time consuming for the researchers (Hergenrather et al., 2009; Etikan et al., 2016). This method of sampling though presents some biases, the main one being the representation of participants. To reduce this bias, convenient sampling was coupled with maximum variation sampling, which is constructed on having a maximum of contrast within pre-set key dimensions of variations (Suri, 2011). This sampling strategy has this advantage of not requiring a high number of participants to draw conclusions: it is not the number of participants that matters, but rather the quality of sampling. In short, potential participants were gathered through convenient sampling, and then final participants were selected through maximum variation sampling.

A total of nine participants were initially gathered for each study, as it allowed the researchers to reflect a broad set of characteristics they wanted to have included in the sampling. Furthermore, it was found to be a sufficient number for the methodology used.

3.1.1 Non-farmers' study

A total of nine locals participated in the data collection, listed table 3 below. Participants were recruited through a poster (see appendix 1) that was put up in various strategic points in the seven communes of the PVT. The poster was also shared virtually through social media on various unofficial Facebook groups from each of the seven communes and on the official Facebook page of the Trient valley and of the PVT. Various persons contacted the researchers to participate; attention was then paid to ensure as much as possible maximum contrast between the participants. The desired sample for the non-farmers' study was defined as having a maximum of contrast in the following characteristics: age; occupations; gender; commune of living; length of time spent living in the valley. The participants from this study were name coded from NF1 to NF9.

As observed table 2 below, the non-farmers were between 26 and 70 years old at the time of the study. Four participants have always been living in the region of study, while others came there more recently, from half a year to 18 years. The participants were coming from three communes of the PVT but they were not living in the same villages within those communes. From the commune of Salvan, two were living in les Marecottes, one in les Granges and one in Salvan ; from the commune of Finhaut, two were living in Finhaut and one in Le Châtelard ; from the commune of Saint-Maurice, one was living in Saint-Maurice and one in Mex. No participants were coming from Evionnaz, Vernayaz, Martigny-Combe or Trient. Their occupations were varied.

Table 2. Non-farmers participants (X= the information was not given)

Code	Year of birth	Age	Commune of living	Years of residency in the valley	Education	Occupation
B1	1997	26	Salvan	Always	Bachelor in energy and environmental engineering	Student
B2	1989	34	Salvan	Always	Landscaper & truck driver	Landscaper & truck driver
B3	1953	70	Salvan	Always	Teacher	Retiree
B4	1998	25	Salvan	Always	Master in history science	Student, campaign manager for a political party
B5	1966	57	Saint-Maurice	8 years	Electrical engineering	Environment, health and safety manager
B6	1984	39	Saint-Maurice	6 months	Master in environment	Bike messenger
B7	1979	44	Finhaut	4 years	Environment, health and safety manager	mortgage financing consultant
B8	1990	33	Finhaut	1 years	Master in education	Primary school teacher
B9	X	X	Finhaut	19 years	X	X

3.1.2 Farmers' study

Nine out of the 43 farmers in the PVT territory were selected for the farmers' study (Barras, 2021). Adrien Favre, the project manager of the axis landscape and biodiversity and the master thesis tutor of this work, wished to be the person in charge of first contacting the farmers to engage them in participating in the study. He contacted them through email and then sent a list of potentially interested farmers. Attention was then paid to ensure as much as possible maximum contrast between the participants. The desired sample for the farmers' study was defined as having a maximum of contrast in the following characteristics: gender; age; size of their farm; type of production; percentage of work dedicated to the farm. The participants from this study were name coded from P1 to P9, see table 3.

Table 3. Farmer participants

Code	Education	Age	Production	Takeover	Percentage	Commune
P1	CFC Mason & military training	64	Sheep, chicken, dunkey and vine	1980	40%	Martigny Combes
P2	Other than agriculture	30	Goat, cow	2019	40%	Trient
P3	Farmer with federal certificate	40	Goat, cow	2013	100%	Finhaut, Giétroz/Fenestral
P4	In agriculture	74	Goat, cow	1973	100%	Martigny/Salvan, Emaney
P5	Farmer with federal certificate	30	Vine	2018	100%	Martigny Combes
P6	Mechanic, ski instructor and educator	67	Cow	1980	x%**	Salvan, les Granges
P7	Teacher	//65	Bees		x%**	Trient
P9	CFC market gardener + arboriculturist	31	Vegetables	2023	Partial	Salvan, Trétien

3.2 Photos

3.2.1 Data collection (description of the process)

Once the participants were selected, they were contacted through phone to explain further the study, answer any questions they might have and schedule a first meeting. During the latter, cameras were delivered, along with three documents. (1) a welcoming letter with the instructions to take the pictures (see appendix 2). In it, the participants were asked to take five pictures of elements that are part of LA and five others of elements that belongs to the revitalization of abandoned lands; (2) a questionnaire to collect some socio-demographic data (see appendix 3 and 4) ; (3) a consent form summarizing the study and ethical concerns (appendix 5). Document (1) and (2) were identical for both the non-farmers' and farmers' study, while one questionnaire was designed for each study. The farmers' study questionnaire had additional farm-oriented information.

Film pictures were chosen over digital pictures for various reasons. First, not all the participants may have a phone with a working camera. Furthermore, with film cameras, the number of pictures the participant could take was limited, which encouraged them to reflect about the given guidelines and about what they wanted to share through their pictures (Simmonds et al., 2015). Lastly, having a physical object that is not usually in their daily life allows the participant to feel more involved in the study. The main drawbacks of using film cameras instead of smartphones was the additional cost and time required, notably around the handling of the camera and developing the films.

The participants were asked to give back the camera with the pictures taken within one week after reception, but most of them, farmers and non-farmers, took around two weeks to finish this step. Furthermore, to reduce the cost of the study and to take advantage of the whole camera rolls which could carry up to 27 pictures, one third of the participants shared cameras. Three cameras were thus given to other participants once the firsts were done taking their pictures. To differentiate which pictures were taken by which participants, the researchers were always taking the code of the participant written on paper as the first picture of the roll. In the case of a shared camera, the two sets of pictures were separated by the second code. Once done with taking pictures, participants were getting in contact with the researchers who came to pick up the camera and send the films for development. The researchers

got the permission from each participant to use the pictures they took in this publication or future works.

Two participants, NF6 and P5, had digital pictures. Since NF6 only had four pictures correctly developed due to technical issues with the camera, the researcher sent him a message with the four developed pictures and suggested he could complement them with other digital pictures for the interview. On the other hand, P5 took all the pictures with her phone and sent them by email before the interview.

3.2.2 Data analysis

The pictures do not represent data that the researchers are analyzing on their own, but rather they serve as the basis for the interviews. Touching upon the theory of social constructivism, the photo represents the essence of reality from the observer's eyes (Stotten, 2018). The photo reflects the photographer's lens on reality, which is influenced by sociocultural aspects, it only represents one perspective on reality. The need to discuss the pictures with the respondents is crucial for its interpretation to prevent any interpretations by the researchers (Wang, 1997; Stotten 2015b).

3.3 Interview

Once the pictures were received, the researchers got in contact with the participants to set an interview date. The methodology of Problem Centered Interview (PCI) was used to carry out the interviews. It is a specific methodology of qualitative research that aims at creating a conversation between the interviewees and the interviewers regarding the subject under study, here land abandonment and its revitalization. PCI focuses as much as possible on the participant's knowledge and point of view on the subject under study, going away from the question-answer patterns of some other interviewing methodologies. Publications from Stotten (2015a; 2015b; 2018) and a methodology book by Witzel & Reiter (2012) were used as a baseline to come up with this part of the methodology.

3.3.1 Data collection

Reflections between the two researchers about prior knowledge revolving around LA, revitalization and the context of the valley were first accomplished before starting to work on the interviews. Being aware of their prior knowledge allowed the interviewers to be as impartial as possible (Witzel & Reiter, 2012). Reflection sessions were also accomplished to find out what knowledge was missing in order to understand the participants and the context they are evolving in.

After this first step, two interview guides were created, one for each study but with a similar baseline (see appendix 6). The interview guides were not intended for a question-answers pattern, instead, they served as an aid to structure the dialogue, as a potential stimulus when the conversation is running low (Witzel and Reiter, 2012). It allowed the researchers to organize the knowledge and interest that is sought through the study. In more detail, the guides were made up of two

main parts: first a narrative introduction summarizing the project and how the interview will be conducted ; second, specific follow up questions organized by themes revolving around LA and revitalization of the land. The following themes were identified for both interview guides, based on the researchers' knowledge, and inspired from the guidelines of Witzel and Reiter (2012) and of the work of Stotten (2015b): *feedback*; *photos*; *LA*; *LR*; *agricultural policy*. The non-farmers' study interview guide had *volunteerism* as an additional theme as it was identified as an axis of interest for this study only. Within those themes, some follow up questions were common to both study guides while some were specific to one.

The interviews were performed individually in French to allow each participant to explain their thoughts behind the particular pictures they took. The interviewees discovered the pictures they took on the day of the interview with the exception of the two above mentioned participants, NF7 and P5. The resting period where the pictures are developed allowed for the participants' thoughts to ferment, bringing more fruitful discussions, as they had to recall what they had in mind when they took the pictures. A total of 8 interviews were conducted for the farmers' study and 9 for the non-farmers' study, spread over the end of March and mid May 2023. All interviews were recorded after the approval of the interviewees, lasted for about an hour and took place in people's homes or farms. Before each interview, the researcher looked at the pictures taken by the future interviewees to be familiar with them and the elements composing them. The first theme, *feedback*, served as a warm-up, to get the conversation started after the first narrative part of the interview, asking the participant how his/her journey went with the camera. The pictures taken by the interviewee were then put on the tables and he/she was invited to talk about them. The pictures represented a great source of dialogue and storytelling that facilitated the start of a conversation with the interviewees (Stotten, 2015). Pictures also allow the discussion to be rooted in reality, with clear examples and facts, as opposed to solely touching upon abstract concepts. Through narrative around the pictures, most of the themes identified in the interview guide were touched upon by the interviewee, keeping the interview flowing like a conversation.

3.3.2 Data analysis

Interviews conducted with non-farmers and farmers were fully transcribed through the Trint software. To ensure the accuracy of the transcriptions, the researchers listened to the recorded interview while reading the software transcription and modified it when needed. The transcription method used is clear reading, smooth verbatim. This implies a word for word transcription of the material, except for dialect and short cut articulations which are put in standard language format. Utterances, repeated words and decorating words including "you know", "ok" or "right" are reduced to facilitate the reading during the coding step (Mayring, 2014).

The transcribed content was then analyzed using Philip Mayring (2014) methodology of

qualitative content analysis (QCA) with the coding technique of inductive category formation. QCA has the advantage of reducing the amount of material by coding solely text material that is relevant to the study, as opposed to other qualitative analysis methodologies which can be more extensive, such as summarizing (Mayring, 2014; Schreier, 2019). QCA allows a systematic and step-by-step analysis across the interviews, by coding all material of interest into categories (Mayring, 2014; Stotten 2015b). The context is included into the coded segment as part of the material, to interpret it in its context of communication (Mayring, 2014). The technique of inductive category formation involves the creation of categories from the text material itself, as opposed to theory. The material was coded through QCAmap, an open access web-based interactive software package used in scientific projects to systematically analyze texts through qualitative content analysis. The process model will now be explained, based on Mayring (2014).

1. **Preparation phase.** Familiarization with the interview by listening to the recording again while correcting the transcript and proof-reading.

2. **First selection of content**. The research question is brought back to define what is relevant or not for the study. In this case, the aim of both the non-farmers' and farmers' parts of the study is to understand people's perceptions of land abandonment and its revitalization with a particular focus on how to engage them for the non-farmers' study and on how it affects them for the farmers' study. Relevant sections are coded. Coding consists of assigning parts of the material to specific categories (Schreier, 2019). To achieve this, several parameters are established: category definition aids in selecting relevant material from the texts; level of abstraction dictates the specificity or generality of category formationè coding unit refers to the smallest assessable component of material; context unit identifies the most extensive text segment that can be encompassed by a single category; recording unit specifies which segments of text are assessed using a specific set of categories.

3. **First inductive category formation attempt.** Three transcripts are coded. Categories are organized and defined. Defining the categories is "a central step in content analysis, a very sensitive process, an art" (Mayring, 2014, p.79). The inductive category formation aims at being as unbiased as possible by leaving out the researchers' preconceptions and focusing uniquely on the material from the individual interviews. A first selection is made by coding solely the relevant material to the research question from the transcripts.

4. **First check**. The three coded transcripts are reviewed by the other researcher. Comments are made and exchanged during a discussion session. Categories are reorganized, deleted, added or merged.

5. **Code book.** The code book is refined individually and tested by rechecking one of the previously coded transcripts.

Finally, the coded data were analyzed in relation to the dimension and categories that emerged, to structure the discussion of the results. Since all interviews were conducted in French, the quotations used within the results and discussion parts were translated by the researchers to English.

3.4 Group discussion

After the individual interviews, a group discussion workshop was accomplished with participants of each study. The workshops explored the issues of land abandonment anLR within the region, with a different angle than the individual interviews (Guest et al., 2017). The workshops enabled a synergy among the participants' thoughts, allowing new ideas than the interviews' ones to emerge (Krueger & Casey, 2009). The group discussion workshop was used to determine the collective needs to mitigate LA and explore priorities among the participants. It enabled a collective voice to emerge (Chinn & Balota, 2023). The main researcher for each study led and facilitated her workshop: Alice Viala facilitated the workshop with the non-farmers' on the 16th of June 2023 and Mónica Revuelta Albero facilitated the workshop with the farmers on the 1st of June 2023.

In short, each participant had to choose one to two of their photos, which represented elements related to land abandonment, and LR as they perceived it. First, they presented one by one the chosen photo(s) and explained why they had chosen these elements. Then, the discussion session opened up and participants were able to comment and bounce back on what others had said. The script of the workshop can be found Appendix 7. Both workshops took around one and a half hours and ended with an informal get-together.

This workshop methodology was adapted from Stotten (2014) to fit the present research aim and the workload required from a master thesis. Stotten (2015b) used a complex methodology to perform the workshop part of her study, named the documentary method. In the latter method, the analysis goes beyond what is said by also focusing on how it is said and by analyzing in depth the recorded discussion. Data collection and data analysis thus had to be adapted considering the restricted time of this master thesis and the level of expertise in research of the researchers. Data collection was thus accomplished through note taking, commonly used in focus groups (Krueger & Casey, 2009; Gundumogula, 2020). Note taking is an adequate alternative to recording when the purpose of the study is well designed and has the advantage of making data analysis faster (Krueger & Casey, 2009). The researcher that was not facilitating the workshop was the one taking notes. Concretely, the main thoughts regarding each photo shared by the participants were noted down, along with the main ideas that emerged from the discussion. For data analysis, the emerging themes and ideas were sorted out, and the photos selected by the participants were highlighted in the result and discussion part.

3.5 Limitation

While this study offers valuable insights into the perceptions of farmers and non-farmers within the PVT territory regarding land abandonment and the potential revitalization strategies, it is important to acknowledge certain limitations. The sampling approach, although a combination of maximum variation and convenient sampling, may still introduce some bias in participant selection. The non-farmer participants were people who saw the advertisement of the study in the valley and contacted us. Therefore, they represent people who had some sort of interest in the subject of research previous to the study. The farmer participants were directly contacted by the RNP and do not represent farmers against the RNP even though they are very few in this region. Despite efforts to ensure contrast in key dimensions, the sample size remains relatively small, consisting of nine participants for each study Furthermore, the limited number of participants, consisting of nine for each study, could potentially have restricted the diversity and depth of insights gained, even if assumed sufficient for the methodology employed and level of expertise. Finally, the study's timeframe, with participants taking pictures from March to April was not the most adequate as the landscape was covered in snow for some period of time. This might have impacted their reflection towards LA and revitalization, even though this period represented the low seasons of the farmers, which correspond to the time of the year when they had the most time to dedicate to this study.

4. Non-farmers' study

4.1 Non-farmers' study results

4.1.1 Interviews

The categories found in **Erreur! Source du renvoi introuvable.**Table 4 below were formulated as part of the qualitative content analysis of the interviews, using inductive category formation. The definition of selection criterion was "All the elements that relate to the participants' perspectives on LA and LR (emotions, definitions, causes). The level of abstraction was anything related to LA or LR. The coding unit used is a phrase or clause (word sequences). The context unit is a whole interview and finally the recording unit is the compilation of all the non-farmers' interviews. The table analyzes categories within various dimensions according to the focus of LA and revitalization. An additional category was created from statements made by non-farmers regarding the method. The details of the coded passage for each category can be found in the external appendix "coded passages from non-farmers' interviews".

