TOWARDS A SUSTAINABLE RURAL MOUNTAIN LANDSCAPE.
EXPLORING THE (HI)STORIES OF VAL BORBERA
(NORTHERN APENNINES, ITALY)

Msc. Rebekka Dossche

Genova, October 2016
Promotors:

Prof. Diego Moreno, University of Genoa
Prof. Carlo Montanari, University of Genoa
Prof. Veerle Van Eetvelde, Ghent University

Members of the Jury:

Dr. Elke Rogge, Flemish Institute for Agriculture and Fisheries, Belgium
Dr. Matthias Bürgi, Swiss Federal Research Institute WSL, Switzerland
Prof. dr. Roberta Cevasco, University of Gastronomic Sciences, Pollenzo, Italy

Dean UNIGE: Prof. Stefano Pittaluga
Dean UGent: Prof. Herwig Dejonghe

Rector UNIGE: Prof. Paolo Comanducci
Rector Ugent: Prof. Anne De Paepe
TOWARDS A SUSTAINABLE RURAL MOUNTAIN LANDSCAPE.
EXPLORING THE (HI)STORIES OF VAL BORBERA
(NORTHERN APENNINES, ITALY)

Rebekka Dossche

Thesis submitted in fulfillment of the requirements for the degree of Doctor (PhD) in Historical Geography (UNIGE) and in Science: Geography (UGent)
Please refer to this work as follows:


This dissertation has been executed under a Joint Collaboration Agreement between the University of Genoa and Ghent University. Additionally, it has been made possible thanks to the financial support of the Flemish Institute for Agriculture and Fisheries (ILVO) for the period March 2014-February 2016.

The author and the promoters give the authorization to consult and copy parts of this work for personal use only. Every other use is subject to the copyright laws. Permission to reproduce any material contained in this work should be obtained from the author.
Subordination and disobedience, humility and the longing for freedom, the ugly and the sublime are closely interwoven and, thus, present an undeniable combination of opposite elements, a combination in and through which the one provokes the other and vice versa.

Van der Ploeg (2008)

We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect

Aldo Leopold

In one hand I have a local farmer who passes me his knowledge on how to produce this land, in the other I have a bunch of study books on production systems. Combining the two is my way to create a sustainable farm.

Interview M. Carucci (2014)

Voor N.D.,

die me leerde zowel mijn handen als mijn hoofd te gebruiken
ACKNOWLEDGEMENTS

“The Three Oddest Words”

*When I pronounce the word Future, the first syllable already belongs to the past.*

*When I pronounce the word Silence, I destroy it.*

*When I pronounce the word Nothing, I make something no non-being can hold.*

Wisława Szymborska

I thought writing this part would have been the easiest, but maybe it is the contrary. There is an endless list of people I would like to thank. People I met during these last 4 years, people who supported me consciously or not, people who taught me, sometimes without even realising themselves. From some of them, I don’t even remember the names, or neither the faces. From others I do, and they are worth mentioning.

Prima di tutto, Diego e Carlo. 4 anni fa sono arrivata in dipartimento, non sapendo bene come e dove muovermi in questo mare di accademici che, al mio parere, parlavano un altro linguaggio (oltre all’Italiano). Però ho guardato, ho osservato, ho cominciato a capire, e ho imparato. Vi vorrei soprattutto ringraziare per le tante discussioni che abbiamo avuto (durante il Semper e non). Non è stato sempre facile, non ci siamo sempre capiti (fino alla fine...), però vi assicuro che durante questi anni ho imparato almeno a seguire i vostri discorsi. E poi ho anche imparato la bellezza della discussione in sé.

Veerle, in 2011, after a few years of working experience abroad, I arrived back at the university of Ghent, not really sure what to do exactly. You gave me the possibility to work on my first ‘landscape research’ project. And look now where it led me ... Thanks for supporting me during these years, and being my promotor.

Elke, I know you’re not officially mentioned as supervisor, but you surely more than deserve the ‘title’. Your availability, transparency, constructive observations, ... have made this research and writing process a lot more understandable and feasable. Several times you’ve opened my eyes and changed my perspective, so I could see my objectives clear again. I really want to thank you for the chances you gave me, and the very fluent collaboration. Even at a distance.
One of the hardest challenges of doing a PhD, from my point of view, was the loneliness. Oddly enough, being part of three research institutes did not always make that easier. The large variety of colleagues at UNIGE, Ghent University and ILVO, surely deserve a big thank you for understanding and supporting me. At the Italian side: Robert, Raffaella, Valentina P., Nicola and the other members of the LASA-research group. At the Belgian side: Lien, Lies, Eva, and all the ILVO-colleagues who made me feel at home during this last summer of writing.

E poi ci sono gli attori, la gente con cui ho lavorato, chi ho intervistato, e che mi hanno ispirato con le loro storie, i loro racconti: Sergio, Maria Angela e Marco Crosetti, Marco Guerrini, Maurizio & Martina, Giuse Cresci, Giannino Delbarba, Walter Sorlino, Paulo Ferrari, Tamara, e molti altri. Siete voi le persone che avete in mano il territorio, ho imparato tanto da voi, spero che anche voi impariate qualcosa da me.

Ma oltre agli attori locali, ci sono anche delle persone che mi hanno dato una mano nel loro modo. Ottavio Rube per essere semplicemente un’ispirazione, Jeff per farmi da specchio ogni tanto, Mario Zadra per dimostrare un interesse in quello che facevo, Paco per aiutarmi con Photoshop, e poi tutti gli amici di questo territorio ‘nostro’. Per avermi appoggiato e sopportato, senza forse neanche capire bene cosa stavo facendo. And in supporting, distance does not matter. That was clear during the huge support by family (mama, dike merci!!) and (old) friends in Belgium: Thank you so much for cheering! I felt your energy on 1000km away!

E poi, alla fine ci sei tu, Michi. Anche se gli ultimi mesi la nostra vita è stata un po’ su ‘pausa’, ci sei sempre stato. A parte del fatto che sei la persona per cui mi sono trasferita in queste zone rurali, sei il filo rosso in tutte le cose che faccio. Non vedo l’ora di riprendere la nostra vita in mano, e costruirla insieme a te e Leandro.

And now? Now it’s time for something else. Something different. Something new.

Thank you all.
# Table of Contents

Acknowledgements ........................................................................................................ iii

Table of contents ........................................................................................................... v

List of figures .................................................................................................................. xi

List of tables .................................................................................................................... xv

Chapter 1 - Problem setting, objectives and research questions .................................. 1

1.1 Introduction ............................................................................................................... 3

1.2 The destabilizing effect of land abandonment ......................................................... 6

1.3 Dualities within current rural landscape and rural life ............................................ 8

1.3.1 Dualities influencing the rural landscape ................................................................. 8

1.3.2 Dualities influencing the rural life ........................................................................... 9

1.3.3 Global changes causing tensions in the rural ........................................................ 11

1.4 Future Sustainable Development ............................................................................ 12

1.5 Objectives and research questions ......................................................................... 13

1.6 Outline of the dissertation ....................................................................................... 14

Chapter 2 - Exploring dynamics and processes of rural mountain landscapes .............. 17

2.1 Exploring ................................................................................................................. 20

2.1.1 ... the different meanings of ‘Paesaggio’ – ‘landscape’ – ‘landschap’ ................. 20

2.1.2 ... the key aspects for landscape research ............................................................... 26

2.2 Dynamics and Processes of rural mountain landscapes ........................................... 34

2.2.1 Historic land management: the agro-silvo-pastoral system ................................ 34

2.2.2 Land abandonment and its largest consequences ................................................. 37

2.2.3 In need for a sustainable development ................................................................. 39

2.3 The rural landscape of Val Borbera ....................................................................... 41

2.3.1 Demographic climate ......................................................................................... 42
2.3.2 Economic climate.................................................................................................44
2.3.3 Cases presented....................................................................................................46

Chapter 3 - Research design, material & methodology ........................................... 49

3.1 Data sampling...........................................................................................................53
   3.1.1 Carto- & photographic data through desktop analysis .....................................53
   3.1.2 Archival documents through archival research................................................59
   3.1.3 Landscape elements through field survey..........................................................62
   3.1.4 Oral knowledge through Semi-structured interviews & focus groups ...............63

3.2 Data analysis............................................................................................................70
   3.2.1 Regressive spatial analysis..................................................................................70
   3.2.2 From open coding to a theoretical framework: a Grounded Theory............... 83
   3.2.3 A heuristic device: the coupled human-environmental timeline.......................84

3.3 Data triangulation....................................................................................................88

Chapter 4 - Land abandonment and its impact on the landscape character of Val Borbera ...91

4.1 Case study 1: Carrega Ligure ..................................................................................94
   4.1.1 Landscape character for 3 time periods..............................................................94
   4.1.2 Toponyms – Oral History................................................................................107

4.2 Case study 2: Figino.................................................................................................115
   4.2.1 Landscape character for 3 time periods..............................................................115
   4.2.2 Toponyms – Oral History................................................................................123

4.3 Indicators for land abandonment ..........................................................................130
   4.3.1 Intensive use, no abandonment .........................................................................131
   4.3.2 Extensive use, small level of abandonment.......................................................131
   4.3.3 No use, complete abandonment.........................................................................133
   4.3.4 Indicators............................................................................................................133

4.4 Major Transformations .........................................................................................138
   4.4.1 Exponential growth of woodland ....................................................................139
4.4.2 Decrease of plantations

4.4.3 Decrease and increase of grasslands

4.4.4 Increase and decrease of shrubland

4.4.5 Disappearance of cultivations

4.5 Conclusions

4.5.1 From heterogeneous to homogeneous

4.5.2 From multiple to single use

4.5.3 From intensification to extensification

Chapter 5 - Detecting people’s and landscape’s identity in a changing mountain landscape

5.1 Landscape identity: interrelation between landscape and people

5.2 Characteristics of ‘Val Borbera’

5.2.1 Major landscape transformations

5.2.2 Spatial identity

5.3 Results

5.3.1 Nostalgia for past - Resignation towards future

5.3.2 Innovation and willingness for change

5.4 Discussion

Chapter 6 - The interplay between driving forces, processes and manifestations

6.1 Understanding Driving forces

6.1.1 Driving forces through literature

6.1.2 A complex system

6.1.3 Research Challenges

6.1.4 Why studying driving forces?

6.2 Driving forces through time

6.2.1 1796-1850: Political instability and first migration trends (seasonal) - see Figures 6.1 & 6.3

6.2.2 1850-1900: Political stability, economic insecurity, large migration to the America’s - see Figures 6.4 & 6.5
6.2.3 1900-1950: Two large political conflicts, economic and demographic decline - see Figures 6.6 & 6.7

6.2.4 1950-today: Depopulation, rewilding, new institutions and initiatives - see Figures 6.8 & 6.9

6.3 Driving forces from an actors point of view

6.3.1 International political impact

6.3.2 Local autonomy & Self-governance

6.3.3 Economic fluctuations and ‘new’ rural initiatives

6.3.4 Good social cohesion

6.3.5 Depopulation, eldering and counter urbanisation

6.3.6 Migrations

6.3.7 Transportation and infrastructure improving and degradation

6.3.8 Intensification and extensification

6.4 Discussion

7.1 Rural sustainable development: not that simple

7.1.1 Modernization > new rural development > neo-endogeneity

7.1.2 Productivism > post-productivism > multifunctionality

7.1.3 Not a linear process

7.2 Different rural development paths for mountain areas

7.2.1 The duality within rural development paths

7.2.2 Basic needs for rural development paths

7.3 Val Borbera: a suitable landscape for multifunctionality and repeasantisation

7.3.1 Local actors and their initiatives

7.3.2 Institutions and their policy
7.3.3 Products and their landscape ................................................................. 233

7.4 A sustainable development path for rural mountain areas .......................... 235
7.4.1 Resource governance ....................................................................... 235
7.4.2 Cooperation and co-production with an Ethos & Morality ................... 238
7.4.3 Summarizing: Arriving at a sustainable rural development ..................... 239

7.5 Discussion ............................................................................................... 241
7.5.1 Knowing the strengths and opportunities of the landscape ....................... 241
7.5.2 Need for policy response ................................................................... 242
7.5.3 Need to work with people ................................................................... 242
7.5.4 Struggle for autonomy, historically based ............................................. 243

Chapter 8 - Conclusions ............................................................................... 245
8.1 Recalling the research objectives ............................................................. 247
8.2 Answering the questions ......................................................................... 248
8.2.1 What is the spatial character of the landscape and how did the land abandonment process change this character through time? ......................... 248
8.2.2 What is the existential character of the landscape and how do actors relate themselves with their landscape through time? ........................................... 250
8.2.3 What were the driving forces behind the spatial and existential changes and what drivers will have an impact on the future? .................................................. 250
8.2.4 How can empirical landscape research lead to sustainable policy-making for rural mountain landscapes? ............................................................... 251
8.3 Topics for future research ....................................................................... 253

References .................................................................................................... 255
Attachments ................................................................................................. 255
LIST OF FIGURES

Figure 1.1: Outline of the dissertation .................................................................14
Figure 2.1: Situation of the two case studies (Carrega Ligure and Figino) in Val Borbera (Alessandria - Piedmont) .................................................................41
Figure 2.2: Population of Val Borbera, Carrega Ligure and Albera Ligure from 1861 until 2011. The two large emigration phases are signed by the dotted line (source: censimenti d’Italia) ....43
Figure 2.3: Agricultural land cover in Val Borbera in 1929. (source: 1° censimento d’Italia – 1929 ISTAT) .................................................................................45
Figure 2.4: View on the villages of Carrega Ligure and Connio in 1920 (left) and 2013 (right) (Photo’s: family archive Crosetti - R. Dossche) .........................................................46
Figure 2.5: View on the village of Figino in 1930-1950 (left) and 2013 (right) (Photo’s: family archive Giuseppe Cresci - R. Dossche) ........................................................................47
Figure 3.1: Folder, title and first page of the “Correspondence of 1819 colonel Vice-Intendant of Novi, and other authorities” (Serie 3-1.5 1819-1821) ........................................62
Figure 3.2: Front and retro side of the filling form used for the field survey .................................63
Figure 3.3: Overview of used material for the regressive spatial analysis ........................................82
Figure 3.4: The data triangulation within this research .................................................................89
Figure 4.1: Representation of coppice woodland at the toponym Valette in the 19th century on three different sources: (a) Napoleonic land register (1811), (b) Minute di Campagna (1828), (c) Gran Carta Stati Sardi ...........................................................................95
Figure 4.2: Representation of the higher pasture land and the shrubland of the 19th century and of the toponyms Lavaggio and Cugnu Peuo on three different sources: (a) Napoleonic land register (1811), (b) Minute di Campagna (1828), (c) Gran Carta Stati Sardi ...........................................................................97
Figure 4.3: Representation of the multiple land use system of the 19th century and of the toponym Forca on three different sources: (a) Napoleonic land register (1811), (b) Minute di Campagna (1828), (c) Gran Carta Stati Sardi ...........................................................................99
Figure 4.4: Representation of the invasion of secondary vegetation in the 20th century around Monte Colletto on two different sources: (a) aerial photograph (1936), (b) aerial photograph (1980) ..............................................................................102
Figure 4.5: Carrega Ligure (a) view 1950 (Foto: William John Crosetti), (b) view 1977 (Foto: Richard John Crosetti) ..................................................................................103
Figure 4.6: The current land register (“1950) positioned on the ortographic photograph ...........105
Figure 4.7: Napoleonic land register map (“1811) with the collected toponyms of Carrega Ligure. The illustrated toponyms are surrounded in black. .........................................................108
Figure 4.8: View on land cover at the toponym Scabiun through time (a) 1828; (b) 1852; (c) 1936; (d) 1980; (e) 2014 (source: topographic map 1970).

Figure 4.9: View on land cover at the toponym Forca through time (a) 1828; (b) 1852; (c) 1936; (d) 1980; (e) 2014.

Figure 4.10: Representation of chestnut plantations at the toponym Bosco Grande in the 19th century on three different sources: (a) Minute di Campagna (1828), (b) Gran Carta Stati Sardi (1852).

Figure 4.11: Hillslope, recent land register, and representation of terraces through hillslope at the toponym Piasri (Based on: Digital Terrain Model – 10m, ARPA Region of Piedmont).

Figure 4.12: Representation of shrubland at the toponym Valle della Croce in the 19th century on three different sources: (a) Minute di Campagna (1828), (b) Gran Carta Stati Sardi (1852).

Figure 4.13: Representation of the cultivated land and mostly vineyards between Vigo and Figino, and Albera Ligure on three different sources: (a) Minute di Campagna (1828), (b) Gran Carta Stati Sardi (1852).

Figure 4.14: Representation of the invasion of woodland in the 20th century at Bosco Grande on two different sources: a) topographic map (1959) b) aerial photograph (1980).

Figure 4.15: Representation of the decrease of arable land and vineyards in the 20th century at Boffalora on two different sources: (a) topographic map (1959), (b) aerial photograph (1980).

Figure 4.16: Figino view today (Foto: R. Dossche, April 2016).

Figure 4.17: The current land register (*1950) positioned on the orthographic photograph.

Figure 4.18: Napoleonic land register map with the collected toponyms of Figino. The illustrated toponyms are surrounded in black.

Figure 4.19: View on the toponym Le Moglie and La Boffalora through time (a) 1828; (b) 1852; (c) 1936; (d) 1980; (e) 2014.

Figure 4.20: View on the toponym Pian del Té through time (a) 1828; (b) 1852; (c) 1936; (d) 1980; (e) 2014.

Figure 4.21: Evolution of abandonment in the two case studies.

Figure 4.22: Sequence of level of abandonment on hillslope for Carrega (a) 1828, (b) 1852, (c) 1936, (d) 1980, (e) 2014 (source: DTM – 10m, Region of Piedmont).

Figure 4.23: Sequence of level of abandonment on hillslope for Figino (a) 1828, (b) 1852, (c) 1959, (d) 1980, (e) 2014 (source: DTM – 10m, Region of Piedmont).

Figure 4.24: Evolution of Land Cover of Carrega Ligure and Figino.

Figure 4.25: Evolution of Woodland of Carrega Ligure versus Figino.

Figure 4.26: Evolution of plantations of Carrega Ligure versus Figino.

Figure 4.27: Evolution of grasslands of Carrega Ligure versus Figino.

Figure 4.28: Evolution of shrubland of Carrega Ligure versus Figino.
Figure 4.29: Image of rough land of Monte Colletto and view on the cultivated land with treelines and hedgerows - Carrega Ligure 1950 (Picture taken by: William John Crosetti) ........143
Figure 4.30: Evolution of cultivations of Carrega Ligure versus Figino .................................................................143
Figure 4.31: Function/use in Carrega Ligure (a) and Figino (b) through time ..........................................................147
Figure 5.1: Theoretical scheme explaining the dynamic of landscape identity through time .........163
Figure 5.2: Localization of tipping points of both spatial (TP1) and existential (TP2) landscape identity, reaching to a tipping point in equilibrium (TPe) ..........................................................................................168
Figure 6.1: Events and proximate driving forces on a heuristic timeline for the period 1796-1850. ..........................................................................................................................................................183
Figure 6.2: Local farmer opening the irrigation canal ‘bego’ to flood his field with beans (fagiolane) in Figino (photo: Giuseppe Crespi, August 2016) ..................................................................................................184
Figure 6.3: Manifestations (bullet points), proximate (top) and underlying (bottom) driving forces and their interrelation for the period 1796-1850. ............................................................................................185
Figure 6.4: Events and proximate driving forces on a heuristic timeline for the period 1850-1900. ..........................................................................................................................................................186
Figure 6.5: Manifestations (bullet points), proximate (top) and underlying (bottom) driving forces and their interrelation for the period 1850-1900. ............................................................................................187
Figure 6.6: Events and proximate driving forces on a heuristic timeline for the period 1900-1950. ..........................................................................................................................................................188
Figure 6.7: Manifestations (bullet points), proximate (top) and underlying (bottom) driving forces and their interrelation for the period 1900-1950. ............................................................................................189
Figure 6.8: Events and proximate driving forces on a heuristic timeline for the period 1950-today. ..........................................................................................................................................................190
Figure 6.9: Manifestations (bullet points), proximate (top) and underlying (bottom) driving forces and their interrelation for the period 1950-today. ............................................................................................191
Figure 7.1: Situation of the territory of the GAL Giarolo and the two case studies of Carrega Ligure and Figino (Albera Ligure) ........................................................................................................................................226
Figure 7.2: The concept of reasoned agriculture (after Quiligotti, 2015 and Van der Ploeg, 2008) ..........................................................236
Figure 7.3: The interrelation between landscape, actors and institutions in a) an autonomous rural system, b heteronomous rural system, c) a multifunctional sustainable system. ..........244
LIST OF TABLES

Table 2.1: Overview of the different etymological meanings of the words 'landscape' and 'territory' in English, Italian and Dutch .................................................................21
Table 3.1: Interpretation of the symbology in the historical maps 'Minute di Campagna', Corpo di Stato Maggiore (1828) and 'Gran Carta degli Stati Sardi di Terraferma' (1852) .........55
Table 3.2: Overview of used cartographic and photographic material ......................................58
Table 3.3: Overview of the consulted documents of the antique and historical archive relevant for an additional research on landscape changes (Communal archive of Carrega Ligure) ........61
Table 3.4: Overview of interviewed actors and their profile .......................................................66
Table 3.5: Main interview questions and subjects during the semi-structured interviews ..........66
Table 3.6: Representation participants focus groups .................................................................67
Table 3.7: Script focus groups .................................................................................................68
Table 3.8: Overview of used methods for a regressive landscape analysis ..................................71
Table 3.9: Overview of the used methods to come to the different time slices ....................75
Table 3.10: Definition of categories and subcategories during the spatial analysis (source: serie climacica e edafo-xerofila del piano montano delle Valli Borbera, Curone e Staffora su calcari del Monte Antola; Castelli et al., 2001) .................................................................77
Table 3.11: Definition of the different types of attributes ..........................................................80
Table 3.12: Overview of the 3 main categories and 15 main concepts that determine the actors' position towards landscape changes in rural mountain areas ..................................84
Table 4.1: Evolution of land cover of Carrega Ligure (1828-2014) .........................................96
Table 4.2: Overview of the land use (category land cover in combination with attribute function/use) of Carrega Ligure through time .........................................................100
Table 4.3: Overview of Toponyms of Carrega Ligure ................................................................112
Table 4.4: Evolution of land cover of Figino (1828-2014) .......................................................117
Table 4.5: Overview of Toponyms of Figino ..........................................................................127
Table 5.1: Argumentation of the two main types of identification and illustrative quotes .......160
Table 6.1: Overview of most important proximate driving forces through time, indicated by their level of decision (IN: International, N: National, R/P: Regional/Provincial, V:Valley, L: Local) .......196
Table 7.1: Active institutions and associations in the Giarolo-territory during the last time slice (1950-today) .................................................................................................................230
Table 7.2: Locations in Val Borbera that are part of one of the Consortia in the GAL ‘Giarolo’..234
Table 7.3: The principles of the peasant mode of farming and the opportunities for Val Borbera (after Van der Ploeg, 2008) .................................................................................................................240
Table 8.1: Overview of the research questions and the chapters where they are handled ....248
'What is your story?' was the prominent question the team of researchers posed during the PhD course in Manchester, organised by IALE- Europe, September 2013. ‘What is the story you want to tell people? What is the thin red line that runs through your work? And why is it worth your research?’ Those questions remained spinning in my head for several years, and even though it seemed clear in my head, I did not always manage to link all the different parts with each other. Writing this PhD made me put all the puzzle pieces together and now I am ready to tell you the story, my story, the story of the landscape, its actors, its dynamics and processes. Today I’m writing it down, tomorrow you, dear reader, will be taken on a journey, to a landscape, and I’ll try to convince you that this story is relevant, that it was worth those four years of exploring and studying. I refer to the words of Chelsea Cain, in the foreword of ‘After dark, my sweet’ (Thompson, 1955):

‘But that’s what writing is, isn’t it? You convince readers to stay with the story, to trust you to take them somewhere. In return you manipulate their emotions. You draw on their weaknesses. It’s the ultimate confidence game.’

So please, be confident and let me convince you... Let me tell you this (hi)story.
CHAPTER 1

PROBLEM SETTING, OBJECTIVES AND RESEARCH QUESTIONS
**Chapter 1 – Problem setting, objectives and research questions**

Duality.

**noun du·al·i·ty \\dü-ə-lə-tē also dyū-\**

the quality or state of having two parts

(Source: Merriam-Webster’s Learner’s Dictionary)

1.1 **Introduction**

1 - ‘Panorama di Novi’ – March 2016 - *La scommessa di due giovani: recuperare gli ultimi vigneti storici.*

A local paper publishes an article on the restoration of the last historical vineyards in a mountain valley of the Northern Apennines (Italy). The young couple that took up this action migrated to the valley a few years ago to start a farming business. Their aim was to create a multifunctional small-scale farm, with respect for the environment and the farming profession, driven by the idea of living and working in the countryside, a better social cohesion than in the city and producing and living from genuine products.

2 – ‘Quattropagine’ - February 2016 (Anno 7, n°2)

*Da Pravaglione a Mulino del Pio. Con le centraline idroelettriche i mulini tornano a nuova vita*

The same local paper publishes an article on a new project for the exploitation of hydroelectric power through an installation in the Molino del Pio, Carrega Ligure. The exploitation of electric energy is conducted on a very small scale with respect for the landscape. The sale of the energy gained provides an additional income resource for the local families and/or the associations that own the installations.
same local paper, but a different month. The Comunità Montana - a local scale horizontal inter-governmental partnership that assists smaller rural authorities in the delivery of services and economic development initiatives - is dissolved, creating a situation that necessitates municipalities to group themselves into new unions (Unione Montana) in order to receive regional level funding and are encountering difficulties in this process.

Three anecdotes are not sufficient to fully represent all of the current dynamics and processes undergone and encountered in and by so-called ‘marginalised’ or ‘remote’ area. However, they are nevertheless indicative of wider trends. All three of the examples cited consider certain landscape change to be either physical - such as the recovery of the vineyard or the construction of the hydroelectric installation, or social - such as in terms of internal power conflicts. All three include actors that are related to these changes; namely the couple who decided to save the old vineyard instead of planting a new one, the mayor of one of the villages who prefers small-scale, ad hoc installations over those created by a large, private company with less consideration of the area, and finally the local and supra-local level institutions (i.e. municipalities, provinces and regions) that have found themselves in power shift situations. Without doubt, landscapes and actors change over time, as do their interrelations. Current landscape dynamics and processes, and their interrelation with actors, are the result of evolution over time. Understanding this constantly changing balance is no easy matter, however it is relevant when seeking to comprehend the values of the landscape. The study and understanding of the (hi)stories and roots of both of these perceptions are therefore important when seeking to establish the valorisation of the landscape. As such, this study is relevant for both the landscape itself and the various actors, such as farmers, visitors, newcomers, tourists, and experts that engage with it.

The world that this thesis concerns is difficult to define. In the holistic meaning of the word, it is a landscape that includes the environmental context and scenery, but one that also includes the diverse, various actors, and complex dynamics and processes over time. However, despite these general characteristics, what kind of landscape it? The selection of an accurate adjective that encompasses and sufficiently encapsulates its full significance is complicated, given that its description is related to and dependent upon a number of aspects.
First of all, the description is largely dependent on location. In this, the location is a mountain landscape in Europe, one that is, more specifically, in a Mediterranean context. As such, it can therefore be classified as a ‘Mediterranean mountain landscape’.

Secondly, the landscape that is visible today is certainly different to that encountered by past generations. However, it is not completely different: landscapes have, do and always will change. As such, identifying traces of the past is crucial when seeking to understand the present and planning for the future. The time span and the historical aspects of a landscape are therefore intrinsic to the description of the current landscape. As such, these should be considered and described as ‘historical landscape(s)’.

Thirdly, it is important to consider land cover, predominately representing a rural function(s), explaining how the landscape is used, its purpose, and how the various actors are related to these characteristics. Such landscapes should therefore be considered and described as ‘rural landscape(s)’.

Finally, landscape is man-made, a complex palimpsest documenting successive, and often widely divergent, cultural and environmental conditions over time. The histories of the handling and management of the land by different actors over time, techniques and strategies that are and were deeply imbued within and reflective of contemporary and historical perceptions and values, result in the creation of ‘cultural landscape(s)’.

All of the aforementioned descriptions can be readily applied to the human and physical geographies of the area addressed in this study. However, referring to the landscape in question as a ‘Mediterranean mountain rural historical cultural landscape’ is not only confusing and somewhat convoluted, but also unnecessary. Given that the focus of this thesis is the rural function and mountain location of the study area, the type of landscape will be hereafter be referred to as a ‘rural mountain landscape’, owing to the fact that there is an inherent understanding that the landscape in question has a historical time span and is a cultural landscape with a societal value. However, in doing so, it is nevertheless important to acknowledge the existence and relevance of the final adjectives.
1.2 The Destabilizing Effect of Land Abandonment

In very general terms, most European landscapes are cultural landscapes given that they have been shaped by many centuries, if not millennia, of agricultural cultivated and practice (Sauer, 1925; Ponting, 1991; Slicher van Bath, 1960), ranging from almost entirely man-made, intensively managed polders in Belgium, to semi-natural areas of extensive grazing in the high Alps. Evidence of historical rural land management is clearly visible in occupation, reclamation, irrigation or drainage and related ecosystem patterns (Klijn & de Haes, 1994). Currently, landscape evolutions in Europe tend to be polarised between intensification and extensification, and areas are increasingly monotonous, less diverse landscapes combined with the impairment of landscape functions over large areas (Antrop, 2000; Haase et al., 2007; Jepsen et al., 2010; Krzywinski et al., 2007). In addition, the reduction in the size of urban settlements due to population decline (decreasing birth rates, out-migration) and resultant land abandonment and residential vacancy are currently conspicuous characteristics of many parts of Europe (Lutz, 1996; Lutz et al., 2001; Haase et al., 2007).

In the Mediterranean, cultural landscapes are characterised by their attractiveness and diversification, resulting from a long history of a man-maintained agro-silvo-pastoral equilibriums, adapted and applied to the natural potentialities and limitations of a specific region (Pinto-Correia, 1993). Specific physical and social conditions create an interesting balance between human management, restrictive environmental conditions and biological diversity (Naveh & Lieberman, 1994; Cevasco & Moreno, 2013; Agnoletti, 2010, 2012), the aim of which is to optimize annual productivity fluctuations. Generally, this long history of interchange and balance did not result in ecological degradation. On the contrary, it created a landscape with a specific ecological and cultural value (Sauer, 1925; Pinto-Correia, 1993; Moreno, 1990; Cevasco, 2007; Wiggering, 2006). These often highly locally specific (agro-silvo-pastoral) systems were well adapted to often highly locally specific natural resources and local environmental constraints, the exploitation of which created economically valuable landscapes and high biodiversity levels (Cevasco et al. 2015).

Since the 1950s, many highly valuable Mediterranean landscapes have been characterised by large-scale land abandonment, dynamics that were already apparent following World War II. This process peaked during the 1970s, creating so-called ‘marginalised’ landscapes and resulting in the degradation of historic cultural landscapes. Where abandoned, spontaneous ‘rewilding’ and development has occurred within a couple of decades and continues to dominate landscapes that were previously used intensively for centuries (Hearn et al, 2014). In particular, rural (mountain) areas have experienced dramatic abandonment resulting from migration to urban areas resulting from new socio-economic conditions (Vos & Meekes, 1999; Di Pasquale et al., 2004; Ferrari, 2013). Historically, many of these areas were intensively used rural
INTRODUCTION

landscapes, where inhabitants lived partly from the exportation of their local products, in combination with self-sufficient farming or herding. Currently, many pastures and fields – mainly on terraces – have fallen out of use, formerly coppiced woodland is becoming high forest, and chestnut groves neglected, the effects of the decline of these traditional economies and the abandonment of their associated practices compounded by the introduction and creation of monocultures in forestry management (Cevasco, 2007; Torta, 2004; Pinto-Correia, 1993). However despite these characteristics, the spatial arrangement of present-day land use continues to reflect the agricultural structures of the early 20th century, structures that had developed since probably the 12th century on. In academic literature, land abandonment in the Italian Apennines has largely been attributed to the decrease in the number of people active in agriculture and forestry in recent decades (Balzaretti et al., 2004; Moreno, 1990; Cevasco, 2007; Vos & Stortelder, 1992; Farina, 1991).

The combination of hard labour, in conjunction with limited demand for the local products, resulted in an economic situation that was unsustainable for traditional activities, and constitutes the main reason for people emigrated. As Pinto-Correia (1993) states, the rural management in similar marginal areas entails a socio-economic depression for the Mediterranean rural areas. These regions cannot compete with the productivity levels in areas of specialized agriculture, especially within a global context of urbanisation and industrialisation. In north-west Europe, agriculture became highly productive and largely related with a strengthening of the market forces. The inability of remote Mediterranean areas to compete with such processes - particularly regarding diversity and extent of crops variation - combined with free market strategies and related agricultural legislation in areas of north-west Europe - such as the Common Agriculture Policy - placed Mediterranean areas in a weakened position, thereby leading to the global marginalization of these regions (Pinto-Correia, 1993).

Land abandonment therefore resulted from marginalization at both European and Mediterranean level, where less favoured land is marginalized in relation to the more favoured areas where investments and efforts for intensification of production are concentrated. This led to the dual development of the European countryside (Vos & Klijn, 2000); intensification and increase in the scale of farming in the most suitable regions and the extensification or abandonment of areas considered less favourable. Historical cultural landscapes are vanishing throughout Europe. While intensification processes often led to urbanization and resultant pressure on agricultural land, extensification processes directly led to changes in the existing rural environments and communities. The outbalancing of these specific socio-cultural systems, well adapted to natural resources and local environmental constraints, are considered as a deterioration and degradation threat, leading to the disappearance of highly valuable cultural

1.3 Dualities within current rural landscape and rural life

The land abandonment processes previously described largely affected the rural landscape and caused many problems for life within these areas. In particular, the composition of rural communities has become increasingly challenged, predominately due to the increased mobility of rural society. This mobility is firstly related to depopulation in rural areas, and secondly to counter-urbanisation, the migration of people from towns and cities to the countryside (Champion, 2001; Mitchell, 2004; Geyer & Kontuly, 1993; Primdahl 2014) and immigration to rural communities, and thirdly related to the inherent mobility of the rural communities themselves (Van der Ploeg, 2008; Primdahl 2014; Woods, 2011).

Within the rural landscape and rural life, these changes and dynamics cause several conflicts, and even dualities. Understanding these dualities or conflicts is a crucial component in planning for better, more sustainable future development. These dualities can take different forms. However, they can be more or less linked with the spatial or existential identity of the landscape(s) (Stobbelaar & Pedrol, 2011), be it the physical landscape character - patterns, forms, elements - or the sense of belonging or attachment to a specific landscape respectively. However, it is important to examine and analysis the most influential of these dualities within rural landscape and rural life.

1.3.1 Dualities influencing the rural landscape

Duality within rural landscape exists within the loss of historical cultural and environmental values resulting from processes of re-wilding or even re-naturalisation (Carver, 2013; Mazzoleni et al., 2004). These concepts rely on a return to a ‘natural’ condition of the landscape, even when landscapes have been managed by societies and their constituent communities for centuries. A return to nature in such a types of landscape can have several discrepancies. While returning to the natural state of the landscape instigates a decrease in its historic cultural value, it does not necessarily stimulate an increase in its ecological value. Moreover, the question arises whether rewilding is acceptable or even possible in similar cultural landscapes especially when local actors are not all in agreement with this development strategy. For example, farmers and hunters often oppose rewilding processes (Hearn, 2015). In addition, studies have revealed that the process of rewilding and spontaneous vegetation dynamics tend homogenise and
reduce the richness of land cover, thereby having negative impacts on the biodiversity of the area (Cevasco & Moreno, 2013; Cevasco et al., 2015; Moneta & Parola, 2014; Agnoletti, 2006).

When the spatial character of the landscape undergoes such drastic changes, the resultant landscape acquires culturally less representative patterns. While the functioning of rural landscape historically rests upon the maintenance of spatial boundaries between different types of nature, problems begin when boundaries are crossed, and when ‘nature’ meets agriculture (Woods, 2011). The spatial consequences - such as the invasion of secondary vegetation and woodland, floods, and landslides - can have significant impacts – such as cattle eaten by wolves, wild boars and deer destroying cultivations - particularly when invasions are mostly on a large scale. As stated by Woods (2011), rural space is shared with non-human life, including both animals and vegetation, which also have ways of ‘living’ in the rural (Hearn et al. 2014; Hearn 2015).

The source of conflict lies in the fact that land management has not been replaced by other forms of integration between the human occupation and a sustainable use of natural resources (Pinto-Correia, 1993). There is a rise of alternative discourses and practices in which nature conservation is positioned equal to, or even above, the traditional interests and practices of rural communities. Renegotiation of these relations requires the acknowledgement of perspectives within which the active roles of both humans and non-humans can be accommodated, as arguably is the case in notion of dwelling (Ingold, 2000; Woods, 2011).

1.3.2 Dualities influencing the rural life

Rural life also contains dualities; on the one hand, significant depopulation trends accompanied the land abandonment, and on the other, new counter-urbanisation processes accompanied by pronounced consequences within the typology of the rural actors.

Land abandonment trends are densely interwoven with depopulation in rural areas, resulting in a continual reduction in the number of people participating in community-based networks and events. As a result, the maintenance and existence of different community services decline, such as mills, irrigation systems, road infrastructure, schools, social contact, rituals, processions, and feasts. The community, its connotations, and its evocations become increasingly associated with nostalgia, and can even create defensive and pessimistic outlooks (Woods, 2011). In particular, the outflow of young people – as the increasing absence of the most economically active and potentially productive sector of the population (Stockdale, 2004) - has significant consequences on the maintenance and future development of the community. While many exhibit strong senses of belonging within and towards their communities (Leyshon, 2008; Rye,
2006; Woods, 2011), empirically based research (Rye, 2006; Ni Laoire, 2001 in Woods, 2011; Ferrari, 2013) has demonstrated reasons for leaving can be vary and are not necessarily related with a ‘fatigue’ of rural life. Some move away because of economic opportunities, despite expressing difficulties in leaving owing to the strength of emotional attachment. Cultural expectations can be another driver, as staying can be regarded as failure within and by the community (Ni Laoire, 2001; Woods, 2011). All of the reasons for leaving rural communities can be related to efforts to improve quality of life, be it perceived or actual.

Despite the conspicuous impacts of the aforementioned demographic trends, counter-urbanisation processes or migration to rural areas, especially from urban areas, can also been identified. Having first been noted by geographers in the United States during the early 1970s (Berry, 1976 in Woods, 2011; Mitchell, 2004; Primdahl, 2014), a variety of reasons belying this trend have been subsequently identified, including economic motivations, recreational and lifestyle opportunities, and the appeal of rural environment aesthetics. Another reason is related to the search for a certain - perhaps idealised - way of life, one that is more peaceful, and more suitable for children. (Ni Laoire, 2007; Woods, 2011). Migration into a rural community can be driven by the aspiration to adopt a perceived rural lifestyle (Woods, 2011). Currently, the types of actors involved in counter-urbanisation are not uniform. Such ‘new rurals’ can include members of the urban middle class searching for a rural idyll and lifestyle, economic migrants occupying lower-order jobs, retired people motivated by cost and health, and those returning the rural life to fulfil family commitments.

Significant landscape changes are intrinsically connected with changes in the demographics and characteristics of the actors in a particular area. Currently, rural environments that underwent several changes in recent decades include a wide variety of newcomers who need to ‘fit’ in the rural community of ‘locals’. According to Woods (2011), adaption in a local rural community is not so much a matter of time, but mostly of learning; local rural identity is based on knowledge and understanding of the culture and the environment, and therefore the landscape to which the community belongs. The variety of actors creates duality in future desires, expectations, and management of the rural landscape and rural life. Different actors with different backgrounds can often have widely divergent ideas on how - and indeed why - to manage rural life problems. Conflicts surrounding issues such as conservation, protection, and maintenance, for example, can have conspicuous impacts on the collectivity and development of the rural landscape. Owing to their new skills and capital, the acceptance of newcomers in the rural community is therefore important, or even essential, when in planning for the future development of rural areas (Stockdale, 2006).
1.3.3 Global changes causing tensions in the rural

The difficulties and challenges posed by the rural landscape and rural life does not only depend on the environment, but also on the actors. The rural mountain areas discussed in this thesis clearly exhibit many – if not all – of the characteristics of the dualities previously discussed. In order to gain a better understanding of the spirit and nature of such conflicts, it is important to delve deeply into the rural landscape and rural life, and to analyse how these dualities are currently characterising those areas. Therefore, the driving forces belying landscape and life changes need to be taken into consideration. Apart from local drivers, the landscape is also characterised by processes of global change that have profoundly affected and continue to affect rural areas.

Running parallel to the start of worldwide globalisation processes, agriculture was largely focused on production. This period of ‘productivism’ was based on the industrialisation of the rural areas and landscapes, geared towards maximizing production and the modernization of farms. In southern Europe, as in other areas with limited conditions for industrial agriculture, agricultural systems have often not entered the ‘productivist’ phase (Perfecto et al, 2010; Robinson, 2008; Pinto-Correia & Kirstensen, 2013). Generally speaking, agricultural land that has been abandoned is land with characteristics considered marginal in terms of production. Strictly speaking, designating an area as ‘marginal’ indicates that the productivity level of the land in question is situated close to the margin beyond which management expenses and risks are not compensated by the profit obtained with production (Pinto-Correia, 1993). Indeed, criticism and demands concerning agriculture and the environmental balance between identity, cultural heritage and social equity have resulted in a shift towards post-productivism, being an even more complicated and evolving concept (Mather et al., 2006; Selman, 2009; Pinto-Correia & Kirstensen, 2013). This transition suggests that a spatial, temporal, and structural co-existence of both productivism and post-productivism is occurring in many rural areas in Europe (Wilson, 2007), resulting in an increase in the diversification of rural spaces (Berkel & Verburg, 2011; Pinto-Correia & Breman, 2009; Pinto-Correia & Kirstensen, 2013). Transition trajectories in agriculture depend on farmers’ decisions; some farmers continue to follow the productivist model, others introducing innovations and combined activities on their farms, whilst others opt for new farming paradigms as re-invented, peasant-like lifestyle (Pinto-Correia & Kirstensen, 2013).

The shift of rural landscapes in the past decades from a productive and living spaces to a spaces of production combined with consumption and conservation (Holmes, 2012; Wilson 2007; Pinto-Correia & Kirstensen, 2013) has created a number of new possibilities and tensions in the management of the ‘rural’ (Traldi, 2015). The dualities and conflicts previously described are conspicuous examples of such tensions. Such rural landscapes require multifunctional
understandings of their rurality (Renting et al., 2009; Pinto-Correia & Kirstensen, 2013), that are not only issues concerning diversification in farming, but also of paradigm changes in the management of rural spaces as holistic entities (Domon, 2011; Selman, 2009; Wilson, 2009; Pinto-Correia & Kirstensen, 2013). Former agricultural systems may decline and even disappear, replaced by new land use systems or alternatively left to re-naturalization processes – planned or spontaneous - should post-productivism discourses not be reflected in practice.

1.4 Future Sustainable Development

Since the decisions made on sustainable development by the Brundtland Report (WECD - Brundtland et al., 1987), the concept has been integrated in policy decisions on international and national levels. However, the question still remains as to how it can be made operational and implemented locally and bottom-up, guaranteeing the sustainability of the qualities of the past. This issue continues to constitute a major concern throughout almost all historical cultural landscapes in Europe. Apart from increasingly fashionable back-to-nature movements, perspectives for the prospective futures of cultural landscapes in Europe are based on the following observations (Agnoletti, 2006; Becattini, 2016; Vos & Meekes, 1999):

- A rich and stable society demands a broad spectrum of functions from our landscapes, including nature and culture;
- Many farmers move towards multifunctionality, including landscape management, when they gain profits from it;
- A growing political and public engagement for a ‘healthy’ countryside as part of regional cultural heritages, especially at international level;
- A shift towards decentralization and denationalization, which favours a Europe of the regions with their own cultures, products and landscapes

While landscape planning and management bodies may be preoccupied with common functions and conditions, and private enterprises may be preoccupied with their own profits, both are highly interdependent in realizing economic, socio-cultural and ecological sustainability in the landscape (Vos & Meekes, 1999). In order to gain a better understanding of the current landscape, and thereby to inform future sustainable possibilities, it is necessary to fully comprehend and consider the evolution of the rural mountain landscape through time and the historical trajectory of the landscape (Antrop, 2005; Bürgi, 2004; Selman 2009), investigations into which need to be conducted on the local, topographical scale of the individual landscape (Cevasco & Moreno, 2013; Cevasco et al., 2015). Therefore, the major contextual and academic discourses were scrutinized and illustrated through in-depth research of empirical case studies.
1.5 Objectives and research questions

The overarching goal of this PhD is to examine how rural sustainable development of rural mountain landscapes with a historical cultural and environmental value can be established, with respect for the different actors and their landscape.

The main objectives of the PhD are (1) to define and document the history of a rural mountain landscape, (2) to detect and analyse the most conspicuous spatial and existential changes, (3) to identify and reconstruct the driving forces and (4) to evaluate and elaborate possibilities and opportunities for sustainable future development.

It is therefore important to ascertain a detailed, nuanced understanding of the historical and contemporary characteristics and evolution of the landscape, its actors and their interrelations. The specific aims and intentions of studying these evolutions is (i) to identify and document the landscape, the actors and the former rural practices that created and were created by this cultural landscape, (ii) to detect the (inter)relation(s) between the landscape and its actors, before and after large shifts in land management, (iii) to reveal driving forces, such as shifts and dynamics, and to explore the interface between these data sets so as to improve the utility and robustness of landscape change assessments within sustainable policy decisions and planning.

These objectives are summarized in four specific research questions:

- RQ1: What is the spatial character of the landscape and how did the land abandonment processes change this character over time?
- RQ2: What is the existential character of the landscape and how do actors relate themselves within their landscape over time?
- RQ3: What were the driving forces behind the spatial and existential changes, and what drivers will impact on the future?
- RQ4: How can empirical landscape research lead to sustainable policy-making for rural mountain landscapes?

In doing so, this research will contribute to more coherent and effective sustainable planning and management in a valuable rural mountain historical cultural landscape (Antrop, 2005), in which planning is approached at an individual landscape scale (Selman 2009). The aforementioned research questions will be addressed through empirical research conducted in the Val Borbera, a mountain valley in the northern Italian Apennines.
1.6 **Outline of the Dissertation**

In order to improve the readability and comprehension of the thesis, an overall scheme has been adopted so as to guide the reader throughout the text. The scheme (Figure 1.1) situates the structure and different steps of the landscape (LS) research, the corresponding chapters and research questions (RQ’s).

![Figure 1.1: Outline of the Dissertation](image)

**Chapter 1 and 8** are the introductory and concluding chapters. The first chapter constructs the problem setting, the aim and objectives, and poses the research questions that will be addressed in this thesis. The last chapter contains the overall conclusions in light of the problem setting, answers the research questions and draws conclusions, based on the results presented in the six middle chapters of primary research that constitute the empirical core of this dissertation. Moreover, this chapter formulates and proposes recommendations for further research.

**Chapter 2** establishes and contextualises the empirical research in terms of dynamics and processes characteristic of rural mountain landscapes. Firstly, the chapter focusses on the use of terminology and concepts in different academic disciplines, and secondly, focuses in depth on
the economic systems and local rural practices that are significant in the construction of the landscape. Finally, the empirical cases are presented with detailed explanation and justification of their suitability and representativeness in addressing the stated research problem(s).

**Chapter 3** provides a detailed description and critical assessment of the variety of quantitative and qualitative material consulted in this thesis, the methodologies pertinent to the large dataset that is used, and the triangulation of material and methods through triangulation.

An integrated landscape analysis is conducted in order to understand the spatial landscape characteristics and how the landscape evolved into its current situation. **Chapter 4** analyses the history of the spatial land abandonment and draws on a number of multidisciplinary sources in order to visualise the evolution of the past rural cultural landscape.

In a world-in-continuous-movement, not only the spatial character or identity of the landscape changed, but also the senses of belonging and attachment that people have with their landscape. **Chapter 5** therefore analyses the evolution of this existential landscape identity and how actors and their landscape have evolved over time, and what the concept of landscape identity can contribute to further future development.

**Chapter 6** describes how the landscape and its identity - both spatial and existential - has changed over time, the driving forces belying these changes, and which of these driving forces were perceived to have had significant impacts on livelihoods by current actors. This chapter seeks to address ideas concerning the balance between widely accepted driving forces, and the driving forces perceived by the local actors and the community.

**Chapter 7** explores and identifies the social relevance and added value of landscape research, the utility of triangulation in the employment of multi-disciplinary material and methods, and interrogates policy decisions, providing recommendations for further research and practical implementations in rural sustainable management and development.
Chapter 2

Exploring dynamics and processes of rural mountain landscapes
2. Exploring dynamics and processes of rural mountain landscapes

Grazie alla reciproca dipendenza del pensiero e della parola appare chiarissimo che le lingue non servono propriamente a esporre la verità già nota, ma piuttosto a saprire la verità che era prima ignota. La loro diversità non è una diversità di suoni e di segni, ma di visioni del mondo.

Wilhelm Von Humboldt (1820)

This chapter is about the exploratory aspect of the dissertation. Exploring means to look at, talk and think about something in a thoughtful way, and to learn about something by trying it (www.merriam-webster.com). This dissertation has been a process of looking, talking, thinking and learning. Therefore, the process often seemed like a discovery on its own. Extravagantly, one could use the metaphor of Christopher Columbus, Genovese explorer, who, when he left from the ports of Spain, looking for the Orient, had a certain objective, but did not know how, when and where he would arrive. Being a Belgian, living and working in Italy and writing this PhD in English, but also being educated and formed in a landscape research school in Belgium, and executing the PhD in the historical department of the University of Genova, was no easy matter. All of these aspects certainly affected my journey and my arrival and it is therefore relevant to start this chapter on where it is situated within a broader academic and physical context. Or to say it with Pedroli’s words:

*It is obvious that what we ‘see’ in the landscape depends very much on where we have come from, and where we expect to be going to our disciplinary pasts and life experiences, and our future goals. Depending on our perspectives and purpose, it seems pertinent to ask: ‘What do we see, or not see?’ Only what we are ready to see, can we approach in a scientific way.* (Pedroli et al., 2006)

This chapter is divided into three parts. Since the word ‘landscape’ includes an infinite world of meanings, the first part of this chapter explains the use and meaning of the word in different, academic and non-, environments, and the relevance of its definitions and how they were used throughout the dissertation. The second part gives an anthology on the most important dynamics and processes in Mediterranean mountain areas, and lastly, the case studies are presented.
2.1 Exploring ...

‘What is landscape?’ Or more specifically: ‘what do you mean by landscape?’ was one of the first questions I was asked when starting my PhD in Genova. Being formed in another country, another school, another culture, another language made it not always so easy to explain to my colleagues and/or supervisors what I meant by ‘landscape’ or ‘paesaggio’. Now what is landscape? The concept has been largely discussed in literature during the last decades (Antrop, 2013, Wylie, 2007; Howard, 2011). This chapter does not want to repeat all of it, but gives an overview of the definitions that are most closely related with my point of view of what landscape includes. Moreover, I want to sketch the concept within the understanding of it in the language, cultures and disciplines I encountered during my academic and personal trajectory.

2.1.1 ... the different meanings of ‘paesaggio’ – ‘landscape’ – ‘landschap’

The origin and history of words

Language represents the world vision of a population, of a culture, as Wilhem Von Humboldt states (1820). As was also experienced by the more famous member of the Von Humboldt family, Alexander, who, as a geographer and landscape researcher avant-garde, climbed the Ecuadorian volcano Chimborazo (Wulf, 2015; Schaumann, 2009) and found his adventure told by several contemporary writers and friends (Goethe, Kehlmann) in a different way than his own, more scientifically based, description of experiences. In this optic, it is necessary to understand the significance of words within the context of its culture. For example, paesaggio in Italian (IT), has a different etymology than landschap in Dutch (NL) or landscape in English (EN) (Table 2.1).

Etymologically, landscape (EN) and landschap (NL), both Germanic languages, where the first derives from the second, reflect a different co-notation and underlying understandings than seems at first sight (Olwig, 1996). The Dutch word originates from ‘land-scap’ and is the oldest reference (13th century) to a land, region or environment (Antrop, 2013, Keisteri, 1990), referring to, firstly, the everyday surroundings in which farmers lived, namely fenced-in fields or a small administrative area, and, secondly, a picture of such surroundings, a rural scene. The word transformed in the currently known word landschap (NL), and from the 16-17th century (Renaissance) landscape was mostly seen as a scenery, related with painting and later photography. This rather limited significance of a picture or image included a more strongly visual and artistic connotation. At that time, the word landscape (EN) was introduced in the English vocabulary. Later on, landschap (NL) also received a perceptive meaning, related to the idea of the land as perceived, or a picture of land. Where landscape (EN) incorporated the
meanings of both a physical scene or view and its pictorial representation. But moreover, it also included, as did the Italian meaning, a particular quality to an area of land.

*Paesaggio* (IT) came also into use during the Renaissance in the 16th century, considering the aesthetic representation of a country or a land. But the meaning enlarged during time. Currently, the word means more than the painting or photography, or the ‘look that holds a place’. Especially in more academic environments, the meaning started to contain also the physical, anthropic, biological and ethnic characteristics of a region.

**Table 2.1: Overview of the different etymological meanings of the words ‘landscape’ and ‘territory’ in English, Italian and Dutch**

<table>
<thead>
<tr>
<th>Language</th>
<th>Word</th>
<th>Pronounce</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| Italian  | Paesaggio             | /pæˈzadʤo/ sostantivo maschile | 1. aspetto di un luogo che si abbraccia con lo sguardo  
2. pittura, fotografia che ha per soggetto un paesaggio  
3. particolare fisionomia di una regione determinata dalle sue caratteristiche fisiche, antropiche, biologiche, etniche |
| Italian  | Territorio            | /terriˈtɔrjo/ sostantivo maschile | 1. regione, paese soggetto ad una particolare giurisdizione                                                                                                                                       |
| Nederlands | Land·schap               | het; o; meervoud: landschappen | 1. de omgeving zoals de mens die waarneemt: een heuvelachtig landschap  
2. schilderij van een landschap  
3. (historisch) gewest                                                                                          |
| Nederlands | Terr·ri·to·ri·um       | het; o; meervoud: territoriums, territoria | 1. grondgebied van een staat of van een dier                                                                                               |
| English  | Landscape              | noun, often attributive land·scape /ˈlan(d)ˌskāp/ | 1. a picture that shows a natural scene of land or the countryside  
2. an area of land that has a particular quality or appearance  
3. a particular area of activity                                                                                   |
| English  | Territory              | noun ter·ri·to·ry /ˈter·riˌto·rē/ | 1. an area of land that belongs to or is controlled by a government  
2. one of the parts of the United States that is not a state  
3. any one of the large parts that some countries are divided into                                                   |

Those small connotations between the meaning of landscape in different languages, derive from evolutions and development of the use of the word within its context and culture, depending on decisions of all kind. As Keisteri (1990) states:

‘... the landscape has always been that which surrounds the place where man lives, and its significance for human culture has been reflected in pictures and words throughout...’
the ages, since language, written or presented in pictorial form, serves as a vehicle for recording the world of human values. Similarly, fluctuations in the meaning of the word for landscape in various languages have been closely connected with descriptions of such landscapes.’ Keisteri (1990: p33)

Thus the word landscape may be said to reflect the manner in which an environment is observed. And, as Wilhelm Von Humboldt (1820) states, the diversity of languages does not lie in their differences of sounds and signs, but in the world vision of whom the language is used by.

**ITS USE IN SCIENCE AND ACADEMICS**

This world visions and etymological meanings of the word landscape are decisive for the different interpretations of the word ‘landscape’, and consequently the meaning of ‘landscape research’, which caused some semantic terminological discussions during the course of this dissertation. Being located within an environment of (Italian) local history (Grendi, 1996; Raggio, 2004) and historical ecology (Moreno, 1990; Cevasco, 2007; Rackham, 1986; Peterken & Game, 1984), the question of what was meant by landscape, frequently came to the surface. As Antrop (2013) states, the multiple meanings of landscape complicate inter- and transdisciplinary cooperation and make it difficult to implement the concept in legislation, in particular in a multilingual international context. Moreover, Claval (2004) argues that linguistic models, as one perspective on the reading of landscapes, ‘are helpful for geographers who try to decipher and interpret specific forms of (rural) landscapes.’ (Claval, 2004; in Palang et al., 2004). Therefore, some interesting definitions are used to start telling the (hi)story of this research journey.

The most complete, and sincerely the most beautiful, way of explaining landscape, was done by Wylie (2007), seeing landscape as a tension:

*It is a tension between proximity and distance, body and mind, sensuous immersion and detached observation. Is landscape the world we are living in, or a scene we are looking at, from afar? (Wylie, 2007: p.1)*

Posing this question, he already underlines the difficulty and complexity of the answer. But resolving the tension between seeing landscape as an (artistic) representation of a scenery, or as the interrelation between ourselves, body, knowledge and land, is not at stake in this thesis. Then again, the drift in the meaning of the word ‘landscape’ in various languages is reflected to some extent in changes in the meaning of the word in research, or more specifically ‘landscape research’, especially in association with geography, history and social sciences. We start the discussion on landscape research with the definition in cultural geography by Sauer:
The term ‘landscape’ is proposed to designate the unit concept of geography, to characterize the peculiarly geographic association of facts.... It may be defined, therefore, as an area made of a distinct association of forms, both physical and cultural. (Sauer, 1925 in Wylie, 2007)

With this quote, Sauer underlines the statement of ‘nature plus culture equals cultural landscape’, where landscape and geography in his opinion were the product of an intellectual engagement with and synthesis of a number of different schools of thoughts (Wylie, 2007). This view of landscape research is rather top-downwards directed, in the sense that disciplines are the ones that study landscape, or, to come back to Wylie, ‘the scene we are looking at’, from the point of view of landscape researchers.

From 1989, at the university department of Antiquity, Philosophy and History of the university of Genova, a weekly seminar ‘Permanent seminar on Local History’ is organized by the multidisciplinary ‘Laboratorio di Archeologia e Storia Ambientale’, a school of local historians and historical ecologists was formed by Edoardo Grendi and Diego Moreno (Raggio, 2004). This group was largely inspired by the English schools of historical geography (C. Watkins), local history and micro-history (W.G. Hoskins) and historical ecology (O. Rackham). The local historical approach is a British legacy in historical studies relatively uncultivated by continental European historians but nurtured in local approaches to applied historical ecology in northern Europe and north America (Swetnam et al., 1999; Szabo, 2010 in Cevasco et al., 2015). The Italian school largely collaborated for over 30 years with a relatively small interdisciplinary research team in Britain that conceived and developed an approach to historical ecology that fitted with the unique tradition of naturalist field studies and the unusual practice of carrying out field studies as part of local or topographical history (Balzaretti et al., 2004; Becket and Watkins 2011; Cevasco et al, 2015).

It was the definition of landscape by Hoskins (1985), as a historian whose vision on landscape is directly founded in the basics of empery, that gives an extra dimension to what landscape research is about in this PhD:

The landscape is an objective, external, material assembly of facts and things which is realized through direct encounter and observation. In contrast to the archival and discursive tenor of much historiography, here the principles and methods of the field sciences apply: knowledge is gained primarily through getting out and about, again preferably on foot, and being prepared to root around in neglected corners for the forgotten key which might unlock an entire scene. (Hoskins, 1985 in Wylie, 2007: p33)
He had a clear mind on how to perform landscape research, based on the key words temporality, rurality, locality, and was especially looking for factual details at a very small scale, evidence visible in fields, trees and hedges, settlements, buildings, etc. In his view, landscape analysis is a local form of history. This dissertation includes those key words, and gives a large importance to empirical evidence as a base for more complex statements.

But in Hoskins’ view, landscape remains an object that was observed from the outside, by researchers, painters, people, etc. where the researcher remains an outsider who studies and investigates his object of study, namely the landscape. It was J.B. Jackson who unwrapped this view and started defining landscape from inside-out (1997), proposing the concept of a vernacular landscape (Jackson, 1984). The pioneering aspect of his definition was the fact that his landscapes are the ones that people inhabit and work in and they are landscapes that people produce through routine practice in an everyday sense. As he said:

*We are not spectators; the human landscape is not a work of art. It is a temporary product of much sweat and hardship and earnest thought. Landscape as ‘made by a group of people who modify the natural environment to survive, to create order, and to produce a just and lasting society’.* (Jackson, 1997)

Moreover, it was Ingold who argued that landscape studies need to recognize the ‘dwelling perspective’: emphasizing that people were reciprocally engaged with the landscape within which they lived (Ingold, 2000). Or as Wylie (2013) summarizes:

*... it is through our ongoing, lifelong practices of dwelling in and with the world – including practices of picturing, writing etc. – that our understandings of ourselves and the world are shaped. And the name given to such practices of dwelling is: landscape.*

(Wylie, 2013)

But more specifically, the definition of Ingold for landscape is the following:

*Landscape, in short, is not a totality that you or anyone else can look at, it is rather the world in which we stand.* (Ingold, 2000, p 207)

Moreover, Ingold gives a large importance to the detailed scale of landscape research. He considers a single tree, for example, to embody the entire history of the landscapes development, encapsulating and representing a history that includes the effects of patterns activities (actions and practices) performed by various inhabitants and groups throughout time (Ingold, 1993; Cevasco & Moreno, 2013; Rackham, 1986; Grove & Rackham, 2003).

At the end of the 20th century, definitions of landscape were published, not by scientific researchers, but by institutions with the aim to include it into policy and regulations for
patrimonialisation. The first was the one by UNESCO on cultural landscape, which was published in the World Heritage Convention.

*Combined works of nature and of man [and which] are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal.* (Unesco, 1996)

These formal definitions are approved in legal documents like conventions, but also used, accepted and debated in the academic landscape world. Another, largely adapted definition, is the one of the European Landscape Convention, where landscape is seen as

> ‘an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors’ (Council of Europe, 2000: Article 1).

The European Landscape Convention recognizes that landscape is ubiquitous and that all landscape has some value as perceived by people. The Convention was introduced to encourage the different member states of the Council of Europe to aim for a more integrated landscape policy by promoting landscape protection, management and planning. It was this Convention that induced other and new interest in landscape research, especially focused on inter- and transdisciplinary approaches. A rather new aspect was the importance of the people was put forward in the Convention as well as the view of landscape as an interrelation between a spatial context and its actors, reciprocally. Or said nicely by Finch (2013):

> The inter-relationships between place and human activity are important, yet the landscape is not limited to being the passive, neutral, setting for human activity, nor should it be seen as merely another form of artefact, created by human activity, instead it encompasses material, cognitive and symbolic realizations of human-environmental relationships (Finch, 2013).

Or by Roymans within Landscape biography:

> ‘[Landscape is the] interim outcome of a longstanding and complex interplay between the history of mentalities and values, institutional and governmental changes, social and economic developments and ecological dynamics’ (Roymans et al., 2009: 339; in Finch, 2013).

Landscape can thus be seen as the territorial expression of the metabolism that any given society maintains with the natural systems sustaining it (Tello et al., 2006 in Agnoletti, 2006). But still, it remains a vague concept and its meaning continues to be open for discussion. One certainty is that landscapes change (Lavigne, 2003; Antrop, 2005; Turner & Fairclough, 2007;
Turner, 2013) and that they are the result of an interaction between biophysical, social and economic factors (Haase et al., 2007).

This overview of definitions leads us to the concentration of three key words throughout this dissertation: place, people and interrelation. This dissertation considers landscape to be a temporal and spatial interrelation and interaction between actors and their environment or context. Studying landscapes in this aspect means to explore the spatial and temporal changes of the environment, the actors and their relation with the latter.

2.1.2 ... THE KEY ASPECTS FOR LANDSCAPE RESEARCH

To reconstruct the history of landscape research, we refer to the synthesis of Marc Antrop in ‘A brief history of landscape research’ (Antrop, 2013). Nevertheless, in this chapter and throughout the entire work, the executed research will be situated in the variety of landscape approaches, responding two questions:

- How can the interrelations between people and place be approached?
- What are the key aspects within landscape research that this research responds to?

INTERDISCIPLINARITY – ROLE OF THE DISCIPLINES

Like discussed in 2.1, the approaches to landscape are very broad and not always clearly defined. Most interest groups who deal with the same territory or land might see different landscapes. As also explained before, the meaning of ‘landscape’ shifts by the context and by the background of the users (Antrop, 2013). Therefore, the collaboration between disciplines is necessary. This is called interdisciplinarity or how to approach the same research objectives and aims by different academic disciplines (Antrop & Rogge, 2005; Tress et al., 2005).

Within historical geography, it was Hoskins (1955), with his undoubted legacy to establish a popular interdisciplinary subject within the United Kingdom, beyond the traditional constraints of academia (Finch, 2013), who firstly mention the importance of interdisciplinarity. The need for interdisciplinarity came on the agenda of landscape research with the foundation of the Working Community Landscape Ecological Research (WLO) in 1972, and the International association of Landscape Ecology (IALE) in 1988 (Antrop, 2013; Naveh and Liebermann, 1994). This renewed interest resulted in the foundation of several, still existing, journals as Landschap (Zonneveld, 2000), The Domesday Geography (Darby and Campbell, 1962), Landscape Research in the 1960s and 1970s, and Landscape and Urban Planning, Landscape Ecology in the 1980s.
At the end of the 20th century, landscape research clearly distinguished different approaches, all of them using their own terminology, but with only little interaction between each other (after Antrop, 2013):

- **Historical geography and archaeology >> genesis of the landscape and its meaning as heritage**
- **Landscape ecology >> relations between spatial patterns of land use and ecological processes**
- **Humanistic and cultural geography >> landscape as a mental and social construct with important symbolic meanings.**
- **Landscape architecture >> focus on scenery**

Finally, it was the attempt of the European Landscape Convention to promote interchange and collaborations between the different disciplines, approaches, terms and interests proposing one preamble, and proposing one holistic and overlapping definition of landscape (see above). Within **Landscape Ecology**, this interdisciplinarity was already done, (Kirchhoff et al., 2013), being the aim of the IALE network was to pool interdisciplinary expertise and to develop partnerships. They focus on specific problems and situations in Europe and offer applied research for planning and managing landscapes in a more holistic and sustainable way (Antrop et al., 2013; Wu, 2010; Naveh, 1975; Vos & Meekes, 1999). Other landscape related disciplines also tried to integrate collaboration, communication and co-investigation with other disciplines, but most encountered some difficulties during the journey.

**Landscape archaeology** for example, is by definition an interdisciplinary field, but the nature and strength of influences from the humanities (particularly history and studies of the ancient world), the biological and physical sciences, and the social sciences (particularly anthropology and geography) have significantly shaped different approaches (Turner, 2013). Within this angle, the ‘**landscape biography**’ approach tried to break down the boundaries within and between disciplines, in order to gain balanced scientific results. The academics participating to this approach, are mostly geographers, archaeologists, historians, and anthropologists.

> *Landscape is a complex entity which is established by many actors, powers and conditions. We stress the importance of collaboration, of hearing each other out and of paying attention to solving each other’s problems because it is the only way interdisciplinarity can bear fruit. Interdisciplinarity strives to be more than the sum of its parts.* (Vervloet et al., 1996; Vervloet et al. 2010).

Another important discipline, which was not quoted by Antrop (2013), and which inherently contains interdisciplinarity, is **Historical Ecology**. To reach their aim of studying the interaction
between humans and their environment over long-term periods of time, in order to gain a full understanding of its cumulative effects, they require a combination of theories and methods from geography, biology, ecology, history, sociology, anthropology and others (Moreno, 1990; Cevasco, 2007; Cevasco et al., 2015; Rackham, 1986).

This research is consistent with the above presented approaches, and tackles the interdisciplinarity by combining different methods and theories. The logistic framework of a joint PhD between the different research institutes (University of Genova, Ghent University and the ILVO), all with their own expertise, already gives an idea of the application of the interdisciplinarity. The research unit of Genova, and more specifically the multidisciplinary Laboratorio di Archeologia e Storia Ambientale (LASA), consists out of ecologists, archaeobotanists, archeologists, geographers and historians. A cross-pollination of those disciplines resulted, inter alia, in a specialisation of historical ecology and micro-history. The landscape research unit of the Geography department in Ghent has years of experience in holistic landscape approaches, including historical geography, landscape ecology and landscape perception studies, and last, there is ILVO, which has a profound background in more sociological themes considering the rural landscape and its interrelation with actors and society.

**Transdisciplinarity – Role of the actors**

Within the start of the 21st century, new problems and gaps in landscape research came along. It was not sufficient anymore to be interdisciplinary, since, landscape research was no longer limited to the research from outside, but should include insiders such as local actors and stakeholders. Especially with the aims of participatory research for the future development of landscapes (Opdam et al., 2001; Selman, 2006), those stakeholders were more and more invited and included into research. The need for a transdisciplinary approach was born within landscape research (Antrop, 2013). The shift from government to governance is also seen in different policy spheres, of which rural policy is certainly the most interesting for this research. In combination with an increasing decentralization of political and administrative responsibilities (Louwe et al., 2003) policy making has become a complex multi-level and multi-actor exercise.

Within the landscape ecology approach, a transdisciplinary approach to landscapes was stimulated involving locals, experts, researchers, planners, practitioners, managers and policy makers to deal with conflicting sector demands in the same landscape (Antrop, 2013). The approach promoted transdisciplinarity largely as an added value for a more socially robust research (Antrop, 2013).
From a **landscape biographical** view, transdisciplinarity concerns the position of cultural history and heritage management in a modern rapidly changing society (Elerie & Spek, 2010; Roymans et al., 2009; Vervloet et al., 2010). Therefore, various parties are involved, including experts, governments, non-governmental organizations and the inhabitants living in the cities and the surrounding countryside.

Within **Landscape archaeology**, the interesting approach of Historical Landscape Characterisation (HLC) was developed, which was widely applied in other landscape related disciplines. Including heritage value, social and symbolic meanings in the characterisations demand a more holistic approach. So, landscape characterization was supported by all kinds of landscape representations and narratives (Antrop, 2013). ‘Landscape archaeology’ is now informed by approaches that move beyond individual finds or sites to consider relationships between people, places, animals and things at much broader scales (Turner, 2013).

A last approach within historical ecology and historical geography, is **oral history**, being the collection of data through interviews with and individual, personal biographies of local actors. Trying to grasp the facts out of their memory and perception and reconstructing the evolution of, in this case, landscape management. This with the main to preserve knowledge for future generations and for the sustainable management of the landscape (Moreno, 1990; Agnoletti, 2006; Bürgi et al., 2013).