Table 4. Coding scheme for qualitative content analysis

Focus	Dimension	Category	Definition
Land abandonment	Definition	Definition	How participants define land abandonment, their state of mind in relation to this phenomenon
	Cause	Urbanisation	Loss of agricultural land through construction and concreting.
		Lifestyle evolution	Changes in the lifestyles of the local population over time that have affected the agricultural sector
		Agricultural arduousness	The difficulty of cultivating land, whether as a private individual or as a farmer
	Result	Overgrowth	Vegetation overgrowth on abandoned farmland
		Change in biodiversity	Change in biodiversity (loss or gain) on abandoned land
		Loss of heritage	Loss of heritage due to land abandonment
		Vestiges and memories of agriculture past	Traces of ancient cultivation, remains of agricultural structures and reminders of the farming past
Revitalisation	Definition	Definition	How they define revitalization, their vision and state of mind in relation to it
	Concrete solution	Farm maintenance	Maintenance that is or could be carried out to revitalize abandoned land or preserve land from abandonment
		Awareness	Raise public and administrative awareness of issues related to land abandonment and revitalization
		Rethink the production	Rethinking production to enhance the value of local agriculture
	Hindering forces	Lack of resources	Lack of money, time, knowledge and manpower
		Lack of awareness	The local population's lack of support and awareness of agricultural issues
		Agricultural challenges	All the challenges specifically related to agriculture that hinder land revitalization. Focus on what's preventing these lands from being revitalized, not on the causes that led to their abandonment
Method	Camera	Camera	Participants' experiences with the camera

4.1.1.1 Non-farmers' experience during the photography process

A total of 80 pictures were taken by the non-farmers during the data collection process, all of which can be found Appendix 8. Some participants took less than the 10-12 motif required, while some took more.

One camera did not function well, so one participant only got 4 photos developed, which he complemented with digital pictures as explained in section 3.2.

In general, participants took photos over several days to capture various scenes and elements. Some participants notably carried the camera in their bags, which facilitated spontaneous photo-taking during various daily activities. Various modes of transportation (walking, driving) were used to access different photo locations. All participants enjoyed taking the pictures, and some noted that "*It was interesting because you pay a bit more attention to the landscape or the elements around you when you have the camera.*" (NF6).

The challenge of finding diversified fields or specific subjects was highlighted by some, "*I had a hard time putting pictures on it, I had to rack my brains.*" (NF5). Furthermore, the seasonal variations influenced the choice of locations and subjects for photography, "*And it's winter, with the snow, we can't go too, too high*" (NF7).

4.1.1.2 LA

This section presents statements from the focus of LA, in which participants speak about their perception and understanding of the causes and results of this phenomenon in the region.

4.1.1.2.1 General perception of LA

"*Everything that was once agricultural is now either inhabited, built on, or is reverting to forest, with a few exceptions that are maintained by farmers or private individuals*" (NF4;

Figure 5), this statement, made by one of the participants, summarize well how they understand LA, even if they were not all familiar with the terminology of the phenomenon. All of them have been witnessing LA occurring in the region at a rapid pace over the years: "*Farmland has melted like snow in the sun*" (NF5). LA was also associated by a participant with the loss of agricultural diversity in

mountainous regions *"Only one type of farming remains: grazing."* (NF6;

Figure 6).

Figure 5. Constructions and forest overgrowth on previously cultivated land (Source NF4)

Figure 6. Pasture (Source NF6)

This phenomenon is mostly described as something negative by the participants, the word *loss* came up several times in the interviews to describe it, such as "*But in the end, there's a loss."* (NF1) or "(…) *the loss this land abandonment can bring.*" (NF8). Nevertheless, LA is also perceived as positive and desirable in some aspects, as it allows nature and biodiversity to thrive in certain areas. As said by a participant: "*I'm not automatically against the abandonment of farmland in the mountains, I don't see agriculture as something that's automatically good."* (NF9), which is similar to what others were mentioning.

4.1.1.2.2 Causes of LA

In this dimension, participants touched upon the causes that resulted in LA in the region.

Lifestyle evolution

From the participants point of view, the overall lifestyle change that has taken place over the last few decades has resulted in LA. The connection of the regions with the outside by rail and various roads has enabled the development of the region's tourism sector. In addition, the development of energy productions and dams in the region has led to a diversification of employment opportunities as outlined by NF4 below.

"We can see that with the arrival of industrialization and the like, energy needs are growing. And our region has taken advantage of this to build dams. This is a retention lake. And in fact, this has taken

some people out of agriculture. And they got jobs to build these structures, but also to maintain them. And it's the same thing with tourism. (...) In fact, there's a new economy that's possible to earn a living other than tending the fields. And these brands, these new economies, show that you don't necessarily need agriculture to live, to feed yourself, because people can earn their living in a different way" (Figure 7).

Some of the participants stressed the influence of globalization on LA, as explained by NF5 *"As we all know, farmland is melting away. But it's also linked to our dear desire to globalize. We're going to look for cheaper food elsewhere, in short, bullshit.".* The evolution of the economy mentioned above has led to increased dependence on external resources. Over the years, the local population has become less involved in agricultural activities and has turned to goods and products from distant regions, reducing the need for local agriculture and contributing to LA:

"Yes, there's a very serious trend to Europe, to the West, and that's the superpower of the market and of agri-food multinationals over agriculture. And our valley, isolated as it is, is no exception. So this isn't a directly agricultural policy, but by allowing it, it amplifies the phenomenon of land abandonment and the abandonment of agriculture." (NF4)

References were also made to the non-local food readily available in supermarkets and the disappearance of gardens where inhabitants used to grow their own food, *"It's all over for the gardens. There are only a few dinosaurs like me who still do it." (NF3).* Nowadays, locals are less involved in communal agricultural tasks and may not feel as connected to their local food system. NF1 notably deplored the fact that there is currently little offer for local food in the territory:

"With distribution, supermarkets, products are not very local. We often hear it said or complained that people don't support local businesses. At the same time, when it's this kind of business, it's not local products, it's not organic products, it's not products that meet the expectations of people who would support local businesses. As a result, people who would buy locally go elsewhere. It does not help the producers." (NF1; Figure 8).

Figure 7. Hydroelectric dam in a village (Source NF4)

Figure 8. A supermarket chain in one of the villages (Source NF1)

Urbanization

Participants assumed that the aforementioned lifestyle change could be associated with land abandonment due to urbanization of previously cultivated land in the area. This phenomenon of urbanization is associated by some with an increased disconnection from the land by the people who use the facilities: "*it brings in people who aren't necessarily present in the area, who aren't connected*

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to the area" NF6. In fact, most of the constructions in the territory are often intended for tourism or secondary habitation, as outlined by this example from NF8 "*Typically, Les Marécottes is an attractive place for tourism, so people buy land for real estate. And it also provides accommodation for people who come on holiday to ski. And the rest of the year, it stays empty." (NF8;*Figure 9). This might bring money in the area but does not benefit the social life of the region.

All participants pointed out that construction has been increasing drastically over the last few decades on the territory, to the detriment of agricultural land. NF2, like others, pointed out which types of land are the most affected by this urbanization phenomenon: *"Over the last ten years, it's grown, even over the last fifteen years, it's grown like mushrooms (...) It's not places that are increasingly difficult to access that are disappearing, it's the easiest places."* (NF2; Figure 10).

Figure 9. Construction and land for sale (Source NF8)

Figure 10. Construction on pasture (Source NF2)

Agricultural arduousness

Participants link the abandonment of subsistence farming with the difficulty of farming in the mountainous region. Overall, participants describe farming in the region as exhausting and labor-intensive, with farmers working "*six days a week from morning to night*" (NF9) and with all the work "*done by human force*" (NF3).

In particular, the difficult topography of the mountainous region, with its steep slopes and inaccessible terrain, was highlighted. To cope with this challenge, farmers used "*techniques for leveling, for making terraces*" (NF7; Figure 11), by creating dry stone walls to make certain areas more suitable for farming, but at the cost of considerable effort: "*You've got the two little walls supporting three square meters of land. So this was the last hope for growing three blades of grass... it shows that you couldn't live there and that's why everything was abandoned."* (NF9; Figure 12).

Participants pointed out that the topography of the area also made farming impractical with modern machinery. The industrialization of lowland agriculture has brought competition that the mountainous region has been unable to keep up with. This competition notably put an end to the valley's important and lucrative strawberry market, as described by NF2 and other participants, leading to

considerable LA: *"There used to be a lot of strawberry growing here. And then it was abandoned because down on the plain where they can easily go with machines to prepare the land."* (NF2).

Participants also spoke of the arduous nature of agricultural work, due to several factors external to the land itself, which have led to its abandonment. These include regulations and administrative burdens linked to farming practices, subsidies and animal welfare, as well as tourism that does not respect farmers' land. NF2 elaborated on that:

"And the third photo, I'd marked words on a sheet of paper like "diplomas", "grumbling neighbors", "the SPA", "prohibitions", "administrative burdens", all the things that weigh down farmers every day (...) And that's discouraging and causes some farmers to abandon the land after a while." (Figure 13).

Figure 11. Different techniques for levelling the soil (Source NF7)

Figure 12. Abandoned pasture with three dry stone walls (Source NF9)
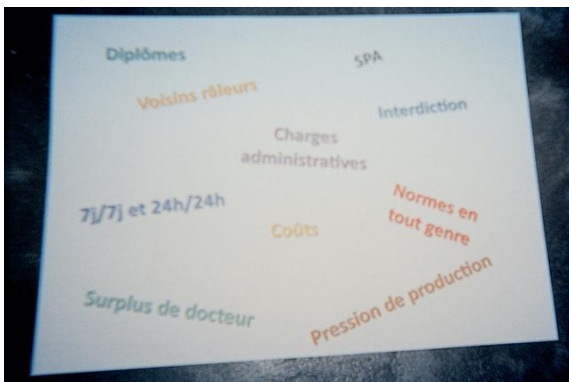
Figure 13. Words and sentences (Source NF2)

4.1.1.2.3 Results of LA

In this dimension, participants touched upon what LA resulted in, in the region.

Vestiges

Participants shared some memories of the region's agricultural past. A wide variety of trees and crops were once grown, first for subsistence farming, then later for sale as the valley opened up to the outside world; animals were raised in pastures throughout the region. Over the year, as a result of LA, most

productions have been abandoned in relation to the factors mentioned in the previous section. NF3 shared some his memories regarding that:

"So, the Adret region is made up of old tables overhanging the railway line, as you can see here, which were all cultivated until the 1950s. Over there, there were lots of raspberries, especially strawberries. I didn't know it. I don't remember the cereals, but at least it was mowed, tended and grazed. And since then, well, it's been sold in the 70s like that, and it's gone."

LA can be observed in the region's landscape through various elements. Participants mentioned ancient infrastructures such as rusting pipes, crumbling dry stone walls and the ruins of dwellings surrounded by vegetation. NF6 outlined the bizarre atmosphere when walking through the forest: *"When you don't know and you're walking around, you think, why did they build a wall? There are places where it's really forest, with dead leaves. There's no trace of grass, well, no trace of meadow apart from the wall."* (Figure 14). These abandoned remains are often perceived as undesirable; some participants even deplored the fact that they are left abandoned without any consideration: *"We've left it all there and nobody's taking care of it. It really affected me because you can see pieces of metal sticking out, pipes, things that were useful at the time, for living in, but which are now useless."* (NF6).

Figure 14. Ruins in the middle of the forest (Source NF6)

Figure 15. Vegetation overgrowth on former pasture (Source NF9)

Overgrowth

Forest overgrowth on abandoned land was a recurrent topic during the interviews. Participants touched upon how LA has led to natural afforestation, turning the landscape from open fields or pastures to forests over the years. NF9 outlined this phenomenon *"So here's an example of what happens when you do nothing. (…) It's a bit north-facing, so it reforested more quickly, so it was grass before"* (See Figure 15). Participants highlighted the speed with which overgrowth and spontaneous afforestation have occurred on abandoned land. In their view, farmers' heavy workloads do not allow them to maintain open land over the whole territory, which explains why it is spreading over all the fields, as outlined by NF3: *"I think the peasantry here is so difficult. So they make priority. And then they say, well, we'll do it next year. And then next year, the tree's already a centimeter bigger in diameter, and that's it."* (NF3).

The proliferation of vegetation is perceived as undesirable and dangerous in some cases. *"If the forest is growing like this, it's not very good either. You can't have a forest that's flush with the houses - that's a serious threat to land protection.",* in this statement, NF3 outlines the fire-related risk associated with the overgrowth. Furthermore, taking the example of dry-stone walls, NF3 explained: *"They're sources of trouble, knowing that just a few meters away there's a train track, if the stones go onto the track and cause damage, it's a shame, in terms of liability it's always the owner of the wall who's responsible."*

Change in biodiversity

Participants highlighted the evolution of biodiversity on abandoned lands due to natural afforestation. Some considered LA to be beneficial for biodiversity. NF3 notably stated *"So there's a positive side, yes, because nature is reclaiming its rights. For the birds and the wrens and all the little creatures that live there".* As there is no longer any human intervention on the land, the flora and fauna can develop on their own which was positively perceived: *"So, in a way, it's a good thing we're not exploiting this area, because at least the forest is taking over, and we're leaving it alone, more or less." (NF5).*

On the other hand, for some others, the process of natural afforestation may not be entirely beneficial for biodiversity as they put in relation the overgrowth on the pastures and a loss of biodiversity. NF9 notably gave the example of typical vegetation succession happening in the region:

"Because one of the main problems here is that when you have oak, underneath it, spruces start to appear. So, if you leave it all, it's a succession of vegetation. So automatically, at the end, you'll have all spruce. And that's something that's neither good for the ecology, nor good for the landscape, nor good for anything (...) So from a point of view, why do you want to grow crops in places like that? (...) It allows you to have species like the martagon lily [an endangered species in the area], which won't grow under the spruces" (Figure 11).

Loss of heritage

Due to LA and the resulting decline in agricultural activity, local people have lost their traditional agricultural practices and knowledge, *"from generation to generation, we no longer know"* (NF3). NF4 notably deplored the fact that *"this whole heritage aspect is a loss, and it's also detrimental to the entity, to the identity of a valley, of a region, to getting to know its roots."* Some insisted that this loss is still ongoing, and that as expressed by NF4, *"the little [they] have left, the maintenance of the land, the breeding, all that, [they] have to try to preserve it."*

Furthermore, participants reported that over time, people lose another type of heritage: the knowledge of who owns the land. Some explained that this knowledge might have got lost through generations because the land became worthless, or because people moved away. This can be linked to the excessive fragmentation of land that has historically occurred on Wallisian territories as explained by NF3:

"It was excessively fragmented in our area, but almost throughout the whole of the Valais. This is also a question of succession. (...) If you had 1,000 square meters of land, which was already a lot, and you

had four children, well, there were 250 square meters for each one. If you had 250 meters and suddenly had eight kids, each kid got one eighth of the 250 meters."

4.1.1.3 Revitalization

This section presents statements from the focus of revitalization, in which participants speaks about their perception and understanding of potential revitalization projects.

4.1.1.3.1 General perception of revitalization

Revitalization was perceived in a variety of ways by the participants. In general, the emphasize was put on revitalizing abandoned land for agricultural purpose, this was often perceived as the evident solution: *"It's kind of obvious really, for me, abandoned farmland, it should be reclaimed to be used as farmland to feed people." (*NF8). Furthermore, a diversification of land use was perceived favorable, notably by using certain abandoned areas as nature reserves. The idea that nature should be allowed to thrive in some part of the abandoned lands was widely present in the interviews, as stated by NF7 *"if nature wants to reclaim land, go ahead. I'm all for leaving nature alone and giving it more space."* Furthermore, some participants expressed concerns about the outcomes on the long term of potential revitalizations:

"What also worries me is the long term, because there are personal initiatives or those of a small group that are commendable, that are timeless, that deserve to be supported and encouraged. But if they don't follow through, that's it. (...) having spoken with locals, people and even farmers, we don't have time to waste on something that won't last anyway." (NF3)

4.1.1.3.2. Concrete solution

In this dimension, participants touched upon potential revitalization projects and what could be needed to achieve them.

Alternative to production

Participants mentioned the need for realistic approaches and the acceptance that it is neither possible nor desirable to revitalize all abandoned lands in agricultural production. The workload and benefits associated with revitalizing certain areas need to be considered as outlined by NF4:

"Now we have to see what's useful, what's interesting here, at the side of the road, up here, you can say what you like, it's useless, it's not interesting (...). After that, how complicated is it? Do we keep this land for mowing? To have grass? It's still complicated."

Furthermore, some suggest that part of the abandoned land could be used for ecological restoration and natural regeneration. In their view, this could be achieved in several ways: without any human intervention, through natural afforestation or, on the contrary, with some human intervention as pointed out by NF1:

"Then, if we know that we're not going to reuse it for agriculture, it might be worth studying the forest dynamics to see if it's worth leaving things as they are? Or would it perhaps be worth restoring or giving a boost to the ecosystem so that it can recover in a richer way, perhaps with an intervention? (...) Maybe in certain places, if we see that it's really not... well you see like here, before it was just a

meadow, there was nothing, maybe with some development we could recreate wetlands or recreate spaces that spontaneously wouldn't come. I think this could be a way of adding value to the land, which in any case is doomed not to be reused."

Others argued that some of the abandoned land on the territory could be used for tourism. They suggested capitalizing on the area's cultural heritage, such as old farms with specific story to attract tourists, or the scenic value of the landscape with hiking trails. NF7 notably gave the example of a hiking trail which brings people to an ancient barn that was previously owned by a farmer with six fingers on each hand.

"Yes, because that story about the six fingers attracts people. On the day of the photo, there were two families with four children who wanted to go there, and then there was a lot of snow and they heard about it. (...) So yes, in that case, I think it can revitalize." (See Figure 16).

It was also suggested that part of the abandoned lands could be used for artistic and educational projects. This would showcase local cultural history and practices, while creating a harmonious link with nature. Ideas for artistic project with the example of a little village made wooden structures as well as open-air museums were notably put forward by NF8:

"And what I find interesting about this project is that it leads people to admire, to pause, to rediscover a form of harmony in this landscape. Let's say it's an artistic dimension too. And this artistic dimension can also be a way of reinvesting the site in a territory, a cultural site [...] In fact, the mountain is a great place to build a museum. So we can look at things like that too, and see our cultural habits differently. We do concerts in the mountains, more and more festivals in the mountains, so why not create museums in the mountains, things like that?" (Figure 17).

Figure 16. Louis de six doigts's farm (Source NF7)

Figure 17. Picture of the website presenting "Le village de Branchés (Source NF8)

Rethinking the production

Participants gave some ideas for developing the agricultural sector in the region to revitalize abandoned lands. The question of where to focus revitalization efforts was discussed. According to some participants, the focus should be on accessible land with good soil and climatic conditions: "*I think all the suitable land should really be kept for farming.*" (NF1). In addition, revitalization efforts should take account of the landscape and its biodiversity. In general, they stressed the importance of concentrating on lands in the process of being abandoned, rather than on land that are fully abandoned and covered in vegetation as explained by NF7: "*If you leave something abandoned, it's very hard to*

go back. It's a lot of work and it's likely to discourage people. It's better to fight all the time than to completely forget and two years later, try to redevelop."

One of the means put forward by participants to promote the revitalization of abandoned land was the promotion of local food consumption in the region. NF1's statement outlined this: *"I had taken this photo, of community supported agriculture, of perhaps having a cooperative store, of also having processing workshops to try to recreate a local supply chain"* (Figure 18). In general, participants felt that local supply was currently insufficient, and that encouraging consumers to buy local products could help develop a local food economy, thus preventing or reversing the trend towards land abandonment.

Participants stressed that the aforementioned increase in local food consumption should be coupled with an increase in food production on the territory, as the current supply is perceived as insufficient. Some participants pointed out that "*if we can see people here, whether in Finhaut or Giétroz, having small vegetable gardens, we can consider doing this on a slightly larger scale. But you need real expertise and the right seeds.*" (NF8; Figure 19). Participants also emphasized on the need to diversify agricultural production:

"*At the moment here, we used to produce meat and cheese, now it's just meat. That's fine, you can buy that from time to time, but in the end, it would be nice to have market gardening and cereals. And for that, you need people to settle down and produce.*" (NF1)

The diversification of the species in livestock production was also discussed. Participants suggested that having mix herds would be an effective way of facilitating LR and preventing vegetation overgrowth. Mix herds would be able to eat a greater diversity of weeds, including invasive species, and could also be used for species conservation. NF3 gave the example of a farmers that took over a farm and reared mix herds:

"*He uses a variety of livestock: he uses donkeys, he has Highland cows, and I think that one of the solutions for maintaining these areas would be to have mixed herds (...) [Highland cows] eat brambles, they eat Japanese knotweed, at least the leaves. So it's a cow that would go well in areas like these to clean up the land.*"

Furthermore, participants stressed the importance of promoting small-scale gardening among the local population. Participants saw this as a valuable way of involving locals in the region's food system. They suggested creating communal gardens, exchanging seeds through seed banks, and supporting initiatives that encourage people to grow their own food. NF4 reflected on the impact of such gardens on the food production of the valley:

"*It's interesting that people have and manage their own vegetable gardens and can consume a little locally. But it's still folklore. But whatever, it's still worth setting things up, saving it. And even if it produces zero to one percent of the valley's consumption or two percent of the valley's consumption, I don't know, it's still worth it, every little step is worthwhile.*"

From the participants' point of view, the support and involvement of local authorities is essential to rethink agricultural production. Some also referred to a potential support from the PVT. Participants mention the possibility of authorities subsidizing local initiatives, financing projects, and facilitating the creation of cooperative markets. NF1 elaborated on that:

"I think it should come from where there's power and money, thus, from the authorities. After that, it can't just come from the authorities and go top-down. It must, I would say, come from the population, but with the support and facilitation of the authorities. Today, I believe that, at least among part of the population, there is this desire."

Figure 18. Pamphlet promoting community supported agriculture (Source NF1)

Figure 19. Personal seed box (Source NF8)

Sensibilization

Participants stressed the need to involve the local population and authorities in the problem of LA and a potential revitalization. They suggested that education and awareness-raising on these issues could encourage locals to participate actively in revitalization efforts and projects, fostering a sense of ownership, because as outlined NF5 *"if people aren't interested, you can say whatever you want, they won't give a damn.".* NF4 explained that land is undervalued by locals, and illustrates his points with the example of the valley gondola:

"But just be aware of the value of the thing, like today, we're aware of the value of tourism and the gondola. I don't know if you've heard the debates about the gondola this winter, but it's a very, very hot topic (...) people are arguing very vehemently about it. Whereas on the land, people don't give a damn. So the responsibility is to be aware of the value of the thing, that it's a tangible and intangible asset, which identifies us, which is us in fact, which is part of us. And when this responsibility of collective awareness comes afterwards, things are much easier. Then you can motivate people to work the land again."

For that purpose, participants put forward various ideas for raising awareness of the problems associated with land abandonment, and of the potential of abandoned land. One participant, NF6, suggested raising people's awareness of their food sources by *"estimate where the merchandise comes from, where the food consumed in all these villages comes from".* Another suggested the creation of information media such as maps and brochures showcasing the diversity of agricultural activities in the region. This would enable residents and tourists to visit certain farms and "*to make people more aware of this [farmers'] work and the abandonment of mountain pastures."* (NF7). One participant presented a project in which young people from an alpine club work on farms for a week, *"to show that this work exists, that it's hard work, that milk and cheese don't come from Migros [supermarket chain], but from the mountains*." (NF7*).* Those types of projects can help people appreciate the importance of agriculture and bring them closer to the land, thus stimulating interest in revitalization.

Two participants also touch upon the importance of a comprehensive understanding of past and present agricultural practices, to understand historical patterns of land use and the changes that occurs over time, "*to show what it was like, the importance of agriculture at the time, so that people can reclaim it and know where they come from*" (NF4). This could help design the way forward in the revitalization process.

4.1.1.3.3 Hindering forces

In this dimension, participants touched upon the hindering forces revolving around a potential revitalization of the abandoned lands.

Lack of awareness

As participants assumed, there is not much appreciation and recognition for the work done by the local farmers in the different communes. Most of them felt that farmers are not adequately acknowledged by some members of the community such as tourists or inhabitants, as stated by NF1: "*there's no consideration, no recognition of the work, and I think we really need to work on promoting and recognizing the services provided by farmers and the amount of work they do.*" NF2 outlined this with an example of non-farmers giving advice to farmers:

"I talk a lot about animal agriculture rather than plant agriculture, but when you have animals, there's everybody who knows how to do it, who'll explain that they're a doctor, a doctor of animals, a doctor of farming, who all come to explain how to look after them. And that's not good at all for encouraging agriculture."

Furthermore, participants perceived that the overall lack of dialogue between farmers and the rest of the community, including local inhabitants, tourists and authorities is also having an impact on LA and hindering a potential revitalization. Some conflicts between farmers and local authorities were mentioned by some, for example: "*We're celebrating the village party of Les Granges, buying cheese elsewhere because we've had a little quarrel with the farmer. Ridiculous.*" (NF2)

Some participants perceived a lack of awareness and collective responsibility toward the importance of preserving agricultural land for local communities. Participants noted that local inhabitants are not involved in problems around the agricultural sector. NF9 linked this problem with the high number of secondary or tourist homes: "*And that's the danger of these small communes here, especially as most people aren't local, most don't give a damn.*". This lack of awareness might also impact the economic viability of local products and the willingness of consumers to potentially pay higher prices as described by NF6:

"There's another problem, and that's the price. It's harder to make something local and traditional. What's more, the product will be expensive. Are local people going to be willing to pay double or triple for bread? I don't think so. It's so much easier to go down to the town just down the valley, then to the supermarket."

Most participants felt that the local authorities have a great deal of power over this issue of LA and revitalization, and that they should become more involved. Two participants took photos of the

town hall to illustrate that, see Figure 20 and Figure 21; *"This is a photo of the town hall, because I think that without the political will behind it, without political powers (...), to ensure that it improves, it's going to be impossible, even very complicated"* explained NF4. *"I hope things will change a bit. Especially in terms of the local authorities realizing that they have to do whatever they can when there are people interested in the landscape and developing things, making food.*" highlighted NF2. The idea that local authorities often prioritize tourism over agriculture was put forward by some, contributing, in their view, to a lack of support for agricultural initiative. To illustrate this statement, NF1 reported that during a meeting with local authorities, the latter said: "*The future is tourism, not agriculture*".

Figure 20. Town hall of Salvan (Source NF4)

Figure 21. Town hall of Salvan (Source NF1)

Agricultural challenges

Participants reported that over the past few decades, younger generations have become less interested in farming. As others have said, NF2 explained this by "*I think that young people, the very youngest, this is a generation where they no longer want to work all the time, they want to be able to take vacations, even in agriculture*", in addition to the low income. The lack of motivation to take over existing farms, coupled with the difficulty of finding available lands for new farmers, has contributed to the problem of LA and hindered a potential revitalization, in their view.

Participants also stressed the difficulty of clearing overgrown land to bring it back into cultivation. The established vegetation can be quite difficult to clear, knowledge about how to get properly rid of them is needed. NF3's statement outlined this:

"You need to know that these plants, these ash trees, these hazelnut trees, are among the plants that are very difficult to eradicate because they sucker and grow back. So you cut off the stem and then you say to yourself ah, I've got an ash tree, I'll cut it off, and well the following year, you've got four of them." (NF3; Figure 22)

Furthermore, reference was also made to the impact of wildlife on agricultural activities and therefore on potential revitalization. These animals can damage crops " *I have a vegetable garden back there, to take one example. It's 25 years old, but now every year I have to fight deer and roe deer. We*

didn't have these problems before." (NF3) and herds, *"We also sometimes hear talk of foxes or lynxes. And then there are fifteen cows at the bottom of the embankment, because they're scared.*" (NF7), creating additional hurdles for farmers or gardeners.

The aspects of climate change on agricultural productivity, particularly in mountainous regions were also highlighted. According to participants, changes in weather conditions, such as reduced water availability and more frequent droughts, are affecting the viability of agricultural practices in the region: *"And then there's the watercourses: there's less and less water in winter, and the summers are increasingly bad. So for agricultural production, it's terrible."* (NF6). Consequently, the sustainability of revitalization activities is affected.

Figure 22. Trees growing on pasture (Source NF3)

Lack of resources

The issue of money to carry out a potential revitalization was a recurring topic of discussion. Participants felt that a lack of financial resources can severely hamper revitalization projects. NF4 illustrated this with his picture "*two 20-franc bills. Basically, it's to say that you shouldn't dream, that you need money for that"* (

Figure 23). NF1 gave the example of a farm for sale, and "a young person who's interested in doing a great project but doesn't have the means at the moment." (

Figure 24). Others mentioned the high maintenance costs of various agricultural structures such as drystone walls: "*It's very expensive. It's about 1,000 francs a square meter (...) When you see what we pay for grapes, it takes several generations to amortize the cost."*

In addition, time constraints and a lack of commitment to carry out revitalization projects and then maintain the land were also mentioned. These constraints concern both farmers and local residents, according to the participants. NF6 put in relation this lack of time and the current lifestyle: *"very often, there are still a lot of people who devote their time to earning money in the lowlands, and are therefore not available to help run a local farming system".* In addition, NF2 linked this time constraints to the regulations that were put in place over the years, making the farmers' job more time consuming:

"It used to be that you'd have to clear a piece of land, then you'd burn a bit of it, and the next year it would be ready for use, so it didn't take too long. I'm not saying it was necessarily good or bad. I'm not making any judgments about it, but these are things that make a farmer's life more difficult."

Figure 23. 20 francs bills (Source NF4)

Figure 24. Farm at the entry of a village (Source NF1)

4.1.2 Workshop: group discussion

Eight out of the nine non-farmers participants took part in the group discussion workshop. A table with the presentation of the pictures chosen by each participant and the following emerging ideas, organized by the thematic of LA and revitalization can be found Appendix 9.

The discussion highlighted several key issues related to land use and revitalization in the region. One major concern was the construction on agricultural lands, particularly those that are flat and close to villages. Participants emphasized the need for the local government to take action to protect these lands. They proposed the idea of leasing these lands as a way to reduce the cost of access and promote revitalization. Additionally, there was a strong emphasis on promoting local consumption, which is under threat from supermarkets.

Another important aspect discussed was the need to reestablish a connection with local farmers. Participants suggested promoting community gardens as a means to reconnect with the land and raise awareness about agricultural issues. The development of market gardening in the region was also highlighted. Nevertheless, preserving traditional livestock farming practices was also seen as essential, considering the cultural significance of livestock farming in the area.

Several challenges hindering revitalization of abandoned land through agriculture in the valley were identified. These included differences in productivity between mechanized lowland farming and the mountainous terrain, which often cannot be mechanized due to steep slopes and climatic challenges. This was recognized as a primary cause of the agricultural decline in the region, notably with the example of the decline of strawberry farming.

Participants stressed the importance of focusing revitalization efforts on areas that are most suitable for agriculture. They noted that some abandoned alpine pastures, although being reclaimed by forests in some places, may be less adapted to agriculture compared to other more suitable lands in the region. In conclusion, the discussion brought to light the pressing need for strategic actions to protect agricultural lands, promote local consumption, reconnect with farming traditions, and focus revitalization efforts in areas with the greatest potential for success.

4.2 Non-farmers' study discussion

The present part of the study explores the perspective of non-farmers' regarding LA and potential revitalization. First, the understanding of LA by non-farmers is explored, followed by their perception of the revitalization of abandoned land and potential revitalization projects. Then, based on that, the role of RNPs in promoting the agricultural sector to reverse or prevent LA is explored.

4.2.1 Understanding LA

How do non-farmers understand LA was first explored. In general, the participants' understanding of LA seems to be aligned with the greater literature: from their perspective, LA is increasing in mountainous regions and the causes of land abandonment arise from a complex interplay of factors that have transformed region's agricultural landscape (MacDonald et al., 2000). More specifically, in the Trient valley, the changing lifestyles due to improved transport, energy development and globalization have diminished the significance of local agriculture, while urbanization and construction on formerly cultivated land have disconnected communities from their agricultural roots. Perpiña Castillo et al. (2018) reported that construction, thus urbanization, is minimal regarding the loss of agricultural land in Europe, concerning only 0.3% of the abandoned land, whereas in the present study it played an important role in LA from the participants' point of view. This might be explained by the fact that in the valley, the urbanization phenomenon occurred primarily in areas where the locals could see direct changes: around the villages. Furthermore, it might also be correlated with the fact that large areas of agricultural land were flooded for the construction of hydroelectric dams (Guex, 2014; Rodriguez & Hirtz, 2014). Whereas urbanization and construction are often referred to as a result of LA in the greater literature, in this study, participants perceived it more as a leading cause of LA (Varotto & Lodatti, 2014; Fayet et al., 2022). The transformation of agricultural structures and the arduous nature of mountainous farming have also contributed to this trend of LA, which is also outlined in the literature (MacDonald et al., 2000; Flury et al., 2013). The combination of these factors has led to the abandonment of the land and of traditional farming practices, impacting both the economic and social aspects of the region.

The repercussions of land abandonment can be seen through various aspects of the region's landscape and cultural heritage. Memories of a diverse agricultural past, characterized by crops, livestock and pastures, are today all that's left from the past. Over the years, the landscape has undergone

a transformation marked by the increased presence of abandoned remains, such as crumbling dry stone walls, and overgrown ruins, often forgotten in the middle of invasive vegetation. The phenomenon of forest proliferation emerged as a major theme within the discussion and interview, similarly to other study on LA with natural afforestation gradually replacing open fields and pastures (Flury et al., 2013; Fayet et al., 2022). In addition, the loss of heritage was also pointed out by participants, as the decline in agricultural activity slowly degrades traditional practices and cultural knowledge, as reported in other regions affected by LA (Queiroz et al., 2014; Levers et al., 2018). This loss of heritage extends to the oblivion of land ownership which can be put in relation with the historical excessive land. This can be linked to what Lasanta et al., (2017) highlighted: areas characterized by small-scale agriculture and highly fragmented land ownership have witnessed significant abandonment rates.

Overall, participants perceived LA in a negative light, as a loss of heritage and land opportunities. However, some participants perceived it positively due to the blossoming of nature associated with such a phenomenon. This is similar to what other studies on the perception of LA have found: locals tend to perceive this phenomenon as negative but some still see it favorably for its natural attributes (Ruskule et al., 2013, van der Zanden et al., 2018).

4.2.2 Potential revitalization strategies

Then, the focus was put on how non-farmers understand LR, what solutions they consider to revitalize the abandoned lands, as well as their role within this process. Participants presented various potential approaches to revitalizing abandoned lands, emphasizing the need for realistic strategies that align with the region's potential benefits and biodiversity. Nevertheless, participants put a potential agricultural revitalization into perspective as it faces a web of challenges arising from insufficient awareness, agricultural complexities, and resource scarcities. They explored various potential revitalization trajectories, including ecological restoration through natural afforestation, with or without human intervention. Such type of revitalization was highlighted in the literature as the most common trajectory following LA, under the name of revegetation process (Fayet et al., 2022). In addition, the notion of repurposing these lands for tourism, taking advantage of the cultural heritage and scenic landscapes, was presented. Artistic and educational initiatives were proposed to harmoniously merge cultural history with nature, advocating for open-air museums and educational trails. This idea of an open-air museum can be found in the literature, with museum landscapes that are areas serving for educational purpose and knowledge sharing, notably around traditional agricultural practices (Fayet et al., 2022). Nevertheless, participants highlighted the risk of local authorities prioritizing tourism over agriculture, hampering support for agricultural initiatives. This risk is aligned with the literature review of Lasanta et al. (2017), which outlined that the development of tourism leads most of the time to LA as farmers move away from agriculture for more lucrative activities. Nevertheless, the same study also found that in some specific cases, tourism prevented LA, notably when landscapes with high aesthetic values were chosen as a touristic approach.