This dissertation tackles transdisciplinarity by combining the different methods, theories and sources here described. The broadening of our field of vision can only be achieved through a transdisciplinary dialogue among different areas of knowledge within the social and natural sciences, all of which are capable of adopting a common historical perspective (Tello et al., 2006 in Agnoletti, 2006).

**Historical importance – Role of the past**

Seeing landscape as a palimpsest came from O.G.S. Crawford, a geographer who has worked as an archaeologist, and defined landscape as:

> ‘a document that has been written on and erased over and over again. ... The features concerned are of course the field boundaries, the woods, the farms and other habitations, and all the other products of human labour; these are the letters and words inscribed on the land. But it is not always easy to read them because, whereas the vellum document was seldom wiped clean more than once or twice, the land has been subject to continual change throughout the ages.’ (Crawford, 1953: 51; Turner, 2013).
One of the basis for the use of a historical approach in landscape research lies in the United Kingdom and Ireland, where both archaeology and history were the focus for landscape research. One of the pioneers was W.G. Hoskins who, with ‘The making of the English Landscape’ (1955), is seen as the founder of historic landscape studies. The work of Hoskins and co. was firmly rooted in traditional historical methods which entailed the detailed study of documentary sources from particular localities. In this respect their approach, and especially the method of multiple sources in a local context, was referred to by other European historical geographers in the mid-twentieth century (e.g. Flatrès, 1957 in Turner, 2013; Braudel, 1972). An important example is the French historian Fernand Braudel (1902-1985) and the Annales School who proposed and developed a model, based on the ‘longue durée’ in opposition to the total, politically-dominated ‘histoire evenementielle’. But it was Oliver Rackham who introduced historical ecology into historical geography (Rackham, 1986; Grove & Rackham, 2003). In Italy, this approach was adapted and transformed by Moreno et al. (1990), who underlined the importance of historical research within the landscape research discourse.

Still today, landscape research in Italy is largely controlled by geomorphology or landscape ecological patterns in explaining landscape structure and planning (Pignatti, 1994; Romani, 1994; Farina, 1998), with a relatively reduced interest in human influence, often resulting in an artificial division between natural features and anthropogenic features of the territory (Agnoletti, 2006). Consequently, there is a need to develop specific methodologies to assess human influence, including a historical approach into landscape analysis, a history no more limited to the use of written or printed sources but able to combine different tools and techniques (Agnoletti, 2000).

But why is historical approach so interesting for a suitable landscape research?

**Historic landscape studies** can be broadly characterized as sharing a central concern with ‘how people in the past conceptualized, organized, and manipulated their environments and the ways that those places have shaped their occupants’ behaviors and identities (Branton, 2009: 51; Finch, 2013). The multi-dimensionality of everyday landscapes (Ingold, 2004; Forbes, 2007), but also the relationships between people, places and things can be traced and explained not only in the past landscapes, but also from the past to the present, and on into the future. Integrative **landscape archaeologies** hold out the possibility of transforming mutual incomprehension into deeper, better-informed awareness of past and present landscapes by bringing together many viewpoints in unified frameworks (Turner & Crow, 2010). One of the main lessons of archaeological theory is that different people in the past or present see the same thing in diverse ways thanks to their varying perspectives.
Already in landscape ecology itself, the need for a better integration and closer cooperation between landscape ecologists and historians was expressed (Bürgi & Russell, 2001). The alternative of not including more historical information in landscape ecological studies frequently leads to misinterpretation of the observed change in environmental features (Pickett and McDonnell, 1993). As a response to that need, a working group on Historical Landscape Ecology was set up within the International Association of Landscape Ecology.

From the point of view of historical ecology, the biodiversity of rural landscapes is revealed especially when their individual historical dimension is explored directly in the field (Rackham, 1986; Moreno 1990; Cevasco & Moreno, 2010). A historical perspective can recognize the environmental systems and processes that shape each rural landscape as true functional nodes – or, rather, ‘areas’ - in a more general historical process of ‘environmental biodiversification’ (Ingold, 2003; Cevasco, 2007; Cevasco & Moreno, 2013). This scale of the ‘individual landscape’ (studying the individual woodland, grassland etc.) gives an added values to the historical-environmental content of each observed landscape (Gramlich et al., 2016).

There is a need for improvements in research on (cultural) landscapes by understanding the background inducing landscape changes. Cultural landscapes, especially in a Mediterranean area, are not easy to understand (Naveh, 1991; Grove and Rackham, 2003; Agnoletti, 2006). History was therefore not considered an option, but the central part of an approach aiming to understand the trajectory of landscape systems, indicating values, criticalities, degradations and threats (Agnoletti, 2000). A historical perspective has the potential to reveal decisive actors and driving forces and the resulting landscape change (Burgi, 1999; Bicik, 2001, Schneeberger et al., 2007). Only in that way can we learn to take responsibility for changes in our current landscapes (Keisteri, 1990). Or, as Antrop states, landscapes of the past cannot be brought back, but ways how valuable elements and areas can be preserved and become embedded functionally in the modern urbanized and globalized society must be studied (Antrop, 2005).

More specifically and relevant for this research, is the fact that in the Mediterranean basin the land use patterns are often characterized by extensification processes during the last decennia (Pinto-Correia, 1993). Looking back at international published landscape research studies, the lack of a historical approach is noticed, more than in the rest of Europe (Landscape Character Assessment, Historical Landscape Characterization in Great-Britain). Examples like Godone, 2014; Gabrielli, 2002; Zomeni, 2007; Marignani, 2008, focus mostly on the last decennia, using GIS methodologies and aerial photography. An integration of historical sources, older than the beginning of the 20th century, is often absent. We underline the importance of these historical sources, also because of its importance in future sustainable planning and management for future landscapes (Antrop, 2005). Understanding the significance of the historic landscape has moved to the centre of planning policy in the United Kingdom since the ratification of the
European Landscape Convention (ELC) in 2004 (Dejeant-Pons, 2006; Finch, 2013). The European Landscape Convention recognises that change is one of the fundamental characteristics of landscape (Council of Europe, 2000). A nice example of how a historical dimension of a landscape is introduced into spatial policy, is the landscape atlas in Flanders (Antrop & Van Eetvelde, 2008).

Using the temporal, historical dimension of landscape is the red line through this research. All aspects have been explored through the glasses of time, with respect to the past, and with a vision towards the future.

**Sustainability – Role of the future**

Interdisciplinarity, transdisciplinarity and an appropriate historical approach, are key aspects that can lead towards an extra dimension of landscape research. There is a need for research that is seen by society as a true problem solving research. Therefore, it has to address questions emerging from practice, formulate the relevant problems and give a sound contribution for their solution (Antrop et al., 2013). But the question arises: How can landscape research be made operational in future strategies for the protection, management and development of landscapes (Palang et al., 2004)?

The disciplines themselves come up with some answers:

For landscape archaeology, the relationships between people, places and things can be traced and explained not only in past landscapes, but also from the past to the present, and on into the future (Turner, 2013). Their focus will certainly remain on the analysis of past landscapes, but archaeologists also believe they have something valuable to contribute to managing and improving the landscapes of the present and future (Turner and Fairclough, 2007; Fairclough and Möller, 2008 in Turner, 2013).

> If we are successful, landscape archaeology and its spatial approaches should be able to provide us with an engaging view not only of the landscapes of the past, but also of the ones we are creating for the future (Turner and Fairclough, 2007 in Turner, 2013).

Protection, management and development of the current landscapes is nowadays largely directed by EU policies, e.g. the Common Agricultural Policy (CAP), directives concerning biodiversity and habitats, water resources, soils, and human well-being and environment. Those policies, often executed on national and even regional level, are not always consistent with the broader goals of the Council of Europe (see definition on Landscape before). And, as Antrop (2013) states:
This discontinuity (between the EU and Council of Europe) can only be addressed using landscape approaches that relate the importance of sustainable and functioning landscapes to the economy of local, region, and European-wide scales.

**Landscape Ecology**, as a transdisciplinary science with a dynamic and holistic perspective on landscape offers therefore a great potential for an integrative approach.

The theoretical developments in the social history of material culture and topographical approaches in Italian micro-history (microstoria) in combination with the **historical ecology** in Britain, are of an added value for both social and economic historical understanding of the landscape (Grendi, 1996). In Italy, discussions concerning such topics began during the 1980s when foresters, geographers, and historians took a growing interest in environmental history studies (Moreno et al., 1990).

When it comes to the development of rural mountain landscapes, the link between territory and culture is essential. Culture can be defined as ‘a set of place-specific forms that can be used to animate and define “development”, respecting local control and ownership (Ray, 1999; 263; Woods, 2011). This research aims to include a chapter on sustainable development in similar areas, and explains the added value of landscape research when it comes to the formulations of future development strategies.
2.2 Dynamics and Processes of Rural Mountain Landscapes

In the marginalized parts of the European countryside, the historical cultural landscapes are vanishing due to a large scale land abandonment. Where they are abandoned, spontaneous nature development takes over and within a couple of decades dominate landscapes that were used intensively for centuries (Vos & Meekes, 1999). One of the landscape types that changed most drastically through time, are rural mountain areas. Those landscapes contain characteristics of certain international dynamics and processes, being related with culture (see Chapter 1). Therefore we can speak of cultural landscapes, being a reflection of the changes between society and environment in space and time (Birks et al., 1988; Russell, 1998; Bürgi & Russell, 2001).

Historically, most of the rural mountain landscapes included an intensive land management and an economic climate where inhabitants combined self-sufficiency with a limited export of their local products. Currently, pastures and fields (mainly on terraces) have been abandoned, coppice is changing into high forest, chestnut plantations have become neglected and monocultures have been introduced in forestry (Pinto-Correia, 1993). But the spatial arrangement of present-day land use still reflects the agricultural structure of the first decades of this century, which gradually developed from probably the 12th century onwards.

To understand the spatial character of a landscape (Chapter 4) and how the land abandonment process changed this character through time, a general introduction on the land management, namely the agro-silvo-pastoral system, and the rural practices that created this landscape, is needed.

2.2.1 Historic Land Management: The Agro-silvo-pastoral System

For rural mountain areas in Northern Italy, the historic land use system was based on the following activities: mixed cultures on small, man-made terraces, chestnut forestry with sheep and pig grazing; coppice for charcoal burning; and grazing cattle on high pastures with seasonal migration to lower pastures, even reaching the coastal area (Farina, 1991; Vos and Stortelder, 1992). Those mixed rural landscapes were driven by local practices who were managed by means of a multiple system (Vos & Meekes, 1999; Moreno, 1990; Cevasco et al., 2007), integrating forests and tree pastures (e.g. for forest grazing, charcoal burning, fire-wood, timber, manuring, and all kinds of utensils), rough grazing lands (e.g. heathlands, phrygana, garrigues), water systems (e.g. for irrigation, fertilization), etc. (Vos and Stortelder, 1992). Really every site and every tree was used. In practically every case, the base was the trinity of trees, arable cultures and grazing (Le Coz, 1990; Joffre, 1992; Joffre et al., 1991, in Vos & Meekes, 1999). These so-called agro-silvo-pastoral systems were regionally differentiated by their
adaptation to climate, physiography and local cultures through a continuous change of practices and production.

The complex mixture of forest or woodland, surrounding the arable land, was fully integrated in the farming system and was part of the intensive rural management. Due to the dry summer climate the more sheltered forests were used for summer grazing in addition to the more exposed grasslands. The cooler temperatures of mountain areas, favoured the practice of transhumance, became one of the more important factors that has contributed to the modelling of the vegetation and landscape over many centuries.

One of the most characteristic land uses was the coppice woodland, as a result from an important silvo-cultural technique (cutting the young branches of the tree close to the ground) which shaped a large part of the forests and woodlands in the Mediterranean area (Rackham, 1986; Grove & Rackham, 2003). This rural practice characterised the forests, composed of deciduous and/or evergreen broadleaved species, by small stem diameters and short tree height. The coppicing practice can be considered as a systematic anthropic disturbance with meaningful consequences on vegetation community succession (White and Pickett, 1985).

The technique was used for different types of woodland. First of all, there were mesophilous forest (e.g. Carpinus betulus) with irregular shelter wood coppice, along streams and on steep lower slopes, for firewood, fences, posts, etc. Secondly there were beech coppices (e.g. Fagus sylvatica) with charcoal burning on flat areas (5-10m in diameter), which were used for the production of charcoal from wood (Di Pasquale et al., 2004; Moreno, 1990; Cevasco et al., 2007) and grazing activities. Thirdly, there was the coppice oak wood (e.g. Quercus cerris) on steep slopes up to ca. 1000 m a.s.l. and used for charcoal production, fences, posts, boar-hunting. A fourth coppice management was applied on the chestnut forests. They were found up to ca. 1000 m a.s.l., and were used in multiple ways: for forest grazing, as a source of fire wood, for mushrooms, chestnuts for human and animal consumption, used for direct eating or flour production, hunting, leaf mould (production of leafs for the stable beds of the animals during winter), honey, etc. (Salvi G., 1982; Vos & Stortelder, 1992; Cevasco, 2004; Moreno, 1990).

The arable cultures, also known as the ‘coltura mista’ system, is mostly combined with the rotation of annual crops between vines growing up. A rotation, for instance, of Leguminosae in the first year, grasses (hay) in the second year and wheat or oats in the third year, is very common. Compared with the perennial crops, these rotations are less intensive with regard to the use of chemical fertilizers, because they use the natural process of nitrogen-fixation by Leguminosae in an efficient manner (Vos & Meekes, 1992). Often, some cultivations did not appear as monoplots, but were mixed with other cultivations. For example, vineyards were not always present as ‘yards’, but other arable fields had one or a few lines of grapes, since it was
part of the multiple rural system. Another technique as the controlled burning has for long been a conscious management tool for grazing in the Italian Mediterranean zone as well as in the mountains. Generally, the arable land was dominated by a combination of cereals, local horticulture, viticulture, fruit trees, rotation of grassland and *Leguminosae* organized on terraces below ca. 700 m a.s.l.. The arable land positioned above the 700 m a.s.l. consisted out of rotation of grassland, *Leguminosae* and cereals.

The grazing land contains firstly the pastures on the terraces above 700 m a.s.l. and on the highest interfluves where cattle and goats were grazing. They are historically mixed with beech coppices and were used for hay production in the first place. The cattle was only brought upon the mountain for grazing after the hay cutting in June-July. Secondly, also the heathland and other rough grounds or shrubland on stony and rocky interfluves and other unfavourable sites were used as grazing grounds. Those ‘naked’ grounds were historically used for grazing of sheep and goats, since they were situated in difficult areas with a high and sometimes steep hillslope.

As mentioned before, the forests and tree pastures were characteristic for the agricultural system. Owing to the dry summer climate, more sheltered forests have been used for summer grazing in addition to the more exposed grasslands (Vos and Stortelder, 1992).

The water systems had an important role for irrigation and fertilization. Inventive irrigation systems (locally called *bedo* or *bego*) were constructed and managed by the local actors. Often, a main canal took the water from a natural source towards the villages, with an inclination slightly less than the altitude level. Once arrived in the village, a dense network of small earth canals interlaced the settlements and brought the water to the individual fields. All inhabitants who needed the water for their fields were integrated in a management system with one ‘head of the bedo’. Every family received a quantity of hours for irrigation which was inheritable, the hours were probably assigned depending on the quantity of land one head. Once it was your turn to irrigate, you could open the sluices that divided the main water channels from your individual ones, and the water arrived in your fields. The need for irrigation and the quantity of people was so high that the system was applied day and night. The maintenance of the water systems was done collectively during winter, spring. The mills in the mountain areas were abundant and had a crucial role in the production chain. Mostly, they were used for the flour production of chestnuts and wheat (Vos and Stortelder, 1992; Sereni, 1961).

An important example of local practices and local land management are the common lands (*comunaglie*), a system allowing the multiple use of vegetation and soil resources largely oriented since the sixteenth century towards the market particularly for animal production: agriculture was not confined in permanent plots, not being in contrast with animal and woodland production (e.g. cheese, hay, mushrooms, acorns, timber). The legal basis and the
historical statute and functions of those *comunaglie* declined during the 19th century through a progressive reduction of the common grazing system but practices allowed by the customary laws carried on into the first half of the 20th century (Cevasco, 2004; Beltrametti & Tigrino, 2014)).

To conclude, the agro-silvo-pastoral system contained a variety of rural practices which need more explanation. Naveh (1975) (Di Pasquale, 2004), reports that the first landscape transformations, through the processes of post-fire regeneration, had been induced to favour hunting and the spread of vegetation species used by man and for livestock nutrition. Fire has therefore played a fundamental role in the transformation of the pastoral and agricultural ecosystems and it is probably also involved in the domestication of cereals (Naveh, 1975; Di Pasquale, 2004). The abundance of charcoal remains found in many different type of soils (Di Pasquale, 1998; Moreno, 1990; Cevasco, 2007) can be used as evidence of the frequency of use of fire in the Mediterranean (Grove & Rackham, 2003).

2.2.2 LAND ABANDONMENT AND ITS LARGEST CONSEQUENCES

The agro-silvo-pastoral system was closely related to the management practices and economies (e.g. firewood collection, chestnut production, forage pollarding) and livestock management with transhumance and intensive free grazing on common land (Beltrametti & Tigrino, 2014; Moreno, 1990; Di Pasquale, 2004; Moneta & Parola, 2014; Cevasco, 2013; Gabellieri & Pescini, 2015). In general, the historically integrated agro-forestry land use systems reached their optimum at some point in the second half of the 19th century. At that moment, the high population pressure and the need for subsistence caused a diversified use of nearly the entire landscape. Livestock became the central component, not only because of their meat, milk, wool and hides, but also for their manure, animal power, transport, etc. In many cases these systems kept a balance between the increasing population and farm production, being sustainable for a long time. But the balance was fragile, and very much alive to catastrophes, periodic overpopulations and effects of wars and epidemics (Vos & Meekes, 1999). After the second World War and until the 1970s-1980s, the rural mountain areas became largely abandoned by its population, with severe consequences for the land.

ON A SPATIAL SCALE

The abandonment of agricultural land and traditional cultivation practices is a common and widespread phenomenon in the mountainous regions of Italy (Colaone and Piussi, 1975; Farina, 1991; Gandolfo, 1994; Vos & Stortelder, 1992; Torta, 2004). The causes of land abandonment
are linked to the large-scale socio-economic transformations that affected the whole country in the last century (e.g. industrialization and migration towards industrial centres and cities, rural exodus and employment alternatives, decrease in the birth rate). At the local level, the phenomenon has a more rural dimension, leading to an extensification process of the land use. This process was closely related with the abandonment of crop cultivation and livestock management, fewer cultivated fields, more shrub patches, larger areas of pastures, and also abandonment of some patches, followed by the development of stratified bush communities. The extensification process resulted in a new landscape mosaic.

When land is abandoned, the original land cover of those man-maintained cultural landscapes changed with several ecological consequences. The consequences of the land abandonment are mostly related with the loss of rural practices and intensive maintenance of the land, resulting in changes of the biodiversity, soil, topography, hydrography etc. Generally, spontaneous nature development takes over and within a couple of decades dominates landscapes that were used intensively for centuries. The diversity of mixed traditional land use systems underwent a simplification; less significant land uses disappear (Pinto-Correia, 1993a), patches become larger, small-scale heterogeneity decreases (Alès, 1991; Vos and Stortelder, 1992), shrub and forest cover increases and landscape fragmentation is reduced. These new vegetation patterns have increased fire risk, with higher burning frequencies and larger size of burned areas (Di Pasquale, 2004).

Especially shrub formations progressively dominate, increasing homogeneity both in the scenic perspective and in the biological composition (Naveh, 1991). Naveh (1991) refers to a reduction in species richness of more than 70% (to less than 30 species/0.1ha) in similar cases. The first species to be extinguished are endemic plants, namely small shrubs and herbs; the Mediterranean flora comprises many endemics that are highly localized. If their local support conditions disappear, they simply extinguish (Pinto-Correia, 1993b). In the shrub formations of reduced vegetation diversity, the variety of habitats is also limited to a minimum, and less trophic resources are available. This impoverishment is accelerated when the shrubland is replaced by monocultures of trees destined to timber production (Montanari & Moreno, 2014; Cevasco, 2007; Cevasco et al., 2015; Castelli et al., 2001).

But on the other hand, literature also discusses the fact that abandonment may lead to an improvement in landscape heterogeneity, and thus biodiversity, through the constitution of a mosaic of elements that are relatively poorer in species, but are diversified according to different levels of degradation due to fires, grazing and loggings. Consequences of land abandonment at the ecological level cannot be generalized, and not so clearly evaluated as
negative. The different evaluations depend mainly on scale, and on the goals of conservation which have the priority (Pinto-Correia, 1993b; Vos & Meekes, 1999; Bürgi, 1999).

Generally, literature mentions this trend as ‘rewilding’, which can be a misleading term since it is often considered as a returning to the way the landscape looked before. Since this is often a biophysical impossibility, ‘wilding’ is therefore perhaps a more accurate term and indicates a forward-looking process of moving on to a new state of ‘wild’ nature (Carver, 2013). At the end, the concept explains a trend where landscape changes because of the fact that it is no longer under man management.

ON THE ACTORS

But the local actors also changed during time. As explained before, historically, the landscapes were especially managed by farmers (cf Vos and Stortelder, 1992). Since the habitants were mainly farmers, donkey drivers and/or shepherds, the decline in population has had an equally large impact on the rural landscape. Today, the actors consist out of a variety of farmers, nature and water managers, recreation entrepreneurs, spatial planners etc. Given the multiple dynamics, the landscape quality may only be guaranteed by the commitment of all actors engaged. Most of the farmers still focus on agriculture, but many also see development opportunities in recreation, nature conservation, water management etc. In many historic rural regions, agriculture is no longer either the main supplier of labour, nor the main source of regional income (Vos & Meekes, 1999). The farmers’ strategy here (Pinto-Correia and Jorge, 1996; Lourenco et al., 1997) is to continue maintaining the land, using the historical land management systems, but with a minimum investment and support from other sources of income (possibly off-farm) (Pinto-Correia, 1993b).

2.2.3 IN NEED FOR A SUSTAINABLE DEVELOPMENT

The rural mountain landscapes which were a scenery for the agro-silvo-pastoral land management system almost completely disappeared through time, and also did the local actors. Inherently, landscapes change, and so does the interrelation between the varied environment, and its actors, through time and space. The large land abandonment was certainly one of the drivers of those changes.

But the story has not finished. On a daily basis, the landscape is being shaped, and decisions are made for the landscape of tomorrow. Policy decisions and measures, technological innovations, economic climate, demographic evolutions, social changes, natural events, ... all have an impact
on both actors and their space. But landscapes that underwent such drastic changes, often do find themselves in an impasse when it comes to future development strategies. To reach such strategies, it is indispensable to understand the evolution of the landscape and how it became the one we see today. The understanding of the dynamics and processes of rural mountain areas through a large time span, is no sinecure, but it is certainly an added value for the construction of future development strategies and recommendations.

The difficulty of creating a new strategy or vision lies in the fact that the current landscape has a large variety of functions, formed by the different meaning and viewpoints of a large variety of actors. Functions like farming, conservation, nature, protection, tourism, hunting, ... in the same space, is not easy to combine. Landscape planning and management bodies, may be preoccupied with common functions and conditions, while private enterprises may be preoccupied with their own profits. But at the end, all of them are highly interdependent in realizing economic, socio-cultural and ecological sustainability in the landscape (Vos & Meekes, 1999).

However, the current landscape has a background as a rural space, made and managed by man, and is still today largely rural. The main function of agriculture can be combined and in respect with other functions, but a future strategy or vision should be largely connected with the rurality. The question on how to realize a new future vision with new functions and still guarantee the sustainability of the qualities of the past is a major concern in nearly all the historical cultural landscapes in Europe. Good perspectives for the future of those landscapes are based on the following observations (Vos & Meekes, 1999):

- A rich and stable society demands a broad spectrum of functions from our landscapes;
- Many farmers move towards multifunctionality, including landscape management, when they gain profits from it;
- A growing political and public engagement with a ‘healthy’ countryside as part of regional cultural heritages, especially at international level;
- Shift towards decentralization and denationalization, which favours a Europe of the regions with their own cultures, products and landscapes.

In Italy, within a process of patrimonialization, the Rural landscapes of Historical Interest (RLHI), require specific agricultural policies, which so far have been lacking, recognizing and promoting the ‘positive externality’ or ‘added value’ couple with local production systems, as well as the practices and contextual knowledge of the producers who are presently managing them (Magnaghi, 2007 in Cevasco et al., 2015).
Throughout the thesis, these perspectives will be handled, telling the story of a particular valley, through two specific case studies.

### 2.3 The Rural Landscape of Val Borbera

This dissertation analyses the landscape dynamics and the evolution of abandoned agricultural land on the Northern Apennines chain from the beginning of the 19th century until recent times. Throughout the dissertation one specific Apennine valley, situated in the valley of the Borbera river (from now on referred to as ‘Val Borbera’), will be studied. The valley has been subject of study of different local historians, tackling themes as the patrimony of the local music, the migration towards the America’s, etc. (Leardi, 1997, Tacchella, 1961,1981; Ferrari et al., 2008; Ferrari, 2013; Sisto, 1956; Botta, 1980) The valley covers a territory of 213,63 km² and is situated in the region of Piedmont, province of Alessandria (see figure 1).

![Map of Italy showing the location of Val Borbera](image)

**Legend**
- Case study Carrega Ligure
- Case study Figino
- Watercourse
- Sites of Community Importance
- Municipalities of Val Borbera
- Province of Piedmont

**Figure 2.2: Situation of the two case studies (Carrega Ligure and Figino) in Val Borbera (Alessandria - Piedmont)**

The area is mainly hilly and mountainous (max. 1700 m a.s.l.). With a predominant marly clay/marly calcareous substrate. The mountain belt (1100-1700 m a.s.l.) of the area is covered
by a herbaceous and shrubby vegetation, covering the geological formation of Monte Antola limestone (Castelli, 2001). Historically, the valley was covered by ancient mercantile trails which connected the Ligurian Sea with the Po plain. Until the 50s, the rural mountain landscapes, between Piedmont and Liguria, were characterized by terraces, cultivated with wheat, vineyards and small-scale gardening around the mountain villages. On the other hand, there were grass and pasture land with herds of sheep and cows more uphill. Farmers of the lower valleys around Mount Antola (1597 m a.s.l.) brought their cattle up unto the highlands, using the ancient trails, and met on the summer pastures. This rural practice was very common until the late 50s in conjunction with other types of income supply, such as the production of cheese, charcoal/wood, chestnut and wine (Leardi, 1997).

The landscape is an example of the rural mountain landscapes described above, and is therefore relevant to explore empirically based on the problems that were set in the first chapter. Two case studies from the Borbera valley were studied and compared. Both cases, Carrega Ligure and Figino (hamlet of municipality Albera Ligure), were chosen based on their geographic situation (respectively higher and lower part of the valley), their accessibility by road, the state of abandonment and the (non)present economic activities. They are representative in terms of both environmental features and socio-economic driving forces within the Borbera Valley. Some of the methods will only be executed in the case studies, but will be extrapolated to the overall story of the valley (see Chapter 3).

2.3.1 Demographic climate

One of the largest changes in the Borbera valley during the last two hundred years (see figure 2) was the demographic evolution (Figure 2.2). The rapid growth of the population at the end of the 19th century, together with a limited self-sufficient economy, eventually caused a large pressure on the households and their living conditions. Two phases of migrations were detected in the 19th and 20th century. During the first one, people migrated towards two destinations. From the half of the 19th century, the inhabitants started to migrate seasonally towards the Po plain (working in the rice fields) and the nearby cities (working as a servant for wealthy families). With the turn of the century, hunger was one of the largest motives of an additional migration towards the Americas. The second one, and also the most impactful, took place after World War II. Whole families migrated towards the lower valleys, attracted by employment opportunities and job security in new factories. The population knew a huge regression since the end of the 19th century. Between 1861 and 1911, the population of the valley decreases with 12.3%. This decrease is largely explained by the large decrease in the higher parts of the valley (as in
Carrega), a middle decrease in the lower valleys (as in Albera) and a small increase in the only village considered to be in the plain area.

![Graph showing population trends for Val Borbera, Carrega Ligure, and Albera Ligure from 1861 to 2011.](image)

**Figure 2.3: Population of Val Borbera, Carrega Ligure and Albera Ligure from 1861 until 2011. The two large emigration phases are signed by the dotted line (source: Censimenti d’Italia)**

Between 1911 and 1921, the valley recuperates a small amount of residents, mostly in the lower positioned municipalities, which is not the case for Carrega Ligure. From that moment on, the decrease is continuous and faster, with a climax in the period after World War II. Between 1911 and 1951, the valley loses 23.55% of its inhabitants, and Carrega even 41%, considering the fact that Carrega was one of the highest populated villages of the valley in 1911. This large decline was a combination of factors, such as a negative birth rate, the migration movement towards the lower valleys and towards the cities of Genoa and Milan, the ageing of the population because of a higher life expectancy (the percentage of inhabitants older than 65, doubled (6.3% to 12.6%)) (Leardi, 1997).
2.3.2 Economic climate

The mainstream economy from the area shifted from a local rural economy of subsistence to a market influenced agricultural system in the second half of the 19th century. Between 1860 and 1880, the rural income increased, especially related to the viticulture. In the same period, a lot of vineyards were planted on former woodland, pasture and shrubland. After 1880, the area starts to feel the influence of the agricultural crisis in Europe of a few years earlier, caused by a drop in the prices and the import of American products that had a lower production cost. Parallel, there was an increase of the ‘pellagra’, a disease caused by a limited diet and typical for poor families who only eat polenta. This crisis was an important trigger of the emigration flow. At the beginning of the 20th century, the only profitable economy in the middle valleys, the viticulture, suffered from an important crisis caused by an infectious disease and the speculation of the wine prices in 1907-1909.

In the second half of the 19th century, the industrialization really became profitable. The railway connection and the introduction of steam power had a large impact on the industry. This might not directly have influenced the middle and upper Val Borbera, but indirectly it had an impact on the local economy, since people were attracted by employment service and job security in other regions. Electricity made his entrance in the valley at the end of the century. In the mountain areas, where the first trends of overpopulation were manifested, the emigration was particularly high between 1881 and 1901. This population decrease declines in the first years of the 20th century due to the nonetheless strong internal economy based on market products produced by the highly present woodlands (wood and carbon) and grasslands (meat), which both suffered less from the crises described above. Most of those villages are situated around 900 m a.s.l. and are quite isolated from the lower valley. The historic agro-silvo-pastoral system protected the higher parts of the valley from the industrial and agricultural crises in the plain areas. But not for long...

Until 1951, agriculture remained the major activity in Carrega (89,54%) and Albera (78,47%). In the second half of the 19th century, the majority of the population is employed in the agricultural sector. The local economy was mostly concentrated on fulfilling the family necessities, reducing the visits to the market to a minimum. Even if the basis of the economy was agriculture, the first social, cultural and political changes occurred. The expansion of the cereal crops with especially wheat increased strongly. While maize started being cultivated in the hills and low mountains, rye and barley started occupying land until 1000 m a.s.l.. Their introduction was combined with the use of watermills, which were largely present in the territory. The cultivation of wine increased in this period, but not above 600 m a.s.l.. The horticulture was a constant for the family economy. In 1822, a historic document was found on the exported productions towards Genova: about 6.500 quintals of wheat, a little less of
The woodland was quite modestly extended and was mostly private property. In both of the case studies, the chestnut production was at time superior to the potato and wheat production. The oaks and beeches are mostly cultivated for wood and/or carbon production. In this period a widespread deforestation activity went on to create new areas for cultivations and specialized wood cultures. Especially in more hilly areas, the little remained woodland served for the production of pole for the vineyard. The pastures were mostly concentrated above 1000 m a.s.l. and had a daily economy of large herds of livestock and sheep and goats, together with an annual hay production.

**Figure 2.4: Agricultural land cover in Val Borbera in 1929. (Source: 1° Censimento d’Italia – 1929 ISTAT)**

In the beginning of the 20th Century, Val Borbera was predominantly known as a rural area, even if people already migrated for centuries abroad for an extra economic entry.

In 1929 (I° Censimento dell’agricoltura), Val Borbera had 91,2% of its territory occupied for agriculture or forestry (Figure 2.3). Carrega Ligure was characterized by the presence of permanent wooded pastures, meaning the use of pasture land together with hay and wood production. Albera Ligure on the other hand had a high quantity of arable land, with a crop rotation of potato, wheat and alfalfa every three to five years, even for a more mountainous part of the valley. The ‘wooded’ cultures meant the cultivation of vineyards, mulberry trees and chestnuts. While vineyards and mulberry trees are more representing for the lower valleys (e.s. Albera Ligure), the chestnuts are more present in the higher mountains as Carrega Ligure (541...
ha). Since the presence of the meadows, the economy of both municipalities was highly dependent on animal husbandry of especially bovines (1.786 in Albera and two surrounding municipalities, 1.334 in Carrega). Carrega also has a high amount of donkeys and goats.

The modernization and industrialisation phase of agriculture in the whole of Europe caused a specialisation of such, and consequently a decline in animal husbandry and a reduction of vineyards because of expansion of cereal production. From the 1980s onwards, a new rural development paradigm was included on international level, concentrating on a more sustainable rural and environmental development.

### 2.3.3 Cases presented

**Carrega Ligure**

The first case study is situated in the upper part of the valley Borbera (Figure 2.1), and located in the municipality of Carrega Ligure, containing the villages of Carrega Ligure (958 m a.s.l.) itself and the frazione Connio (930 m a.s.l.). The area is delimited by the borders of a lateral valley of the Monte Carmo (1641 m a.s.l.) and covers 5.9km². This mountain crest limits the case study area in the East, the river Carreghina in the West, the Monte Colletto (1050 m a.s.l.) in the North and a collateral current of Monte Carmo following the Medieval Tower to the South.

![Figure 2.5: View on the villages of Carrega Ligure and Connio in 1920 (left) and 2013 (right) (Photo’s: family archive Crosetti - R. Dossche)](image)

The landscape was historically dominated by pasture land, chestnut plantations, coppice woodland, arable land and largely populated villages (Figure 2.4). The land abandonment induced an extensification process and consequently an – apparent - homogenization process caused by the dominance of secondary vegetation. Underneath the cover of wood- and
shrubland, a historical landscape, with the remains of ancient rural practices and knowledge is hidden.

**FIGINO**

The second case is situated in the middle part of the main valley, and contains the ‘cantone di Figino’, the villages of Albera, Figino and Vigo, and the area towards the east of Figino, following the ancient irrigation system of the ‘bedo/beudo’, known locally as ‘bego’. The area covers 6.6km² and is delimited by the Albirola-river in the north, the administrative border in the east, the geographical border of Pian delle Melighe in the south, and the river Borbera in the west.

**FIGURE 2.6: VIEW ON THE VILLAGE OF FIGINO IN 1930-1950 (LEFT) AND 2013 (RIGHT) (PHOTO’S: FAMILY ARCHIVE GIUSEPPE CRESCI - R. DOSSCHE)**

The landscape was historically dominated by vineyards, chestnut plantations, coppice woodland, arable land and largely populated villages (Figure 2.5). The land abandonment motivated an extensification process and resulted in a diverse landscape where agriculture is still present but clearly in decline. Secondary vegetation invaded large parts of the area, and is starting to invade the abandoned former cultivated land as well.
CHAPTER 3

RESEARCH DESIGN, MATERIAL & METHODOLOGY
In this chapter, we zoom in on the methodological part of the research in order to define and document the (hi)stories of a rural mountain landscape, to detect the largest spatial and existential changes and to reconstruct the driving forces. The objective is to describe how the spatial-temporal dynamics and processes of rural mountain landscapes are being studied within this research, based on the empirical case studies of the Apennine valley ‘Val Borbera’ (Figure 1.1).

Landscape research reinforces the need to adopt approaches were both a quantitative and qualitative analysis are integrated (see Chapter 2). Van Eetvelde and Antrop (2004) stated that interpretations from aerial photos and census data are insufficient to fully understand landscape changes and suggest combining these measures with interviews and oral history. Also Wagner and Gobster (2007) underline the fact that while the ‘classic’ landscape assessments provide planners with critical data on various physical and social changes visible on the landscape, important differences may exist between these analysis and what is perceived and experienced by residents in the region. Moreover, an integrated approach of both quantitative and qualitative analysis holds promise in contributing to an improved understanding of landscape change.

In order to understand the symbiosis of landscape transformations, its driving forces and its actors and stakeholders, applying various data sources (historical, topographic, land register and
physiographic maps, aerial and orthographic photographs, semi-structured interviews, focus groups, field visits and policy documents) and multiple methods of analysis are found to be the most appropriate. The research was illustrated with two case studies in order to grasp the more complete storyline of the whole Borbera valley, since the landscape is often the only witness or palimpsest of what happened in the past, and is at the same time the scenery for the future.

This chapter focusses on the research design existing of three main methodological phases applied during research, explaining why they were the most appropriate for this research: the data collection and sampling, the data analysis and finally, the data triangulation where the three methods are combined and interrelated (Figure 3.4 at the end of this chapter).
3.1 DATA SAMPLING

In this section, the attention goes to the collection of the used data, especially spatial data as cartographic and photographic material but also other spatial representations of data like Digital Terrain Models (DTMs), land register maps, soil maps, hydrographic maps, etc. Other additional spatial and non-spatial data are found in archives, through field survey and interviews or focus groups.

3.1.1 CARITO- & PHOTOGRAPHIC DATA THROUGH DESKTOP ANALYSIS

Large map collections are available in many European countries, representing a great potential for describing and understanding the development of landscapes through time (Kienast, 1993; Rackham, 1986; Moreno, 1995; Vuorela, 2002). As landscape change analyses often extend over a long period of time, different sources of maps have been used. These vary from modern digital based maps to historical land use maps. Beside the map collections, photographic data are available since beginning of the 20th century. The interpretation of maps and aerial images is challenging because of several aspects, even with the advantage of modern technological tools. Before going into detail on the used material, the issues and improvements for interpretation of the carto- and photographic material is discussed.

CHALLENGES AND IMPROVEMENTS FOR MAP AND PHOTO INTERPRETATION

The landscape features of present landscapes are observed using remote sensing data and field surveys, while historical landscapes are being interpreted additionally based on secondary data sources. In Italy, the book of Emilio Sereni ‘Italian Agrarian Landscape’ (1961) used iconographic records to describe the landscape, but remained rather superficial in its analysis (Balzaretti, 2004; Raggio, 2004; Gabellieri & Pescini, 2015; Moreno, 2004). A more topographical and local approach requires less generalisation, and (historical) large scale maps do provide a unique information source for this purpose (Vuorela, 2002; Cevasco, 2007). Although much of the recent development in landscape research has been dedicated to improve landscape observation and analysis tools, historic maps still maintain their uniqueness as the most immediate documents of past landscape patterns. However, the use of historic maps and the subsequent overlaying of different time phases implies several challenges in the analysis of landscape changes, since each map is made in a different way and with a different aim. Understanding the origin and a critical assessment of each data source (who made it, why, how and with what purpose) is therefore essential before using it (Vuorela, 2002; Petit & Lambin,
A critical analysis and selection of the sources is thus needed.

First of all, the representation of the mapped elements (land cover, including vegetation, infrastructure, roads, etc.) on historical maps is mostly done through symbols, written on the maps but not containing any contours. This can create some confusion and uncertainty about the exact surface that has that specific symbol. Secondly, the classification of the mapped elements is done by different authors and surveyors in the field and does not always correspond between different time phases. Thirdly, to understand correctly what the legend of a historical map means, one should be aware of the purpose of the mapmakers at that time.

Additionally, a carto- and photographic analysis is not only largely influenced by the map ‘constructor’ or ‘creator’, but the interpretation of the symbology represented on a map is very much dependent on the map ‘user’, since this last needs to understand the influences of the purpose, scale and time of the mapping, and the generalisation techniques used in the map production (Vuorela, 2002; Svenningsen, 2015). Therefore, throughout the analysis and by tackling these problems, it is essential to carefully extract the data from its best possible source. Creating a unified legend (table 3.1 and table 3.10) between the collected historical and modern maps is an important step in the analysis (Cevasco, 2002; Haase, 2007; Van Eetvelde & Antrop, 2009). Cevasco (2002) underlines the importance of the interpretation of the legend in combination with other historical sources (e.g. archival documents, field survey, oral knowledge, ...). Moreover, a sequence of time slices, using a large variety of material, always contains considerable redundant material, which helps to assess the quality of information between different sources (table 3.9).

A large improvement of the time-consuming data analysis through the comparison of different sources, came up with the advance of the Geographical Information System (GIS). Firstly, GIS gave the possibility to tackle a research question in an interdisciplinary way, combining both environmental and human sciences (Turner, 2006a). Secondly, the large advantage of the construction of a GIS database is the collection of attributes for every object and the possibility to collect and manage large volumes of data. During the last decennia, landscape research in Europe has put a lot of effort in creating large, GIS based map collections (Kienast, 1993; Vuorela, 2002). A sequence of very different sources of maps has the potential to give a complete overview of spatio-temporal landscape changes (Käyhko & Skånes, 2006; 2008; Van Eetvelde & Antrop, 2009). Moreover, attributes can be added and mutually combined to come to new interpretations and are therefore never considered to be complete; new interpretations or perspectives on the landscape will demand additional data or new characterisations (Turner, 2010). A GIS database is therefore a flexible tool where several people might choose to
characterise the same area in different ways in response to different research questions, respecting different scales (Turner, 2006b; Crow, 2009).

**Table 3.2: Interpretation of the symbolism in the historical maps ‘Minute di Campagna’, Corpo di Stato Maggiore (1828) and ‘Gran Carta degli Stati Sardi di Terraferma’ (1852)**

<table>
<thead>
<tr>
<th>1828</th>
<th>1852</th>
<th>Interpretation</th>
<th>Current CLASS</th>
<th>Current TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woodland (Bosco)</td>
<td>Woodland (Bosco)</td>
<td>1.1 WOODLAND</td>
<td>3 Middle woodland Or 4 High woodland</td>
<td></td>
</tr>
<tr>
<td>Woodland with grazing activity (Bosco-Pascolo)</td>
<td>Woodland with grazing activity (Bosco-Pascolo)</td>
<td>1.1 WOODLAND</td>
<td>2 Coppice woodland</td>
<td></td>
</tr>
<tr>
<td>Woodland with grazing activity (?)</td>
<td>Woodland with grazing activity (?)</td>
<td>1.1 WOODLAND</td>
<td>2 Coppice woodland</td>
<td></td>
</tr>
<tr>
<td>Grassland for grazing (Pascoli)</td>
<td>Grassland for grazing (Pascoli)</td>
<td>1.3 GRASSLAND</td>
<td>1 On higher altitude</td>
<td></td>
</tr>
<tr>
<td>Shrubland (Gerbido)</td>
<td>Shrubland (Gerbido)</td>
<td>1.4 SHRUBLAND</td>
<td>1 Mixed shrubland (stones, trees, ...)</td>
<td></td>
</tr>
<tr>
<td>Vineyard (Campo Vigneto)</td>
<td>Vineyard (Campo Vigneto)</td>
<td>1.6 CULTIVATED LAND</td>
<td>3 Vineyard</td>
<td></td>
</tr>
<tr>
<td>Cultivated land (Campo)</td>
<td>Cultivated land (Campo)</td>
<td>1.6 CULTIVATED LAND</td>
<td>2 Agricultural land, cropland, permanent fields</td>
<td></td>
</tr>
<tr>
<td>Village (Paese)</td>
<td>Village (Paese)</td>
<td>2.1 HOUSING</td>
<td>1 Historic housing</td>
<td></td>
</tr>
<tr>
<td>Mill (Mulino)</td>
<td>Mill (Mulino)</td>
<td>2.3 INDUSTRIAL INFRASTRUCTURE</td>
<td>1 Mill</td>
<td></td>
</tr>
<tr>
<td>Water (Acqua)</td>
<td>Water (Acqua)</td>
<td>3.2 WATER COURSE</td>
<td>1 River</td>
<td></td>
</tr>
</tbody>
</table>

But integrating historic land use maps in a GIS system faces a number of challenges such as georeferencing old maps, applying the right projection, dealing with differences in scale and symbolization (Monmonier, 2014; Vuorela, 2002; Moreno, 1999; Cevasco; 2002; Gabrielli, 2002; Keates, 1996). As Eriksson (2010) states, the challenge lies in handling inconsistencies between historical maps without violating the inherent semantic potential. At the end, it is worthwhile to emphasise the need to integrate information extracted from old maps into modern data processing environments and at the same time stress the importance of systematic and well-documented work methods in any such effort (Vuorela, 2002).

Another challenge is the limited amount and frequency of aerial photography (Godone, 2014; Gabrielli, 2002; Zomeni, 2007; Marignani, 2008). This source has the advantage of not being an
interpretation, as it is with maps, and offers ‘raw’ information for the researcher to work with. The first aerial photographs, in Europe, were made during the first World War (Gheyle et al., 2014). This means that in some lucky cases, a regressive analysis can go back to 1914. But mostly, aerial photographs are only available from the interbellum, or even after World War II (1950s), onwards. Therefore, most regressive landscape analyses based on aerial photography interpretation, give a direct overview of the changes of the last 60-80 years. However, it is not obvious to make a complete historical analysis of a landscape, only based on aerial photographs, even if they still represent traces of former landscape structures. In this view we underline the importance of sources, such as archival documents but also pollen analyses, which go further than the time period available by aerial photography, to include in landscape analyses.

When the researcher succeeds to overcome these problems/challenges, he/she can (re)construct a relatively detailed picture of the historical development of the landscape. Analyses based on historical photos and cadastral maps have been executed in Liguria, more specifically in the Apennines (Cevasco, 2007; Gemignani, 2013; Gabellieri & Ruzzin, 2015; Quaini & Gemignani, 2014) but also in Tuscany (Vos and Stortelder, 1992; Agnoletti and Paci, 1998; Gabellieri & Grava, 2015).

**Used sources and their characteristics**

Different types of spatial data sources were used for the regressive analysis (see 3.2.1), covering a time period of over 200 years, based on historical maps (1828, 1852), land register maps (1811, 1950) and aerial photographs (1936, 1954, 1981, 2000, 2009-2010, 2014), in combination with the available topographic maps (1877, 1902, 1935, 1937, 1959) (Table 3.2).

As stated by Cevasco (2002) and Moreno (1990), the ‘Minute di Campagna’ form an important and exceptional cartographic source to reconstruct the context of the historic agro-silvo-pastoral system of the Apennines. This collection of maps, called tavolette (tables), covers the whole territory of the former Ligurian Republic, and was executed by military topographers on a large scale (from 1/9.450 until 1/20.000). Every ‘table’ had his own style and symbology, depending on the topographer/surveyor. The tables were originally published with a booklet of notes, called ‘quadernetti di campagna’, where the land use and several statistics were described, but they were lost through time. The meaning of the symbology was largely depending on the military purpose of the mapmakers; ‘cultivation’ and ‘non-cultivation’ land covers are strongly related with their sense of ingombro, or obstruction (Svenningsen, 2015). An optic in which, at the end of the 19th century, the cultivations are distinguished between ‘those who permit a large practicability of the land’ (like fallow land and pasture land) and ‘those who make the land impossible and difficult to trespass’ (like vineyards, peat bogs, and coppices).
(Cevasco, 2007). As Cevasco (2002) states, it is important to find the key used by the
topographers to describe the land cover on the one hand, but also to understand how the
context of the local practices at that time are represented on the map on the other hand. By
confronting the symbology with the legend of the second historical collection (the ‘Gran Carta
degli Stati Sardi di Terraferma’, maps Bobbio and Torriglia), it became possible to better
understand the first map. Also the information of the topographical maps of the same time era
was of additional importance for the interpretation. All historic maps of 1828 and 1853 were
found in the local archive of the Laboratorio di Archeologia e Storia Ambientale (LASA -
University of Genova, department of Antiquity, Philosophy and History) and were imported in a
GIS-environment through georectification. Table 3.1 represents the interpretation of the
symbology of the historic cartography (Minute di Campagna, Corpo di Stato Maggiore – 1828;
Gran Carta degli Stati Sardi di Terraferma - 1852) and links them with the constructed legend
(Table 3.10) for the representation of the land cover during the regressive cartographic analysis.
The explanation of the symbols was mostly linked with research done by the LASA research
group of the University of Genova (Cevasco, 2002; Moreno 1990).

Both the Napoleonic (1811) as the modern land registers (1950) of Carrega Ligure and Figino
were obtained in the corresponding municipalities. Land register maps, other than the
information of land cover, they represent also the socio-political dynamics of the era. The
Napoleonic land registers, introduced after the seigneurial local system, were the first made in
the area, and were in a way an artificial ‘privatisation’ of the land. The Napoleonic maps were in
a deplorable state of maintenance, especially the ones for the case study of Figino. In Carrega
Ligure, they were still maintained in a folder in the communal archive, and the series were
complete. In Figino, the maps were hang out as decoration in the communal building, which,
because of the exposure to light and air, had a negative impact on their state. The individual
sheets of the different sections were photographed, and afterwards reunited using Photoshop.
The resulting images that covered the case study areas, where then georectified, but since the
large error of projection, the maps were only used to help with the interpretation of some
particular spots of the 1828 historical map. The recent land register was used in a vector format,
and the information of the individual parcels was only inquired for some particular spots where
the uncertainty of the land use was higher, and to be of help for the main interpretation and the
construction of the database. The information of the land registers was collected for certain
small areas or pilots. Based on this information, and in combination with other data, certain
land uses could be confirmed or specified, taking a margin of error into consideration.
### Table 3.3: Overview of Used Cartographic and Photographic Material

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
<th>Scale</th>
<th>Made by</th>
<th>Carrega Ligure</th>
<th>Figino</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Historical maps</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minute di Campagna, Corpo di Stato Maggiore</td>
<td>1828</td>
<td>1:20.000</td>
<td>Sig. Cap.no Cav.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>- 88 ‘Porzione di Carrega – Prov. Di Novi’</td>
<td>1828</td>
<td>1:20.000</td>
<td>Mariani</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>- 93 ‘Porzione di Cantalupo – Prov. Di Novi’</td>
<td>1828</td>
<td>1:50.000</td>
<td>Mariani</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>- O.14 ‘Rocchetta’ 20</td>
<td></td>
<td></td>
<td>Drawn by Sig. Ing. Brambilla</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gran Carta degli Stati Sardi di Terraferma</td>
<td>1853</td>
<td>1:50.000</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>- F62.Bobbio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- F68. Torriglia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Topographic maps</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F.71 Forotondo III SE</td>
<td>1877</td>
<td>1:25.000</td>
<td>IGM</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>F.71 Rocchetta Ligure III SO</td>
<td>1902</td>
<td>1:25.000</td>
<td>IGM</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>F.83 Carrega IV NE</td>
<td>1935</td>
<td>1:25.000</td>
<td>IGM</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>F.71 Cabella Ligure III SE</td>
<td>1937</td>
<td>1:25.000</td>
<td>IGM</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>F.83 Carrega IV NE - della Carta d’Italia – serie M891, edizione 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F.71 Cabella Ligure III SE</td>
<td>1959</td>
<td>1:25.000</td>
<td>IGM</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>F.71 Rocchetta Ligure III SO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carta Tecnica Regionale (196050-196060-196090-196100-196110-196140-196150-214020-214030)</td>
<td>1:10.000</td>
<td>Region Piemonte</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Land registers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Napoleonic Land Register</td>
<td>1811</td>
<td></td>
<td>Local municipalities</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Recent Land Register</td>
<td>1950</td>
<td></td>
<td>Local municipalities</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>and beyond</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Physiographic maps</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DTM</td>
<td>10m</td>
<td></td>
<td>Region of Piemont</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>(ARPA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Photographs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerial photographs</td>
<td>1936</td>
<td>IGM</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerial photographs</td>
<td>1954</td>
<td>1:55.000</td>
<td>IGM</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Aerial photographs</td>
<td>1981</td>
<td>1:30.000</td>
<td>Region of Piemont</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Aerial photographs</td>
<td>2000</td>
<td></td>
<td>Region of Piemont</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Orthographic photographs</td>
<td>2009-2011</td>
<td>Region of Piemont</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Google Earth</td>
<td>2014</td>
<td>Google</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
A series of aerial photographs was used from different time eras (1936, 1954, 1981, 2000, 2009-2010, 2014). The black and white aerial photographs of 1954 are considered the oldest pictures visualising the historic rural landscape, documenting the years before the development of mechanization, the use of chemical fertilizers and the abandonment of many farms due to industrial development, the so-called Italian ‘economic miracle’ (Agnoletti, 2006). The use of colour digital aerial orthophotos of the year 2000 and later allowed us to analyse the present landscape, but their interpretation was accompanied by field work as data validation. The aerial photographs were analysed in combination with the topographical maps of the same time period. The reason for using this material was their rich temporal availability and the detailed spatial resolution required on a local scale. The aerial photographs of 1981 and 2000 and the orthographic photograph of 2009-2010 were provided by the Region of Piedmont, as was also the Digital Elevation Model with a resolution of 5 meters. The other aerial photographs were acquired at the Military Geographical Institute (IGM), as were the topographic maps. All the material was digitalized, georectified when necessary and included in a GIS database.

3.1.2 Archival documents through archival research

As was the case for the (historical) cartography, the context of the production of textual and other archival documents needs to be taken into consideration when using them. This is what is called the ‘topographical context’ of the sources (Cevasco, 2007; Grendi, 1996; Torre, 2002; Raggio, 2004). The advantage of textual documents is the detailed and interesting information that it can provide on local issues. On the one hand, there are quantitative sources that provide statistical data on demography, economy, resources, etc. On the other hand, there are more textual sources that give information about actions and behaviour of the society versus natural, cultural, political, technological and economic events and decisions. For this research, one particular archival source was used, and the communal archive of Carrega was visited.

Inchiesta Istituto Nazionale della Repubblica Ligure (1798–1799)

From the end of the 18th century, ‘modern’ forestry techniques and schemes were devised by enlightened agricultural ‘improvers’ who sought to replace historical agro-silvo-pastoral land management and usage practices in Liguria. The data collected by these contemporary agricultural ‘improvers’ provides evidence of old land-management practices (Moreno 2004: 131). In Liguria, a questionnaire (Inchiesta Generale) circulated by the Istituto Nazionale (Scotti 1979) - ‘a group of doctors, naturalists, agriculturalists, and lawyers from the emerging Genoese bourgeoisie who were concerned with propagating the French enlightenment ideology’
(Moreno 2004 - 131) - is one such example. Comprised of 35 questions concerning various elements of the parish’s social, cultural, political and economic life, in late 1798, the Inchiesta was circulated to parish priests and mayors throughout the newly-created Repubblica Democratica Ligure (est. 1797). Many surveys were lost in the early 19th century, 240 responses from 193 parishes and localities survived and are housed in the Archivio di Stato di Genova (A.S.G., Repubblica Ligure, n.610). They have been used extensively in a number of studies on Genoa and Liguria (Costantini & Bulferetti; 1966; Costantini 1973; Grendi 1973; Quaini 1973; Grendi 1996; Moreno 1990, 2004; Cevasco 2007).

The results of the Inchiesta are interesting when combined with historical maps because they are complementary and provide a relatively clear indication of the nature of the landscape and its usage in the late-18th and early-19th centuries. Especially questions 14 to 18 aimed to gather information concerning the landscape:

- [14] the extension of the territory, the extent of cultivation and non-cultivation on the plain, hilly and mountainous areas;
- [16] which type of agriculture was executed, if there were any changes made, since when, why, and what type of cultivations could be introduced to gain a higher profit;
- [17] whether the mountains and non-cultivated areas were covered by pasture or by trees and shrubland, and the extent and quality of the woodlands;
- [18] what have been the products of the cultivated land, of the non-cultivated land, and their respective quantity.

The answers need to be interpreted in the temporal context. As was the case for the understanding of the origin and purpose of the map makers of the historical maps, it is also relevant to understand the origin and purpose of the interviewers. The main aim of the interviews was based on the quality of the production and type of products. When respondents mention ‘cultivated land’, they most certainly refer to cultivated and arable land, while ‘non-cultivated land’ includes vineyards, meadows, pasture land, chestnut plantations and coppice woodland. Nonetheless, both have an objective of production, even if they were considered not so in the Inchiesta (Hearn and Dossche, 2016).

COMMUNAL ARCHIVE OF CARREGA LIGURE

The communal archive of Carrega Ligure exists out of two parts, namely the antique archive and the historical archive, proposed by the author of the Communal Archival Inventory, Daniela Cabella (Cabella, 2010). The archive was not studied in detail in this dissertation, but a first glimpse was thrown on the available material. These sources can be studied, in future, in
### Table 3.4: Overview of the Consulted Documents of the Antique and Historical Archive Relevant for an Additional Research on Landscape Changes (Communal Archive of Carrega Ligure)

<table>
<thead>
<tr>
<th>Serie</th>
<th>Folder</th>
<th>Type of information</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serie 3</td>
<td>Corrispondenza e registri di copialettere - Correspondence and records of letterbook</td>
<td>1.5 1819-1821: “Corrispondenza del 1819 coll’Ill.mo Vice – Intendente di Novi et altre autorità”</td>
<td>Picture taken - Figure 3.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21 maggio 1819: Correspondence between mayor and vice-intendant</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Request to restore the ‘controllio’, control system of pasturing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>‘tutti i prati della comunità sono aperti, senza siepi e ripari’</td>
<td></td>
</tr>
<tr>
<td>Serie 4</td>
<td>Ordinati e delibere - Orders and deliberations</td>
<td>2.1 1820–1834: Ordinati in doppia congrega</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ruolo di contribuzioni predeali</td>
<td></td>
</tr>
<tr>
<td>Serie 13</td>
<td>Imposte e Tasse - Taxes</td>
<td>11.4 1839: Role of praedial contributions</td>
<td></td>
</tr>
<tr>
<td>Serie 14</td>
<td>Liste di leva e ruoli matricolari - Military list</td>
<td>14.1 1792–1806: Lista di leva</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Role of military list in the period of 1792–1806</td>
<td></td>
</tr>
<tr>
<td>Serie 15</td>
<td>Strade comunali - Municipal roads</td>
<td>25.2 1869–1877: Elenco delle strade comunali obbligatorie</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Link of the necessary municipal roads</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Width and length of the streets in 29 October 1871</td>
<td>Picture taken</td>
</tr>
<tr>
<td>Categoria V</td>
<td>Finanze - Classe 1 Beni comunali - Common goods</td>
<td>126.8 1884–1956: Inventario dei beni mobile ed immobili</td>
<td></td>
</tr>
<tr>
<td>Historical</td>
<td></td>
<td>Inventory of common mobile and immobile goods</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No common land was registered, a part from the municipality and the school</td>
<td>p. 48</td>
</tr>
<tr>
<td>Categoria XI</td>
<td>Agricoltura, industria e commercio - Agriculture, industry and commerce</td>
<td>197.2 1930: Censimento generale dell’agricoltura</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Agricultural Census</td>
<td>Picture taken</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Map of the municipality of Carrega with references to the cadastral map</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Agricultural Census (3) Investigation 29 ottobre 1889</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Link of people who ask for the wheat seed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aim of this campaign was to reproduce different varieties</td>
<td></td>
</tr>
</tbody>
</table>

61
combination with the historical and cadastral maps, since some documents give detailed information about land management practices. Table 3.3 and Figure 3.1 give an overview of the already found material, and what type of information can be collected from it.

**Figure 3.7: Folder, Title and First Page of the “Correspondence of 1819 Colonel Vice-Intendant of Novi, and Other Authorities” (Serie 3-1.5 1819-1821)**

### 3.1.3 Landscape Elements through Field Survey

Adding field survey data to the data collection has the advantage to validate the preliminary results based on the cartographic analysis, to confront the information of the topographical maps with the information of the vegetation cover with field evidences, and to improve the final hypothesis of the historical land cover. This method does not only give the possibility to assess the spatial land cover/use dynamics, but can be used to validate the current vegetation mosaic and the landscape formation.

The field survey was largely executed through field observation and documentation. In total 21 field visits were executed, of which 17 by the author, and 4 in company of one or more of the supervisors and/or external experts and/or local actors. They were organised in different seasons of the year, from February 2013 until September 2016, to have a better knowledge of and insights into the seasonal changes of the landscape.

The field notes were collected through standardized forms (Figure 3.2) in combination with panoramic or punctual photographs. The first type of photographs was collected to grasp different horizontal views and directed vistas of the landscape, while the latter were taken as illustration of a certain landscape type, for which an individual form was completed. The forms were largely concentrated on the description of the individual landscape, the accessibility of the
area, the level of abandonment, and contained a more detailed part on geomorphology, openness of the landscape, presence of roads, water, landscape elements, etc.

**Figure 3.8: Front and retro side of the filling form used for the field survey**

The first three field visits were executed to get a better knowledge of the landscape and the valley itself, since the research area was rather new for the author. The second phase of field visits provided more detailed information about the land cover and land use patterns as a field validation for the interpretation of the cartographic data and aerial images and the construction of the GIS database. The final series of visits were executed to control the results of the desktop analysis, based on the cartographic interpretation.

### 3.1.4 Oral knowledge through semi-structured interviews & focus groups

As for any other research sources, the collection of oral knowledge is largely dependent on a more general context and on a series of specific factors.

Firstly, there was the position of myself as interviewer, being a foreigner (Belgian), who was not familiar with the area until the start of the research. Moreover, there was the position of the interviewer as researcher, and therefore related with the university as institution. This profile certainly had an influence on the results of the interviews. While being a foreigner had
advantages as neutrality, objectivity, and a lack of political connotation of status, it had disadvantages as the difficulty of language, and the reduced knowledge (at least in the beginning) of Italian agricultural, internal and external, dynamics. The position as researcher contributes to the neutral, objective and not politically coloured position, which might have had an impact on the liberty of speaking of the people interviewed. The disadvantages of the language might have had a negative influence on the results, in the meaning that respondents might have simplified their answer because of the difficulty of understanding. Another limitation was the lack of understanding and speaking the local dialect, especially since land management and its practices often have a variety in words in dialect, but only one or none in formal Italian. Nonetheless, the objective and neutral position of the interviewer is relevant for the results.

Secondly, there was the position of the respondents in the different case studies with a geographical different position. The representation of the mountain and the related living conditions were influenced by their geographical position: the higher mountain part and larger isolation in Carrega Ligure, the lower mountain valley and less isolation in Figino. Both cases have a different history, which also influenced the respondents. Moreover, several inhabitants of Carrega Ligure have been interviewed before, and the results were published in the book ‘Lassu in montagna non si poteva stare’ (Ferrari, 2013), explaining the migration dynamics and the impossibility of life in mountain areas. The research and publication of Ferrari (2013) has had its impact on the meaning of current life in mountain areas. Figino has not been subject of similar research.

Thirdly, the researcher, unintentionally, has an impact on the interpretation and positioning of local actors towards the tackled themes. By opening up, often sensible and emotional, subjects, he/she makes certain themes negotiable, and, through asking questions, can have an impact on the interpretation and meaning of the respondents. The power of researchers is often underestimated.

During the research, the oral knowledge was systematically collected through three phases.

(1) Firstly, there were the semi-structured interviews as discussed below. During this phase, the researcher, more than getting to know the tackles issues, got to know the respondents and a first bond was created.

(2) During a second, intermediate phase the data from the interviews were confronted with other material (written sources, carto- and photographic sources, field survey). This confrontation was partly done by the researcher itself, and partly through non-formal encounters with some privileged interlocutors. During those encounters, the relation
between researcher and respondent deepens and become largely based on mutual trust, where the dialogue is used to improve the found material. This was especially the case in the situation of small communities, like in rural mountain landscapes, where the relationships are largely built on an exchange of individual and collective thoughts. During this phase, the resulting maps of the spatial analysis were interesting communication tools, and information such as toponyms, land use, etc. were discussed.

(3) Thirdly, two focus groups were organised where several interpretations and conflicts, e.g. the future possibilities of similar areas, were presented and tackled. During this phase, initial meanings of individuals, might have been influenced and even changed during the collective exercise.

During those three phases, the researcher has perceived a dynamic of *straniamento*, as called by Carlo Ginzburg, one of the first masters of micro history at the University of Genova (Ginzburg, 1998). The combination of inside and outside knowledge leads to certain insights that are only gained by the combination of views of outside academics with the local knowledge of farmers and local historians. Outsiders do question what remains unproblematic to the local. Local knowledge can be rigorously examined in the context of historical documentary and field evidence (Ginzburg, 1998; Balzareti et al., 2004).

**Semi-structured interviews**

In order to gain insight into the former and present relation between the landscape and its actors and their detected rural practices, in-depth open interviews were conducted with 20 stakeholders (Table 3.4). Different types of actors with diverse roles within the research area were selected based on two criteria. Hence a whole range of thematically relevant positions in the population is reached in the study area (Soliva, 2007). The first criterion was their background and relation with the study area. Some people were born and remained in the area (=stayer); others migrated and came back to live and/or work (= hopper). Still others, newcomers, were not originally related with the mountain valley but arrived from outside. A last group, the visitors, has no background association with the area nor live there but has another relation such as a professional interest, tourism, etc. The second criterion expressed the interest respondents have in the mountain valley, based on, for example, farming, nature and environment, tourism, hunting, or housing.
CHAPTER 3

TABLE 3.5: OVERVIEW OF INTERVIEWED ACTORS AND THEIR PROFILE

<table>
<thead>
<tr>
<th></th>
<th>Agriculture</th>
<th>Nature/environment</th>
<th>Other economies (Tourism/Hunting)</th>
<th>Housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stayer</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Hopper</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Newcomer</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Visitor</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

The questions for the semi-structured interviews were formulated on (1) how people felt about the landscape changes, (2) its causes and consequences and (3) future perspectives for the current landscape (Table 3.5). The first question wanted to understand the diversity of actors, the type and seasonality of land use and the organisation of the land management in the past rural area.

TABLE 3.6: MAIN INTERVIEW QUESTIONS AND SUBJECTS DURING THE SEMI-STRUCTURED INTERVIEWS

<table>
<thead>
<tr>
<th>Main interview questions</th>
<th>Interview themes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| What were the living conditions in the area in the beginning of the 20th century and which ancient rural practices were used? How is the situation now? | Local actors (diversity of past and present local actors)  
Land use (type and seasonality of past and present cultivations, infrastructure, production)  
Land management (maintenance & organization of past and present cultivations, infrastructure, local economy; done by which actors) |
| How do people perceive the land abandonment & landscape changes? | Causes and consequences of land abandonment considering:  
Local actors (variety of local actors)  
Land use (difference in cultivations, infrastructure, production)  
Land management (difference in maintenance & organization of cultivations, infrastructure, local economy) |
| What do people think of the future of the area, and which prospectives do they consider? | Future prospects considering:  
Local actors (future possible local actors)  
Land use (future possible cultivations, infrastructure, production)  
Land management (future possible maintenance & organization of cultivations, infrastructure and local economy; done by which actors) |
The second focused on the perceptions and opinions of people on the land abandonment and landscape changes. The third theme provided insight into the opinions of people towards the future possibilities of the area. The data collection was divided into a first phase of five and a second of two months, followed by a first preliminary analysis. This iterative and cyclic process was done to improve and specify the questions during the following phase of interviews. Each interview lasted between one and three hours.

Focus groups

Since the focus for the tackled research question was more on the community and collectivity, we chose to gather a number of local actors of both cases in two different focus groups. Within these groups we discussed the main land use changes of the last 200 years and to what extent certain events or driving forces had an impact on the living conditions in the rural mountain area.

Focus groups are group interviews in which a moderator guides the conversations and uses the groups discussions to generate data on specific topics (Morgan, 1998). The moderator works from a predetermined set of discussion topics and uses different participative methods to keep the discussion animated and well-balanced (Patton, 2002). The method is used to target groups and interests seen as excluded or poorly represented in more conventional research on land abandonment, especially on higher institutional levels. Through the focus groups, their voices and opinions are included into the analysis (Scott, 2011).

Table 3.7: Representation participants focus groups

<table>
<thead>
<tr>
<th></th>
<th>Carrega</th>
<th></th>
<th>Figino</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stayer</td>
<td>Newcomer</td>
<td>Hopper</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-60</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>&gt;60</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-60</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>&gt;60</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

The selection of interviewees was based on the snowball sampling done for the selection of the semi-structured interviews. Some key persons were also invited for the focus groups. Two focus groups were executed. The first in Carrega Ligure had 12 participants (of which 4 were interviewed previously), the second in Figino had 17 participants (of which 3 were interviewed previously). Table 3.6 gives a representation of the type of people and their relation with the
research area (gender, background, interest, origin). Both of the focus groups took about two hours, that were divided into two parts, with a break in the middle. The discussions were concentrated on the driving forces of changes and their impact on the living conditions. In Table 3.7, the questions and assignments for the group are described in detail.

**Table 3.8: Script focus groups**

<table>
<thead>
<tr>
<th>Timing</th>
<th>What</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.00-18.20</td>
<td><strong>INTRODUCTION (20’):</strong></td>
<td>Everybody</td>
</tr>
<tr>
<td></td>
<td>- People come in and fill in a small form with personal information.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Small presentation of myself: who am I, what do I do (PhD)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- People present themselves, based on the personal information scheme.</td>
<td></td>
</tr>
<tr>
<td>18.20-19.00</td>
<td><strong>PART 1: most impactful changes of landscape</strong></td>
<td>Rebekka</td>
</tr>
<tr>
<td></td>
<td>- SMALL INTRODUCTION (5’):</td>
<td>Individually</td>
</tr>
<tr>
<td></td>
<td>on the landscape of 1936-1980-2015, based on projected aerial photos of the landscape.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- ASSIGNMENT (10’):</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>What are the most impactful changes that happened through time with the landscape and the living conditions? This can be both tangible or non-tangible. Write the 3 most important for yourself on a post-it (max.3). If you can detect this on one/or more map, please do so in the corresponding colour. E.g. the construction of a railway in 1940s changed the living conditions because it connected us with the city.</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- COLLECTING INFORMATION (25’):</td>
<td>Group</td>
</tr>
<tr>
<td></td>
<td>Together with the group, we try to group the answers of the respondents. The idea should be to come to the following 5 categories:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➔ Cultural/social changes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➔ Economic changes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➔ Political changes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➔ Technological changes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➔ Natural/structural changes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➔ …</td>
<td></td>
</tr>
<tr>
<td>19.00-19.10</td>
<td><strong>BREAK (10’)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>During the break the table for PART 2 needs to be constructed. In the meaning that the largest changes should be defined.</td>
<td></td>
</tr>
<tr>
<td>19.10-19.50</td>
<td><strong>PART 2: driving forces of the landscape changes (40’)</strong></td>
<td>Group</td>
</tr>
<tr>
<td></td>
<td>Based on the XX categories of changes we found (see PART 1), I would like you to help me fill in the table here below. Based on the following questions:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➔ What changed through time?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➔ What was the impact of the changes?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➔ When did the change/event happen?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➔ Why did the change happen?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➔ On what level was the change taken?</td>
<td></td>
</tr>
<tr>
<td>19.50-20.00</td>
<td><strong>END OF DISCUSSION (10’)</strong></td>
<td></td>
</tr>
</tbody>
</table>

Difficulties of focus groups lie within the fact when they are used as one source (group dynamics, empowerment, inclusivity), but when they are used in conjunction with other
methods they can deliver their maximum potential, both in terms of complementarity and additionally. The aim of such research is to give voice and to accurately reflect concerns of various stakeholders as part of the sustainability agenda.