Diving more in depth into revitalizing through agriculture, a shift towards local food production was suggested, with a call for diversification, to include vegetables and cereals alongside traditional livestock. Returning to agricultural use is a trajectory that is also highlighted in the literature to reverse LA (Varotto and Lodatti, 2014; Fayet et al., 2022). To prevent further land abandonment, participants suggested that the focus should be on accessible, climate-appropriate land, as well as small-scale gardening with ecological consideration and community initiatives, which can also be found in the literature (Fayet et al., 2022; Fayet et al., 2023). Awareness and education emerged as essential, with participants advocating for collaborative engagement among local populations, authorities, and the problem of land abandonment. Nevertheless, participants highlighted the lack of recognition for local farmers' efforts, underscoring a disconnect between farmers and the broader community. The lack of awareness and collective responsibility arising from this disconnection is perceived by participants as having an impeding influence on potential revitalization projects. This is aligned with Fayet et al., (2023) who highlighted that the willingness of people to engage in revitalization projects is influenced by their preferences in terms of social, economic outcomes. Furthermore, a study by Soliva et al. (2008), presenting four 2030 land-use change scenarios and their assessments by stakeholder panels in six European countries, concluded that the majority of stakeholders think that local farmers should be the primary managers of the landscape. This is in contradiction here with the participant's idea that non-farmers should as well be quite involved in managing the land. A comprehensive understanding of historical agricultural practices was also highlighted by some participants to inform the trajectory of revitalization. Munroe et al. (2013) and Lasanta et al. (2017) notably outlined that it is essential to understand the drivers of LA in order to anticipate the possible trajectories.

In essence, these diverse suggestions underscored a holistic approach rooted in local engagement, ecological considerations, and cultural preservation. The proposed approach is aligned with the farming approach within the Alpine region explored by Varotto and Lodatti (2014). The latters take into account the Alpine culture heritage to revitalize traditional landscape, through the expansion of non-commercial agriculture coupled with the development of small-scale diversified agriculture, all of this with the support from public authorities. However, forest encroachment, wildlife disturbance and the effects of climate change have compounded the obstacles, making abandoned land less suitable for revitalization. Flury et al., (2003) highlighted the uncertainties of the impact that climate change could have on revitalization processes. The financial strain of revitalization initiatives also emerged as a critical barrier, with participants citing resource scarcity and high maintenance costs for structures like drystone walls. Fayet et al. (2022) study also outlined the pivotal role of monetary means and authorities in guiding future trajectories of abandoned land especially when distinct from natural succession.

4.2.3 RNPs and LA

RNPs can thus play an important role in promoting the agricultural sector to reverse or prevent LA, such as the PVT in the Trient valley. More in detail, RNPs can help enhance the understanding of the LA in specific regions, which was highlighted as essential to adequately plan revitalization strategies (Munroe et al., 2013; Lasanta et al., 2017). This study was notably a first step in the creation of this understanding for the Trient valley. Furthermore, RNPs can facilitate discussions and collaborations among various stakeholders to explore various revitalization strategies, such as the one suggested by the participants: ecological restoration through natural afforestation, repurposing for education, and promoting local food production. These strategies notably align with the general objectives of RNPs, such as conservation and enhancement of biodiversity and landscape, strengthening sustainable and economic development and environmental awareness and education (Conseil Fédéral Suisse, 2007). Furthermore, the need for education and awareness raised by participants to create community engagement and bring locals closer to agriculture to promote revitalization can also be addressed through RNPs projects within the latter mentioned general objectives. Participants notably suggested open-air museums, didactive hiking trails or maps of the different agricultural activities on the territory to showcase the local cultural history and practices, which could remind locals about their heritage. Furthermore, the funding support that RNPs can provide such as by identifying funding sources or through projects falling under their objectives is also of great importance to reverse LA and support revitalization projects (OFEV, 2014; Fayet et al., 2022).

5. Farmers' study

5.1 Farmers' study results

5.1.1 Interviews

The main output of the study is the code book which helped to extract the main ideas from the transcripts to answer the first research question on the perceptions of locals towards LA and LR. The code book comprises four dimensions and 16 categories (Table 5a). The content analytical technique used is inductive category formation. The definition of selection criterion is *anything that has to do with their perception on LA and on their responsibility, management, reasons for LA, the way LA affects them, the way they talk about it, optimistic/pessimistic.* The level of abstraction is *any discussion clearly related to LA or its revitalization*. The coding unit used is a *phrase or clause (word sequences)*. The context unit is *a whole interview and finally the recording unit is the compilation of all the farmers' interviews*. Coded passages from the transcripts are organised into the 16 categories. The coded content in them is then used to understand the way farmers perceive LA and explore the role that the RNP can have in promoting the development of the agricultural sector.

Table 5. Code book of farmers

Focus	Dimension	Category	Definition
Land Abandonment	Results		
		General description of LA	Description by farmers of what LA means and its indicators or elements which they referred to when talking about LA
		Memory	Farmers' memory of former ways of working the land and historical event in the region
	Causes		
		Industrialization of agriculture	The development of agricultural machinery and tools for large scale agriculture, mostly unsuited for the mountains
		Conditions	The description of the topography, geology, and climatic circumstances or factors affecting the way in which people live or work in this mountainous region
		Change in lifestyle	A lower demand of local products than in the past, a different lifestyle which does not rely on the local products
		Lack of resources	Difficulty in making mountain agriculture a profitable activity
		Hardiness	Struggle of mountain agricultural activities
		Difference in understanding	Divergences in understandings and multitude of perceptions between farmers and the rest of the population
Revitalization & Maintenance	Results		
		General description of LR	Description by farmers of what LR means and its indicators or elements which they referred to when talking about LR
		Adaptations	The modifications made in a farm to adapt to change
	Drivers		
		Interest for a local agriculture	A higher demand for local products and a will and interest of producing locally
		mechanization	The development of agricultural machinery and tools which allow the perpetuation of mountain agriculture
		External aid	Aid to farmers from outside their farm which incentivizes them to maintain agricultural lan in the mountains
		Conviction	Strong believes, instincts from the farmers that they are doing the right thing
		Solidarity	Mutual aid, sharing and community living
Camera			The handling and experiences with the camera within the project

The original transcripts are in French, therefore the quotes incorporated in the following discussion section are translated from French to English. To better grasp the language of the farmers and get a sense which resonates more closely their feelings and impressions please refer to the original

version in (Appendix: Farmer Transcripts). This section presents the code book and defines the 14 final categories. They are described in detail in the in the following discussion section 5.2 along with the main extracted ideas.

In the code book, the 16 categories are organized into four dimensions, two for each phenomenon: LA and LR (Table 5). For LA, the two dimensions are Results and Causes of LA. Under Results of LA the two categories are *General description of LA* and *Memory*. *General description of LA* turned out to be a rather large category as it is one of the main focus of the study and combines farmers' description of LA as well as the elements associates with it. In this single category a total of 137 passages were coded throughout the 8 transcripts. Under Causes of LA six categories were created: *Industrialization of agriculture, Conditions, Change in lifestyle, Hardiness, and Difference in understandings*. This is the largest dimension. Similarly, with LR, the two dimensions in it are Results and Drivers. Under Results of LR *are General description of LR* and *Adaptations*. The General description of LR is also a large category with 140 coded passages versus 56 for Adaptations. The five last categories are located under Drivers of LR. An additional category called *Camera* englobes the statements of the farmers in relation to the reflexive photography approach.

5.1.2 Workshop: group discussion

The four farmers who attended the workshop discussed the issue of agricultural land abandonment the region. P5 expresses concern over the negative impacts of land abandonment, illustrated by photos of abandoned and overgrown vineyards. She emphasizes the need to repurpose agricultural lands but talks about polyculture, promoting the cultivation of multiple species in the same area for biodiversity and aesthetic reasons, especially on steep terrain.

P1 reflects on the transformation of the landscape over the past thirty years, where agricultural lands have been reclaimed by forests. He is not happy with the loss of traditional farming practices, including the manual labor that was once prevalent. He mentions efforts to combat forest encroachment through subsidies and the PVT help for clearing the land and highlights the challenges of maintaining pastures against the never stopping forest.

P9 discusses the overgrowth of brambles and wild roses in the Trétien area, asking why some landowners do not clear these invasive plants. She also mentions her own efforts in planting asparagus to revitalize the land and create connections within the community.

Similar to P1 who is also a retired farmer, P6 shares historical context when the Trétien area was known for strawberry production and other crops. He points out the challenges of farming, such as the steep terrain, labor-intensive work, and the decline in agricultural profitability. He emphasizes the importance of preserving certain agricultural practices, like gardening and local production, as a way of changing societal values.

Overall, participants discuss the impact of modernization and consumerism, which have shifted people's priorities away from traditional farming. They discuss the difficulties of sustaining a family through farming, mechanization challenges in mountainous regions, and the need to adapt to modern economic demands. They also mention the effects of COVID-19 on local consumption and the importance of reconnecting with local food production. Norms and regulations related to farming, such as chimney filters and strict land use regulations, are seen as potential hindrances to agricultural autonomy.

5.2 Farmers' discussion

5.2.1 Farmers' experiences with the camera and its handling within the project

Some participants were reticent to use single use cameras. One farmer ended up taking them on their phone. Another did not want to take the pictures themselves and took the researcher along a farm tour asking her to take the pictures instead. Nevertheless, the ones who played the game mentioned their motivation to participate in the project and to capture these photos as a means of documenting and expressing what they were witnessing and feeling about the changes and evolution in the valley. Some participants took the pictures for a whole month during work (P5 & P9), or when taking their car as they kept their camera in it to remember to take the pictures (P7 & P6). Others dedicated an afternoon or a day for the activity (P4). P5 and P3 thought about the pictures they wanted to take in advance. Others were more spontaneous (P4). Some waited for sunny days (P6), others just got out when they had time and were surprised with snow (P3). During the interviews, when farmers saw their pictures for the first time, they did not always remember where they had taken it "oh yes, I remember now" (P4) or "I do not remember which pictures I took anymore" (P2).

Participants felt pictures were a great support to express themselves. In most of the cases, they enjoyed taking them and sharing them with the researcher. In P5 words: "*I like to take photos in the field. And when they're pretty, it's true that I have quite a photographic memory, so I know where I have classified them, and I enjoy reusing them.*". P7 found the approach useful "*For me, what was interesting was to be able to have the pictures […] I'm quite happy because it allows us to express what we're experiencing, what we're feeling, the evolution here in Trient.*"

The testimonies reflect a sense of purpose and commitment to preserving and sharing the area's heritage and environmental changes and the pictures helped them image this: "*Nevertheless, I took these pictures for posterity*" (P5). Similarly, P1 says "*I took these photos for historical reasons and with the feeling of protecting our heritage.*" It can be inferred that participants had a strong connection to the subject matter and a desire to convey their observations and sentiments through the reflexive photography activity.

5.2.2 Farmers' perceptions of Land Abandonment (LA)

5.2.2.1 General description of LA

The complex dynamics of land-use including agriculture, forestry and urbanization emerge when participants share insights about LA. Different elements associated to LA are mentioned as well as the ones which lack in the system transforming agricultural lands into abandoned ones. Generally, farmers define LA as the **transition** from agricultural land to forest land or other wild vegetation: "*the land is no longer taken care of. It is not used anymore […] so nature simply takes over again*" (P9).

There is a lack of human presence and care. The transition is characterized by its pace which from their perspective is "*extraordinarily fast*" (P1), occurs "*in the glimpse of an eye*" (P4). P1 describes the process as a natural cycle. They says:

"*In the soil, there are all the seeds, all the little regrowth of trees, it is all there, ready. All it requires is to be left out to grow. […] So you just have to leave it alone and give it some light.*" (P1)

Abandoned lands become **naturally overgrown** by wild vegetation, including trees, bushes and other plants. In The Valley of Trient the hazel, black locust, ash and European aspen trees are associated with LA (P9, P4, P1). P2 talks about the fast growth of pioneer deciduous trees who are first in taking over pastures. Lack of practices such as pastures with small densities of grazers or without mowing easily grow small bushes and are considered LA (P4). Around the bushes it is not well grazed, and they are a source for further bushes and trees to grow. P9 explains the succession "*the forest expands and first you have brambles, dog roses and then there are small trees […] that grow*".

Even though the idea of an overgrowth by nature is present where nature threatens their agricultural lands, nature is also seen as an important component of their agricultural system: "*I won't say there aren't little grasshoppers running through the mower, but overall, [our work is] pretty close to nature. So, I think [natural and agricultural systems] go together.*" (P2).

These farmers from the mountainous region are in close contact with nature: "[*LA] really is the mountain reclaiming its rights, the forest reclaiming its place*" (P5). Nevertheless, the naturally overgrown wild vegetation is considered tedious to different degrees: "*We're still lucky, we don't really have brambles, but depending on where [farmers] are, they do have quite a few brambles, so the animals, when these grow, they don't go around them anymore*" (P4).

Brambles take over the fields as animals do not eat them. At the same time, they do not grow as much where enough animals graze:

"*As soon as you don't go through it with the sheep or ponies, in five years it's like that (*Figure 25*) […] So we're trying with the animals to keep up the pressure, but we're keeping up the pressure as best we can.*" (P4).

The number of farming animals has drastically decreased in the region. The "*commune of Salvan, had in 1920, they had about 500 cows or even 800*" (P4). The overgrowth of wild vegetation

on pastures results in a **loss of grazing land**, which once abandoned can quickly become unusable for livestock as well as for other agricultural activities. The few remaining farmers are trying to keep up with the work of their ancestors to maintain open grasslands.

Figure 25. Brambles and deciduous trees taking over abandoned field (source. P4).

Once land is abandoned, the so-called **invasive species** also take over, such as the mention of reeds in The plat des Marais (P6), annual fleabane *(Erigeron annuus)* and *Helanthius* in the case of vines: "*it's part of the process of abandoning the land, because the land is no longer maintained and, as a result, invasive plants arrive and multiply. It is a big, big problem*" (P5; *Figure 27*)..

Smallholders no longer maintain their parcels around vines, and this impacts the producers around them. The abandoned parcels become a nest for weeds but also for cryptogrammic diseases including downy and powdery mildews. This **maintenance challenge** is tackled by a legislation in Wallis obliges all smallholders to take care of their vines (RS 916.142 - Vine and Wine Ordinance). Nevertheless, it is not always easy to enforce it as **ownership** of vines shifts over time and **responsibility** of maintenance and use can become unclear: "*In Wallis, we have more or less 4700ha [of vines], and if I am not mistaking, we have 19 000 owners*" (P5).

Abandonment can lead to **changes in biodiversity**, with some native species being overrun by invasive ones (*Figure 26*) or drystone walls crumbling apart where "*there are no longer these little habitats […] and there you lose biodiversity and ecology. All the little insect*s" (P5). The loss in biodiversity results in a hazard for agricultural production such as in vines. P5 explains:

"If we have used an insecticide, for example, and there are no more insects present and one arrives just after you've used the insecticide and it hasn't been harmed by the insecticide, then it invades and occupies all the space. There's never its opposite to keep it at bay. And it's all a question of constant balance with nature" (P5).

P2 thinks that without agricultural activities in the valley "we*'d lose in terms of diversity of flowers, in terms of diversity of everything. [The landscape] would close up and then the remaining things would be trees or bushes, what grows best. Personally, I think we'd lose out*". Their farming activities are seen as beneficial for the ecosystem.

Figure 26. Annual fleabane in between vine rows (P5)

Figure 27. Abandoned parcel between two houses (P5).

In addition to the vegetation described above, firs are also mentioned as having a particularly fast propagating pace and with the added inconvenience that "*under the fir trees there's nothing left to eat*" (P4) for their herd. P4 already sees small trees on the edges of meadows which are not cut as a hazard, because they propagate younger trees and when becoming too large they can break the expensive drystone walls which "*cost approximately 1000CHF the square meter*" (P5). **Ruins of drystone walls** are seen as an indicator of LA. P6 explains the process by which they crumble apart as one where their cows walk along the walls and excrete:

"*Water runoff pushes the matter down the dry stone walls. This material stays there and brings in a little vegetation swelling the whole thing. But that's not the problem. The problem is that in winter, when [the matter] is very wet, it freezes, it swells, it melts, it lets in more and more dirt*" (P6).

The consequences of abandoned walls can pose a **security** problem to locals as they can fall on them.

Different **attitudes toward land abandonment** are present. Some individuals express a general frustration, while others consider letting nature reclaim certain areas as a more sustainable approach. P9 confesses "*I don't like it because [agricultural land] is hard to restore and the terrain is precious*". The abandoned agricultural lands result in a **loss of productivity**, and larger efforts will be required to reestablish them for productive farming. There is also a land stewardship aspect: "*for me, a farmer loves its land, and perhaps seeing the forest grow on it is not something they like. To see wild roses and brambles. I don't like it*" (P9).

Two of the older participants reacted when asked the question of what does LA means to them in the context of their village. One insisted that LA was not a thing anymore in his village: "*I'd say that in Trient no [there is no LA]. Because the abandonment is older than what we've been talking about in recent years [...] the abandonment took place at the end of the 50s, in the 60s*" (P7). The other one reacted to the word abandonment and said that it was rather "*a transformation of the use of the agricultural surfaces*" (P6).