After a small introduction on the PhD-project, the first exercise was presented. Participants had to write down of what they thought were the three most relevant and impactful changes on the landscape during the last 200 years. Afterwards, the data was collected and put on a timeline, discussing the answers randomly. When possible, a category (cultural, economic, political, technological, natural...) was given to the answer on the post-it. After the group discussion, a 10-minutes break, gave the possibility to the moderator to group the answers in main categories, and prepare the second exercise. After the break, the participants were questioned, in group, about every main category, what their impact was, why the changes happened, and with what decision level the change was linked.

In this way, certain attitudes, feelings, beliefs, experiences and reactions were detected in a dynamic and participative way (Kitzinger, 1994; Scott, 2011). Especially in combination with other methods, focus groups are recommended to improve overall verification and triangulation (Burgess, 1996; Scott, 2011). The use of focus groups can contribute to getting the full, high definition picture of a landscape, grasping local knowledge of the patterns, functions and values of the rural living environment (Rogge & Dessein, 2013).
3.2 Data analysis

3.2.1 Regressive spatial analysis

As comprehensively described in Chapter 2, landscapes are a representation of a continuous and endless interaction between the land, how it is used, and by whom it is used. The results of this interaction are structured in land use patterns. In some literature, land use is seen as an institutional-political concept (e.g. cadastral information) and is rather limited in the representation of the real use and local practices performed in each individual landscape (Moreno & Raggio, 1999; Gabellieri & Ruzzin, 2015). Land use in this research is seen as the result of local practices on the environmental sources and represents the use and management of the land and its resources to produce goods and services, and, hence, includes the relation of the land, its environment and the related actors. Land cover on the other hand considers the occupation (vegetation, infrastructure, water, etc.) that covers the land or the soil (Antrop, 2007b; Lambin et al., 2006; Geist et al., 2006). The vegetation cover is a very sensible indicator for the former land use, and is therefore one of the main palimpsest sources. Both are important aspects in landscape research (Antrop, 2007a). The first because of the underlying significance of the interrelation between environment and actor, noticeable through the actor’s local management practices, and the second because of its valuable environmental information on the former land use. The one can therefore not be seen without the other.

From the 1970s onwards, research on land use and land cover was increasingly used within global environmental change studies, with the understanding that land-surface processes influence climate change (Lambin et al., 2006). Through time, similar research studies also started studying the vulnerability of places and people in relation with economic or socio-political perturbations. The prediction of how land use changes affect land degradation, the feedback on livelihood strategies from land degradation, and the vulnerability of places and people in the face of land use/cover changes requires a good understanding of the dynamic human-environment interactions associated with land use change (Kasperson et al. 1995; Turner et al. 2003; Kasperson et al, 2005). Moreover, land use and cover analyses are a valuable way to discover the strengths and weaknesses of a landscape, but can also give information about the future possibilities and threats (Carvalho-Ribeiro et al., 2013; Garcia-Frapolli et al., 2007). Therefore, land use and cover change studies (LUCC) are interesting for landscape research, with the aim to construct a sustainable future development, considering the fact that understanding the landscapes of the past is an important asset for the landscape of the future (Antrop, 2005). And it is therefore the elected approach to grasp the spatial character of the landscape and how the land abandonment process changed this character through time. Nevertheless, the comparison of different generations of topographic maps was done with
caution as it is always prone to errors due to differences in accuracy and definitions (Agger & Brandt, 1988; Caspersen, 2002; Swetnam, 2007; in Kristensen, 2009).

But how should this be done? Several academic approaches have presented methods and ways to study the landscape patterns of the past. This research focusses on two of them which are based on a regressive analysis of the landscape, each one of them with their specific characteristics (Table 3.8) namely the Historical Landscape Characterisation (HLC) and the Historical-analytical Approach used within historical ecology.

**Table 3.9: Overview of Used Methods for a Regressive Landscape Analysis**

<table>
<thead>
<tr>
<th>Inspired by</th>
<th>Historic Landscape Characterisation</th>
<th>Historical-analytical Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archaeology and landscape history - Great-Britain</td>
<td>Historical ecology – Great Britain</td>
<td></td>
</tr>
<tr>
<td>Microhistory &amp; interdisciplinary research group LASA - Italy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used material</td>
<td>Wide range of sources</td>
<td>Wide range of sources</td>
</tr>
<tr>
<td>Spatial scale</td>
<td>Landscape</td>
<td>Local, topographical site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Individual landscape</td>
</tr>
<tr>
<td>Temporal scale</td>
<td>Long-term</td>
<td>Multi-scale time</td>
</tr>
<tr>
<td>Method</td>
<td>Historic patterns of landscape elements and structures</td>
<td>Decryption of sources</td>
</tr>
<tr>
<td>Type of analysis</td>
<td>Retrogressive analysis</td>
<td>Regressive analysis</td>
</tr>
</tbody>
</table>

The first presented method is the Historic Landscape Characterisation (HLC), pioneered in British landscape studies over the last 20 years by archaeologists and landscape historians. Outside Great-Britain, some pilot-cases were done in Greece and Turkey (Crow, 2009; Turner 2010), but the Mediterranean area remained rather unfamiliar with the methodology. In the 1980s and early 1990s, British archaeologists became increasingly aware that, beyond individual monuments and sites, the historic value of the cultural landscape was often ignored during development and planning (Herring, 1998; Crow, 2009; Turner, 2010). Therefore, English Heritage sponsored research projects that led to the development of HLC as a way to present and analyse the historic nature of the whole landscape (Fairclough et al. 1999). The difference with other traditional archaeological methods lies in the storage and presentation of landscape data (Turner, 2006b; Crow, 2009). Instead of mapping individual archaeological features in an inventory, HLC bundles the features that are linked by their historical development and maps them as areas. Therefore, the researcher needs to understand how patterns of cultural features in the landscape, such as field systems, reflect its historical development and how physical features in the landscape relate to each other (Turner, 2006b; Crow, 2009).

The aim of HLC is to characterize the historic patterns of landscape elements and structures, as there are fields, woods, lanes, rural settlements, etc. HLC underlines the possibility of combining
its approach with data from a wide range of sources, including archaeological field surveys, historical documents and ethnographic records, to build up in-depth, long-term and highly-textured accounts of rural life in a region (Crow, 2009). The approach is described as such:

*Closer examination [of the landscape] reveals that particular groupings and patterns of components which recur throughout the county can be seen to have been determined by similar histories. Cornwall’s historic landscape can, therefore, be characterised, mapped and described, using a finite number of categories or types of ‘historic landscape character’. (Herring, 1998: 11)*

The characteristics of each category are identified through field surveys and a re(tro)gressive analysis of the sources. This retrogressive analysis is an approach that unravels the physical and chronological relationships between different elements in the historic landscape. In this dissertation, the analysis of features in the present landscape has helped to refine HLC character categories and provide increased chronological definition for our characterisation (see Chapter 4) (Crow, 2009).

This Historical-analytical Approach consists of a decryption of the used sources and a reconstruction of them, including the entire context of their production. It is derived from the British Historical Ecology and Italian Microhistory, applied by the interdisciplinary research group called LASA (Laboratorio di Archeologia e Storia Ambientale), constructed in 1995. Their main objective is to execute highly detailed research in specific territories, with the aim to grasp information on the medieval and post-medieval eras, confronting different types of sources (documents, maps, oral knowledge, field observations, archaeological and sedimentary sources) and constructing a dense network of information on a very specific, detailed and local scale. The approach is largely connected with the school of historical ecology (Cevasco, 2002; Moreno 1995; Cevasco et al., 2015) and generally consists out of a regressive analysis of those large variety of sources. The specific regressive analysis, as described by Roberta Cevasco (*Memoria Verde*, 2007), was based on the premises of the local school of historical ecology at the University of Genova, Italy, promoted by Diego Moreno (*Dal document al terreno*, 1990) and Edoardo Grendi (*Storio di una storia locale: perché in Liguria (e in Italia) non abbiamo avuto una local history?*, 1993), and includes several key elements.

The method applied in this research aims to be a combination of both described methodologies. Both positions originate from an historical (archaeological) perspective, study the landscape in a regressive or retrospective way and base themselves on a wide range of sources. But there are some small, but relevant differences.
Firstly, more than in the HLC, Historical-analytical Approach focusses its research on a very detailed scale and allows to identify multiple systems of land use through time, looking at a local topographical site or an individual landscape. The importance of empirical data is therefore inevitable (Cevasco, 2002, Moreno 1995). In that way, the historical (environmental and cultural) driving forces that generate processes of change in management practices, become clear (Cevasco et al., 2015). In our opinion, the combination of several local case studies has the possibility to upscale these local stories and to tell the ‘story’ of a larger area or landscape to finally relate them with similar landscape stories, with respect for a high resolution of the research, and without losing any eye for detail. The regressive approach enables the observation of discontinuities thereby facilitating a greater understanding of the historical asynchronies and anomalies that can appear in sedimentary evidence, therefore avoiding simplistic generalisations concerning system disturbances (Cevasco et al., 2015).

Secondly, the combination of different types of sources (historical/archival documents and texts, historical cartography, land cover and land use analysis, oral history) is relevant for the understanding of the local dynamics, analysed in a very detailed way and within a large time scale. The term ‘cartographic filtering’ was introduced by Moreno (1995) and contains the collection of a sequence of cartographic and photographic material of different eras, mostly of a specific place or site, that is analysed and compared to each other. The aim of this filtering is to make a reconstruction of the temporal dynamics of the land cover and land use.

Thirdly, field work and the production of field sources, in combination with cartographic filtering and other techniques, are used for a realistic decryption of the sources themselves and the construction of a series of sources. The regressive history of landscapes requires a specific Historical-analytical Approach to documentary and archival sources in tandem with evidence derived from in situ field studies (Beltrametti, 2013).

**Construction of the database**

To have a better grasp on the collected data from all kind of sources, a database was constructed in a GIS environment. As said before, the use of a GIS database has the advantage to add and change the data in a flexible and interactive way and to integrate spatial and non-spatial data. The construction of a well-built database is an important step in the methodology and its composition depends largely on the research questions of the project. As is described in Chapter 2, this research concentrates on land abandonment in marginalized areas, thus the information in the database is related with this aspect. The database is constructed with the aim to get an overview of the evolution of landscape (land use, linear elements, etc.) within the case study area during the last 200 years. Since the regressive cartographic analysis requires a high
level of resolution, the spatial analysis was executed for the two specific case study areas of Carrega Ligure and Figino. The local stories of the two cases are representative for the story of the whole Borbera valley (see Chapter 2). After the delineation of the case studies, the database was constructed in three steps:

1) Organising the selected data sources into different time slices
2) Drawing of the main polygons with individual information on land cover, land use and function, hillslope and field structure
3) Linking additional attributes with information on the presence of terraces, small landscape elements and the state of abandonment, with the individual polygons.

**STEP 1: 5 DIFFERENT TIME SLICES**

In order to develop a dynamic picture of landscape changes, a fairly extended time scale (200 years) was chosen. The analysis was undertaken as a longitudinal study using data from five points in time. Those time slices are based on the available carto- and photographic material, but added by other types of sources, since supplementary data and additional information to assess the quality of the time slices is very helpful. The separate maps and other sources were merged to obtain quantitative information about the trajectories of different land use categories, i.e. the land use situation between 1828 and 2014. Moreover, it is essential to carefully extract each landscape data from its best possible source. Table 3.9 gives an overview of the combination of sources to construct the different time phases with their representative land use.

Since the analysis considers a regressive trajectory, the first time slice is the most recent one. Therefore, several aerial and orthographic photographs were combined with the collection of landscape elements through field surveys, the recent land register and the collection of oral knowledge through interviews and focus groups.

This was similar for the second and third time slice. The used sources were the aerial photographs of 1936/1954 and 1980, together with the corresponding topographical maps of 1935, 1937, 1959 and 1979, the present land register map of 1950, and the relevant information of the communal archive. For this time period, the collected lay knowledge became interesting, since most of the respondents, because of their age, have a good memory of the landscape of the 20th century.
**Table 3.10: Overview of the used spatial sources to come to the different time slices**

<table>
<thead>
<tr>
<th>Mapped Time Period</th>
<th>Used material Carrega</th>
<th>Used material Figino</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TIME SLICE 1</strong> (today)</td>
<td>- Google Earth</td>
<td>- Google Earth</td>
</tr>
<tr>
<td></td>
<td>- Orthophoto of 2009-2010</td>
<td>- Orthophoto of 2009-2010</td>
</tr>
<tr>
<td></td>
<td>- Recent land register (1950)</td>
<td>- Recent land register (1950)</td>
</tr>
<tr>
<td></td>
<td>- Landscape elements</td>
<td>- Landscape elements</td>
</tr>
<tr>
<td></td>
<td>- Oral knowledge</td>
<td>- Oral knowledge</td>
</tr>
<tr>
<td></td>
<td>- Topographic map of 1979</td>
<td>- Topographic map of 1979</td>
</tr>
<tr>
<td></td>
<td>- Oral knowledge</td>
<td>- Oral knowledge</td>
</tr>
<tr>
<td><strong>TIME SLICE 3</strong> (1936 – 1954)</td>
<td>- Aerial photo of 1936</td>
<td>- Aerial photo of 1954</td>
</tr>
<tr>
<td></td>
<td>- Topographic map of 1937</td>
<td>- Topographic map of 1935 &amp; 1959</td>
</tr>
<tr>
<td></td>
<td>- Recent land register (1950)</td>
<td>- Recent land register (1950)</td>
</tr>
<tr>
<td></td>
<td>- Oral knowledge</td>
<td>- Oral knowledge</td>
</tr>
<tr>
<td></td>
<td>- Communal archive</td>
<td>- Communal archive</td>
</tr>
<tr>
<td><strong>TIME SLICE 4</strong> (1852)</td>
<td>- Topographic map of 1902</td>
<td>- Topographic map of 1877</td>
</tr>
<tr>
<td></td>
<td>- Gran Carta Stati Sardi (1852)</td>
<td>- Gran Carta Stati Sardi (1852)</td>
</tr>
<tr>
<td></td>
<td>- Communal archive</td>
<td>- Communal archive</td>
</tr>
<tr>
<td><strong>TIME SLICE 5</strong> (1828)</td>
<td>- Minute di Campagna (1828)</td>
<td>- Minute di Campagna (1828)</td>
</tr>
<tr>
<td></td>
<td>- Napoleonic land register (1811)</td>
<td>- Napoleonic land register (1811)</td>
</tr>
<tr>
<td></td>
<td>- Inchiesta Istituto Nazionale</td>
<td>- Inchiesta Istituto Nazionale</td>
</tr>
</tbody>
</table>

The year 1828 was chosen as ‘point zero’ because of the availability of a detailed survey of the landscape by Ligurian Republic in combination with the cadastre describing almost all the territory on a scale of 1:5,000 (1811). The mapping was done based on two historical maps (1828 and 1852), the first national topographical maps (end 19th, beginning 20th century) and checked with some pilot cases of the Napoleonic land register map (1811), information taken from the communal archive of Carrega Ligure, and the answers of the Inchiesta Nazionale. The oral knowledge was less useful for the fourth and fifth time slice, when the communal archive and the historical maps and land registers grew in importance. For this time phase, the error of recognition and mapping based on historical maps, needs to be taken into consideration. This period probably also represents the era with the highest complexity of landscape patterns, due to the strong development of agriculture and demographic growth (Agnoletti, 2006).

**Step 2: The main land cover and differentiating attributes**

Information about land cover was obtained through visual interpretation of aerial photographs and topographic maps and validated by the field survey. Twelve main land cover categories were used; seven as vegetation, three as infrastructural and two as hydrographic coverage. For each land cover category, several subcategories were defined (Table 3.10). The largest mapping units varied between 0,85m² (Carrega) and 1,72m² (Figino).
One shape file was set up, with the information of all 5 time slices. For every time slice (2014, 1980, 1954/1936, 1852, 1828), every polygon was interpreted and given a code for a corresponding category and subcategory. Furthermore, every (sub)category was described through a series of additional attributes (Table 3.11) (Vink, 1980; Van Eetvelde, 2007).
### Definition of Categories and Subcategories during the Spatial Analysis

**Definition Code**

**Function/Use** (see Table 3.11)

<table>
<thead>
<tr>
<th>Code</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Cultivated Land by land that is being cultivated and exploited</td>
</tr>
<tr>
<td>14</td>
<td>Shrubland</td>
</tr>
<tr>
<td>13</td>
<td>Grassland</td>
</tr>
<tr>
<td>12</td>
<td>Plantations</td>
</tr>
<tr>
<td>11</td>
<td>Woodland</td>
</tr>
<tr>
<td>10</td>
<td>Non-Covered</td>
</tr>
</tbody>
</table>

#### Categories and Subcategories

**Vegetation Coverage**

<table>
<thead>
<tr>
<th>Code</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Cultivated Land by land that is being cultivated and exploited</td>
</tr>
<tr>
<td>14</td>
<td>Shrubland</td>
</tr>
<tr>
<td>13</td>
<td>Grassland</td>
</tr>
<tr>
<td>12</td>
<td>Plantations</td>
</tr>
<tr>
<td>11</td>
<td>Woodland</td>
</tr>
<tr>
<td>10</td>
<td>Non-Covered</td>
</tr>
</tbody>
</table>

(Please note: The table contains detailed definitions and codes for various categories and subcategories, including vegetation coverage, plantations, grassland, shrubland, cultivated land, and non-covered areas, each with specific descriptions and codes as outlined in Table 3.11.)
### Hypocartographic Coverage

#### Water Course
- **WATER COURSE**
  - Polygon dominated by a flow of water, either natural or artificial
  - 2: Source
  - 1: Pool

#### Water Surface
- **WATER SURFACE**
  - Polygon dominated by stable water, either natural or artificial
  - 3: High-flow
  - 2: Medium flow
  - 1: Low flow

#### Other Coverages
- **OTHER COVERAGES**
  - Areas dominated with other coverage
  - 4: Beans
  - 3: Vineyard
  - 2: Arable land
  - 1: Horticulture land

### Infrastructural Coverage

#### Housing
- **HOUSING**
  - Polygon dominated by buildings for residential use
  - 3: Medieval housing
  - 2: Modern housing
  - 1: Ruins

#### Historic Building
- **HISTORIC BUILDING**
  - Polygon dominated by buildings with historic roots
  - 3: Castle
  - 2: Church

#### Industrial Infrastructure
- **INDUSTRIAL INFRASTRUCTURE**
  - Area dominated by productive infrastructure
  - 3: Mill
  - 2: Stable
  - 1: Hydroelectric installation

#### Hydrographic Coverage

#### Water Surface
- **WATER SURFACE**
  - Polygon dominated by stable water, either natural or artificial
  - 3: High-flow
  - 2: Medium flow
  - 1: Low flow

#### Other Coverages
- **OTHER COVERAGES**
  - Areas dominated with other coverage
  - 4: Beans
  - 3: Vineyard
  - 2: Arable land
  - 1: Horticulture land

### Historical Building
- **HISTORIC BUILDING**
  - Polygon dominated by buildings with historic roots
  - 3: Castle
  - 2: Church

### Industrial Infrastructure
- **INDUSTRIAL INFRASTRUCTURE**
  - Area dominated by productive infrastructure
  - 3: Mill
  - 2: Stable
  - 1: Hydroelectric installation

### Hydrographic Coverage
- **WATER SURFACE**
  - Polygon dominated by stable water, either natural or artificial
  - 3: High-flow
  - 2: Medium flow
  - 1: Low flow

#### Other Coverages
- **OTHER COVERAGES**
  - Areas dominated with other coverage
  - 4: Beans
  - 3: Vineyard
  - 2: Arable land
  - 1: Horticulture land

### Infrastructural Coverage

#### Housing
- **HOUSING**
  - Polygon dominated by buildings for residential use
  - 3: Medieval housing
  - 2: Modern housing
  - 1: Ruins

#### Historic Building
- **HISTORIC BUILDING**
  - Polygon dominated by buildings with historic roots
  - 3: Castle
  - 2: Church

#### Industrial Infrastructure
- **INDUSTRIAL INFRASTRUCTURE**
  - Area dominated by productive infrastructure
  - 3: Mill
  - 2: Stable
  - 1: Hydroelectric installation

### Hydrographic Coverage
- **WATER SURFACE**
  - Polygon dominated by stable water, either natural or artificial
  - 3: High-flow
  - 2: Medium flow
  - 1: Low flow

#### Other Coverages
- **OTHER COVERAGES**
  - Areas dominated with other coverage
  - 4: Beans
  - 3: Vineyard
  - 2: Arable land
  - 1: Horticulture land
According to Vink (1980) and Van Eetvelde (2007), different types of attributes can be defined. The first type of attributes has an important role in the delineation of the polygons and are therefore called **differentiating attributes** (Table 3.11). They are considered to have a major contribution on the composition of the landscape and consist out of relevant information to answer the research questions on this largely abandoned area.

First of all, there are the land use and function that corresponds with the land cover, which give an indication to the management of the landscape. This information was very important for the extensive landscape analysis, since land use and management go hand in hand. The land abandonment of the research areas was largely connected with the lack of management during the years. The use of the land, more than the land cover, gives a good idea on how the goods and services of the land are/were used. Looking at the evolution of the land use through time provides additional information on how and when the land became abandoned. The first five classifications were focussed on a single use or function, while the last three could be used for multiple uses. In this way, it was possible to map the multiple rural system of the mountain areas of the past and see if these multiple functions are still present or not in the current landscape. The choice of the single uses was based on the information drawn from literature on the agro-silvo-pastoral system, the field observations and the oral knowledge.

Being a mountain area, the hillslope was a very significant attribute. The DEM made it possible to divide the hillslope percentages in five most relevant classes, from flat (>6%) to very steep (33-63%). The relation with the land abandonment is relevant since questions rose about the relevance of hillslope in the velocity and way land was abandoned.

Thirdly, the field structure was defined based on the recent land register maps. Therefore, the fields were not given any temporal definition such as modern, post-medieval or medieval. Some particular field structure changes were detected through a comparison with the Napoleonic land register maps and were described in detail, especially cases of unification or large divisions of the fields. Generally, three types of field structure were defined. The strip fields are long, narrow fields that normally lie side-by-side in extensive blocks. Sometimes, individual strip fields or bundles of a few strips lie isolated when other strips have been amalgamated into bigger fields through the removal of subdividing boundaries (Crow, 2009). This normally indicates where one owner has acquired several contiguous strips and begun to farm them as one unit. In the research area, two different types of strip fields were defined based on their situation towards the slope: perpendicularly or parallel. The third type were blocky fields, who tend to be rectangular. They are mostly the result of reshaping earlier strip fields or their origin lies in medieval block fields used as common grounds and therefore not divided into smaller fields (Antrop, 2007; Renes, 2015).
STEP 3: DESCRIPTIVE AND DIAGNOSTIC ATTRIBUTES

Next to the differentiating attributes, there are the descriptive attributes and diagnostic attributes, that were ascribed to for each of the polygon delineated in the second step.

The descriptive attributes are used to give an extra dimension to the characterisation of the main (sub)categories, and consist out of peculiarities that are described for every polygon. The choice of those attributes is, again, depending on the research question of the evolution of this largely abandoned landscape.

**Table 3.12: Definition of the different types of attributes**

<table>
<thead>
<tr>
<th>ATTRIBUTES</th>
<th>CODES</th>
<th>TIME PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIFFERENTIATING</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FUNCTION/USE</strong></td>
<td>0: no function</td>
<td>ALL</td>
</tr>
<tr>
<td></td>
<td>1: only grazing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2: only hay production</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3: only cultivations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4: only fruit production</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5: only wood production</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6: hay and grazing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7: wood production and grazing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8: fruit, grazing and wood production</td>
<td></td>
</tr>
<tr>
<td><strong>HILLSLOPE</strong></td>
<td>0: flat (&lt;6%)</td>
<td>2014</td>
</tr>
<tr>
<td></td>
<td>1: slightly flat (6-16%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2: hilly (16-24%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3: steep (24-33%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4: very steep (33-63%)</td>
<td></td>
</tr>
<tr>
<td><strong>FIELD STRUCTURE</strong></td>
<td>0: no</td>
<td>2014</td>
</tr>
<tr>
<td></td>
<td>1: Strip fields perpendicular to the slope</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2: Strip fields parallel with the slope</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3: Blocky fields</td>
<td></td>
</tr>
<tr>
<td><strong>DESCRIPTIVE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PRESENCE OF TERRACES</strong></td>
<td>0: no terraces</td>
<td>2014</td>
</tr>
<tr>
<td></td>
<td>1: earth terraces with small pendance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2: terraces made by stone walls (stairs)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3: mixed terraces</td>
<td></td>
</tr>
<tr>
<td><strong>SMALL LANDSCAPE ELEMENTS</strong></td>
<td>0: no</td>
<td>2014</td>
</tr>
<tr>
<td></td>
<td>1: hedgerows</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2: treelines</td>
<td></td>
</tr>
<tr>
<td><strong>CLEARLY VISIBLE PASSAGES</strong></td>
<td>0: no passages</td>
<td>2014</td>
</tr>
<tr>
<td></td>
<td>1: less visible passages</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2: clearly visible passages</td>
<td></td>
</tr>
<tr>
<td><strong>DIAGNOSTIC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>STATE OF ABANDONMENT</strong></td>
<td>0: not abandoned, intensive use of the land</td>
<td>ALL</td>
</tr>
<tr>
<td></td>
<td>1: medium abandoned, extensive use of the land</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2: completely abandoned, no activity is going on</td>
<td></td>
</tr>
</tbody>
</table>
The first descriptive attribute is the presence of terraces. Many of the steep hillsides in the Italian Apennines are terraced, so terraces were an important historic landscape attribute to consider in the characterization of this landscape. Oliver Rackham identified six main terrace types that are widespread in the Mediterranean (Rackham & Moody, 1996; Grove & Rackham, 2003; Turner & Crow, 2010), in our cases, we considered three types. The aim of the terraces was to extend the cultivable land and to combat erosion. With the retreat of agriculture only few old terraces are still cultivated and some are largely invaded by secondary vegetation. Their detection came especially from the interpretation of the earliest aerial photographs in combination with the field survey. The construction and incidence of terraces depended on the presence of stones. The terraces were largely constructed with the available means. Earth terraces with small slopes correspond with the braided terraces that Rackham found in Crete (1996), the zigzag up the slope, being joined by switchbacks at the ends. But, more than in Crete, they are not largely concentrated and are found on hillslopes with small slopes and a slightly undulating relief. Sometimes, a reinforcement by stones and/or vegetation can be found. The terraces made by stone walls correspond with the stepped terraces (Rackham & Moody, 1996), which are parallel and straight.

The second and third descriptive attributes are the presence of small landscape elements like hedgerows and treelines, and clearly visible passages or not. Both attributes are detected by the interpretation of the aerial photographs. They are less important than the presence of terraces, but they have however a significance in understanding the level of abandonment.

The last type of attribute is called a diagnostic one. This attribute represents the events and processes that are relevant for the landscape change, in this case the land abandonment process. The attribute is therefore called ‘State of Abandonment’ and several descriptive attributes are indicators for the abandonment process. Three classes of abandonment were detected, related with their extensive or intensive use. The level of abandonment was detected for every time period, depending on the different (sub)categories and attributes. Its interpretation was not always easy, since the large amount of data made it sometimes difficult to make decisions. They largely depend on the function and use, since land without a clear function is mostly related with a complete abandonment. The single uses of the land, a part from the cultivations and hay production, is considered to be an extensive use of the land, in comparison with the past. The multiple uses are all classified as an intensive use of the land. This generalisation depends on every polygon and time slice, in combination with the other attributes.
LANDSCAPE TRENDS

Finally, all the information of the database needs to be put together in relation with the posed research questions (see Chapter 1). This is done through a combination of the different carto- and photographic material and verified through during field survey. Afterwards, the intermediate results were valorised with the data extracted from the field survey, to come to the final dataset and the final maps of representation (Figure 3.3).

Firstly, the landscape character over time of the two individual case studies is initially described for the last 200 years in a very detailed way, focusing on three main time periods: the landscape of the 19th century, of the 20th century, and of today. All the (sub)categories are explored in relation with their attributes and the surface they cover in every time period. Consequently, the evolution of the landscape of each case study is narratively exposed. Additionally the different levels of abandonment are described, evaluating the land cover, land use and other attributes that are linked with every state of abandonment. This results in the identification of the indicators of the land abandonment for every case study. Finally, the major shifts and changes for every case study are described.

In a second step, the results for every case study are collected and compared, resulting in the major transformation trends for the whole of the Val Borbera.
3.2.2 From open coding to a theoretical framework: a Grounded Theory

The representation of the landscape, how it is used and its evolution is largely described using a regressive spatial analysis. However the interaction with the landscape actors is still missing. Moreover, it is interesting to understand the existential character (see Chapter 1) of the landscape and how the actors relate themselves with their landscape through time. Analysing the concept of landscape identity (see Chapter 5) through interviewing techniques is challenging since the identity concept is too abstract to answer directly.

To get a better understanding of the role and position of those actors in relation to the studied landscape, a qualitative approach is very useful in obtaining a better insight into the dynamics, difficulties and conflicts in the area. The aim of this approach is to understand and map the heterogeneity of the ideas, opinions and perceptions through interviews (Hearn et al., 2014). Rather than starting from a well-defined hypothesis, the research applied a grounded theory approach (Strauss & Corbin, 1998), providing the possibility of extracting theory from the collected data. The core idea behind a grounded theory approach is to select participants supporting the researcher to understand the problem and the research question (Creswell, 2003). The aim is to choose a small number of respondents that will yield in-depth data for theory construction, rather than a random selection of a large number of respondents to give statistical information about the opinions of an entire population (Koontz, 2003). The selection of the stakeholders (see 3.1.4) was conducted according to the methods of theoretical and snowball sampling (Kerselaers et al., 2013; Rogge et al., 2011).

The obtained data was analysed by open coding. This implied the literal transcription of all interviews that were subsequently broken into discrete incidents, ideas, events and acts within the software NVivo. This fits as the first step in the coding approach outlined by Strauss and Corbin (1998). Each phenomenon that contained the stakeholders’ perception of both the former and current landscape and its transformation was allocated a name. This phenomenon became a concept when mentioned by two or more respondents. Finally, the concepts were analysed and grouped into distinct categories. The outcome of the interview rounds resulted in the creation of fifteen main concepts and was grouped into three main categories (Table 3.12). This step is called axial coding, which implies the determination of links and cross-cuts between categories in order to find more complete and precise explanations of the concepts. In practice, the open and axial coding phases were closely intertwined. During the final analysis step, selective coding, where a grounded theory is being formulated, a larger conceptual scheme is constructed. This was discussed during a session with experts on landscape and grounded theory, aiming to visualise the opinions of the stakeholders on the changing mountain landscape, and how they identify themselves with it.
Table 3.13: Overview of the 3 main categories and 15 main concepts that determine the actors’ position towards landscape changes in rural mountain areas

<table>
<thead>
<tr>
<th>Category</th>
<th>Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural practices and living conditions</td>
<td>Life in Val Borbera before abandonment</td>
</tr>
<tr>
<td></td>
<td>• A lot of people within a community based culture</td>
</tr>
<tr>
<td></td>
<td>• Rural area based on an agro-silvo-pastoral system</td>
</tr>
<tr>
<td></td>
<td>• High pressure on land, and daily maintenance</td>
</tr>
<tr>
<td></td>
<td>• Economy based on animal husbandry, together with other activities</td>
</tr>
<tr>
<td></td>
<td>Life in Val Borbera after abandonment</td>
</tr>
<tr>
<td></td>
<td>• Not many people within where the community based culture disappeared</td>
</tr>
<tr>
<td></td>
<td>• Abandoned rural area with grasslands and woodlands</td>
</tr>
<tr>
<td></td>
<td>• Little economy based on multiple activities for survival</td>
</tr>
<tr>
<td>Perception on land abandonment and landscape changes</td>
<td>• Nostalgic view on the past and resignation towards the future</td>
</tr>
<tr>
<td></td>
<td>• A lot of losses</td>
</tr>
<tr>
<td></td>
<td>• New threats</td>
</tr>
<tr>
<td></td>
<td>• Spatial transformations dominated by reforestation process</td>
</tr>
<tr>
<td>Opinion on future prospectives</td>
<td>• People have to do an effort to stimulate return to the countryside</td>
</tr>
<tr>
<td></td>
<td>• A mix of economical, emotional, physical, political, social and technical detected problems</td>
</tr>
<tr>
<td></td>
<td>• Possible prospectives dominated by multiple farming activities</td>
</tr>
<tr>
<td></td>
<td>• Especially looking for social cohesion as reason for return/arrival</td>
</tr>
</tbody>
</table>

3.2.3 A heuristci device: The coupled human-environmental timeline

As introduced earlier in this chapter, studying different data sources need to be done with respect for the context the sources were created in, their purpose and the way they were collected and studied. To get a better understanding of the contextual framework of a landscape and how and when it transformed, an interesting approach was introduced in landscape research, namely the study of the driving forces that caused landscape changes.
(Brandt et al., 1999; Bürgi & Schuller, 2003; Klijn, 2004; Bürgi, 2004; Antrop, 2005; Holmes, 2006; Schneeberger et al., 2007; Hersperger & Bürgi, 2009; Primdahl & Swaffield, 2010).

But within the literature on driving forces, a consistent methodology is absent, often the approach of studying driving forces was done by studying processes of change (Antrop, 2004, 2005; Primdahl & Swaffield, 2010; Eiter & Pothoff, 2016) or structures (Serneels & Lambin, 2001), or both of them, categorised or grouped (Brandt et al., 1999; Bürgi et al., 2004; Kristensen et al., 2009; Eiter & Potthoff, 2016; Antrop & Van Eetvelde, 2008b). The advantage of combining processes and structures lies in the categorisation of the forces, even if this is quite a challenge, considering the fact that events and changes are often the result of different, or a combination of, driving forces. For this dissertation, both processes as structures were studied, which were represented using a heuristic timeline (Kristensen et al., 2009). The interest for this method in our research was due to the integration of both spatial and temporal scales as well as the necessity to include a range of socio-economic and physical factors in the analysis of long term landscape changes.

A large source of inspiration was the approach presented by Bürgi et al. (2004), who proposed a systematic procedure rooted in general system theory. Clearly, defining the system under study, being the landscape, its boundaries and components, is essential. The system approach allows to describe the state of the landscape, the processes within the landscape and the reactions of the landscape over time (Naveh and Liebermann 1994). Since landscapes are complex systems (see Chapter 2), the system (especially the extent and the level of hierarchy) is best described in the light of the question. Often, a graphic depiction of the relevant landscape aspects and elements, the main group of actors and most important socio-economic, political, technological, natural and cultural driving forces is sufficient to start the analysis (Bürgi et al., 2004).

The procedure includes three major steps, i.e., system definition, system analysis and system synthesis (after Bürgi et al., 2004; Schneeberger et al., 2007):

1) system definition, where study area and study period as well as the landscape elements of interest are defined;
2) system analysis, in which changes and persistencies, actors and institutions, and driving forces are studied;
3) system synthesis, in which actors, institutions, and driving forces are linked in causal relationships and their impact on the landscape elements under study is determined.
**CHAPTER 3**

**SYSTEM DEFINITION: SPATIAL ANALYSIS AND TRANSFORMATION TRENDS**

The presentation of the case study areas in Chapter 2 includes already large part of the system definition. The general study area contains the upper and middle part of the Val Borbera, with Carrega Ligure and Figino as exemplary case studies. For the analysis on driving forces, the boundaries are not limited to the mapped area (see case studies Carrega Ligure and Figino, 2.3.3), but contain the whole middle and upper valley. The timespan starts with the end of the 18th century, until today and contains around 200 years. The main landscape context is the large abandonment by local actors of their land during the last 50 years.

The spatial analysis, executed in Chapter 4, gives a good overview of how the landscape looked/looks like and how it has changed through the same time period, resulting in the major trends of transformation. There are five time slices, based on the available material for the spatial analysis. The results of this Chapter 4, namely the transformation trends, form the base of the heuristic timeline.

**SYSTEM ANALYSIS: ‘METRO-MAPS’ CHANGES AND DRIVERS**

Considering the importance of the historical context, we chose to construct a timeline for the whole time span of the research, including the manifestations and events of landscape changes in the field. Four timelines (1796-1850; 1850-1900; 1900-1950; 1950-today) were constructed based on the available material. The time breaks in between the periods correspond more or less with the ones of the spatial analysis (see Chapter 4), apart from the first spatial time slice (19th century), which corresponds with the first two time slices of the driving forces. The added value of the human-environmental timeline (Reenberg et al., 2008) is the visual presentation of the temporal dynamic interactions between human strategies on the one hand and the environmental and societal conditions and events on the other (Kristensen et al., 2009). We therefore considered the approach very suitable to answer the last research question, namely ‘What were the driving forces behind the spatial and existential changes and what drivers will have an impact on the future?’

Once the data were collected, a time line was constructed with the groups of events. These were joined with the information that was collected from literature review (archival documents, lay literature, local newspapers, etc.) and put all together. Additionally, the used material, such as cartographic data and archival documents, especially over a long time span, do include several uncertainties during the analysis (Kristensen et al., 2009). Burgi et al (2004) recognise these problems and recommend that the difficulties in establishing clear cause and effect relationships between drivers and landscape changes may be improved by incorporating
narrative explanations based on circumstantial evidence and inferential reasoning. This has been attempted in this study through the incorporation of semi-structured interviews and focus groups.

All the information was mapped on the heuristic timeline and linked with the interconnected driving forces. This analysis resulted in different ‘metro-maps’ for every individual time slice. Every ‘metro-map’ was discussed based on the physical changes (see Chapter 4), the related actors and institutions, and their interlinked driving forces.

**SYSTEM SYNTHESIS**

The system synthesis is a challenging but crucial part in studies of driving forces. This final step stresses the fact that a landscape is always more than the sum of its elements; it is a whole (Naveh and Lieberman 1994). Here, the actors, institutions and driving forces are linked in causal relationships with the manifestations and the main landscape transformation trends.

An overview of the main driving forces for every time slice is done and, moreover, linked with the opinion and perception of local actors. This information is collected through two focus groups in both case study areas Carrega Ligure and Figino (see 3.1.4). Through this exercise, the system synthesis is enlarged with the opinion of local actors and how they perceive the main landscape transformations and their driving forces. Regarding responses as essential part of the concept stresses the temporal aspect of system studies. Unquestionably, all elements of the system under study have a historical dimension: not only landscapes are subjects of change, but so are the actors and driving forces.
3.3 DATA TRIANGULATION

The discussion on landscape research by different approaches already stated that inter- and transdisciplinarity is a key element for successful results (see Chapter 2). But not only the disciplines, also the combination of different types of sources and the way in which they are collected are a success for understanding the landscape dynamics through time in a more holistic way. The adoption of an interdisciplinary approach encourages researchers to ask new questions on their data and to contextualise and scrutinize their collected evidence against and in light of other sources (Cevasco et al., 2015). In this research, different sources were used and integrated (Figure 3.4). The collection of different types of datasets can be seen and treated independently from each other, but that would not give any added value to the research. The added value of the combination of sources, called data triangulation, lies in the richness of the large amount of data and its combination which enables novel interpretations of the development and understanding of landscape history (Balzaretti et al., 2004).

Triangulation in research refers to the use of multiple techniques for gathering and/or handling data within a single study. A part from looking for confirmation, data triangulation leads also to completeness of the whole data collection. The technique facilitates validation of data through cross validation from two or more sources. In particular, it refers to the application and combination of several research methods in the study of the same phenomenon (Bogdan, 2006). The datasets are therefore not used in isolation but are often used to deconstruct particular issues or verify other qualitative or quantitative survey approaches. Furthermore, using techniques in combination can provide a clearer picture from which to inform policy (Burgess, 1999; Scott, 2011) and are therefore an important asset when it comes to the question how empirical landscape research can lead to sustainable policy decisions for rural mountain landscapes.

As described before explaining the data sampling, the main sources of material were cartographic and photographic data, landscape elements, archival documents and oral knowledge. The way to extract this material in a coherent, systematic and respectful way was done through a combination of methods or analysis, such as a desktop analysis, archival research, field survey, semi-structured interviews and focus groups. As explained in the data analysis part (see 3.2), all methods have the aim to collect a certain type of knowledge, but do, consciously or not, collect different types of sources, and are therefore not limited to the analysis of one type of material.
The combination of the five methods (desktop analysis, archival research, semi-structures interviews, focus groups and field survey) was inspired through three main approaches, being a regressive spatial analysis, the grounded theory, and the construction of a heuristic timeline.

The regressive spatial analysis is mainly based on the cartographic and photographic analysis, but it remained important to cross the information from the maps with other sources such as the field survey, the archival documents (Montanari, 1989; Moreno, 1999; Cevasco, 2002) and the collection of the oral knowledge through in-depth interviews, informal encounters and focus groups. The regressive analysis has a quantitative aspect, since the main transformation trends were supported by numeric data of changes in land cover, function, abandonment, etc.

The grounded theory and the construction of the heuristic timeline have been based mostly on qualitative analyses which involve local knowledge (in-depth interviews and focus groups). The combination with the more quantitative methods like the spatial analysis makes it possible to draw up a very rich picture of the relation a local community has/had with land and land use change (Rogge & Dessein, 2013). Moreover, focus groups have considerable potential as
participative tools for rural policy making. As the agenda shifts to embrace rural governance, sustainability and localism, it is increasingly recognised that the complexities involved in deconstructing key land use problems require a range of qualitative and quantitative research techniques and approaches (Scott, 2011).

The combination of these approaches emphasizes the great care that has to be taken into account when contextualize any static description of environmental conditions. It also provides an understanding of the crucial role of diverse and changing management practices in the environmental history of a region. These insights in the added value for scientific analysis can be particularly valuable for the development of policy and plans in rural areas. Moreover, future strategies, recommendations and visions for a sustainable development of a landscape can only fruit to a fully and holistic understanding of the landscape and what and by whom happens in it.
CHAPTER 4

LAND ABANDONMENT AND ITS IMPACT ON THE LANDSCAPE CHARACTER OF VAL BORBERA
CHAPTER 4 – LAND ABANDONMENT AND ITS IMPACT ON THE LANDSCAPE CHARACTER OF VAL BORBERA

As described in Chapter 2, the local cultivation practices (agro-silvo-pastoral system) of the rural mountainous regions of Italy and its abandonment is a common and widespread phenomenon (Farina, 1991; Gandolfo, 1994; Giudi and Piussi, 1993; Vos and Stortelder, 1992; Torta, 2004; Cevasco, 2013). But what physical consequences had the abandonment on the landscape, at what speed did the changes happen, which landscape types remained intact and which completely disappeared? Those questions are important to put when it comes to understanding the spatial character of a landscape and the impact of the land abandonment through time (RQ1 – see Chapter 1). Therefore this chapter analyses the landscape dynamics and the evolution of abandoned agricultural land in the Val Borbera (Northern Apennines) from the beginning of the 19th century until recent times.

First, the landscape character of both case studies will be analysed (see 4.1 and 4.2) by

1) presenting the composition and spatial configuration of the landscape for every time period, and
2) reporting on the spatio-temporal landscape changes over a 200-year period, focusing on how the cultural and environmental resources were used through time.

Secondly, the spatial indicators of land abandonment will be explained and discussed (see 4.3).

Thirdly, the major trends of transformations of rural mountain landscapes are discussed based on the empirical cases and situated in a Mediterranean and European context (see 4.4). Through this exercise, the spatial landscape character of the Val Borbera will be grasped.

Before going into detail about the landscape patterns in the two case studies, it is important to understand the typical historical agro-silvo-pastoral system, its land cover and use. This information was described in Chapter 2 and can be helpful to understand the landscape character of the Val Borbera. The landscape character of the case studies and its evolution through the last 200 years is described based on a GIS database (see Chapter 3).

The evolution of the major land covers (woodland, plantations, grasslands, etc.) through time already gives a first overview of the landscape character for every time period. But the (hi)story of the landscape is more complex than focusing on main categories of vegetation cover. Therefore, we chose to deepen the analysis and focus on the different descriptive and diagnostic attributes (function and land use, hillslope, field structure, presence of terraces, small landscape elements and state of abandonment - see Chapter 3) through time to get insights in
the major physical landscape transformations. By doing so, we want to illustrate the complexity of this rural mountain landscape by digging and presenting its evolution in detail, using a large variety of resources (land register maps, topographic maps, aerial photographs, ...) as described in Chapter 3. When reading this chapter attachments 1, which gives an overview of all the legends of the used maps, and 2 to 5 (land cover and land use of the two case studies) can be of help since they include the maps with the representation of the land cover and function/use for every time slice for both cases Carrega Ligure and Figino. Throughout the text of this chapter, details of those maps were added for illustration and explanation.

4.1 Case study 1: Carrega Ligure

The landscape of the higher parts of Val Borbera, as in the case study of Carrega Ligure, is currently characterized as a largely wooded area, with grasslands on top of the mountain Monte Carmo (Figure 2.4) and shrublands on the southern oriented slope of Monte Colletto (Figure 4.27). But the question rises what lies underneath that blanket of woodland? By looking at the landscape in a profound way, the (hi)story of today’s landscape becomes unravelled.

4.1.1 Landscape character for 3 time periods

Landscape of the 19th century

Two mapped periods of 1828 and 1852 (see attachment 2, A & B; attachment 4, A & B) give a good representation of the landscape of the 19th century. Until the end of the 19th - beginning of the 20th century, the largest land covers were woodland and cultivated land (both around 30%), but shrublands, grasslands and also plantations, covered together another 40% of the area (Table 4.1). The land cover types were quite in balance since no singular land cover was dominant.

The coppice woodlands in the 19th century were mostly positioned in the outfield of the village, in western direction, especially in the vicinity of the river and on hillsides with a higher slope (toponyms Valette, Satu and Campu Preve). They consist mostly out of Turkey oak (Quercus cerris; locally called ‘cerreti’) and were used for both wood production and grazing. The local economy was strongly based on the production of wood and/or charcoal in combination with animal husbandry, especially small cattle such as sheep (5000 goats and 1500 sheep in 1819 – see Fondo Antico, Serie 3, 1.5 1819-1821, Corrispondenza del 1819 coll’ill.mo Vice – Intendente di Novi et altre autorità) and goats. The mountain areas were also used for transhumance of sheep and goats of other villages. Due to the large amount of people and cattle, the whole area was a ‘grazing’ area, especially before the months June-July when the grasslands of Monte
Carmo were still in use for the production of hay. The Napoleonic land register (1811) maps show that the woodlands were private and the parcels had a blocky form. But the ‘forced’ privatization strategy of the French emperor need to be taken into consideration, especially because historically the woodlands were also used as common grazing area. 22 out of the 27% of woodland is positioned on very steep (33-63%) and steep (24-33%) slopes, but none of them included terraces.

**Figure 4.11:** **Representation of coppice woodland at the toponym Valette in the 19th century on three different sources:** (A) **Napoleonic land register (1811),** (B) **Minute di Campagna (1828),** (C) **Gran Carta Stati Sardi**

More specifically, the secondary vegetation obtained only 2% in the beginning of the 19th century, including small landscape elements as hedgerows, treelines and solitary trees and some small bushes between the cultivated land.

The most dominant types of woodland were the coppice and high woodland, covering around 20% of the area. Both types of woodland require an intensive maintenance and are part of the
agro-silvo-pastoral system that was typical for the area (see Chapter 2). Due to the difficulty of recognizing the land cover in the 19th century, we assume that the land cover of high and coppice woodland might have been even higher than our interpretation of the historical maps. Especially because both coppice and high woodland also occurred between the parcels of

Table 4.14: Evolution of Land Cover of Carrega Ligure (1828-2014)

<table>
<thead>
<tr>
<th>(Sub)categories of Land Cover</th>
<th>1828</th>
<th>1852</th>
<th>1936</th>
<th>1980</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>WOODLAND</td>
<td>27.16%</td>
<td>30.90%</td>
<td>30.67%</td>
<td>50.58%</td>
<td>61.64%</td>
</tr>
<tr>
<td>Secondary vegetation</td>
<td>2.06%</td>
<td>5.22%</td>
<td>6.61%</td>
<td>12.03%</td>
<td>20.14%</td>
</tr>
<tr>
<td>Coppice woodland</td>
<td>12.04%</td>
<td>4.86%</td>
<td>9.77%</td>
<td>3.05%</td>
<td>5.71%</td>
</tr>
<tr>
<td>Middle woodland</td>
<td>6.17%</td>
<td>4.68%</td>
<td>6.16%</td>
<td>21.44%</td>
<td>23.09%</td>
</tr>
<tr>
<td>High woodland (fagus)</td>
<td>6.90%</td>
<td>16.13%</td>
<td>8.13%</td>
<td>11.65%</td>
<td>13.10%</td>
</tr>
<tr>
<td>Pine woodland</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>2.41%</td>
<td>2.57%</td>
</tr>
<tr>
<td>PLANTATION</td>
<td>3.97%</td>
<td>5.40%</td>
<td>5.58%</td>
<td>2.87%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Chestnut plantations</td>
<td>3.97%</td>
<td>5.40%</td>
<td>5.58%</td>
<td>2.87%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Hazelnut plantations</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>GRASSLAND</td>
<td>15.10%</td>
<td>11.46%</td>
<td>12.57%</td>
<td>10.31%</td>
<td>17.48%</td>
</tr>
<tr>
<td>Grasslands on high altitudes</td>
<td>15.10%</td>
<td>11.46%</td>
<td>12.51%</td>
<td>10.16%</td>
<td>8.94%</td>
</tr>
<tr>
<td>Grasslands on low altitudes</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.05%</td>
<td>0.15%</td>
<td>8.53%</td>
</tr>
<tr>
<td>SHRUBLAND</td>
<td>19.22%</td>
<td>20.16%</td>
<td>25.25%</td>
<td>17.06%</td>
<td>14.00%</td>
</tr>
<tr>
<td>Rough land</td>
<td>8.45%</td>
<td>14.96%</td>
<td>21.59%</td>
<td>6.19%</td>
<td>6.00%</td>
</tr>
<tr>
<td>Bushland</td>
<td>10.77%</td>
<td>5.20%</td>
<td>3.66%</td>
<td>10.87%</td>
<td>8.00%</td>
</tr>
<tr>
<td>NON COVERED</td>
<td>0.28%</td>
<td>0.43%</td>
<td>1.13%</td>
<td>0.68%</td>
<td>0.93%</td>
</tr>
<tr>
<td>Non covered substrate</td>
<td>0.28%</td>
<td>0.43%</td>
<td>1.13%</td>
<td>0.68%</td>
<td>0.93%</td>
</tr>
<tr>
<td>CULTIVATED LAND</td>
<td>31.61%</td>
<td>28.98%</td>
<td>22.08%</td>
<td>15.71%</td>
<td>0.05%</td>
</tr>
<tr>
<td>Horticulture</td>
<td>0.00%</td>
<td>0.05%</td>
<td>0.05%</td>
<td>0.05%</td>
<td>0.05%</td>
</tr>
<tr>
<td>Arable land</td>
<td>31.61%</td>
<td>28.93%</td>
<td>22.03%</td>
<td>15.66%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Vineyard</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Beans</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>
cultivated land or on the grasslands, and were mapped as such. Looking at the Napoleonic land register maps, confirmed that the small parcels of cultivated land were alternated by small parcels of ‘bois taillis’ or ‘bosco ceduo’, meaning coppice woodland (Figure 4.1). The high woodland contained several flat areas (5-10m diameter) where the production of charcoal from wood was done, which makes it still possible today to find numerous large fragments of carbonated wood (Montanari, 2013; Zonza & Carbone, 2013). A part from the wood production, this high woodland served as shadow areas for the cattle in the middle of the nude pasture land. Another practice was the collection of the leafs (oak, poplar, ash, horn beam) for animal forage during winter (Salvi, 1982).

The coppices of *Quercus cerris* were mapped based on the symbols ‘b’ (bosco (ceduo)) in 1828 or BP (bosco-pascolo) in 1852, situated in the north-western part of the case study, on the slopes of Monte Colletto, and between the villages of Conio and Carrega and the river. The
situation was checked and confirmed by the category ‘Bois taillis’ (coppice woodland) of the land register map of 1811. During the feudal period, the Quercus cerris coppices were also used for the production of tannis for the local leather manufacturing (Cevasco, 2013). **High woodland** is a type of coppice woodland dominated by beech (Fagus sylvatica, see Chapter 3) and located on the higher positioned grasslands around Monte Carmo in the eastern fringe of the case study, above 1200 m a.s.l. (mapped as ‘B’ in 1828 and 1852). They are categorized as ‘high woodland’ because they are positioned on higher altitudes and with higher crowns than the Turkey oak Quercus cerris, providing shadow for the grazing cattle. This type of high woodland can be recognised in toponyms like Scabiun, Scabbia, Scaiun, Scaiassa. This refers to the rural practice of Scabbia (see 4.1.2).

The high woodland was less present in the 19th century, since most woodlands were maintained as coppice, while the middle high woodland is a mixture of coppice with high trees.

The **plantations**, chestnut in this case, were mostly located on the left bank of the Borbera (Carreghina) river, on the eastern slope. This less sunny slope can have had an impact on the location for chestnuts, but also the soil composition (chestnut is a rather acidophilous species) might have had an impact. But Carrega had a few small chestnut plantations close to the village at the location Serè and Amaine, which was provided by water through a small channel that came from the village source (Stagno, 2013). The parcels have a blocky form and contrast with the parallel strip fields of the cultivated land around. They are situated on steep and hilly slopes and contained mixed terraces of which there are still traces. They were used for wood production and grazing, as was also the case for the woodland, but were mostly productive for the chestnut fruits. They are located beneath 900 m a.s.l. which is the productive limit of chestnut plants. Another chestnut plantation in the northwest of the area belongs to the village of Cartasegna, a submunicipality of Carrega Ligure.

The **grasslands** were located on the higher altitudes above 1200 m a.s.l. around Monte Carmo and its slopes (see Figure 4.2). They were mixed with the high woodland of beech coppices and located on hilly and steep slopes. Since they were used for hay production in the first place, they were actual meadows. The cattle were only led to the mountain for grazing after the hay cutting in the months June-July (see before). They form blocky parcels or small strip parcels perpendicular to the slope, especially around Monte Carmo.

The steepest slopes, around Monte Colletto and the eastern flank of Monte Carmo, were extensively used by small grazing livestock as goats and sheep, since they had less difficulties to move on steep slopes. Both rough land and bushland are located on hilly (16-24%) and steep (24-33%) areas and do not contain terraces or small landscape elements. In former research on the historical map of 1853 - Foglio Bobbio (Cevasco, 2004, p91), this ‘gerbido’ is categorized as
rough land and/or woodland used as pasture, close to woodland populations and locally present humid areas. The difference between rough land and non-covered substrate is that the latter is located on less suitable places for cultivation, mostly because of its slope, e.g. canyons.

**Figure 4.13:** Representation of the multiple land use system of the 19th century and of the toponym Forca on three different sources: (A) Napoleonic land register (1811), (B) Minute di Campagna (1828), (C) Gran Carta Stati Sardi.

The cultivated areas, situated in the infield around the villages, could contain horticulture, arable land, vineyards, but also specific cultivations as the production of beans, cultivation of wheat, potatoes, corn, vegetables, cereals, lentils, chickpeas, etc. (Leardi, 2007; Cevasco et al., 2015). Even if they were located on the less steep slopes of the area (slightly flat (6-16%) and hilly (16-24%)), the construction of terraces and small landscape elements was necessary. Especially on very steep areas (e.g. Forca – Figure 4.3), stone terraces were constructed. On less steep areas, mixed or even earth terraces reinforced with treelines or hedgerows were sufficient. Another technique for reinforcement of earth terraces was the plantation of one line of vines. The presence of real vineyards in this area was not identified on the historical maps,
but this does not mean that there were no vines; they were symbiotically mixed with the arable land. Finding the remains of wild grapevines during the field survey and finding toponyms (see 4.1.2) related with the cultivation, were an indicator of their presence in the past (Beltrametti et al., 2014). However, they were often not considered spatially large enough to include in the land cover classification as a single subcategory.

**Landscape of the 20th Century**

Time periods 1936 and 1980 (see attachment 2, C & D; attachment 4, C & D) are described to get an understanding of the landscape of the 20th century. This time phase shows the start of some shifts in the land cover. The woodland became the most dominant land cover, followed by the shrubland, and especially the cultivated land, but also the grasslands and plantations, went into decline.

At first sight, the amount of woodland remained stable between half of the 19th century (1854) and the beginning of the 20th century (1936). However, at the end of the 20th century, the landscape character is slightly different than in the beginning, especially when looking at the different subcategories and attributes. In the beginning of the 20th century, the woodland is still mostly used for both grazing and wood production, as was the case in the 19th century, but the uses and functions of different types of woodland changed in the 1980s (Table 4.2).

**Table 4.15: Overview of the land use (category land cover in combination with attribute function/use) of Carrega Ligure through time**

<table>
<thead>
<tr>
<th>Land cover</th>
<th>Function/use</th>
<th>1828</th>
<th>1852</th>
<th>1936</th>
<th>1980</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>WOODLAND</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary vegetation</td>
<td>no function</td>
<td>0,00%</td>
<td>0,00%</td>
<td>0,00%</td>
<td><strong>12,03%</strong></td>
<td>20,14%</td>
</tr>
<tr>
<td></td>
<td>only grazing</td>
<td>0,00%</td>
<td>0,00%</td>
<td><strong>6,61%</strong></td>
<td>0,00%</td>
<td>0,00%</td>
</tr>
<tr>
<td></td>
<td>wood production and grazing</td>
<td><strong>2,06%</strong></td>
<td><strong>5,22%</strong></td>
<td>0,00%</td>
<td>0,00%</td>
<td>0,00%</td>
</tr>
<tr>
<td>Coppice woodland</td>
<td>no function</td>
<td>0,00%</td>
<td>0,00%</td>
<td>0,00%</td>
<td>0,00%</td>
<td><strong>5,07%</strong></td>
</tr>
<tr>
<td></td>
<td>only wood production</td>
<td>0,00%</td>
<td>0,00%</td>
<td>0,00%</td>
<td><strong>3,05%</strong></td>
<td><strong>0,63%</strong></td>
</tr>
<tr>
<td></td>
<td>wood production and grazing</td>
<td><strong>12,04%</strong></td>
<td><strong>4,86%</strong></td>
<td><strong>9,06%</strong></td>
<td>0,00%</td>
<td>0,00%</td>
</tr>
<tr>
<td></td>
<td>fruit, grazing and wood production</td>
<td>0,00%</td>
<td>0,00%</td>
<td>0,71%</td>
<td>0,00%</td>
<td>0,00%</td>
</tr>
<tr>
<td>Land Type</td>
<td>Function</td>
<td>Middle Woodland</td>
<td>High Woodland (Fagus)</td>
<td>Pine Woodland</td>
<td>Chestnut Plantations</td>
<td>Grasslands on High Altitudes</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>---------------------------</td>
<td>-----------------</td>
<td>----------------------</td>
<td>--------------</td>
<td>----------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0,00% 0,00% 0,00% 0,00% 22,24%</td>
<td>6,90% 16,13% 8,13% 11,65% 13,10%</td>
<td>0,00% 0,00% 0,00% 2,41% 2,57%</td>
<td>0,00% 0,00% 0,00% 2,87% 0,00%</td>
<td>15,10% 11,45% 12,51% 0,00% 0,00%</td>
</tr>
</tbody>
</table>

**PLANTATION**

<table>
<thead>
<tr>
<th>Land Type</th>
<th>Function</th>
<th>Middle Woodland</th>
<th>High Woodland (Fagus)</th>
<th>Pine Woodland</th>
<th>Chestnut Plantations</th>
<th>Grasslands on High Altitudes</th>
<th>Grasslands on Low Altitudes</th>
<th>Rough Land</th>
<th>Bushland</th>
<th>Non-Covered</th>
<th>Cultivated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0,00% 0,00% 0,00% 0,00% 21,44%</td>
<td>6,17% 4,68% 6,16% 0,00% 0,84%</td>
<td>0,00% 0,00% 0,00% 2,41% 2,57%</td>
<td>0,00% 0,00% 0,00% 2,87% 0,00%</td>
<td>3,97% 5,40% 5,58% 0,00% 0,00%</td>
<td>0,00% 0,00% 0,00% 0,15% 8,53%</td>
<td>0,00% 0,00% 0,05% 0,00% 0,00%</td>
<td>0,00% 0,00% 0,00% 4,24% 7,36%</td>
<td>0,28% 0,43% 1,13% 0,68% 0,93%</td>
<td>0,00% 0,05% 0,05% 0,05% 0,05%</td>
</tr>
</tbody>
</table>

**GRASSLAND**

<table>
<thead>
<tr>
<th>Land Type</th>
<th>Function</th>
<th>Middle Woodland</th>
<th>High Woodland (Fagus)</th>
<th>Pine Woodland</th>
<th>Chestnut Plantations</th>
<th>Grasslands on High Altitudes</th>
<th>Grasslands on Low Altitudes</th>
<th>Rough Land</th>
<th>Bushland</th>
<th>Non-Covered</th>
<th>Cultivated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0,00% 0,00% 0,00% 0,00% 22,24%</td>
<td>6,90% 16,13% 8,13% 11,65% 13,10%</td>
<td>0,00% 0,00% 0,00% 2,41% 2,57%</td>
<td>0,00% 0,00% 0,00% 2,87% 0,00%</td>
<td>15,10% 11,45% 12,51% 0,00% 0,00%</td>
<td>0,00% 0,00% 0,00% 0,15% 8,53%</td>
<td>0,00% 0,00% 0,05% 0,00% 0,00%</td>
<td>0,00% 0,00% 0,00% 4,24% 7,36%</td>
<td>0,28% 0,43% 1,13% 0,68% 0,93%</td>
<td>0,00% 0,05% 0,05% 0,05% 0,05%</td>
</tr>
</tbody>
</table>

**SHRUBLAND**

<table>
<thead>
<tr>
<th>Land Type</th>
<th>Function</th>
<th>Middle Woodland</th>
<th>High Woodland (Fagus)</th>
<th>Pine Woodland</th>
<th>Chestnut Plantations</th>
<th>Grasslands on High Altitudes</th>
<th>Grasslands on Low Altitudes</th>
<th>Rough Land</th>
<th>Bushland</th>
<th>Non-Covered</th>
<th>Cultivated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0,00% 0,00% 0,00% 0,00% 22,24%</td>
<td>6,90% 16,13% 8,13% 11,65% 13,10%</td>
<td>0,00% 0,00% 0,00% 2,41% 2,57%</td>
<td>0,00% 0,00% 0,00% 2,87% 0,00%</td>
<td>3,97% 5,40% 5,58% 0,00% 0,00%</td>
<td>0,00% 0,00% 0,00% 0,15% 8,53%</td>
<td>0,00% 0,00% 0,05% 0,00% 0,00%</td>
<td>0,00% 0,00% 0,00% 4,24% 7,36%</td>
<td>0,28% 0,43% 1,13% 0,68% 0,93%</td>
<td>0,00% 0,05% 0,05% 0,05% 0,05%</td>
</tr>
</tbody>
</table>

**NON-COVERED**

<table>
<thead>
<tr>
<th>Land Type</th>
<th>Function</th>
<th>Middle Woodland</th>
<th>High Woodland (Fagus)</th>
<th>Pine Woodland</th>
<th>Chestnut Plantations</th>
<th>Grasslands on High Altitudes</th>
<th>Grasslands on Low Altitudes</th>
<th>Rough Land</th>
<th>Bushland</th>
<th>Non-Covered</th>
<th>Cultivated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0,00% 0,00% 0,00% 0,00% 22,24%</td>
<td>6,90% 16,13% 8,13% 11,65% 13,10%</td>
<td>0,00% 0,00% 0,00% 2,41% 2,57%</td>
<td>0,00% 0,00% 0,00% 2,87% 0,00%</td>
<td>3,97% 5,40% 5,58% 0,00% 0,00%</td>
<td>0,00% 0,00% 0,00% 0,15% 8,53%</td>
<td>0,00% 0,00% 0,05% 0,00% 0,00%</td>
<td>0,00% 0,00% 0,00% 4,24% 7,36%</td>
<td>0,28% 0,43% 1,13% 0,68% 0,93%</td>
<td>0,00% 0,05% 0,05% 0,05% 0,05%</td>
</tr>
</tbody>
</table>

**CULTIVATED**

<table>
<thead>
<tr>
<th>Land Type</th>
<th>Function</th>
<th>Middle Woodland</th>
<th>High Woodland (Fagus)</th>
<th>Pine Woodland</th>
<th>Chestnut Plantations</th>
<th>Grasslands on High Altitudes</th>
<th>Grasslands on Low Altitudes</th>
<th>Rough Land</th>
<th>Bushland</th>
<th>Non-Covered</th>
<th>Cultivated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0,00% 0,00% 0,00% 0,00% 22,24%</td>
<td>6,90% 16,13% 8,13% 11,65% 13,10%</td>
<td>0,00% 0,00% 0,00% 2,41% 2,57%</td>
<td>0,00% 0,00% 0,00% 2,87% 0,00%</td>
<td>3,97% 5,40% 5,58% 0,00% 0,00%</td>
<td>0,00% 0,00% 0,00% 0,15% 8,53%</td>
<td>0,00% 0,00% 0,05% 0,00% 0,00%</td>
<td>0,00% 0,00% 0,00% 4,24% 7,36%</td>
<td>0,28% 0,43% 1,13% 0,68% 0,93%</td>
<td>0,00% 0,05% 0,05% 0,05% 0,05%</td>
</tr>
</tbody>
</table>
The secondary vegetation grew exponentially and accelerated after the 1980s. Former small landscape elements became bushes and started invading areas covered with cultivated land and grasslands (Figure 4.4). Until half of the 20th century, secondary vegetation was present in the landscape, mixed with other land covers, and mostly used for grazing. Being the first areas that were not used anymore, they expanded largely during the second half of the 20th century. The areas with secondary vegetation were initially mostly located on very steep areas, but extended on less steep areas and even terraced areas of former cultivated land in 1980. This explains the increase of abandoned strip field in comparison with the block fields in the 20th century.

![Figure 4.14: Representation of the invasion of secondary vegetation in the 20th century around Monte Colletto on two different sources: (A) Aerial photograph (1936), (B) Aerial photograph (1980)](image)

The coppice woodland of Turkey oak (*Quercus cerris*), historically structured in blocky fields, decreased largely between the 19th and 20th century, and even more between 1936 and 1980. The coppices on very steep areas almost completely disappeared in the 1980s and they only remained on less steep areas. The mixed coppice woodland corresponded with the former chestnut plantations, which lost its function of plantation and fruit production in the arch of the 20th century. The higher coppice beech woodland, which were dominant in the former century, decreased in the beginning of the 20th century and increased again at the end of the same century. They still functioned as both wood production and grazing areas through time, situated on the steep slopes blocky fields of Monte Carmo.

In the 1980s, the middle woodland is present for more than 20% of the total coverage. They are located in the lower part of the case study between the river and the villages and on the western flank of Monte Colletto. The middle woodland covered the former coppice woodland that has been abandoned as well as between the arable land, on the higher positioned grasslands and on former spots of shrubland and/or secondary vegetation that expanded (Figure 4.5). The middle woodland was always present in the landscape and was used for wood
production and for grazing, but, due to the large expansion, it lost the grazing function before the 1980s. They were always largely present in very steep areas, but extended in less steep areas as well between 1936 and 1980. The field structure of the middle woodland is mostly dominated by blocky fields, but with its invading aspect, its starts occupying also strip fields at the end of the 20th century.

The pine woodlands (Pinus nigra) are recognised for the first time in the 1980s time phase, located on the very steep slopes of former rough land. They were introduced in the 1950s for a wood production but the wood has never been exploited. All were planted with the aim to invest and use the first abandoned areas to produce wood within time. They were mostly planted on shrubland which was the first land cover that lost its function, namely grazing. The property of the pine woodlands is the forestry management of the region of Piedmont.

The chestnut plantations were still present at the beginning of the 20th century but decreased largely since then. Their function changed from the combination of wood and fruit production
with grazing to only fruit production. They are still located on steep areas, but historically have terraces for an easier and better maintenance of the plots. The plantations were still active in 1936, but some of them were already abandoned in 1980 and changed into middle woodland with coppice traces.

The grasslands of the 20th century remained more or less the same in location as in the 19th century, but their use shifted towards the single grazing function, thus without hay production. In the 1980s, the first hay production grasslands were identified close to the village. They were located on the strip fields, parallel with the slope, which were formerly used as cultivated land.

In 1936, the amount of bushland was the lowest (3.6%) but started to increase from 1980 onwards. This evolution confirms the ‘clean’ situation of the landscape of the beginning of the 20th century, when shrub and woodland was reduced to a minimum. The rough land in 1936 was also present between the pastureland with its high Fagus sylvatica woodland and the arable land of the villages, for example on the flank of Monte Carmo. The reason why the most eastern part of the historic gerbido was invaded firstly is because of the invasion of secondary vegetation. In the 1980 aerial photos, the invasion of the rough land by secondary vegetation is clear (Figure 4.5).

Through the entire 20th century, the cultivated land diminished but the location on hilly and slightly flat areas and their single use for cultivations did not change. They continue being organized by terraces and small landscape elements. The arable land was still used in the 1980s, especially for wheat production.

The cemetery could be identified on the aerial photo of 1936 for the first time as well as other innovations like the construction of ‘new’ stables and the agritourism of the Crosetti family, and the soccer field of Carrega and of Connio. A part from one stable, they were all built by the same family Crosetti.

**LANDSCAPE OF TODAY**

In the last time phase (see attachment 2, E; attachment 4, E), the landscape is clearly dominated by woodland (> 64%), followed by grasslands (17%) and shrubland (14%) (Figure 4.6). But here again, the subcategories differ from the previous periods and give a better and more detailed idea of the landscape character.

With 20% of the current area, the secondary vegetation is one of the most dominant coverages in the case study. The former shrubs and small landscape elements were already extended largely at the end of the 20th century. The plots with secondary vegetation have no function or
use in the current landscape and occupy all types of field structures and mainly on steep to very steep hillslopes.

Relicts of coppice woodland are still present in the landscape. The mapped coppices in 2014 correspond with the former chestnut plantations, on blocky fields. They are not mapped as middle woodland because the coppices are still largely recognizable, even if they lost any former function and are therefore in a situation of decline and complete abandonment. The areas cover around 5-6% of the whole case study of Carrega and are situated between the villages and the river, in a hilly to steep area, thus including mixed terraces. The steepest areas were strengthened with stone terraces, while less hilly slopes were flattened with earth terraces. In the northwest of the case study, there is the historical chestnut plant of Cartasegna, which is still recognized by its coppice. This patch is in a further situation of decline, since it was already mapped in 1980 as coppice and not as productive plantation.
Another type of coppice woodland is the high woodland (*Fagus sylvatica*) above 1200 masl, situated on the blocky fields between higher positioned grasslands around Monte Carmo. The high woodlands are rather dominant in the case study (> 13%) and have been increasing since 1936 (only 9%).