Other elements participants mentioned associated to LA and more specific to single participants include a farm in the middle of the forest which is completely destroyed (P4; *Figure 29*). This is a mountain farm which was once surrounded by pastures and is now in the middle of the woods. It depicts the process of forest encroachment when grazers are not present anymore. P4 says "*the day when there will be no more animals, well it will be forest in no time*". Another indicator for P5 are vines without cover crops: "*the abandonment of the land reminds me of these vineyards that are weeded, deserted, where on these plots there's no life present*"(Figure 28).

Ruins of abandoned grain mills were also brought to the table. Three existed along a river in Salvan and now:

 "*there's only one left standing and functioning, and that's the Fin mill. It worked until about 55, then fell into disrepair, and in 95 they rebuilt it. The stones were still there, but the beam and all that* was *all rotten*" (P6).

Figure 29. Abandoned farm in the woods (source P4).

Figure 28. Weeded and deserted vineyard (source P5).

As old farmers pass away with no succession or are too old for some of the activities the few farmers left have to find people to maintain the farms (P4). At the same time, young farmers are struggling to get land for their vines while other smallholders leave them to abandonment (P5). There is also the larger spatial frame of current land abandonment: "*To leave it abandoned like that is a bit, I really think it means that all the work that was done before, we're abandoning it too*." (P5).

Traditional livelihoods seem to have been lost in the previous generation when tourism arrived and with-it other sources of income. LA therefore has **social and economic implications** with a **reduced agricultural activity**.

One of Stotten's (2015b; 2018) findings is that when farmers described what a cultural landscape meant to them, often they pictured human beings as actors of it. Farmers and their families were taken during the reflexive photography activity. In this study, farmers did not picture humans when talking about LA, it was rather the lack of humans which represented LA. The only humans taken were for the LR ones where in one we can see two women planting asparagus roots.

5.2.2.2 Memory

Memories and observations about the evolution of the landscape and agriculture in the valley of Trient are shared. Participants talk about the landscape evolution, how it has changed considerably since the 70s. In the past, there were crops, strawberry fields and more cattle pastures. Over time, however, vegetation has invaded these areas, transforming some of them into forests. The growing of local crops such as cabbage, potatoes, beet, rye and barley for self consumption are described and encompassed as traditional agriculture. People used to rely on the lunar calendar for farming and were knowledgeable about when to plant different crops. There is also a reference to the tradition of auctioning off the right to harvest wood from certain areas. Additionally, the interviews highlight the importance of vineyards and wine production in the region's history. There were terrasses for growing vegetables. Cows were an important part of farming, and hay was harvested by hand. Strawberry production was an important extra source of income in the region for certain locals, particularly in the 70s and 80s. Strawberries were a way to earn extra money, although they eventually lost their value due to competition from foreign producers. Every piece of land was used for agriculture, mainly for grazing cows. Less exposed areas were reserved for wheat crops, while more exposed parts were used for hay. The landscape in the valley has undergone significant environmental changes over the years. Many areas that were once open fields or pastures have become densely forested. This transformation seems to have been influenced by various factors, including changes in land use practices and the natural regeneration of vegetation. These changes have impacted local ecosystems and land management. People worked hard to maintain fields and pastures, and they were resourceful in using the land for both sustenance and income.

Farmers mention natural hazards like avalanches and their historical impact on the landscape. The participants touch on the use of water resources for various historical purposes, such as hydropower for sawmills and the flotteurs. P1 says that forests back in the days could not grow due to the valuable wood locals extracted from them to run the wood industry. Former inhabitants also used the wood for heating.

Overall, participants provide valuable insights into the historical land use, cultural practices, environmental changes, and challenges faced by the community in the valley of Trient. They reflect the complex interplay between human activities and natural processes in shaping the landscape over time. There were once eight mills and two sawmills along the same torrent, indicating the importance of water-related industry in the area (P6). This changed with the construction of the dams. LA as a transition does not seem to be an easy one to bear for everyone. These farmers see it as a loss regarding the region's agricultural history and culture and share the importance of preserving them.

5.2.2.3 Industrialization of agriculture

This mountain region did not undergo the Green Revolution as the topography and climatic conditions do not favor it. Nevertheless, the industrialization of the agricultural sector impacted the livelihoods which relied on small scale agriculture. Farmers highlight changes in crop cultivation and the abandonment process, from strawberries and raspberries to forests (P3 & P1). They also mentions the shift from small family gardens to larger agricultural domains where topographical conditions allowed it. Farmers touch on the **challenges of modernization** and the need for machinery in agriculture. However, the terrain in these mountainous regions makes it difficult to use heavy machinery effectively and agricultural machinery does not seem to address the needs of these small fields.

Industrialization of agriculture led to LA and a decline in Livestock Farming with a decrease in the number of cattle. This decline is attributed to changes in agricultural practices and lifestyle choices. With the industrialization of agriculture came its mechanization, with the use of tractors and machines for tasks like haymaking and harvesting. In addition, **globalization** had an impact on agriculture and food consumption (FAO et al., 2022; Gladek et al., 2017). Imported fruits vegetables and meat now flood the Swiss markets with lower prices than locally grown products (P1). This is one of the reasons why strawberry production ended in the valley (P1). Smaller agricultural operations face challenges in competing with larger, more mechanized farms, which may prioritize efficiency over traditional and sustainable methods.

5.2.2.4 Conditions and hardiness

The often-hard conditions in the sense of the circumstances or factors affecting the way in which people live or work in this mountainous region are seen as a cause for the abandonment of agricultural lands.

The specific **challenges** faced by farmers **in mountainous regions** include rocky terrain, the presence of stone walls, and limited access for machinery, which make agriculture in such areas less productive.

In addition, natural hazards are very present in the mountains. P7 and P2 mention the risk of avalanches as a cause of LA. They say that in the past there were heavier snowfalls and avalanches were more common. P7 says that a meadow under an avalanche site is:

"*Something that could discourage farmers. Because every spring, you had to wait for the snow to melt, which wasn't a problem, but after that, you had to go and clean up the meadows, which meant a lot of work: trees, stones, earth. To be able to maintain it, for animals to graze and to be able to mow, make hay*".

The construction of a dig to protect the village from avalanches, rock falls and landslides also have a small negative effect on local agriculture as P7 cattle cannot graze there anymore.

Figure 30. Avalanche site early spring (P7).

Figure 31. Avalanche site later in the spring (P2).

Participants also mentioned dangers due to torrential rains, which can lead to flooding and landslides in the mountainous areas. These natural events can have adverse effects on the landscape and infrastructure (P7).

The valley of Trient has historically being poor compared to other valleys. Some of the reasons include the challenging terrain and limited agricultural opportunities. Accessibility of mountainous terrain for agriculture is described as an important cause for LA. Some areas are more challenging to cultivate due to their steepness and the presence of stone walls and their distance to the nearest village (P9). P2 states that abandoned lands are mostly the ones hard to access. P1 cuts down trees to take back agricultural land. Without roads or too steep terrain access to machinery is a challenge. **Subsidies and policies** have played a role in shaping agricultural practices in the region. But these subsidies are tied to the slope but not accessibility of the land facilitating the abandonment of terrains that are hard to access (P6).

Regarding beekeeping, P7 highlights the importance of pollen availability for bee colonies' development. Bee colonies in the mountains may struggle due to limited pollen resources at the beginning of spring. Farmers face unique challenges in mountainous regions with the factors abovementioned influencing their agricultural practices and land use decisions.

In mountain regions conditions are different than in lower altitudes. They discuss **challenges of farming in mountainous regions**, including the difficulty of working with stone walls, steep terrain, and small, fragmented parcels of land (Figure 32). This makes their agricultural work harder. The difficulty in maintenance is a factor for LA. Farming as in other regions requires **daily commitment**, with no weekends or holidays. The physical demands of the work are strong, including the need for constant maintenance and clearing of land. Participants mentioned **stone walls** in the region as causing problems due to animals climbing on them, stones falling, and the important costs required for restoration. Additionally, **trails crossing farmers' fields** create issues as pedestrians and bikers unintentionally remove the electric fences with their backpacks or so when hopping over and animals frequently escape.

Figure 32. Dry-stone wall crumbled apart (source, P5).

Farmers face numerous **administrative and regulatory constraints**, including surface declarations, chemical treatments, and inspections (see section 5.2.2.6 impact of policies). They face numerous regulatory constraints and administrative burdens, which affect their ability to work the land and manage their livestock effectively. P3 says that for certain direct payments the paper work is so labour intensive that it is not worth it. P6 **expresses frustration with bureaucracy** and regulations, which can delay and complicate farming activities.

The **reappearance of wolves** in the region complicates matters, increasing stress among farmers and requiring constant livestock monitoring. P5 mentions issues related to **the management of invasive plants**, requiring significant work in clearing them:

"That's a bit of a problem, this plant, it makes tons of seeds, it's complicated to manage and you especially have to mow before it hails. And it really wants to go to seed. So as soon as you mow it, it gets stressed and grows back twice as fast. And that's a big problem when it comes to managing all this, because it already requires a lot of work with the brush cutter on the slopes, and in fact, it's a

very high-growing plant, it creates humidity in the cluster zone, and we don't want that at all. And the problem is that if it comes into the vineyards, it also proliferates elsewhere"

5.2.2.5 Change in lifestyle

Participants highlighted changing lifestyle choices and priorities in contemporary society, particularly in relation to agriculture, nature, and self-sufficiency and their impact on the regions' and overall Swiss agricultural sector. They talk about the fact that people's interests and ways of living have changed. Agriculture is no longer a central component of their lives. The conversations with farmers highlight the **rural exode** that took place in the valley where people shifted from rural to urban, and what are often considered more modern, and comfortable lifestyles. As more people live and are born in cities a **disconnect from nature grows**. P5, the teacher, suggests that education should include more teachings about nature and agriculture:

" *I'd say we're at school all day, sitting on a bench for 8 hours. That's what life's all about these days, but isn't there something else we should be teaching our children? Because, unfortunately, it doesn't necessarily come from the parents, who don't know any more either. There's no longer this connection with nature, and we often forget that we actually come from nature and that we're so good outside*" (P5).

Participants think that people prioritize their own needs and conveniences over communal efforts like tending to gardens or farmlands. This shift in mindset affects lifestyle choices. P9 says " *I think there's still a lot of individualism, as if people want a garden and they've got their own, so there you go.*"

This shift is accompanied by a decline in agricultural activities and an increasing preference for urban professions. Many people in modern society have become **dependent on convenience**, choosing to purchase food and goods rather than grow or produce them themselves. This convenience-oriented lifestyle reduces the need for traditional agricultural practices. Even more when it is cheaper to buy something at the supermarket than producing it yourself : "W*e don't need to have things that grow here with difficulty and then cost us three-four francs a kilo. It's the way we live that has changed.*" (P1). On the same note, P9 also mentioned: "*Detached from primary needs, yet everyone eats. And in that case, we'd rather work two extra days in the week than be attached to a garden, which is restrictive and requires commitment because it's a living thing."*

People are now more accustomed to buying food from stores rather than growing it themselves. P9 points out that the population is expanding, not in the valley, but generally in the world. When global efforts are required to transition towards a more sustainable food system which supports a growing world population in the long term, the region is abandoning agricultural lands and importing from places where the food could be needed or where the source and practices are so far away that there is no traceability (Gladek et al., 2017). Furthermore, globalization has influenced lifestyle changes by introducing global food markets and altering consumption patterns such as the strawberry case presented under industrialization of agriculture.

Factors like the disinterest of younger generations, alternative job opportunities in the tertiary sector (such as tourism), and the conversion of agricultural lands into residential areas greatly cause LA. There are fewer farmers:

"*One of my theories is that a large part of the reason for the abandonment of farmland is in fact this changing pattern. People used to be farmers, maybe not all of them, but most of them. So they tended to use pretty much all the land they could to plant potatoes, rye and so on. Nowadays, at the end of the 21st century, there's hardly anyone left. So that's why, in my opinion, the most difficult lands have been abandoned, and the forest is growing back, so that nowadays, only the lands that are easiest to maintain are used.*" (P3)

The same applies to heating techniques which require **less physical work:**

" *I took a photo of our furnace. In 1966 or 67, my parents were among the first to install oil-fired central heating. Before that, everyone here heated with wood. So there was no opportunity for trees to grow. As soon as they had a very small diameter, they were cut down to heat the houses. There was automatic, necessary, vital maintenance between guimets. And so, from the 65-70s onwards, everyone switched to oil-fired heating. Because, back then, oil was less than 0.20 ¬ a liter. So it wasn't expensive. There was no need to do any maintenance work on the houses. It was so cheap that there was no need to insulate houses. And it was a lot less work than cutting wood.*" (P1) (Figure 33).

Overall P1 has a strong opinion that: "*There is only the need that will say we have an order, we do everything because we need. Until we need, we don't need, we don't go*".

P6 shares this opinion they say :

"*The walls used to be inspected, and when they saw one that was moving, well, he redid it. Almost every year, because back then, they needed to ensure the wall did not fall on the vegetables, but now it falls on the grass and that's it.*"

Figure 33. Furnace to heat up the house with wood (source P1).

Already before locals moved away from the valley, the region underwent a shift in the economy that affected people's lifestyle with the **arrival of tourism**. This had an impact on traditional farming practices as it led to changes in land use and a shift away from small-scale agriculture (P4).

5.2.2.6 Causes of LA: Lack of resources

Participants expressed a lack in resources, be it time, money or labor force. As mentioned in section 5.2.2.3 and 5.2.2.5, globalization has flooded the Swiss markets with cheaper products "*strawberries have lost their value*" (P1). Farmers do not rely anymore on the gains from the goods they produce and sell but rather on subsidies. The lack of resources is identified as a significant issue contributing to land abandonment. Farmers represent a very small part of the population in the valley: "*Sometimes I get the impression that when you talk to farmers, we're less than 2% of the population, so of course it's normal when you feel a bit alone in the world.*" (P5)

P6 shares this frustration of not being able to gain a minimum income through their agricultural activities. The **economic viability** of agriculture is questioned. There is the need to diversify income sources due to the decreasing profitability of farming which results in working days of 15h (P6). P6 also shares the **lack of practical knowledge** of agronomists an ontological reversal :

"*Once again, it's because we haven't put into their training the power of decision criteria and analysis to say, write, know how to type, then go faster and then, take photos and then transform all the messages, it's great. But the other thing is, you go out into the field to see how things are going. And then when someone comes up to you and says, Sir, you mowed on July 13, that's before the 15th, you tell that gentleman, listen, take care of your blood cells, because if he mowed on the 13th, it's because he knew he could mow on the 13th. There is this total disconnect between the administration in general terms and the reality on the ground*" (P6).

While P5, who comes from an agricultural background, experienced the opposite during their agricultural studies:

"*Ah well, I'm putting technical terms on something that's always been done (...) I think I'm lucky to have been able to experience this, to know this and to see this evolution and to have the technical skills to make this difference. But then, it makes me laugh every time, as we define things that are and that & that were at least: normal.*" (P5)

Participants talk about a **generational gap**, where younger individuals are less inclined to continue traditional farming practices, and there may be a lack of successors to take over farming. The interviews suggest that attracting new farmers is challenging due to the demanding nature of the work and economic factors.

The **impact of policies**, such as zoning and land use regulations, on land abandonment is briefly touched upon. Although perceived as good intentioned to protect certain aspects of mountainous landscapes these politics can remove farmers the possibility to handle problems their own way, taking resources away from them (P6).

5.2.2.8 Divergent understandings and interests

The mountains are shared by **various stakeholders** who have their own understandings and interests. They behave in different ways and prioritise different aspects. Stakeholders include the farmers, but also pedestrians who come for a short period of time, locals who commute to cities for work etc. The disconnect from the land hinders the possibility of finding together feasible solutions. P6 talks about the importance of having a bottom-up approach where main stakeholders, in this case farmers, are invited in the design of solutions from the start. Overall participants point out a decline in knowledge about agriculture and an increasing gap between rural and urban communities, and on how people perceive and practice agriculture.

There are also debates on **best strategies to combat invasive species** on agricultural land and the need to strike a balance with nature. For example, in vines, the conventional way of handling weeds is to remove all vegetation from the alleys (P5). Locals do not necessarily know what plants are classified as invasive and even plant them in their gardens (P5).

Participants touch upon the need **to raise awareness about the environment and agriculture**, especially among young people. They feel a disconnect between how farmers perceive nature and how the general public does. Residents near Martigny complain about the use of **helicopter to spray phytosanitary** products on vines. P5 a winegrower explains that without them it would be hard :

"*when you realize that on the Martigny estate, we have 850 vineyard owners, you can imagine 850 sprayers that you start by hand, which means that when they can, when they're not doing their job, you use products that you're not sure what's going on. It's the professionals who use the products in helicopters.*"

P9 points out the aberration of not using the valuable resource from animal waste. He say :

"*how is it done? We bring straw from the plains to provide bedding for cows in the mountains. Why is it that some mountain farmers have too much manure for the land they have? And yet the land is normally adapted to the number of cows they have. That's why they can't put all the manure on the land. I don't understand it. After all, I'm not a livestock specialist, so maybe that's why I don't understand.* »

P9 expresses their deception when trying to start off a community garden. They emphasize **the importance of effective communication in collaborative projects**, particularly in managing participants' expectations and ensuring coordinated work. P9 complains:

"*We kind of said we'd set a day and that it would be Sunday. Already, we arrived at 11 am. The earliest to arrive was a new buddy, X, who arrived before me at 11 a.m. I got there around 11.10 a.m., then there were a few who got there just after, and a couple who left after we'd had a break for lunch. We'd already done a lot of work, but you see, I'd imagined things and maybe I didn't communicate well either. We didn't communicate well. Of course, I had expectations, and that's why I said I shouldn't let them get to me.* »

Power dynamics of the hierarchical system where stakeholders who are at the top have different interests than the ones at the bottom of the pyramid, in this case farmers are brought forward by P5. P6 warns of a possible disaster due to **a misunderstanding of traditional agriculture**.

5.2.3 Role of RNPs in supporting agricultural land revitalization

This section presents in bold the main perceptions from the participants regarding the second dimension on Land Revitalization and discusses them answering the second research question: How can RNPs support the agricultural sector to prevent LA or revitalize it.

5.2.3.1. General description of LR

Since most participants except three have a herd, revitalized lands are often described as open grasslands where either animals graze or farmers mow. For P3 LR is a land where farmers could not previously mow and now they can. Participants present **strategies to maintain and expand** accessible land for agricultural and pastoral use. **Efforts to conserve the environment**, such as reforestation projects with diverse tree species, including native varieties are also seen as a revitalization project. Even though they are not directly agricultural ones, these projects aim to revitalize and improve the landscape just as mountain agriculture. P7 talks about the denaturalization project of the Trient river: " *There are 3,500 trees, but I've been told that 30 species, 30 varieties, are being planted this year here on the Trient plain to revitalize it.*". They discuss how their activities contribute positively to the local ecosystem. P5 sees revitalized agricultural lands as places where biodiversity is high and various insects, such as ladybugs and predatory mites, help agriculture in controlling pests in vineyards.

P5 talks about two projects which represent LR for them. The first one is a project lead by the commune of Martigny to Well conserved **stone walls** as indicators of LR (P3 & P5). Stone walls not only do they represent the care that locals have towards their cultural heritage, but they also serve as habitats for various species, including reptiles and insects contributing to the preservation of biodiversity and healthier agroecosystems. There is also a sense of satisfaction from having a beautiful wall (P5), which goes with the idea of preserving the landscape's beauty and open spaces, for **scenic viewpoints** and **cultural significance**.

Some areas have been left to nature due to the reasons presented in the previous section 5.2.2.4. Furthermore, grazing animals, such as goats and cows, play a crucial role in maintaining the land. They help control vegetation growth and improve the quality of pastures.

Community efforts to maintain and restore the landscape, including revitalizing walking paths through vineyards and engaging in reforestation projects are seen as LR. The revitalization of walking paths go in hand with a desire to **involve younger generations** in environmental and agricultural initiatives, with an emphasis on education and awareness. Just as a lack of communication was seen as a cause for LA with the example of the community garden (see section 3.1.8), a good communication between community members, local authorities, and agricultural experts is crucial for successful environmental and agricultural projects.

For LR to take place, ways of making agriculture sustainable in the sense of also profitable need to be put in place. The establishment of the François Xavier Bagnoud center which hosts **youth in social reinsertion and integrates some agricultural activities** is seen as having an impact on local residents. It highlights the importance of agricultural activities for the well-being of the people (P6).

The community's efforts to keep the old operation of a mill, its history, and functioning are also presented as an example of LR. It produces flour and use it to make bread, highlighting a connection between traditional practices and contemporary activities. P9 also explores various ways to enhance the value of agricultural land, such as planting edible crops (*Figure 34*) and using innovative solutions like yurts (*Figure 35*).

Figure 34. Enhancing the value of agricultural land by planting asparagus with friends (P9)

Figure 35. The yurt seen as a non-concrete structure which allows more adaptability than a building and does not destroy the soil (P9)

The conversations with participants suggest trying other ways of managing the system with long-term planning for land usage, including rotating cultivation with forests and pastures and managing forested areas alongside open lands. They include a focus on sustainable agricultural practices, such as the project from the PVT of revitalizing chestnut trees. Overall, when participants talked about LR they mentioned the efforts of the community to balance agriculture, biodiversity, and environmental conservation in the valley of Trient while preserving cultural heritage and engaging younger generations in these initiatives. As opposed to LA where the transition is seen as one where humans lack in the system, for LR humans are proactive and present in the initiatives even if these are to rewild the region such as the case of the Trient river.

5.2.3.2 Adaptations

Farmers mention the adaptation of certain **animals**, such as goats and sheep, which are valuable assets for mountain farming because they can access steep terrains. This makes them essential for managing areas which are difficult to reach. P3 has modified some of their previous generations' practices when they used to mow in a steep and hard terrain. Instead, they bring in their goats and a neighbor brings in

their cows in Finhaut. The participants emphasize the importance of diverse land usage and the benefits of having both cattle and goats, which can graze on different types of vegetation. P1 even adapted within available breeds of sheep:

"*I replaced my breed of sheep so they could eat the small regrowth of trees, because the white Alpine sheep, which I had before, doesn't eat tree regrowth very well. So I switched to the Skuddes and now I cannot use them as much because of the presence of large predators. So I will go back to ponies, which are less at risk from large predators but don't eat as well*" (P1).

The presence of the wolf in the region is a challenge for farmers who have lived without it for the previous years. P2 have bought dogs to protect the younger ones from their herd. Nevertheless, they mention how now they must keep the dogs and feed them yearlong for only four months of use when the cows are out in the mountain fields higher up, but at least the herd is protected.

P3 turns the destructive character of avalanches into a positive aspect. They utilize avalanche corridors for grazing with their goats as the trees are often cracked and bent and goats are fond of leaves which they often, otherwise, struggle to eat.

P1 changes his selling strategy of grapes for wine by diversifying:

"*There's enough of it, and there's no grape juice. So we make it on demand. People reserve x liters of grape juice, and then, according to the orders, we harvest before. So we work at different times than everyone else who will be harvesting on the same week. We'll be harvesting about two weeks earlier. And this juice is vinified without alcohol, which meets a demand. Every year, there's a greater demand.*" (P1)

A winemaker who has a vineyard which is not well exposed to the sun, converted it into a cook and handles a restaurant where they serve the grapes and wine from the vineyard (P5). Overall, farmers talk about the importance of adapting to local conditions and era.

5.2.3.3 Interest for local agriculture

An interest in producing and buying locally produced food contributes to LR. In the 1990s people consumed more vine and there was a need to grow more grapes: "*When there was still a need for a lot of grape production, some winegrowers bought a whole area of meadows. I'd mowed that too. They bought all the meadows and then planted vines.*" (P1)

Participants mention a general interest from the population to maintain local agriculture in the region to **conserve the landscape** and attract tourism for "*the postcards of Switzerland*" (P4). P7 sees the small number of farmers left in the valley as an asset. Young farmers "*got plenty of opportunities, since the land has been abandoned by others*" (P7). They have more land available allowing them to expand their farms and making a better living from it since farmers with herds get subsidies per square meter of land they take care of. Furthermore, P3 who is a young farmer has exactly that in mind:

"*There's one area I'd like to try and develop for haymaking. It's the flat part of the shooting range. (…) it reduces our costs quite a bit because we don't have to buy the hay we make here. Logically, with all*

the hay we make, I could feed the goats in winter without having to buy any, but on the other hand, there are still 40 head of cows that need to be fed hay. If the hay we make here is given to the cows, it lasts a month and a half." (P3).

For now, they import hay from further down in the valley for their cows and goats but would like to reduce their expenses by producing more hay locally. P4 on the other hand had have cows in the plain, outside of the valley and come up for the summer. This allows them to expand their amount of food for their herd instead of buying more from elsewhere.

Agriculture has become also a more diversified profession, where most farmers in the region have a second profession and due to the growing interest in raising the Hérens breed for cow fights or just for cultural pride some people farm as a hobby. The interest of keeping agricultural lands to produce food leads them to get concerned about construction on previously natural areas, which can affect wildlife like frogs. Tourism is also discussed as a factor influencing decisions to preserve certain areas.

Participants emphasize the importance of local food production to ensure food security, especially in the current context of global uncertainty. P1 sees the interest in growing vegetables from their garden for **economic and health reasons**: "*You plant your two zucchinis, some Swiss chards and that's all you produce yourself, [...] you feed yourself relatively much more cheaply than from the grocery store. You can also manage your inputs in terms of phytosanitary products*". (P1)

They also discuss about the pleasure of growing one's own vegetables and sharing knowledge with others interested in local agriculture. P9 says:

 "*I want to eat. [...] I don't want to go to the store and I want to create links and I want to pass on my knowledge. My little garden is my obsession to eat good food and MY food and to become food independent with people who want that and then it started with such and such a person and it's true that, well, we talked about it with X who says that I'm a locomotive and that there may be wagons that will leave and others that will hang on and maybe they'll be the right people.*"

Local food production strengthens the connection between farmers and the community, which can lead to a better understanding of the importance of high-quality food production. P1 suggests that the revitalization of agricultural land could occur naturally if local food needs increase. Participants seem committed to improving local food production and preserving their agricultural heritage.

5.2.3.4 Mechanization

Industrialization of agriculture and the development of large machinery is mentioned as a hindering force for the development and preservation of the agricultural sector in this mountainous region. However, some of current agricultural mechanization has made **farming more efficient and less labor-intensive**. Current machinery give the potential to reclaim abandoned or unused lands more easily compared to centuries ago when everything was done manually. Now helicopters and chainsaws can be used for example to remove trees from a previously agricultural field. Helicopters and drones are considered practical and useful specially for grape treatments which allows winegrowers to be less in contact with the phytosanitary products (P5). Despite the limitations of terrain, mechanization is seen

as essential for making certain lands in the mountainous regions productive. It allows for more efficient haymaking: "*now we mow with the machine, turn [the hay] with the machine, harvest with the machine, then put in the barn with the blower*" (P6). Machines also help to **prepare field crop terrains** "*Today, with very small backhoes, you can turn over 1,000 square meters in a single day. You make the land usable again for gardening*" (P1). The development of machinery has also allowed the connection of Martigny, a town in Switzerland, to Chamonix, a town in France by trainline in 1908 (Perriard-Volorio, 1996). P9 suggests the idea of using the train line to ship food from the valley to the mountains and vice versa. Even if machinery can be very useful and efficient, P7 points out that:"*all the current mechanization is interesting, but as long as timber trade has little value, even if there is mechanization, it's not interesting.*"

5.2.3.5 External aid

This section gathers the parts when participants mentioned, among other external entities, RNPs as potential promoters of LR. The involvement of **volunteers** is discussed as a way to help with land maintenance, including clearing and upkeep. Nevertheless P4 say that they do not feel that there a lot of volunteers.

Subsidies through the system of direct payments for land maintenance in the mountains are an external aid which encourages farmers to maintain their activities (P7). Farmers none the less highlight the **trade-off** between financial support and increased control and restrictions on agricultural practices (P4).

Farmers now mow not only for their herds. Their main motivation seems to be to maintain a cultural landscape for which they receive direct payments (see section Drivers for LR).

"*It is written into the constitution, isn't it, that as a farmer you're supposed to produce but also maintain the landscape. So there's also this notion of the beauty of the landscape. So, in Switzerland, this has a high value.*" (P5)

P5 thinks that the **PVT** plays a significant role in coordinating and supporting efforts to maintain agricultural landscapes and preventing land abandonment, including weeding days among locals to gather forces for the fight against specific weeds in vineyards.

Some participants are actively involved in projects contributing to LR. These include a wall reconstruction project (P5), a woodcutting day by professional woodwomen and woodmen to take back abandoned agricultural land (P1) and the Corvée which are collective workdays on land maintenance, such as clearing areas and maintaining fences. (P).

P2 suggests that collaboration and synergies between lowland and mountainous regions are important for supporting agriculture in the region: "*I think we're already well supported, if we work hard enough […] but we need to find good synergies between the plains and the mountains. We have a lot more animals in summer than in winter.*" The cows they get for the summer season are work but

also an external help which allows them to earn more money and graze more surfaces. Then they return them to their correspondent farms for the winter period.

5.3.3.6 Conviction

Farmers have a special attachment to the land by stewarding it. They develop instincts. They believe what they are doing is right and have a high respect for their ancestors and their work on the land. They are rooted on the local traditional identity on which they were born. Some of the participants place significant importance on preserving the traditions and agricultural heritage of their region, including dry stone walls that were built to support hillside farming. P1 has the will of perpetuating their grandparents theory which says "*it doesn't matter how much you earn, what matters is how much you spend.*" On this matter, P5 expresses a sentiment of luck to be born in a farming family and to perdure the production of wine:

"*My grandparents and my great-grandfather, they built an enourmous amount of walls. I'm lucky to have inherited this family heritage, but it's also a cultural heritage with all these traditions that have enabled us to support our families and that we tend to forget. We say, yes, it's pretty, but in fact, in the beginning, it was mostly useful*".

There is a sense of passion among farmers in the region, agriculture is more than just a job, it's a passion (P6 & P5). For P6 it is even a hobby as they do not earn money from it. It sometimes is a hard hobby but what motivates them is:

"*Passion. Passion for animals, for being in nature, for seeing life. On top of that, we're in a country, under a latitude, where we have four seasons, so we have spring, where everything comes back to life, summer, where everything comes back to life, autumn, when things start to get a bit quiet. And then winter, when we're a little calmer.*"

This reflects the joy of working with animals, witnessing nature change with the seasons, and how this passion is passed down from generation to generation (P6 & P3). Passion and attachment to the land and animals motivate farmers to continue despite the challenges.

P7 perceives their job with bees as essential for higher quality of their neighboring pastures. P5 discusses how the importance of preserving biodiversity and ecosystems is a close matter for them. The mention of planting various tree species in the vines and efforts to maintain stone structures indicates an awareness of the need for ecological balance and conservation practices.

P1 mentions the fact that farmers get subsidies for the animals they lose due to large predator attacks. However, the problem is that they do not want to keep animals if they lose them continuously "*I don't want to build a meat fridge*" (P1). Farmers prefer to see their animals born in the farm and reach maturity rather than bringing them in from outside. Building a good herd takes years. The passion and conviction of preserving the heritage from the region contribute to shaping the identity and life of the communities in the valley.

Solidarity is an important driver for LR. Farmers share how through their activities they feel responsible or care for other farmers' activities such as the winegrower, P5, recognizes that fighting invasive plants requires collective effort because if one farmer fights these plants and others don't, it's less effective. There is a sense of solidarity in their work which drives them to maintain the lands clean. In agriculture there is also a longer-term vision of solidarity, particularly in vineyard cultivation, where vines are planted for 40 years or more (P5). There is a sense of responsibility of inheriting the land and passing it on to future generations.

The benefits of community and synergy among farmers is brought forward by P2. They present the example where in the summer, they host animals from other farms from lower altitudes as part of a collective effort to maintain pastures and profit from grass which is scarce in the lower parts of the region. Then in winter when hay is scarce in the higher altitudes most cattle are gone and profits from the lower altitudes. This cooperation helps ensure all lands are adequately grazed in the region.

P9 mentions the local community activities and associations, such as the "Siat" (Société des Amis du Trétien), which are involved in various projects, including the care of animals like donkeys to graze their lands. While some activities have decreased, community involvement remains strong allowing the preservation of agricultural lands.

If land is abandoned there is a sense that this can be dangerous for others. In the case of dry stone walls:

"*The notion that you can endanger others, right? When you don't maintain your plots. It's a notion that appeals to me personally, because I think it's ok if you don't want to look after your plots, but you do not need to let others suffer from it.*" (P2).

The farmers seek their motivation in their longing to being united with the rest of the population.

6. Conclusion

Participants from both study parts exhibited a similar perception of LA, acknowledging this phenomenon as a growing issue in mountainous regions, shaped by the interaction of complex factors. Similar key indicators for LA were highlighted by both groups, such as overgrown vegetation on previously cultivated land, or crumbling drystone walls. Both farmers and non-farmers recognized the transformative impact of lifestyle change that occurred over the years in the region, including the development of tourism in the valley and the industrialization of agriculture in lowland areas, as significant drivers of LA in the region. This aligns with the general discourse on LA, but with specific nuances related to the PVT territory.

Both non-farmers and farmers recognized the challenges faced by agricultural revitalization, such as the arduous nature of farming, characterized by hard physical work and limited resources. They also highlight a disconnection of the local population with agriculture and nature in general, resulting

in a lack of awareness about the importance of local agriculture among the population and authorities. This underscored the need for enhanced awareness and mutual understanding between both farmers and the population. Furthermore, non-farmers perceive farmers' hard work as not fully acknowledged by the community, which was not echoed by the farmers themselves, who instead stressed the importance of better representation for farming.

Promoting local agriculture and increasing local food production emerged as a shared priority for both farmers and non-farmers, as it could strengthen the bond between farmers and the community. Nonetheless, non-farmers viewed agriculture with a more critical lens, highlighting various approaches to LR, not always in relation to agriculture. Their proposed strategies ranged from ecological restoration through natural afforestation to repurposing for tourism, associating cultural heritage with the picturesque landscape. In parallel, farmers, although proposing a different set of strategies, demonstrated a more grounded and pessimistic perspective, perhaps due to their firm commitment to established farming practices. While non-farmers emphasized that not all land needs to be revitalized, notably for nature conservation benefit, farmers perceived agriculture as inherently beneficial to nature conservation.