Plantations are no more present in 2014. The old chestnut plants went in decline and none of them are still in production. For that reason, they are not mapped as plantations, but as middle woodland, even if the remains of the old chestnuts were detected in the field.

A part of the grasslands is still situated on hilly and steep slopes around Monte Carmo and the mountain ridge, mixed with the high woodland of beech coppices. These type of grasslands decreased slightly in comparison with the landscape of 1980 and earlier. But the remaining meadows can still be considered as permanent grasslands. Their double function of grazing and hay production got lost through time and nowadays the uphill grasslands are only used for grazing. However another type of grassland was introduced, namely the grasslands on lower altitudes, located in the infield of the village on the former cultivated land, and only used for hay production. The field structure of these ‘new’ grasslands is the same as the former cultivated land: small strip fields which are parallel orientated with the altitude. These small strips are not so much noticeable on the field, since the farmers who use the fields merge several parcels, aiming to work easier and with the necessary equipment. They are positioned on the flat areas with small earth terraces. The former cultivated land with stone terraces was not fruitful for the grasslands. Those two types of grasslands (permanent and non) are very different in their biodiversity and composition (Cevasco, 2004; 2007).

The bushland increased in comparison with the rough land, but both are still present in the current landscape. Both types of shrubland in the northeast of the case study correspond with a steep or very steep area. The rough land, situated on the eastern flank of Monte Colletto, was historically a *gerbido* and is still a rough land on steep and stony ground. The bushland, historically also positioned on the *gerbido*, has been invaded by thorny shrubs (e.g. *Crataegus monogyna*, *Prunus spinose*, *Rubus spp*. *Rosa canina*) through time. Shrubland is mostly structured on large blocky fields.

The arable land almost entirely disappeared in 2014, a part from some single vegetable gardens in the outfield, and close to the villages, in the infield.

The installation of a hydro-electric power plant is one of the new ways of validating the abandoned area and gaining an alternative income since the collected energy is sold to the energy company. In spring 2016, a second hydro-electric installation was constructed just
outside the case study (Molino del Pio), but is nonetheless considered to be important. All are private initiatives.

The housing area in Carrega and Connio is less than 1% of the whole case study. The largest part of the housing is (post-)medieval, which partly became abandoned during the land abandonment phase in the second half of the 20th century and fell apart into ruins. Even if the land abandonment was quite extensive, the housing did not suffer that much. The buildings are a sensible issue for the remaining owners, since it is the only remnant of the landscape of the past and represent the relation with their territory. The emotive link with housing is so strong that, when empty buildings are asked to be used by newcomers, owners refuse to rent or sell.

The historic buildings in the research area of Carrega are the medieval tower, which became a ruin, and the church. The industrial infrastructure was historically based on the large amount of mills in the area. Using the power of water, the mills were a perfect way to transform wheat and chestnuts into flour. Historically, the mills were located on strategic places along the trading routes between the Ligurian sea and the Po plain.

The amount of modern stables grew during time because of the modernization of livestock management.

4.1.2 Toponyms – Oral History

In the case study of Carrega, several toponyms were recovered based on historical maps, the Napoleonic land register and the local knowledge collected through informal and formal interviews. The use of toponyms is of additional value for the interpretation of the historical land cover (Table 4.3). Hereby, some of the toponyms are described in detail, since the land use like described in the Napoleonic land register helped to understand the land use of the beginning of the 19th century.

The land register map of Napoleon (1811) represents a very divided landscape where every piece of land is parceled (Figure 4.7). The land register of 1950 is the basis for the land register of today, and is even rather similar. Parcels have been divided even more since the increase of land owners for the same parcel by inheritance. Some land has been reunited, as was the case for the toponyms Peie Riunde, Piese Lunghe, Suoleca, Poguea, Gamba in Carrega. This land was divided into parcels by Napoleon, but has been reunited in 1950 with the agreement of the owners, and given complete ownership to the municipality of Carrega. It considers land that was historically used for grazing, covered by a mixture of coppices, woodland, cultivated land, shrubland, located between the higher meadows, and the lower cultivated areas. This reunion is the recovery of the common use of common land, used for grazing.
The toponyms *Scabiaun, Scabiassa, Scaiun, Scabiaielia* have the same base ‘scabbia’. This term refers to a rural practice that was studied in the nearby valley of val Vobbia (higher part of val Scrivia, Genova) (Cevasco, 2007). The systems refers mainly to a coppice woodland, which had a large importance in the production of charcoal and contemporary animal production (Poggi, 2013). In other areas, like Val Vobbia, it was mainly *Quercus cerris*, while in Sestri Levante it referred to a high macchia (especially *Erica arborea*) which was coppiced for vineyard poles. The ‘scabbia’ had rather short rotation in cutting periods (every 7-15 years), the underlying grassland was used for grazing of sheep in spring, and bovine at the end of winter. Field survey and local informants confirmed that the toponyms in Carrega refer to a similar multiple system, but included *Fagus sylvatica* instead of *Quercus cerris*. Indeed, the toponyms are located on higher altitudes close to the grasslands, where there are still large stems of beech coppices present. Other toponyms on high altitudes refer to woodland in combination with pasture land, the typical *prato alberato*, as for example *Lavaggio* (Figure 4.8).
The toponyms Ronchetta, Runco, Runchurie, Ronco, Runcu du Gallu, Rungurie refer to the rural practice of *ronco*. The significance of this toponym is linked with the practices of a temporary agriculture. The given name depends on the time when the practice began, and is therefore largely variable (Cevasco, 2007; Beltrametti et al., 2015). *Ronco* can refer to the use of fire to gain land from the woodland and especially in close combination with the pasture land. It can also refer to a multiple rural system that has a cyclic rhythm for soil management with the aim of rye (*segale*) and oat (*avena*) production, through controlled fire. The fertilization of ronco-fields was done through cattle grazing of these wooded areas. This rural practice has been rather important and famous in the Ligurian Apennines, so it is plausible that the same practice was executed in Carrega. It explains also the variation of land cover found in the Napoleonic land register, which is a mixture of cultivated land, woodland, rough land and pasture land, depending in which phase of the practice the registration of the property was done. The difficulty to understand the significance of *ronco* lies in the complete abandonment of this practice during the 19\textsuperscript{th} century, which is one of the main shifts in the history of the management of local environmental resources (Moreno, 1990; Cevasco, 2007).

The same type of mixed land uses (pasture, cultivation, rough ground) was found on higher altitudes at the toponyms of *Peie Riunde* and *Piese Lunghe*. While the Ronco-areas were all located in the territory of Carrega, the latter two are situated in Connio. The inhabitants of Connio had less flat areas close to the village and were more obliged to start cultivating on higher positioned areas like *Peie Riunde* and *Piese Lunghe*. The meaning of the toponyms is
unclear, but the first refers to the small strip fields, while the latter refers to a blocky field structure. Another example of the poor soils of Connio is the large shrubland of Monte Colletto. The toponyms Cugnu Peuo and Arxi, registered in 1811 as rough ground or shrubland, confirm this land cover. Also Funtaniela and Forca refer to places where a mixture of pastures, cultivated land and rough ground was present on the tiny strip fields, parallel with the slope (Figure 4.9). Those type of fields confirm the presence of an agro-silvo-pastoral system, where every corner was used for grazing, also the shrubs between the cultivated parcels. Field survey confirmed the strip fields, in combination with stone terraces due to the very steep slope. The amount of bovine cattle per capita was 0,6 for the community of Carrega. Therefore, every piece of the territory was used to graze the animals, including the coppice and middle woodlands close to the river and the village. After the hay production of the uphill meadows in June-July, the cattle was taken uphill to the grasslands and beech woodland.

Figure 4.19: View on land cover at the toponym Forca through time (a) 1828; (b) 1852; (c) 1936; (d) 1980; (e) 2014

The cultivations were divided by small landscape elements such as shrubs, treelines and hedgerows, individually parcelled and used for grazing or wood production. Praü, Stassiun, Molino Ratta, Le Canniele, Nuo-Cebieca, Zerbi were all toponyms referring to cultivations. The pasture land was not only found on top of the Monte Carmo, but clearly also in between the cultivated area around the villages, in the middle of the woodland and nearby the river bed (Pro de Serrin).
The chestnut plantations between the village of Carrega and the river are found by the toponym *Amaine*, including other woodland and cultivated land. The toponym refers to an area at the border of the current remainings of the chestnut plantations. This was similar for the toponym *Campu Preve*. The middle woodland and coppices are found on the toponyms *Valette* and *Satu* (latin ‘saltus’, which means pastureland or more precisely wooded pasture), in the north-western part of the case study.
## Table 4.16: Overview of Toponyms of Carrega Ligure

<table>
<thead>
<tr>
<th>Land Cover</th>
<th>Toponym as Collected</th>
<th>Recent Land Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultivated land - pasture - rough ground</td>
<td>C. della Vigna</td>
<td>Piana dell'orto; Crusa del'orto; Pro de Semin</td>
</tr>
<tr>
<td>Grassland on lower land</td>
<td>Suolecà</td>
<td>Terrabuona</td>
</tr>
<tr>
<td>Woodland</td>
<td>L'Alpesello</td>
<td>L'Alpisella</td>
</tr>
<tr>
<td>Vineyard</td>
<td>P. gio Rondino</td>
<td>Font.na Campostrino</td>
</tr>
<tr>
<td>Meadow</td>
<td>Poggio Rotondo</td>
<td>Sassi; Campo Strin; Riva; Cruxe; Suolecà</td>
</tr>
<tr>
<td>Shrubland</td>
<td>P. Ramo; Nassera</td>
<td>Poggio Rotondo; Suolecà</td>
</tr>
<tr>
<td>Woodland - coppice woodland</td>
<td>Grassland on lower land</td>
<td>Suolecà; Terrabuona</td>
</tr>
<tr>
<td>Chestnut (labé - bois)</td>
<td>Fagus sylvatica</td>
<td>Fuetti; M. Fuiti</td>
</tr>
<tr>
<td>Meadow - grassland on lower land</td>
<td>Castagno</td>
<td>Castagno</td>
</tr>
<tr>
<td>Cultivated land - pasture - rough ground</td>
<td>Serè; Seri; Serretti; Pro de Serrin</td>
<td>Plano: land used for pastoral use and secondary vegetation</td>
</tr>
<tr>
<td>Grassland on lower land</td>
<td>Praü</td>
<td>Praü</td>
</tr>
<tr>
<td>Shrubland dominated by rocks</td>
<td>Peete</td>
<td>Peete</td>
</tr>
<tr>
<td>Pasture (Pature)</td>
<td>Cugnu Peuo</td>
<td>Cugnu Peuo</td>
</tr>
<tr>
<td>Cultivated land</td>
<td>Crusa del'orto; Pro de Semin</td>
<td>Crusa del'orto; Pro de Semin</td>
</tr>
<tr>
<td>Rough ground (Terre Vaine)</td>
<td>Pro de Serrin</td>
<td>Pro de Serrin</td>
</tr>
<tr>
<td>Pasture</td>
<td>Peie Riunde</td>
<td>Peie Riunde</td>
</tr>
<tr>
<td>Rough ground (Terre Vaine)</td>
<td>Cugnu Peuo</td>
<td>Cugnu Peuo</td>
</tr>
<tr>
<td>Cultivated land</td>
<td>Fossa; Cugnie; Fusielli</td>
<td>Fossa; Cugnie; Fusielli</td>
</tr>
<tr>
<td>Pasture</td>
<td>Cugnuë</td>
<td>Cugnuë</td>
</tr>
<tr>
<td>Field structure</td>
<td>Piesu Riundin; Piese Lunghe; Peie Riunde</td>
<td>Piesu Riundin; Piese Lunghe; Peie Riunde</td>
</tr>
<tr>
<td>Small hill</td>
<td>Cugnu Peuo</td>
<td>Cugnu Peuo</td>
</tr>
<tr>
<td>Field structure</td>
<td>Lunga; Piesu Riundin</td>
<td>Lunga; Piesu Riundin</td>
</tr>
<tr>
<td>Rough ground (Terre Vaine)</td>
<td>Cugnuë</td>
<td>Cugnuë</td>
</tr>
<tr>
<td>Cultivated land - pasture - rough ground</td>
<td>C. della Vigna</td>
<td>Piana dell'orto; Crusa del'orto; Pro de Semin</td>
</tr>
<tr>
<td>Grassland on lower land</td>
<td>Suolecà</td>
<td>Terrabuona</td>
</tr>
<tr>
<td>Woodland</td>
<td>L'Alpesello</td>
<td>L'Alpisella</td>
</tr>
<tr>
<td>Vineyard</td>
<td>P. gio Rondino</td>
<td>Font.na Campostrino</td>
</tr>
<tr>
<td>Meadow</td>
<td>Poggio Rotondo</td>
<td>Sassi; Campo Strin; Riva; Cruxe; Suolecà</td>
</tr>
<tr>
<td>Shrubland</td>
<td>P. Ramo; Nassera</td>
<td>Poggio Rotondo; Suolecà</td>
</tr>
<tr>
<td>Woodland - coppice woodland</td>
<td>Grassland on lower land</td>
<td>Suolecà; Terrabuona</td>
</tr>
<tr>
<td>Chestnut (labé - bois)</td>
<td>Fagus sylvatica</td>
<td>Fuetti; M. Fuiti</td>
</tr>
<tr>
<td>Meadow - grassland on lower land</td>
<td>Castagno</td>
<td>Castagno</td>
</tr>
<tr>
<td>Cultivated land - pasture - rough ground</td>
<td>Serè; Seri; Serretti; Pro de Serrin</td>
<td>Plano: land used for pastoral use and secondary vegetation</td>
</tr>
<tr>
<td>Grassland on lower land</td>
<td>Praü</td>
<td>Praü</td>
</tr>
<tr>
<td>Shrubland dominated by rocks</td>
<td>Peete</td>
<td>Peete</td>
</tr>
<tr>
<td>Pasture (Pature)</td>
<td>Cugnu Peuo</td>
<td>Cugnu Peuo</td>
</tr>
<tr>
<td>Cultivated land</td>
<td>Crusa del'orto; Pro de Semin</td>
<td>Crusa del'orto; Pro de Semin</td>
</tr>
<tr>
<td>Rough ground (Terre Vaine)</td>
<td>Pro de Serrin</td>
<td>Pro de Serrin</td>
</tr>
<tr>
<td>Pasture</td>
<td>Peie Riunde</td>
<td>Peie Riunde</td>
</tr>
<tr>
<td>Rough ground (Terre Vaine)</td>
<td>Cugnu Peuo</td>
<td>Cugnu Peuo</td>
</tr>
<tr>
<td>Cultivated land - pasture - rough ground</td>
<td>Fossa; Cugnie; Fusielli</td>
<td>Fossa; Cugnie; Fusielli</td>
</tr>
<tr>
<td>Grassland on lower land</td>
<td>Cugnuë</td>
<td>Cugnuë</td>
</tr>
<tr>
<td>Shrubland dominated by rocks</td>
<td>Peete</td>
<td>Peete</td>
</tr>
<tr>
<td>Pasture (Pature)</td>
<td>Cugnu Peuo</td>
<td>Cugnu Peuo</td>
</tr>
<tr>
<td>Cultivated land</td>
<td>Fossa; Cugnie; Fusielli</td>
<td>Fossa; Cugnie; Fusielli</td>
</tr>
<tr>
<td>Rough ground (Terre Vaine)</td>
<td>Cugnuë</td>
<td>Cugnuë</td>
</tr>
<tr>
<td>Cultivated land - pasture - rough ground</td>
<td>C. della Vigna</td>
<td>Piana dell'orto; Crusa del'orto; Pro de Semin</td>
</tr>
<tr>
<td>Grassland on lower land</td>
<td>Suolecà</td>
<td>Terrabuona</td>
</tr>
<tr>
<td>Woodland</td>
<td>L'Alpesello</td>
<td>L'Alpisella</td>
</tr>
<tr>
<td>Vineyard</td>
<td>P. gio Rondino</td>
<td>Font.na Campostrino</td>
</tr>
<tr>
<td>Meadow</td>
<td>Poggio Rotondo</td>
<td>Sassi; Campo Strin; Riva; Cruxe; Suolecà</td>
</tr>
<tr>
<td>Shrubland</td>
<td>P. Ramo; Nassera</td>
<td>Poggio Rotondo; Suolecà</td>
</tr>
<tr>
<td>Woodland - coppice woodland</td>
<td>Grassland on lower land</td>
<td>Suolecà; Terrabuona</td>
</tr>
<tr>
<td>Chestnut (labé - bois)</td>
<td>Fagus sylvatica</td>
<td>Fuetti; M. Fuiti</td>
</tr>
<tr>
<td>Meadow - grassland on lower land</td>
<td>Castagno</td>
<td>Castagno</td>
</tr>
</tbody>
</table>
Ronco

Pasture – Woodland – Rough
ground (Patures – Bois – Vaine)

Rough ground (Terre Vaine)

Fallow land – Woodland (Friche –
Boi)

Scabiun

Piese Lunghe

Runchurie

1937)

R. del Scabione (1902,
1937)

Secondary vegetation
– High woodland

Secondary vegetation

High woodland

Secondary vegetation

High woodland

Grassland on lower
land

Woodland – Pasture (Bois –
Pature)

High woodland –

Coppice woodland

Cultivated land – Woodland
(Terre labé – Boi)

grassland on higher
altitude

Cultivated land – Fallow land –
Woodland (Labé – Friche – Bois)

Stassiun

Woodland – Pasture (Bois –

Grassland on lower

C.ne del Pra (1902,
1937, 1970)

Lavaggio

Pature)

land

Casone (1937)

Middle woodland
(Cerreti)

Rough ground – cultivated land

Funtaniela

Pro di Berti

Cultivated land – Pasture –
Woodland (Labé – Pature – Bois)

(Terre Vaine - Terre Labe)

Ronchetta

R. del Scabione (1902,

____________________________________________________________________________________________________ LAND ABANDONMENT AND ITS IMPACT

Ronco: Ronchetta; Runco; Runchurie; Ronco; Runcu du
Gallu; Rungurie
Scabia (woodland): Scabiun; Scabiassa; Scaiun; Scabiaiela

Rural practice
-

Infrastructural sources
Mill: Molino
Housing: Della Campo Ca; C.ne del Pra; Casette
Rest place: Stassiun
Important infrastructure: Prigione; Castello di Carrega
Roads: Sentie
Water (or an irrigated or provided by water point for animals)
Lavaggio; Fontanetta; Püssü; Fontanin; Pussai; Funtaniele; Pusette;
Fontana Cavanna; Fontane; Funtaniela

Familyname
Cavanna; Sampa; Molino Galli; Molino del Bestia; Ratta; Campu
Preve; Molino di Berti; Casun di Castagnin; Casun di Pagnocche;

113


<table>
<thead>
<tr>
<th>Location</th>
<th>Land Use</th>
<th>Vegetation Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casun di Ravaxin</td>
<td>Cultivated land - pasture (Terre)</td>
<td>Le Canniele; Custua; Nuo-Cebieca; Rutte; Braia; Vaxeline; Peguea; Piassum; Pussixun; Lania; Carmo; P. di Braghe; Pian Mu in; Felue; Scaüa; Arxi; Spietà; Caxinin; Ruei; Lùbbie; Pianne da Bassu; Pianne Reixedes; Pian di Sbeivi; Satu; Riun du Groppu; Pian di Scaie; Sugou; Da Pui e Seivre; Dötta; I Sue; Sgarbiela; Damiesu, Forca, Fussaie; Ciuella; Scagne Lietti; Fraschelé; Ruexiela; Piassu; Zerbi; Piassu; Descu; Furnaccrie; Vaie; Priamua; Ca Rutta; Cugnu Grállu; Valette.</td>
</tr>
<tr>
<td>Crosa di Prieli</td>
<td>Cultivated land - pasture (Terre)</td>
<td>Le Canniele; Custua; Nuo-Cebieca; Rutte; Braia; Vaxeline; Peguea; Piassum; Pussixun; Lania; Carmo; P. di Braghe; Pian Mu in; Felue; Scaüa; Scaüa; Arxi; Spietà; Caxinin; Ruei; Lùbbie; Pianne da Bassu; Pianne Reixedes; Pian di Sbeivi; Satu; Riun du Groppu; Pian di Scaie; Sugou; Da Pui e Seivre; Dötta; I Sue; Sgarbiela; Damiesu, Forca, Fussaie; Ciuella; Scagne Lietti; Fraschelé; Ruexiela; Piassu; Zerbi; Piassu; Descu; Furnaccrie; Vaie; Priamua; Ca Rutta; Cugnu Grállu; Valette.</td>
</tr>
<tr>
<td>Pro du Preve</td>
<td>Cultivated land - pasture (Terre)</td>
<td>Le Canniele; Custua; Nuo-Cebieca; Rutte; Braia; Vaxeline; Peguea; Piassum; Pussixun; Lania; Carmo; P. di Braghe; Pian Mu in; Felue; Scaüa; Arxi; Spietà; Caxinin; Ruei; Lùbbie; Pianne da Bassu; Pianne Reixedes; Pian di Sbeivi; Satu; Riun du Groppu; Pian di Scaie; Sugou; Da Pui e Seivre; Dötta; I Sue; Sgarbiela; Damiesu, Forca, Fussaie; Ciuella; Scagne Lietti; Fraschelé; Ruexiela; Piassu; Zerbi; Piassu; Descu; Furnaccrie; Vaie; Priamua; Ca Rutta; Cugnu Grállu; Valette.</td>
</tr>
<tr>
<td>Pro di Berti</td>
<td>Cultivated land - pasture (Terre)</td>
<td>Le Canniele; Custua; Nuo-Cebieca; Rutte; Braia; Vaxeline; Peguea; Piassum; Pussixun; Lania; Carmo; P. di Braghe; Pian Mu in; Felue; Scaüa; Arxi; Spietà; Caxinin; Ruei; Lùbbie; Pianne da Bassu; Pianne Reixedes; Pian di Sbeivi; Satu; Riun du Groppu; Pian di Scaie; Sugou; Da Pui e Seivre; Dötta; I Sue; Sgarbiela; Damiesu, Forca, Fussaie; Ciuella; Scagne Lietti; Fraschelé; Ruexiela; Piassu; Zerbi; Piassu; Descu; Furnaccrie; Vaie; Priamua; Ca Rutta; Cugnu Grállu; Valette.</td>
</tr>
</tbody>
</table>

**Legend:**
- *Cultivated land - pasture (Terre)*
- *Fallow land (Friche)*
- *Pasture (Friche)*
- *Middle woodland (Cerreti)*
4.2 Case study 2: Figino

The second case study of Figino is located in the middle high parts of the Val Borbera. The area is characterized by a wide riverbed surrounded by soft slopes of fertile grounds which come from the further located mountains. The soft slopes are currently occupied by grasslands, mixed with woodlands further away from the village (Figure 2.5). But was this landscape always mainly characterised to those two land covers? Or was the landscape of the past a representation of a different, more heterogeneous socio-economic situation?

4.2.1 Landscape character for 3 time periods

Landscape of the 19th century

Until the end of the 19th century, the dominant land covers were cultivated land with more than 38% and shrubland and plantations, covering another 35% of the area. But, like in the case study of Carrega, it is important to have a look at the different subcategories to fully understand the landscape patterns (see attachment 3, A & B; attachment 5, A & B) (Table 4.4).

The woodland in the 19th century consisted mostly out of coppice woodland (+/-10%), while the other categories of woodland are rather absent with less than 1%. During the field survey, a mixture of leaf trees was detected with no dominant tree type apart from the beech (Fagus sylvatica) in the higher positioned area. Those beech coppices are situated on the north eastern part of the case study area. Other coppices are more closely situated to the village and are mixed with the chestnut plantations. These coppices are situated on blocky fields on hilly to very steep slopes and were used for both wood production and grazing.

---

Figure 4.20: Representation of chestnut plantations at the toponym Bosco Grande in the 19th century on three different sources: (A) Minute di Campagna (1828), (B) Gran Carta Stati Sardi (1852)
The chestnut plantations cover around 20% of the total land cover in this century (Figure 4.10). As was the case for Carrega, the chestnut plants were primarily used for fruit production, but also for wood and even for grazing. They are located in the north-eastern part of the mapped area, on the northern slope of ‘Pian delle Melighe’, towards the confluent ‘Albirola’. Their field structure are mostly blocky parcels, sometimes interrupted by strip parcels with cultivations. The hillslope runs from hilly to very steep, and terraces were constructed on the most steep areas (Figure 4.11 at toponym Piasri).

![Image of hillslope, recent land register, and representation of terraces through hillslope at the toponym Piasri (Based on: Digital Terrain Model – 10m, ARPA Region of Piedmonte)](image)

The grasslands show a strange shift in the 19th century. While there is an abundant land cover of grasslands with a grazing function in 1828, those grasslands disappeared in 1852. The interpretation of the grasslands in 1828 was done based on the symbol ‘Pi’, which means ‘pascoli’ or meadow. They are situated along the edge and on the southern slope of ‘Pian delle melighe’. In 1852, the same area was mapped as ‘Go’ or ‘gerbido’, known as ‘rough land’ that is also used for grazing activities. It is clear is that the area was used for grazing activities, but the
Land cover was probably a mixture of grasses, small shrubs or plants. Probably no grassland is known on the upper lands of the mountains as is the case in Carrega with Monte Carmo. Moreover, the area contains strip fields which are parallel with the hillslope and are located on slightly flat and flat areas.

**Table 4.17: Evolution of Land Cover of Figino (1828-2014)**

<table>
<thead>
<tr>
<th>(Sub)categories of Land Cover</th>
<th>1828</th>
<th>1852</th>
<th>1959</th>
<th>1980</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WOODLAND</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary vegetation</td>
<td>0,22%</td>
<td>0,68%</td>
<td>2,84%</td>
<td>4,48%</td>
<td>12,21%</td>
</tr>
<tr>
<td>Coppice woodland</td>
<td>11,27%</td>
<td>10,74%</td>
<td>11,06%</td>
<td>0,00%</td>
<td>0,00%</td>
</tr>
<tr>
<td>Middle woodland</td>
<td>0,56%</td>
<td>0,43%</td>
<td>0,43%</td>
<td>48,26%</td>
<td>46,23%</td>
</tr>
<tr>
<td>High woodland (fagus)</td>
<td>0,00%</td>
<td>0,00%</td>
<td>0,02%</td>
<td>0,00%</td>
<td>0,00%</td>
</tr>
<tr>
<td>Pine woodland</td>
<td>0,00%</td>
<td>0,00%</td>
<td>0,00%</td>
<td>2,26%</td>
<td>8,36%</td>
</tr>
<tr>
<td><strong>PLANTATION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chestnut plantations</td>
<td>22,70%</td>
<td>18,00%</td>
<td>26,36%</td>
<td>0,14%</td>
<td>0,12%</td>
</tr>
<tr>
<td>Fruit plantations</td>
<td>0,00%</td>
<td>0,00%</td>
<td>0,00%</td>
<td>0,14%</td>
<td>0,12%</td>
</tr>
<tr>
<td><strong>GRASSLAND</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grasslands on high altitudes</td>
<td>10,61%</td>
<td>0,00%</td>
<td>9,17%</td>
<td>22,62%</td>
<td>19,11%</td>
</tr>
<tr>
<td>Grasslands on low altitudes</td>
<td>0,00%</td>
<td>0,00%</td>
<td>9,16%</td>
<td>22,62%</td>
<td>19,11%</td>
</tr>
<tr>
<td><strong>SHRUBLAND</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rough ground</td>
<td>11,21%</td>
<td>26,81%</td>
<td>19,20%</td>
<td>9,02%</td>
<td>5,57%</td>
</tr>
<tr>
<td>Bushland</td>
<td>0,00%</td>
<td>0,00%</td>
<td>1,15%</td>
<td>1,65%</td>
<td>0,00%</td>
</tr>
<tr>
<td><strong>NON COVERED</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non covered substrate</td>
<td>0,00%</td>
<td>0,00%</td>
<td>0,00%</td>
<td>0,00%</td>
<td>0,02%</td>
</tr>
<tr>
<td><strong>CULTIVATED LAND</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horticulture</td>
<td>0,00%</td>
<td>0,00%</td>
<td>0,29%</td>
<td>0,41%</td>
<td>0,62%</td>
</tr>
<tr>
<td>Arable land</td>
<td>12,07%</td>
<td>8,36%</td>
<td>22,14%</td>
<td>6,47%</td>
<td>1,39%</td>
</tr>
<tr>
<td>Vineyard</td>
<td>26,32%</td>
<td>29,96%</td>
<td>1,33%</td>
<td>0,69%</td>
<td>0,80%</td>
</tr>
<tr>
<td>Beans</td>
<td>0,02%</td>
<td>0,00%</td>
<td>2,22%</td>
<td>0,66%</td>
<td>0,14%</td>
</tr>
</tbody>
</table>
For the same reason as explained before, the shrubland is especially present in 1852 (Figure 4.12). This land, dominated by rocks and characterized by non-fertile grounds, was used for grazing activities for the cattle. This type of shrubland is mapped in both historical maps as ‘Go’ or ‘g’, meaning ‘gerbido’. It is located on the southern slope of ‘Valle della Croce’ and ‘Pian delle Melighe’, and includes flat to hilly slopes.

The cultivated land is the most dominant land cover in the 19th century because of the large amount of vineyards. This is a peculiarity because the Val Borbera in general did not have so much vineyards at that time, like in the area of Albera and Figino (Figure 4.13). The vineyards are all located between the villages of Figino and Vigo on one side and the Borbera river on the other, mainly on the less steep western slopes. Another dominant type of cultivated land is the arable land. Those cultivations are all situated in the infield around the village and mostly below and around the irrigation system ‘bego’ (see 2.2.1). The field structure of both vineyards and arable land is a mixture of strip fields parallel with the slope and blocky fields, all including small earth terraces and hedgerows and treelines.
Landscape of the 20th Century

Time periods 1936 and 1980 (see attachment 3, C & D; attachment 5, C & D) are described to get an understanding of the landscape of the 20th century.

The woodland changed extremely in the 20 years between 1959 and 1980. In 1959, the woodland obtains around 14% of the whole case study and is dominated by coppices. Like in Carrega Ligure, they were mostly used for both wood production and grazing.

In 1980, the whole woodland coverage took more than 50% of the whole area, containing mostly middle high, and pine woodland and an increasing amount of secondary vegetation. The explanation of the dominance of middle woodland lies in the change of categories and not in the exponential growth of the vegetation. The former coppices, mapped as such until 1959, became largely invaded by new and young species of trees. This aspect, together with the decline in maintenance of the rural coppice technique, made the land cover change to middle woodland. This was also the case for the former chestnut plantations, which were situated in 1959 from the river Albirola towards the northern slope of Plan delle Melighe, toponym ‘Bosco Grande’ (Figure 4.14). Without maintaining them, these chestnut plantations got invaded by other species and became categorized largely as middle woodland. They were divided into blocky parcels on this hilly to very steep slope, where terraces were constructed in the past.

Figure 4.23: Representation of the cultivated land and mostly vineyards between Vigo and Figino, and Albera Ligure on three different sources: (a) Minute di Campagna (1828), (b) Gran Carta Statì Sardi (1852)
This categorisation during the mapping explains the dominance of middle woodland in 1980, located on the hilly to very steep northern slope of Pian delle Melighe and a part of the flat to hilly southern slope, on the former shrubland. This ‘newly’ middle woodland and the pine woodland were only used for wood production. The southern slope of Pian delle Melighe was also taken by pine woodlands which were planted in the 1950s for wood production. The large and growing area of secondary vegetation had no specific function.

The grasslands in the 20th century did increase largely. In 1959 they were located around the village of Albera, mixed with some middle woodland in the northern part, and above the villages on the less steep slopes towards Pian delle Melighe. In 1980 they covered almost all the slopes between Figino and Vigo, the Borbera river and the unwooded areas above the villages. They were located on flat to hilly slopes and structured in strip fields parallel with the slope, which were formerly used for cultivation. The areas are only used for hay production from the 1980s onwards.

The shrublands decreased with 10%, mostly due to the decrease in rough land, which are invaded by the secondary vegetation and middle woodland, and the plantation of the pine woodland. They are located on the flat to hilly southern slope of Pian delle Melighe and contain mostly blocky fields.
A decrease of cultivated land is largely noticeable in the 20th century (Figure 4.15). In 1959, the general decline is due to the large decrease of vineyards in comparison with the 19th century. In addition, the arable land largely disappeared in 1980. While the vineyards were the most dominant type of cultivation in the 19th century, arable land became more dominant in the 20th century, even if this subcategory is also decreasing. The aerial photographs of the 20th century are the first where another type of cultivation can be recognized, e.g., the cultivation of the typical white beans of Figino, all located close to the village and below the irrigation system, the ‘bego’, so they could fruit the water. The cultivations are located on blocky and strip fields parallel with the flat to hilly slopes, sustained by earth terraces and sustained by treelines and hedgerows.

**Landscape of today**

In the last time phase (see attachment 3, E; attachment 5, E), the woodland is clearly dominant (66%), followed by the grassland (19%). While the first has the maximum percentage through time, the last is again, after a peak in the 1980s, in decline.

Today, the case study is for more than 66% covered by woodland, with a large portion of middle woodland, secondary vegetation and pine woodland. The middle woodland is stable since the end of the 20th century, but the amount of secondary vegetation increased exponentially. The remaining function of this woodland is wood production. A second pine woodland was planted in 1970s on the flat to hilly southern slope of Pian delle Melighe.
The chestnut plantations of the northern steep slope of Plan delle Melighe disappeared completely. The only plantations that are left are a few fruit plantations, combined by grasslands and vineyards, all located close to the village or in the western direction on the less steep slopes of former cultivations. They are used privately and were mostly detected by the field survey.

The grasslands remain permanent on their former locations, even if they slightly decreased. Taking the road from Albera to Figino, the first slopes are covered with grasslands, divided by treelines, hedgerow, and small earth taluds. The secondary vegetation is located where the land is not used for cultivations or hay production. Some small ancient vineyards and/or fruit plants (mostly peaches) are found between the grasslands that were used for hay production. Closer to the village, the parcels are used for cultivation of wheat and the local species of white beans (fagiolane di Figino) (Figure 4.16). Within the village, the vegetable gardens form a large part of the cultivated land. The arable land decreased in comparison with 1980. The cultivations are concentrated in the area of the irrigation canal ‘bego’. The bean production fields are situated beneath the upper part of the canal and next to the secondary canals who lead towards the river, in western direction. The whole area of former cultivations and current grassland is located on flat to slightly flat slopes, with small earth taluds or terraces to flatten the slope. The field structure is dominated by strip fields parallel to the slope (Figure 4.17).
Also the rough land became invaded by secondary vegetation. All the rough grounds located on the southern hilly slope of Pian delle Melighe became invaded by invasive species and changed, probably with an intermediate phase of bushland, to land dominated by secondary vegetation.

### 4.2.2 Toponyms – Oral History

In the case study of Figino, several toponyms were recovered based on historical maps, the Napoleonic land register (Figure 4.18), the land register of 1950 and the local knowledge collected through informal and formal interviews. Hereby, some of the toponyms are described into detail, since the land use as was described in the land register, helped to understand the land use of the beginning of the 20th century, and also the significance of the toponym itself.
The toponyms _ronco_ and _ronchi_ refer to the practices of a temporary agriculture, with the use of fire (4.1.2). The _scabbia_ toponym was not found in this area, probably because this type of coppice woodland, with a production of charcoal and contemporary animal production, was not present in the lower part of the Val Borbera.