Interestingly, while nature conservation efforts in LR were perceived as important by both parties, a nuanced distinction arose in their approaches. Non-farmers tended to view LR through a more passive lens, advocating for the natural reclamation of land, while farmers favored an active approach, emphasizing deliberate efforts to revitalize land for the explicit purpose of conservation. Their views on local authorities and more generally regulations also differed. Farmers mostly advocated for autonomy while non-farmers complained that authorities should prioritize agriculture instead of tourism.

RNPs could have an important role in preventing and reversing LA in their territory as they are not necessarily seen as an authority but as an overarching entity among locals and to the outside of the region. They can contribute by enhancing understanding, fostering discussions, and supporting diverse revitalization strategies, all of which align with their broader objectives of conservation, biodiversity enhancement, sustainable development, and environmental education. Furthermore, RNPs can address the crucial need for education and awareness, fostering community engagement and reviving the recognition for the importance of agriculture and cultural heritage. Their potential assistance in funding opportunities and in supporting projects within their scope could become a crucial element in reversing LA and aiding in revitalization efforts. RNPs can also foster a unified identity among different communes which otherwise would not necessarily work together towards the aforementioned common goals. While this study focused on the potential role that RNPs can play within reversing and preventing LA, future research needs to be done to assess the actual impact it can have on the phenomenon and the diverse revitalization strategies.

"*No, but at some point, everyone will have to take a little time to think. Maybe not as extremists, but as people who realize that there are other ways of doing things than the way we're doing things today.*" (P1)

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Appendixes

Appendix 1. Poster to recruit participants for the non-farmers' study part

Norwegian University
of Life Sciences

isara
AGRO SCHOOL FOR LIFE

Elizabeth Stephansens v. 15,
1430 Ås, Norvège
www.nmbu.no/en
23 Rue Jean Baldassini, 69007 Lyon, France
isara.fr/

Mónica Revuelta Albero et Alice Viala
Étudiantes master en Agroécologie

+41 77 970 01 50
monica.revueltaalbero@mail.mcgill.ca
alice.viala@nmbu.no

Giétroz, 28 février, 2023

L'abandon de terres agricoles. Perceptions des agriculteur.trice.s et de leurs bénévoles illustrées par une étude de cas dans la vallée du Trient, région des Alpes suisses valaisannes.

Bonjour _____.

Encore une fois, nous tenons à vous remercier pour votre intérêt et votre volonté de participer à l'enquête pour notre projet de master La revitalisation de terres agricoles abandonnées au travers de l'agriculture, encouragée par un parc naturel régional. Nous vous envoyons maintenant l'appareil photo jetable comme convenu par téléphone. Vous trouverez ci-dessous la mission plus détaillée. Nous vous demandons de bien vouloir remplir le questionnaire de données statistiques ci-joint et de nous le remettre le jour de l'entretien.

Dès que nous aurons l'appareil, les photos seront développées. Ensuite, nous vous recontacterons par téléphone pour convenir d'un rendez-vous pour l'interview. Lors de celui-ci, nous apporterons les photos développées qui serviront de base pour l'entretien.

Tâche :

Notre projet de master porte sur l'abandon des terres agricoles en montagne et vise à étudier comment la population locale perçoit ce phénomène ainsi que leurs rôles pour enrayer celui-ci. Nous aimerions donc vous demander de photographier dans votre environnement environ cinq éléments qui pour vous font partie de l'abandon des terres agricoles ainsi que cinq éléments qui appartiennent à leurs revitalisations. Sentez-vous libre de prendre en photo tout ce que vous évoque les instructions ci-dessus.

Merci de prendre au total 8 à 12 photos et chacune deux fois afin d'éviter d'éventuelles erreurs. Veuillez avoir vos 16-24 photos prises dans le délais d'une semaine et renvoyer l'appareil photo le __ mars au plus tard. Si vous avez des questions ou des problèmes, n'hésitez pas à nous contacter par courriel ou par téléphone.

En vous remerciant,

Cordiales salutations,

Alice Viala et Mónica Revuelta Albero

Questionnaire à remplir

Nom, prénom : _____

Adresse : _____

Numéro de téléphone : _____

Année de naissance : _____

1. En quelle année avez-vous repris votre domaine ?

Dans l'année _____

2. Vous travaillez sur votre domaine à :

□ Temps plein

□ Temps partiel :

Veuillez indiquer à quel pourcentage : _____

Quelle est votre occupation secondaire? _____

3. Avez-vous une certification sur votre exploitation ?

□ Bourgeon

□ IP-Suisse

□ Autre : _____

5. Quelle est la répartition de vos terres agricoles ?

(veuillez compléter avec le nombre d'hectares ou d'un « 0 » si vous n'en avez pas)

a. Superficie de l'ensemble du domaine: _____ha
b. Surface agricole : _____ha
c. Superficie louée : _____ha
d. Autres terres (forêt, haies, marais, lac, etc.) : _____ ha

7. Quelles mesures de surfaces de compensation écologique avez-vous sur votre exploitation ? (Veuillez marquer avec une croix et compléter la surface (ha) ou le nombre)

- Prairies extensives: _____
- Pâturages extensifs: _____
- Pâturages boisés: _____
- Prairies peu intensives: _____
- Surfaces à litière: _____
- Jachères florales: _____
- Jachères tournantes: _____

- Bandes culturales extensives: _____
- Ourlets: _____
- Arbres fruitiers haute-tige: _____
- Arbres isolés indigènes adaptés au site, allées d'arbres: _____
- Haies, bosquets champêtres, berges boisées: _____
- Fossés humides, mares, étangs: _____
- Surfaces rudérales, tas d'épierrage et affleurement rocheux: _____
- Murs de pierres sèches: _____
- Chemins naturels non stabilisés: _____
- Surfaces viticoles à haute diversité biologique: _____

10. Quelle formation professionnelle (agricole et/ou autre) possédez-vous ?

□ Agriculteur avec certificat fédéral de capacité

□ Maître agriculteur

□ Étude des sciences agricoles

□ Autre:

11. Quand avez-vous effectué votre formation ?

Dans l'année _____

Si *une question n'est pas claire pour vous, n'hésitez pas à me contacter (au +41 77 970 01 50) ou à la marquer sur le questionnaire afin de clarifier les détails lors de l'entretien. Merci beaucoup pour votre participation !*

Mónica Revuelta Albero

Questionnaire à remplir et à remettre lors de l'entretien

Nom, prénom : _____

Adresse : _____

Numéro de téléphone : _____

Année de naissance : _____

1. Quelle formation professionnelle possédez-vous ?

_____

2. Quelle est votre profession actuelle?

_____

Pour touts question, n'hésitez pas à me contacter (au 077 970 01 50 ou à alice.viala@nmbu.no).
Merci beaucoup pour votre participation !

Alice Viala

Titre du projet : La revitalisation de terres agricoles abandonnées encouragée par un parc naturel régional.

Chercheuses: Alice Viala et Mónica Revuelta Albero

<u>Informations</u>

En quoi consiste le projet de recherche ?

L'objectif de ce projet est de comprendre comment un Parc Régional Naturel peut contribuer à mitiger le phénomène de l'abandon des terres agricoles en montagne. Pour ceci, nous analysons les projets proposés par le Parc Régional Naturel de la vallée du Trient et étudions comment la population locale perçoit ce phénomène, leurs rôles pour enrayer celui-ci et comment impliquer un plus grand nombre. Pour réaliser cette étude, nous utilisons une méthode de recherche photographique participative, la photo-voix, au travers laquelle les personnes participantes seront amenées à prendre des photos pour explorer le sujet de l'abandon des terres agricoles et leurs rôles dans leur revitalisation.

Cette étude consiste en trois étapes :

1. **Photo Shoot.** Vous recevez les instructions avec un appareil jetable que vous utilisez pour prendre 8-12 photos (une semaine, du 6 au 15 mars).

2. **Entretien**. Une fois les photos développées, vous avez un entretien individuel dont l'audio est enregistré pour parler de vos photos (45min-1h, entre fin mars et fin avril).

3. **Atelier**. Vous recevez un résumé de l'entretien qui vous servira de support lors des discussions à l'atelier commun avec le reste des personnes participantes (80-100min)

Qui peut participer ?

Cette étude est ouverte aux personnes de plus de 18 ans résident dans l'une des communes suivantes: Saint-Maurice, Evionnaz, Vernayaz, Martigny-Combe, Salvan, Finhaut, Trient et ayant pratiquées le bénévolat ou travaillant dans le secteur agricole.

Que suis-je censé faire en tant que participant ?

Vous devrez vous engager à prendre des photos dans le temps imparti, à participer à un entretien individuel dont l'audio sera enregistré et enfin à particper un ateliers avec les autres personnes participant à l'étude.

Quels sont mes droits pendant ma participation ?

Votre participation à cette étude est volontaire. Vous pouvez retirer votre participation à tout moment sans préciser les raisons et sans aucun inconvénient. Vous pouvez sauter une question si vous préférez ne pas y répondre.

Quelles données sont recueillies auprès de moi et comment sont-elles utilisées ?

Votre nom, votre adresse électronique ou votre numéro de téléphone et votre signature seront recueillis sur le formulaire de consentement et stockés séparément des données recueillies au cours de l'entretien. Une clé de pseudonymisation sera utilisée pour lier votre nom aux données collectées pendant l'entretien. L'entretien sera enregistré et transcrit par la suite à des fins d'analyse. Les informations mentionnées durant l'entretien qui permettraient de vous identifier seront cryptées dans la transcription.

Les données personnelles ne seront pas transmises à des tiers et les données collectées ne seront utilisées qu'à des fins de recherche dans le cadre du cours sur les études de cas.

Une stricte confidentialité sera respectée à tout moment. Les résultats seront présentés aux parties

prenantes locales et aux participants à l'étude et publiés sous une forme anonyme. Ainsi, aucune conclusion ne peut être tirée sur les participants individuels. Il n'y aura pas d'utilisation ultérieure des données. Tout sera mis en œuvre pour préserver la confidentialité entre les participants à la recherche et les chercheurs, ainsi que l'anonymat de toutes les photographies lorsque les résultats seront partagés avec un public plus large.

Quels sont mes droits sur mes données personnelles ?

Avant l'anonymisation irrévocable des données collectées, vous pouvez demander à tout moment et sans motif des informations sur les données personnelles collectées auprès de vous. Vous pouvez également demander qu'elles soient rectifiées, qu'elles vous soient remises, que leur traitement soit interdit ou qu'elles soient effacées. Pour ce faire, veuillez contacter la personne chargée de l'équipe indiquée ci-dessus.

Nous veillons à ce que la loi fédérale suisse sur la protection des données (LPD) soit respectée tout au long du processus de collecte et de traitement des données.

Qui finance cette étude ?

Le Parc Naturel Regional candidat de la Vallée du Trient, de l'Arpille à la cime de l'Est finance cette étude.

Formulaire de consentement

Je, le participant, confirme par ma signature que :
- J'ai lu et compris les informations relatives à l'étude. J'ai reçu des réponses complètes et satisfaisantes à mes questions.
- Je me conforme aux critères d'inclusion et d'exclusion de la participation décrits ci-dessus. Je suis conscient(e) des exigences et des restrictions à respecter pendant l'étude.
- J'ai eu suffisamment de temps pour décider de ma participation.
- Je participe volontairement à cette étude et je consens à ce que mes données personnelles soient utilisées comme décrit ci-dessus.
- Je comprends que je peux cesser de participer à tout moment.

Je souhaite être informé(e) des résultats de cette étude.
□ Non
□ Oui, précisez une adresse email : _____

Nom prénom participant.e	Nom prénom chercheuses
Lieu, date	Lieu, date
Signature	Signature

Color coding:

> *Red: specific questions for farmers' interviews*
>
> *Yellow: specific questions for non-farmers' interviews*

Introduction

Thank you for your time and thank you for taking the photos and filling in the questionnaire! I've already looked at the photos and look forward to discussing them with you. As stated in the consent form, to be able to focus more on the conversation and not have to write everything down, I would like to record the discussion. This exchange will be transcribed later and used anonymously for the study. Is this okay with you?

This meeting should be more like a conversation than a formal interview. The conversation is going to be based on the photos that you've taken, it's your perspectives that are interesting here. I'm here to listen to you and understand what you see in these photos. You are the one who took them, so you are the pro! I have prepared some questions in case that you can answer freely and say as much as you want. There are no good or bad ideas, I'd just like to explore your views on farmland abandonment and its potential revitalization and how to better engage people in this topic.

The meeting should take between 45 minutes and an hour. Do you have any questions before we start?

Returns

Perhaps you could start by telling me what it was like to walk around with the camera and take pictures in your environment?

When did you take the camera, was it over several days? Did you go out especially with the camera, or did you bring it to work?

Were there any unusual things while taking your photos?

Photos

If we now look at the individual photos, can you tell me something about them and explain them to me?

Why did you photograph this? What is the significance of this element to you? How was it created?

Abandonment of agricultural land

Before this study, had you ever heard of the term farmland abandonment?

What does farmland abandonment mean to you?

What are the elements or components that, in your opinion, show the abandonment of agricultural land in the region?

Which of these do you find on your farm?

How has the image of the farm changed? What was your father's or the previous generation's attitude towards abandoning the land?

How do you feel about this abandonment of agricultural land?

How has the landscape of the valley changed over time?

What responsibilities do you think you have in the abandonment of agricultural land? Who else has a responsibility for this phenomenon?

Revitalization of agricultural land

What does the revitalization of agricultural land mean to you?

What role do you think you play or can play in the revitalization of agricultural land?

What role do farmers have to play in this? Administrations?

What role do you think the public can play in this? How can they be involved?

Which of your works/activities do you think have an impact on the abandonment of agricultural land? What is their impact?

What motivates you to revitalize this land?

What is your relationship with agriculture? Do you have any relatives or ancestors who are farmers?

Nature conservation

What elements in your photos are part of nature? What is part of nature?

In your opinion, to what extent is the abandonment of agricultural land related to nature conservation?

To what extent is the revitalization of abandoned agricultural land linked to nature conservation?

What is the link between land abandonment and nature?

To what extent is there an exchange of ideas or discussion on the respective goals and wishes between nature conservation and farmers?

Agricultural policy

You have told us in advance what measures you are implementing in the context of direct payments. Do they help to prevent the abandonment of agricultural land?
What do you see as the tasks of agriculture in general?
How important are these tasks compared to other tasks, such as food production?
Do you know of any agricultural policies that amplify the phenomenon of farmland abandonment? Which can stop it? That allow the revitalization of abandoned land?

Conclusion

We have now come to the end. Finally, is there anything else you would like to say or mention that has not yet been asked? Again, thank you very much for taking the time to talk to me about it!

1. Introduction *[10 min]*

Bonsoir, tout d'abord merci d'avoir pris le temps de venir à cette discussion de groupe. Cela devrait prendre environ 1h-1h30 avec un petit apéro à la fin. On peut commencer cet atelier en se présentant chacun, chacune, en précisant notre prénom, occupation et commune d'habitation.

[La chercheuse principale se présente en premier et ensuite tour de table].

2. Explication du déroulement de l'atelier *[4 min]*

L'objectif de cet atelier est d'explorer la question de l'abandon des terres agricoles et leurs potentielles revalorisations, mais tous ensemble cette fois. J'ai déjà eu un entretien avec chacun, chacune d'entre vous, mais le but ici est de vraiment partager vos idées et explorer le sujet ensemble, de partager vos points de vues qui peuvent varier grandement dans certains aspects.

L'atelier va se dérouler en trois parties:

1. Vous avez devant vous vos photos. Vous allez en choisir une ou deux, qui représentent des éléments liés à l'abandon des terres agricoles, et à la revalorisation telle que vous la percevez. C'est important que vous choisissiez des éléments qui vous semble important, ou unique à votre perception et que vous voulez partager avec les autres.
2. Dans un second temps, vous allez chacun, chacune présenter la ou les photos choisies, et expliquer pourquoi vous avez choisis de présenter ces éléments là.
3. Ensuite, vous aurez l'opportunité d'échanger sur ce qui a été dit par d'autres personnes, que cela soit pour émettre des questions, des commentaires ou autres.

Mon rôle est de faciliter la discussion et l'atelier en général. Mónica/Alice prendra des notes sur ce qui émerge des discussions. Il se peut qu'on intervienne par moment pour éclaircir quelque points. Vous avez à votre disposition stylo et papier pour noter d'éventuelles questions ou remarques à partager par la suite. Des questions avant que l'on commence ?

3. Déroulement de l'atelier

1. Vous avez donc 4 minutes pour choisir vos/votre photo(s) et les éléments que vous voulez présenter. Vous aurez ensuite environ 3 minutes pour en parler. *[4 minutes]*

2. Maintenant que vous avez tous et toutes choisi vos photos, vous allez pouvoir échanger, un par un. C'est important de ne pas s'interrompre, si vous avez des questions ou des commentaires à faire sur ce qui est dit par d'autres personnes, notez les soit sur le papier à disposition ou dans votre tête jusqu'à la discussion commune. Pour garder en tête qui présente quelles photos, nous allons les numéroter avec des stickers. Vous avez donc 3 minutes pour parler, si vous atteignez ces 3 minutes, je lèverais la main pour vous signifier que votre temps est bientôt écoulé, afin que tout le monde puisse parler autant. Qui veut commencer ? [Si personne ne veut commencer les chercheuses désigne quelqu'un.e].

[tout le monde présente sa/ses photo(s), les chercheuses les marques au fur et à mesure afin de les différencier]. *[30 minutes]*

3. Vous pouvez maintenant discuter entre vous de ce qui a été présenté par chacun chacune, si vous avez des commentaires à faire, envie de rebondir sur quelque chose qui a été dit, sentez vous libre. L'idée est vraiment que vous parliez entre vous, et que vous exploriez les différents points de vue. Je vais faciliter la discussion selon le besoin pour que toutes les personnes qui désirent partager, puissent s'exprimer. *[30 minutes]*
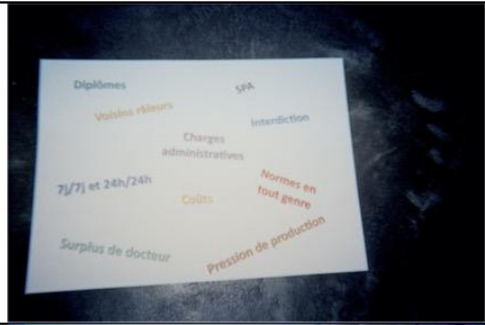
The pictures with a ⭐ next to them are the ones chosen by the participants for the group discussion.
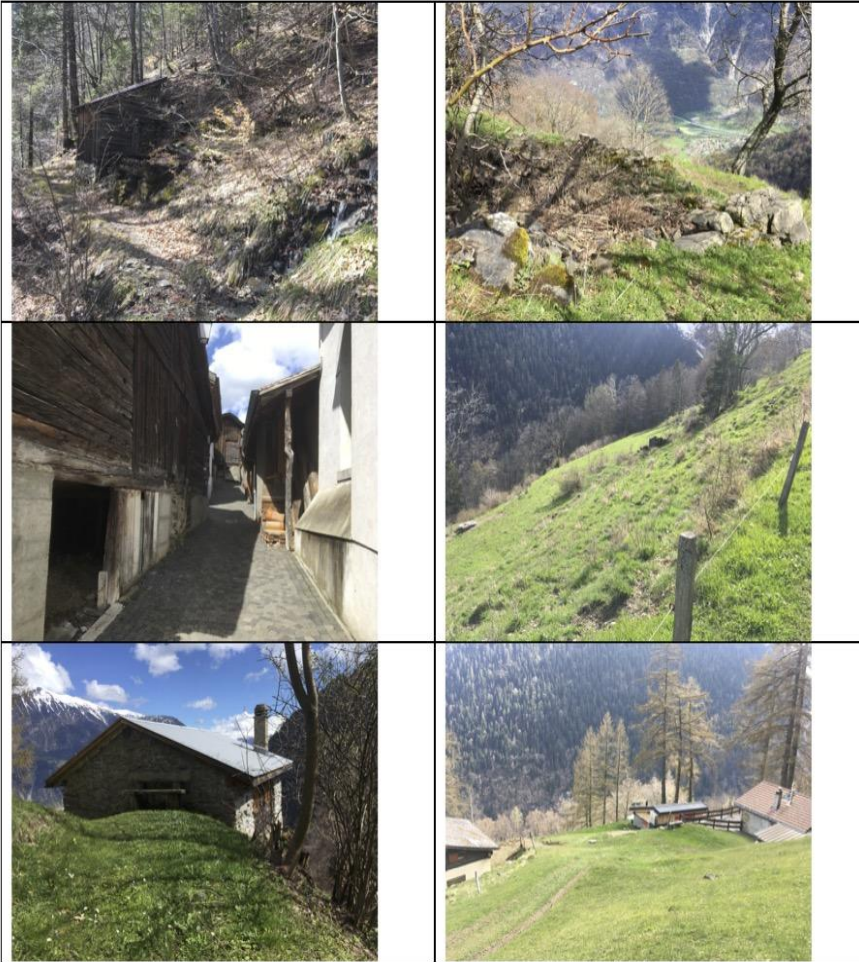
Pictures from NF2

Pictures from NF3

Pictures from NF5

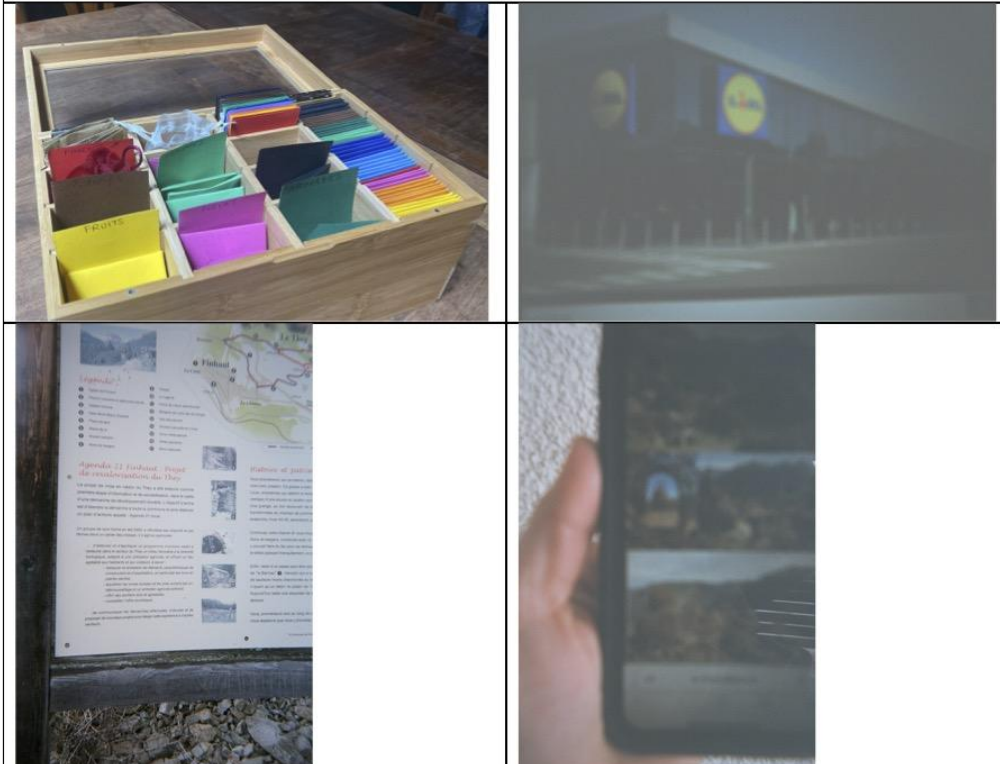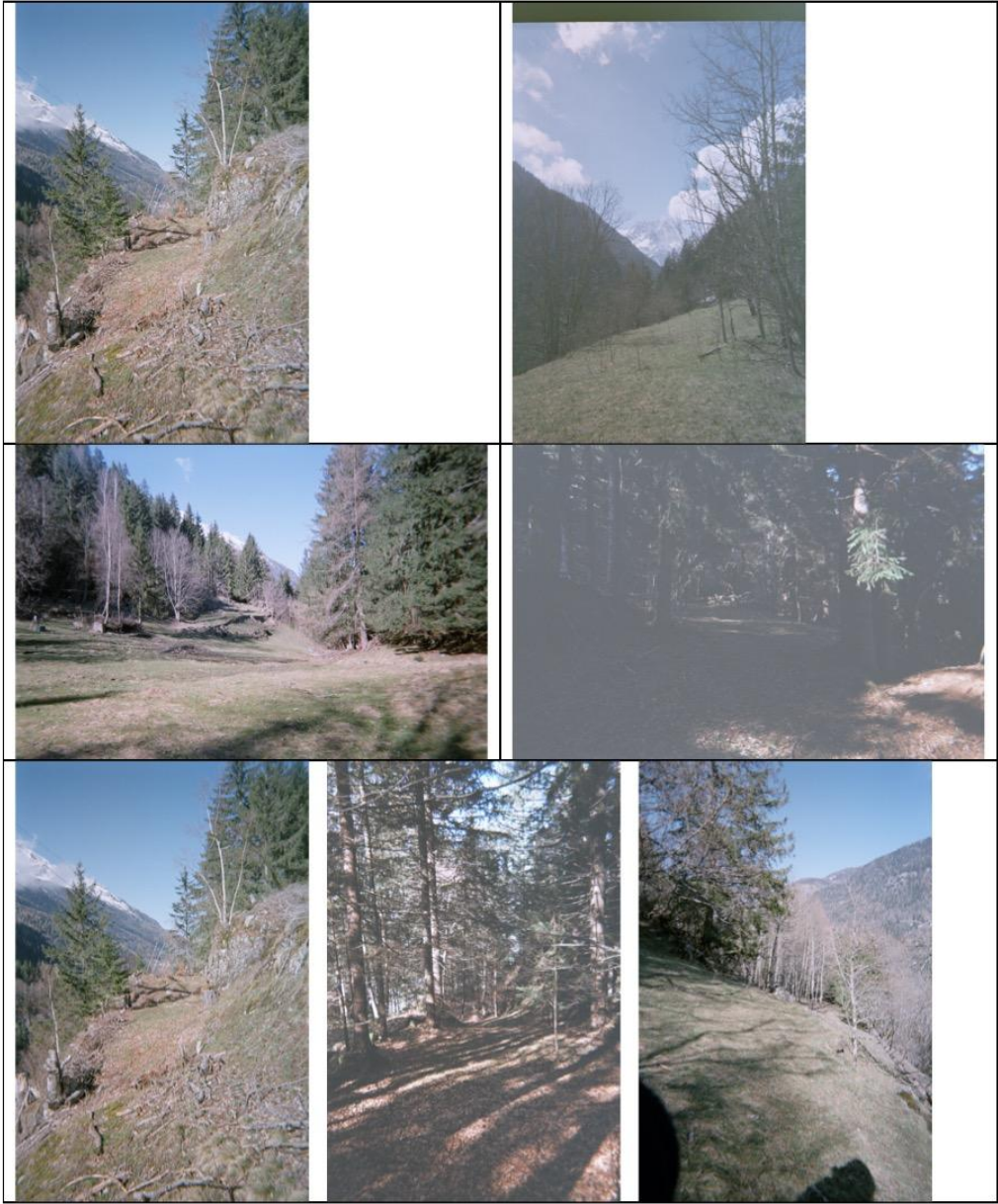Pictures from NF6

Pictures from NF7

Pictures from NF8

Pictures from NF9

Appendix 9. Table presenting the emerging ideas from the non-farmers' group discussion, organized by the thematic of LA and revitalization

Speaker	Land abandonment	Revitalization
NF1	. Photo taken from the train between Salvan and Les Marécottes, on a bend you can see the construction on a meadow of housing lost farmland. . Idea that construction is invading more and more farmland.	. Photo of the entry of the village of Salvan. There's a farm, and a young man is super-motivated to start a market-gardening project there, but he doesn't have the financial means to acquire the land. No help from the commune. . Idea of the lack of agricultural policy in the commune and support for farmers.
NF2	. Photo with several words: -"Grumbling neighbors" who complain about manure, barbed wire, the noise of bells or animals. - "Doctor surplus", people with no knowledge of agriculture take the liberty of criticizing what farmers do, thinking they know better than everyone else. - "Production pressure", difficulty of being profitable compared to the plain. . Idea that the ambient environment in the valley doesn't help farmers in their work: no recognition for the work they do.	
NF3	. Photo of former cereal fields on the Adret, now overgrown with brambles. .It's a lot of work for landowners to maintain, not easy. . The idea is to show that it's not easy to maintain agricultural land, and that the forest comes back easily everywhere.	. Photo of a clearing operation carried out by the triage forestier, which enabled the cultivation of overgrown land. . Idea that it takes a lot of work to be able to cultivate again and that sometimes professionals are required. Idea that it takes a lot of work to maintain pastures, but that it's feasible, a passion for farmers.
NF4	. Photo of Lac des Marécottes, 100 years ago it was a lake and now it has been transformed into a hydroelectric dam, which has submerged pastures close to the village. . Idea that agricultural land is disappearing to meet the needs of tourism and the valley's inhabitants.	. Photo of a household where members maintain a garden with a collective spirit. This makes it possible to maintain farmland, without the pressure of being profitable, because they don't depend on it for their livelihood. . The idea of working the land collectively to preserve land, without this being the main activity.
NF5	. Photo of the Ferbissio plateau, with the forest returning to the plain and taking over crops. . Idea that agricultural land is being invaded by the forest.	
NF6	. Photo of a farm ruin where you can see terraces where cereals used to grow. It's in the middle of nowhere where you'd never suspect it was once cultivated. . The idea that the forest is now present on formerly agricultural land. . Photo of a dwelling in the middle of a meadow, it's a leisure dwelling in the middle of a place that used to be	. Photo of a communal oven, recently renovated with the idea of creating a place of community in the village where people gather as before to bake their bread. Shows how important it is to bring people together around simple things. . Perhaps there should be only one farmer in the village to ensure the flow of production to the village.

	cultivated. He doesn't think it's normal for this to be possible, as it's harmful to the environment. . The idea that people are allowed to live on agricultural land.	. Idea to show that we need to recreate a community spirit in the villages.
NF7	. Photo of a hydrant in the forest in the middle of nowhere near La Léchère. He was surprised to come across it. For him, it shows that there is little infrastructure, protection against natural hazards or anything else on the mountain pastures. . Idea that security should be reinforced to make people want to come back and occupy land further away from the villages.	. Photo of the Louis des six doigts tourist trail. This trail leads to a sheepfold, where tourism has helped to preserve a mountain pasture. . Tourism idea to preserve certain mountain pastures.
NF8	. Photo of Les Marécottes ski slope plan: the ski slopes take up land that could be used for agriculture. . Photo of a Liddl supermarket, the implementation of supermarkets is detrimental to local consumption and AMAPs because there is more competition. . Idea of showing that competition is tough for agriculture, and that it's easier to source products elsewhere. Idea that the abandonment of farmland is not only due to forest invasion and construction, but also to leisure activities.	. Photo of his seed box. We need to adapt our crops and diets to feed ourselves more on what we would grow in the valley, to move towards food self-sufficiency. . Thanks to climate change, market gardening in the region can be envisaged, while growing plants adapted to the ambient climate.

Appendix 10. Table presenting the emerging ideas from the farmers' group discussion, organized by the thematic of LA and revitalization

	LA	Revitalisation
Mélanie	L'abandon des terres agricoles la marque beaucoup, elle voit beaucoup de négatif dans ça. Photo de vignes abandonnées et malade, avec des plantes envahissantes et la forêt. Ça montre que la forêt revient, même par-dessus les constructions (bâtiments et murs en pierres sèches). Comment récolter ces vignes ? La production n'est plus possible dans de tels conditions.	Il faut réutiliser les terres agricoles mais pas en monoculture : photo de ses vignes en polyculture avec des oliviers. Mettre plusieurs espèces dans un même espace, ça apporte différents éléments pour la biodiversité et l'esthétique. (surtout en zone pentue ?).
Claude	Deux photos de terrains envahi par la forêt. Ces trente dernières années il y a eu un envahissement des terres agricoles par la forêt. Avant, tout était fauché à la main et ce qui était fauché était utilisé. La perte de ces surfaces, et la perte du patrimoine qui va avec (comme les murs en pierres sèches) lui font mal au cœur. « Perte de la valeur du travail des anciens », qui habitaient et vivaient là. Aujourd'hui, on achète le foin ailleurs, qui est récolté grâce à des machines (baisse du coût ?). La limite théorique de la forêt qu'ils ont établie sur les propriétés familiales a permis de « sauver des terres ».	L'année dernière, le PVT a subventionné le débroussaillement d'un de de ces prés par des bucherons du village (20 000 chf). C'est la seule méthode qu'il voit pour repousser la forêt, « la forêt va plus vite que nous ». Pourtant le pré en question a toujours été pâturé, c'est difficile de limiter l'agrandissement de la forêt. Plus il y a de buissons, moins il y a de lumière au sol et moins il y a d'herbes. Il faut garder des pâturages à moyenne altitude, les garder contre la menace de la construction qui est partout. Dans un siècle il pense qu'il n'y aura plus de zone agricole à basse altitude à cause de ça. C'est impossible de contrer la productivité en plaine mais c'est possible de préserver certaines choses, comme les potagers, qui permettent d'augmenter la production locale et la résilience.
Anne-Laure	Photo des églantiers au bord de chemin. Le Trétien est envahi par les ronces et les églantiers. Il y a des terrains en bord de chemin qui sont envahi et d'autre plus loin qui ne le sont pas. Ça montre que des gens font l'effort de s'occuper des terrains mais d'autres non. Pourquoi est-ce que les gens n'enlèvent pas les églantiers sur leurs terrains ? Les terrains perdent de la valeur à cause de ça, c'est un système sans vision et utilisation des ressources à long terme.	Photo d'elle et une amie qui plantent des asperges. Ça permet de revaloriser les terrains de façon accessible et de créer un lien avec les gens du village, ainsi que de produire sur place, simplement.
Dominique	Ce qui est vert sur la photo était en culture jusqu'à ses 15 ans. Avant au Trétien était produit 70 tonnes de fraises, il y avait aussi du maraichage. Maintenant, les pâturages sont gardés ouverts mais grâces aux bêtes. L'abandon des terres est frustrant. Si on compare une photo de 1850 à maintenant, on voit la vraie limite de la grande forêt. Avant il y avait des cultures en terrasses. Un élément majeur qui cause l'abandon des terres est la pénibilité. C'est ok de jardiner pour soi, mais jardiner pour gagner sa vie non. Trop de travail pour difficilement être rentable. La méchanisation à la montagne n'est pas toujours possible à cause de la pente, avant tout était fait à la main, la terre était tournée à la main. C'est même trop pentu pour des chevaux.	La forêt sèche en dessous montre là où il y avait la grande forêt.