The slope between Figino and Albera is formed through three large ‘stairs’, each with their slightly ondulating plane. Starting from Albera, the first ‘step’ is called _Ronchetti_. The second step, with the central plane, is called _Le Moglie_, very well adapted for the cultivation of the white beans. And the third step forms the plane beneath the village, also especially used for the production of the white beans.

_Le Moglie_ and _La Boffalora_ are plane areas where the fields are very narrow parallel to the slope. The plane was perfectly organised for the plantation of white beans or for wine production. As is confirmed by the land cover during 1828 and 1852 (Figure 4.19).
The evolution of *Pian del Té* is rather interesting (Figure 4.20), since the toponym found on the historical maps of 1828 (Minute di Campagna) and 1852 (Stati Sardi) was different (Table 4.5), namely *Pra di Cè*, referring to a meadow (Pra). This can confirm the multiple use of the agro-silvo-pastoral system at Figino. The vineyards seem very dominant in the 19th century landscape, but were probably mixed with other land covers (such as cultivations, woodland, etc.) and uses (fruit production, grazing, wood production). During the construction of different maps, the toponym changed. Nonetheless, the presence of vineyards in the middle high parts of the Borbera valley is confirmed. Today, the land use does not seem to have any remembrance of these vineyards, but in the shrublands and secondary vegetation zones, wild vines are present. Last summer (2016), the young farmer planted a new vineyard on the *Pian del Té*, also driven by the elder people of the village who remembered that the grape production of that locality was very suitable for a good wine. The area is not situated in southern direction, but has, because of its morphology, a warm and wind protected micro-climate. Future will tell us if the local farmers were right or not...
Figure 4.30: View on the toponym Pian del Té through time (A) 1828; (B) 1852; (C) 1936; (D) 1980; (E) 2014
<table>
<thead>
<tr>
<th>Toponym as collected on maps</th>
<th>Recent land use (CGEA)</th>
<th>Land cover and Register</th>
<th>Toponyms as collected in maps</th>
<th>Examples of toponyms and meaning as collected from local sources and land register 1950</th>
</tr>
</thead>
</table>

**TABLE 4.18: OVERVIEW OF TOPONOMS OF FIGNO**

**Family Name**
- C. Spinola
  - C. Boffalora (1877-1935)

**Toponyms as collected from local sources and land register 1950**

<table>
<thead>
<tr>
<th>Toponym</th>
<th>1950 Land Register</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bosco grande</td>
<td>-</td>
</tr>
<tr>
<td>Plane: Pian delle Melighe</td>
<td>-</td>
</tr>
<tr>
<td>Plane: Pian del Te</td>
<td>-</td>
</tr>
<tr>
<td>Plane: Viale della Longa</td>
<td>-</td>
</tr>
<tr>
<td>Plane: Costalunga</td>
<td>-</td>
</tr>
<tr>
<td>Plane: Castel frutto</td>
<td>-</td>
</tr>
<tr>
<td>Plane: Pascolo</td>
<td>-</td>
</tr>
<tr>
<td>Plane: Pascolo cespugliato</td>
<td>-</td>
</tr>
<tr>
<td>Boschi di latifoglie</td>
<td>-</td>
</tr>
<tr>
<td>Boschi di latifoglie</td>
<td>-</td>
</tr>
</tbody>
</table>

**Rural practice**
- Ronco: Ronchi Castel frutto - Pascolo cespugliato - Castel frutto - Pascolo cespugliato

**Roads**
- Il Canale (1935-1959-1979)

**Geography**
- Cocee: Viale della Longa
- Vial: Viale della Longa
- Plan: Plane della Melighe
- Plan: Plane della Melighe

**Land use**
- Woodland: Bosco
- Woodland: Bosco

**Recent land use (CGEA)**
- Recent land use (CGEA)
- Recent land use (CGEA)
<table>
<thead>
<tr>
<th>AREE SEMINABILI</th>
<th>MANUFATTI</th>
<th>Aree ricreative e sportive</th>
<th>VITE</th>
<th>BOSCHI</th>
<th>latifoglie</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viszela</td>
<td>Seminativo - Vigneto</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Magnana</td>
<td>Seminativo</td>
<td>-</td>
<td>Semin irrig</td>
<td>Cast frutto</td>
<td>-</td>
</tr>
<tr>
<td>Scagni</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Castello di Figino</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Pian del té</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Valersa</td>
<td>Incolto</td>
<td>-</td>
<td>Cast frutto</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sgaie</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Boesso</td>
<td>Seminativo</td>
<td>-</td>
<td>Bosco ceduo</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Piasri</td>
<td>Cast frutto</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cipale</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Resga</td>
<td>Cast frutto</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Magnana</td>
<td>Seminativo</td>
<td>-</td>
<td>Semin irrig</td>
<td>Vigneto</td>
<td>-</td>
</tr>
<tr>
<td>Braiassa</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ciapin</td>
<td>Seminativo</td>
<td>-</td>
<td>Bosco ceduo</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Visuela</td>
<td>Seminativo - Vigneto</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Visuela</td>
<td>Seminativo</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Visuela</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C. Del Gian (1852); C. Croce (1877); C. Della Croce (1935)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C. Capellari</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C. Della Costa (1935)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C. Della Chiesa (1852 - 1935); C. Della Chiesa (1959)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C. Del Gian (1852); C. Croce (1877); C. Della Croce</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Latifoglie</td>
<td>SE MINIERI - Boschi di latifoglie e arbustivi in evoluzione</td>
<td>Zerbasso, Pasc cespuglio - seminativo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>----------------------------------------------------------</td>
<td>-------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Mombanbasso, Pasc cespuglio (TARA 50%) | Boschi - bosco caduto - cast |"
4.3 Indicators for Land Abandonment

The level of abandonment, as diagnostic attribute, is based on the combination of the mapping of the subcategories together with the differentiating and descriptive attributes (see Chapter 3). The combination of the level of abandonment with the land cover, its function and use, the hillslope, field structure, presence of terraces and small landscape elements, gives a comprehensive overview of how and where the abandonment started and how it evolved.

This level of abandonment was constructed for every time phase. Figure 4.21 shows for both Carrega and Figino that the landscape of the past was completely used, mostly in an intensive, but also an extensive way. Through time, a large decline of intensive land use happened in both cases, especially in the 20th century. In the same time period, the extensive use of the land grew exponentially. The difference between the cases lies in the evolution at the end of the 20th and beginning of 21st century. The landscape of Carrega (Figure 4.22) got more abandoned and both the extensive as intensive land use systems completely collapsed. In the current situation, the abandonment transcended almost all extensive use. The case of Figino (Figure 4.23) still remains largely used on an extensive way. The level of abandonment excluded the intensive land use but did not transcend the extensive use. However, the abandonment process is still increasing, but slower than the second half of the 20th century. The largest difference of the landscape changes of both cases lies in the last decades. While the land abandonment for Carrega Ligure is complete and exponential, the land abandonment of Figino apparently reaches a peak at the end of the 20th century and is now even slightly reducing. In the latter case, the land abandonment never completely invaded the landscape.

Figure 4.31: Evolution of Abandonment in the Two Case Studies
But what land covers were first abandoned? And how did this shift to more extensive land use happen?

4.3.1 INTENSIVE USE, NO ABANDONMENT

The landscape of the 19th century was largely used in an intensive way, 77.61% in Carrega, almost 90% in Figino. The intensive land contained especially the cultivated land (Carrega 31.83%; Figino 38.30% in 1828) but also the coppice (both the small as the high ones) woodland that was used for both wood production and grazing. In Carrega, the intensive use of the grasslands used for hay production and grazing of the livestock (14.68%) was rather important. In Figino, the intensive use for the chestnut plantations also included the production of fruits, in addition to the production of wood and the overall function of grazing.

In the 20th century a decrease could be noticed from a high (Carrega 66.74%; Figino 68.74%) to a less (Carrega 21.31%; Figino 13.13%) intensively used landscape. The cultivations remained intensively used, but the multiple functions of the grasslands with both hay production and grazing of cattle disappeared. In the case for the chestnut plantations and the coppice woodlands, the wood production was combined with grazing and/or the production of chestnuts. The chestnuts remained in use, but only concentrated on the production of their fruits, while the coppices became only useful for wood production.

The landscape of today does not have any intensively used areas in Carrega, a part from some private vegetable gardens. In Figino, only the cultivated land (vineyards, beans, wheat) is used intensively.

4.3.2 EXTENSIVE USE, SMALL LEVEL OF ABANDONMENT

In the 19th century, the only extensively used land cover monofunctionally used as grazing land was the shrubland. In Carrega, the steepest slopes on the part of Monte Colletto and Monte Carmo were extensively used and grazed by small livestock as goats and sheep, since these animals had less difficulties with similar areas. In Figino, it contained the southern slope of Pian delle Melighe. There is some difference in the interpretation of the historical maps between 1828 and 1852, but both symbology corresponds with the use of the land as grazing area, which is categorised as an extensive use.

In the 20th century, the extensive use of the land increased exponentially. This is related to the large areas of former chestnut plantations, coppices and grasslands, all losing their multiple functionality. Some functions also even completely disappeared, especially the combination of
Figure 4.32: Sequence of level of abandonment on hillslope for Carrega (a) 1828, (b) 1852, (c) 1936, (d) 1980, (e) 2014 (source: DTM – 10m, Region of Piedmont)
The landscape of today has 36,53% of its territory used in an extensive way in Carrega. In Figino, the landscape is managed for 73,66% on an extensive way. They include grasslands with grazing activities (not in Figino), grasslands with hay production activities, woodland used for wood production and the high coppices for wood production and grazing.

4.3.3 No use, complete abandonment

The landscape of the 19th century was completely in use, so this situation is absent in that time period.

In the 20th century, the chestnut plantations went completely in abandonment after the 1980s, especially the ones further away from the villages. In Carrega it happened first in the north eastern part of the case study, which is a chestnut plantation that belongs to Cartasegna, a village on the northern flank of Monte Colletto. The increase of secondary vegetation and middle woodland, especially on steep and very steep areas, increased also the amount of land which did not have any function or use, and was completely abandoned. In Figino it happened with the abandonment of the former shrubland on the southern slope of Pian delle Melighe, and on the middle woodlands and secondary vegetation that started to invade cultivated areas.

Today, more than 60% of the territory of Carrega completely abandoned. Especially the decrease of cultivated land and the increase of the dominant land covers of secondary vegetation and middle woodland are related with the abandonment. Figino is less completely abandoned, but an increase of abandonment of the cultivated areas is noticeable. Another indicator is the disappearance of the water mills which became ruins through time. Some completely disappeared and were only found on the historical maps of 1828 and 1852.

4.3.4 Indicators

Land cover and Use

Clearly, the presence of secondary vegetation is a direct indicator of land abandonment and is the first land cover to invade and change the former landscape. It contains a mixture of post-cultural vegetation, shrub and forests of neo-formation (Geranio nodosi-Laburnetum alpine ass. Nova) (Castelli et al., 2001). This is the same for the middle woodland. Also the bushland
increased through time as an indicator of the land abandonment, being the first areas that were not maintained anymore.

Figure 4.33: Sequence of level of abandonment on hillslope for Figino (a) 1828, (b) 1852, (c) 1959, (d) 1980, (e) 2014 (source: DTM – 10m, Region of Piedmont).
The reforestation of pine woodlands was executed on large parts of the Apennines when the first signs of abandonment became clear. It was a strategy to use the abandoned fields for wood production on the long term. The current fragmented distribution of *Pinus nigra* probably has been influenced by the impossibility of re-sprouting of these trees and thus their unsuitability for coppice. In both cases, the pine woodlands were installed on the former shrubland, which was already located on southern, less fertile and steep slopes.

The arrival of the grasslands on lower heights since 1980 is largely present in the current landscape and is a clear indicator for abandonment. Currently, the amount of these type of grasslands is almost the same as the higher located grasslands (+/-8%). These meadows, only used for hay production, are also an indicator of the land abandonment, more specifically of the former historical cultivated land. The choice for producing hay closer to the village and in easily positioned areas with less hillslope is related with the abandonment of land.

**Hillslope, Field Structure and Small Landscape Elements**

When analysing the hillslope in relation to abandonment, it becomes clear that generally the flat areas remain used intensively, though in decline. The slightly flat or hilly areas undergo a shift from an intensive use towards an extensive use, with an increase of completely abandoned areas, especially the hillier the area becomes. The steep areas, which were not abandoned either until the end of the 19th century, are not used anymore in an intensive way from the second half of the 20th century. Some steep areas are still used extensively, but they form a large minority. The ones who are still used might have terraces to flatten the slope (southern slope Pian delle Melighe – Figino) or are particularly interesting for cattle (steep areas in the nearby of the meadows – Carrega).

In Carrega, the blocky fields and the strip fields perpendicular to the slope used as grasslands changed first from an intensive to an extensive use. The strip fields parallel to the slope had a slight decrease in percentage during the 20th century, but were still less abandoned. The hilly, but especially the steep and very steep areas changed drastically from an intensive to an extensive use of the land.

In Figino, the largest part of the area is divided into strip fields parallel with the slope (16,95%) or blocky fields (75,61%).

The first fields to be abandoned were the blocky fields with the chestnut plantations, located on steep to very steep slopes (northern slope of Pian delle Melighe), even with terraces. Their shift from intensive to extensive use started at the end of the 19th century. Also the areas of shrubland were one of the first to be abandoned. Their location on hilly to steep slopes that
were difficulty to reach and the orientation towards the south explains why they were already used extensively in the 19th century. Subsequently, the extensification process started on the strip fields after the second world war. At the end of the 20th century, almost all the types of fields were used extensively, a part from some strip fields with cultivations, parallel to the slope. The extensification process is continuing today in the steeper areas between the flat and slightly flat areas. Currently, the amount of extensively used blocky fields is higher in comparison with the complete abandoned ones, more than in the case of the strip fields. This can be explained by the complete abandonment of the arable land on strip fields, while the woodland on blocky fields is still partly used for wood production or grazing. The current landscape is still largely in use on an extensive way, a part from some very steep slopes of non-covered substrate with nude, not-cultivated land, along the river basin.

**New initiatives**

But there are also indicators for other processes than land abandonment. New initiatives and small landscape changes are detected in the last phase of the landscape. In Carrega Ligure there was the new hydro-electric installation of the Crosetti family, in the canyon beneath the village of Connio. Recently, two other hydro-electric installations are installed in the Val Borbera, one at the ‘mulino del Pio’, in the extreme north-western angle of the case study, and one at the former Mulino dei Gatti, close to the village of Connio. The installation of the first is made by the small energetic company Sun Energy, of which the major of Rocchetta Ligure (a village in Val Borbera) is the owner. The idea behind the central, apart from the energy production, is to present it with a didactic project on the history of the mill and its recovery (source: Quattropagine, anno7, n°2, febbraio 2016). The second installation was organised by the family Crosetti, owners of the land and the local agritourism. The idea behind the installation of small, local hydro-electric plants is to put less pressure on the territory and to avoid large installations as like those exploited by multinationals. Water mills were largely present in the area for the use of hydro-energy and this use is now recuperated.

Another new initiative is the restauration of the old historic vineyards in the municipality of Figino and the plantation of new vineyards on parcels that where historically occupied by vineyards. These vineyards are located on La piana delle Moiette, the Pian del Té and on the slope from Figino towards the river. The land use map of 2014 shows clearly some additional vineyards in comparison with 1980. The initiative comes from a farming couple, originally from outside the valley, which started inventorying the different types of vines, in combination with some ampelographers of the research institute CNR (Consiglio Nazionale delle Ricerche –
Istituto per la Protezione Sostenibile delle Piante). Some of the recovered vineyards are 40 to 70 years old and contain a large variety of local autoctonous types (Nibieu all’Uva Rara, Timorasso, Moscato d’Amburgo, Barbera, Sangiovese).
### 4.4 Major Transformations

After the description of the landscape changes through time, it is important to grasp the evolution and the largest trends through time, to get a good understanding of the spatial character of the landscape. Looking at figure 4.24 of the evolution of the main land covers in both case studies, five transformations are being detected:

- Exponential growth of woodland
- Decrease of plantations
- Decrease and increase of grassland
- Increase and decrease of shrubland
- Disappearance of cultivated land

![Land cover evolution Carrega Ligure](image1)

![Land cover evolution Figino](image2)

**Figure 4.34: Evolution of Land Cover of Carrega Ligure and Figino**
Based on those 5 main transformations, the general evolution trends of the landscape through time is discussed, taking into consideration the subcategories and all the mapped attributes.

4.4.1 Exponential growth of woodland

Figure 4.25 and tables 4.1 and 4.4 show that different types of woodland, considering secondary vegetation (Carrega 20,14%; Figino 12,21%), coppice woodland (Carrega 5,71%), middle woodland (Carrega 23,09%; Figino 46,23%), high woodland (Carrega 13,10%) and pine woodland (Carrega 2,57%; Figino 8,36%), take a large part of the current landscape, while the same land covers take only 27,16% of the surface in 1828 in Carrega, and 12,06% in Figino. This large increase of woodland during the last 200 years, but especially from the second half of the 20th century onwards, is mostly due to the increase of secondary vegetation (Carrega 2,06%; Figino 0,22% in 1828) and middle woodland (Carrega 6,17%; Figino 0,56% in 1828) and the introduction of the pine woodlands in the area. Through time, the amount of middle woodland increased, mainly because of the abandoned coppice woodland that transformed more and more into middle woodlands, even if there are still traces of the coppice management. The middle woodland is the only type of woodland that largely declined, and even disappeared. Even though the woodland itself did not disappear, the rural technique of coppice management were not practiced anymore and disappeared. The general increase of woodland went also in favour of the decrease of other land covers as grasslands, shrubland and cultivated land.

![Carrega vs. Figino](image)

**Figure 4.35: Evolution of Woodland of Carrega Ligure versus Figino**

The first time phase where the different types of woodland cover was clearly recognized, was on the aerial photographs of 1936 for Carrega and 1959 for Figino. The coppice woodland (Carrega 12,04%; Figino 11,27%) and the high (coppice) woodland in Carrega (13,10%) took the
The largest amount of the wooded cover. Even considering the smaller details of the historic maps, we can see a higher coverage of high woodland in the 19th century than in the beginning of the 20th century. Especially in Carrega, a decrease of both coppice and high woodland is noticeable during and after the first World War (1915-1918 in Italy). This corresponds with the kick-off of the industrialization and modernization, the first world war and the large amount of organic fuel (wood) that was needed to feed the necessary machinery (Leardi, 1997). 1936 was probably the most ‘naked’ time phase considering forest coverage. After the cutting phase, the coppices continued decreasing in percentage, while the secondary vegetation and middle woodland started invading the area. These transformations are interrelated. The coppice woodland is a type of woodland that needs a continuous maintenance and was historically included in the rural practices of the area. When the large abandonment started and the area depopulated, the maintenance of the coppiced woodland got into decline. This meant an easy and fast invasion of secondary and invading species, which transformed them into middle high woodland. The expansion of the high woodland in the second half of the 20th century is also related with the decrease of livestock during the same time period (Leardi, 1997).

4.4.2 Decrease of plantations

Another land cover that was covered by secondary vegetation and transformed into middle woodland were the plantations (see Figure 4.26). The chestnut plants were historically maintained in an intensive way, like any other part of the rural landscape, but got largely abandoned between 1936 and 1980 in Carrega and from 1959 in Figino. The same story happened as with the coppices, they became invaded by other species, and were therefore mapped first as coppice woodland since their lasting function of wood production and later as middle woodland from the 1980s onwards. They were abandoned in a later phase than the coppices since the chestnut plants were mostly used for fruit production, which was a rural practice that survived slightly longer. In Carrega, the former chestnut plantations remained categorized as coppice, since the difference with the other coppice woodland that transformed into middle woodland is large. The amount of chestnut plantations was much larger in Figino and they all changed rather homogeneously into middle woodland through time.
**Figure 4.36: Evolution of plantations of Carrega Ligure versus Figino**

### 4.4.3 Decrease and Increase of Grasslands

In Carrega the amount of grasslands seems to have remained stable through time (around 15% - Figure 4.27), but when looking at the types of grasslands, a landscape transformation is clearly visible. Until 1980, no other grasslands than those located above 1200 masl, like the historic permanent grasslands around Monte Carmo, were recognized. From the second half of the 20th century onwards, a shift in types of grasslands was noticed. Today, the total amount of grasslands is equally divided by grasslands on lower and higher altitudes. This means that the permanent upper hill grasslands decreased through time to 8%. The highest amount was detected in 1936, corresponding with the deforestation phase of the high woodland, and in 1828, which might also be a result of the less detail of the historic maps. Analogue with the land abandonment, and visually notable from 1980 onwards, the historical permanent meadows changed slowly into simple grazing fields. The intensity of the land use disappeared into an extensive use.

**Figure 4.37: Evolution of grasslands of Carrega Ligure versus Figino**
The small amount of higher grasslands in Figino completely disappeared in 1852 (Figure 4.27). Grasslands were mapped on the 1828 historical map, but probably it contained a poorly type of shrubland were cattle was brought for grazing. Because of its lower altitude, Figino does not have any higher grasslands. The ‘new’ grasslands, like in the case for Figino, have increased largely. They are positioned on the former cultivated land, but are slightly in decrease.

4.4.4 Increase and decrease of shrubland

Also the shrublands were largely invaded by secondary vegetation. In both cases (Figure 4.28) the rough land was historically positioned on the less fertile grounds, positioned on the southern and steepest slopes, containing a lot of stones and rocks, and little shrubs (Figure 4.29). Those less suitable parts of land were historically used for grazing, but were the first to be abandoned. From 1980 onwards, the large scale land abandonment caused a decline in cattle and therefore affected also the rough land, which made them shift to bushland (where rough land was still recognizable) or secondary vegetation woodland. Another large part of the shrubland disappeared with the plantation of the pine woodlands (see before) or the invasion of secondary vegetation. The peak of rough land in 1936 (Carrega) and 1852 (Figino) is a result of the wood-cutting policy as explained before, and before the invasion of secondary species.

4.4.5 Disappearance of cultivations

The secondary vegetation started invading mostly the cultivated land (see Figure 4.28). They probably started from hedgerows, treelines, solitary trees or small bushes that were historically installed in the area to delimit the parcels (see figure 4.29). Especially in Carrega, the massive (large quantities) and fast (short time period) abandonment of the cultivated land made it easy
for the invasive species to cover for over 14% more of the territory than in 1936. The cultivations were located on the strip fields parallel to the slope around the village (infield).

**Figure 4.39:** Image of rough land of Monte Colletto and view on the cultivated land with treelines and hedgerows - Carrega Ligure 1950 (Picture taken by: William John Crosetti)

**Figure 4.40:** Evolution of cultivations of Carrega Ligure versus Figino
The decline of the arable land is clearly visible in both cases, from 20 to 30% until non-existing in 200 years (Figure 4.30). As explained before, the arable land changed mostly to grasslands and shifted from an intensive use, e.g. cultivations, to an extensive one, e.g. hay production. Those fields are not completely abandoned, but changed dominantly from an intensive to an extensive use.

In both Figino and Carrega, some private vegetable gardens are still present. The inhabitants garden in the surroundings of their houses and need to fence their land because of the large presence of wild boars and deer who destroy their production.

Figino historically was covered less by arable land but had a large amount of vineyards. This decline in land cover was a consequence of the price decline together with an increase of diseases for the vineyards. People had difficulties to live from viticulture, and most kept some vineyards for private use, but abandoned the large production. A small increase (0,69% to 0,80%) is noticeable in Figino, related with the recovery of old, and plantation of new vineyards by a new local farming family.
4.5 Conclusions

The historical agro-silvo-pastoral system had a large impact on the construction of the cultural landscape for centuries, with the coppice woodlands and chestnut plantations, the large meadows alternated by coppice beech woodland on mountain tops and higher slopes, cultivations on less steep and fertile slopes and shrublands on steep and southern oriented ones. The results of the analysis of the spatial character showed that the landscape of Val Borbera remained quite stable from the end of the 19th century until the first half of the 20th century. But with from the second half of the 20th century, the spatio-temporal changes undertook a large turning point; modernization, industrialization and consequential rural depopulation, led to a progressive abandonment of this mountain landscape with a more complex and intense land cover. The typically rural area underwent a spatial transformation of increasing woodland and secondary vegetation and decreasing coppices, plantations and cultivated land. Fallow land or shrubland and the spread of forests are a direct consequence of the end of the traditional agro-silvo-pastoral system. The speed of landscape transformations is clearly shown by diachronic analysis of photographic archives.

The spatial transformations detected in the two case studies of the Val Borbera, can be led to three main trends:

- From a heterogeneous to a homogeneous landscape
- From multiple to a single use
- From intensification to extensification

Agnoletti (2006) ascribed the decreased landscape diversity to the following main trends:

The advancement of a continuous forest layer covering the former landscape mosaic like a mantle; increased size of fields in agricultural areas and the simplification of the internal structure of landscape patches. In many cases these trends are not sustainable, not only for biodiversity but also for the conservation of landscape resources, not to mention the disappearance of specific woodlands, like chestnut orchards and a wide number of traditional management practices. In the areas where the farmers are still present instead, this tendency can even be inverted, although the internal quality of new landscape patches is not always good. (Agnoletti, 2006)

The spatial analysis and the detection of the spatial landscape character can help us value the historic landscape on a broader scale. Appreciating the landscape’s temporal aspect can assist local authorities and others to set priorities for management and planning for the future (Fairclough, 2006; Crow, 2009). Thus, proposed changes which reinforce the coherence of the historic gain might be encouraged; those that would disrupt or destroy it might be altered or
prevented. The results reveal that this landscape is not uniform but has a complex history that demands to be understood and appreciated. It shows clearly that field systems of diverse types are largely correlated with the land use, the positioning of the village, and the infield-outfield system.

4.5.1 From heterogeneous to homogeneous

The decline in land management had a large impact on the landscape. The abandoned cultivated areas were very sensitive for the expansion of secondary vegetation starting from existing treelines and hedgerow. The reduction of goat and bovine population and the increasingly extensive pastoral resource management allowed the spread of shrubs and recolonization on grasslands and rough lands. The lack of maintenance of the historical coppices changed them easily into mixed, impenetrable middle woodlands. But a part from the invasion of the woodland, grasslands are noticeable in the valley, including both grasslands on higher and lower altitudes. While the first is still used for extensive grazing, the latter is used for the production of hay. The vegetation dynamics are thus producing a more homogeneous environment in which the forest is closing up, except for the remaining or transformed grasslands.

The disappearance of various land covers through time and the dominance of just one, namely woodland, lead to a first conclusion, namely the homogenization of the rural mountain areas.

But this homogenization is not only a process that is present in relation with abandonment. It also is a result of industrialization of areas, of modernization processes and of mono-cultures. Therefore, this process is a result of the world we currently live in, a world in which one activity and purpose of landscapes is largely concentrated in one place, in contrast with the past, when several activities were executed in the same landscape. The cultural landscapes of the Mediterranean were characterised by landscapes with a large variety in land cover. Today, those diverse landscapes are largely transformed into homogeneous landscapes, but the landscape of the past still has its remains.

4.5.2 From multiple to single use

The agro-silvo-pastoral landscape of the Val Borbera had historically a lot of different functions and uses on the same land cover. The high population pressure and the need for subsistence caused a diversified use of nearly the entire landscape. This multiple use of the landscape is characterized by farming activities on the one hand and forestry on the other hand, both being
executed within the same land cover. The historical rural system was based on five different functions: grazing of the cattle; production of hay; cultivations of wheat, potatoes, vegetables, corn, among others; fruit production like chestnuts, hazelnuts, peaches, etc. and wood production. The land cover provided all of these functions, as single or multiple uses.

Until 1936-1959, 40 to 50% of the landscape had a multiple (grazing in combination with hay production, wood production and/or fruit production). The grazing activities were largely present over the whole territory, using woodland, shrubland, grassland and even plantations, and always in combination with another function. Only the arable land was only reserved for cultivations. The wood production in combination with grazing, together with the cultivations (both almost 30%) were historically by far the most important functions of Carrega, and this remained until the beginning of the 20th century. Figino was largely into cultivations as wine and beans as well as fruit and wood production in the chestnut plantations. The grazing activities took place on the shrubland and everywhere else in the landscape, but no specific pastures were present. Until the beginning of the 1900s, the single grazing activity increased in both cases, together with the combination of hay production in Figino, while the other multiple functions start to decline. This assures the concentration of the rural system on animal husbandry, more than combining different activities for survival, as was the case in the 19th century.

**Figure 4.41: Function/use in Carrega Ligure (A) and Figino (B) through time**
The multifunctionality of the territory starts to fall apart from the second half of the 20th century onwards. Certain, mostly multiple functions completely disappeared (hay and grazing, fruit-grazing-wood production, cultivation, fruit production) and especially single functions as hay production, grazing and wood production remain (Figure 4.31). With this change, the multiple use of hay production on the higher pastureland changed into a monofunctional use. This simplification process of the land use is firstly noted in the outfield and moves later on to the higher positioned meadows, which are still in use. They are used for grazing on the uphill pastureland in combination with wood production in the high beech woodland. An important aspect is the decline of all functions and the transformation of more than 60% in 2014 without any productive function. This trend started from the second half of the 20th century and continues exponentially until now.

4.5.3 FROM INTENSIFICATION TO EXTENSIFICATION

Historically, the multiple land use system of the Apennine valley required an intensive maintenance of the land, with functions as cultivations, fruit, hay and wood production. The multiple activities of the land created therefore an intensively elaborated rural area, concentrated the variation of animal husbandry, cultivations, etc., which obtained 70 to 80% of the case study of Carrega. At the same time, about 20% of the area was used in an extensive way, referring to the single grazing areas.

The extensification process is largely geographically related. In Carrega, the trend started first in 'lower' areas, close to the river, and shifted than uphill towards the east. There was first an extensification of the middle and coppice woodland and later of the meadows uphill. In Figino, the shrublands used for grazing on the southern slope firstly became used extensively and remained as such through time. The former chestnut plantations followed and finally the cultivations became also largely completely abandoned.

A part from the link with the land use, this extensification shift is also related with the hillslope of the area. The very steep areas are the first to be extensified and later abandoned. Also the field structure is a representation of the extensification. The landscape of today is not a representation of the land register. While the latter contains a large variety of very small parcels, the landscape of today seems quite homogeneous and field boundaries are difficult to recognize since a lot of them disappeared. Several fields have been merged a lot of parcels are used in common property, or rented. Especially the former cultivated land, which is now largely used as grassland for hay production, is used by a small amount of farmers who use several parcels together. This is easy for the machinery and thus small landscape elements like hedgerows disappeared. The other land use where field boundaries are not necessary are the
higher positioned pasture lands, since the grazing function is managed in common. The pasture land of Carrega is although separated by a fence from the one of Connio. When parcels are not merged, they have a larger probability to be abandoned, or they are used for cultivation purposes like a private vegetable garden, a fruit plantation or a vineyard.

The conclusion is that there is a large ambiguity of the field structure in the land registers in comparison with the visual landscape and how the fields are actually used. This large division of parcels can create problems for the future development of the rural area. The low economic value of the agricultural land, the private ownership, the large quantity of owners for just one parcel, the difficulty to trace them back and the lack of interest in land management by those owners are all aspects that create difficulties in the current and future sustainable management of the landscape. Newcomers, new initiatives, future projects encounter problems when looking for land or even housing in the largely abandoned areas.
CHAPTER 5

DETECTING PEOPLE’S AND LANDSCAPE’S IDENTITY IN A CHANGING MOUNTAIN LANDSCAPE
La ricerca sul campo non può risultare in primo luogo come un processo di raccolta di 'esperienza' o di sapere 'culturale' da parte di un soggetto autonomo. deve essere vista invece come un incontro dialogico privo di regole e storicamente contingente il quale implichi in una certa misura sia conflitto sia collaborazione nella produzione di testi. (Clifford, 2004)

5.1 Landscape identity: interrelation between landscape and people

Landscapes are complex representations of continuous and endless interactions throughout time between the land, how and by whom it has been used, and is largely influenced by driving forces as the influential processes of its evolution (Bürgi et al., 2004; Jepsen et al., 2015). In Europe, this reciprocal interaction has caused a shift from ‘traditional’ to ‘post-modern’ landscapes during the last 200 years (Antrop, 2005). This transition has resulted in the loss of several valuable landscapes and is characterized by differences in the dynamics, speed and scale of landscape changes as well as changing perceptions, values and behaviour amongst its users (Renes, 2015). Traditional landscapes can be considered as more stable, coherent and legible and have therefore a distinct and more profound character or identity, based on a unique sense or the ‘spirit of place’ (genius loci) (Antrop, 2000). The ‘post-modern’ contemporary landscapes, the people and their interactions are the result of a ‘world-in-continuous-movement’ (Stephenson, 2008; Van Eetvelde & Antrop, 2004). These landscapes are characterized by significant reductions in balance and coherence, in which shifting dynamics may stimulate feelings of non- and misunderstanding, disorientation and even threat. This instability leads to a loss of identification between people and the existing landscapes (Antrop, 2005; Vos & Klijn, 2000; Pinto-Correia & Vos, 2004; Shannon & Mitchell, 2012).

It is clear that landscape identity is a core concept in the above-described shift, but however not always clearly understood. A straightforward definition of ‘landscape identity’ is relatively elusive in existing literature. Stobbelaar and Pedroli (2011) consider landscape identity as the unique psycho-sociological perception of a place defined in a spatial-cultural space. They establish a distinct, specific differentiation between spatial and existential identity. Spatial identity is based on a broad sense of the features by which people recognize landscapes, e.g. landscape forms, patterns and elements, and are related with the landscape character itself; existential or place identity refers to a sense of belonging or attachment to a specific landscape,
based on a combination of the physical and socio-cultural environment. When detailing ‘identity of the region’ (referring to spatial) and ‘regional identity’ (referring to existential), Paasi (2002) made a similar differentiation. Loupa Ramos et al. (2016) proposed a transactional model of landscape identity underlining the importance of both the physical landscape and the peoples’ perception. The relationship between people and their landscapes are therefore interdependent. This mutual and dynamic interaction is characterised by two levels; a sphere of perceptions, which refers to the perceived character of a landscape as a mentally constructed entity (Werner, Brown, & Altman, 2002) and a sphere of action, which describes how landscape and society (as a group of people) interact with actions that are induced by policies, planning and land management and how the resulting landscape might stimulate bonds between people and their surrounding place (Antrop, 2005; Selman, 2012).

This paper adopts the definition of landscape identity as the result of the mutual interaction between landscape and people as joining concepts and considers spatial and existential identity having an inseparable connection. This interaction also lies in the formative role of the physical landscape as a potential identity ‘builder’ for people, in response to the basic human need to belong to a place (Egoz, 2013).

The attachment to a landscape can be either individual or collective. For individual belonging, we consider feelings that are recognized by one individual in attachment to a place. Collective identity is intended for people with the same feeling (Stobbelaar & Pedroli, 2011), with common characteristics (Loupa Ramos et al., 2016), or common responsibility and engagement with the place (Woods, 2011). This collective landscape identity unites people and distinguishes them from others (Haartsen et al., 2000; Kruit et al., 2004). Paasi (2002) also refers to feelings of ‘we’ and ‘them’ based on a belief in deep, fixed links between a specific group and a specific territory. This may also lead to processes of social exclusion, both inside a region and in external relations. Identity can therefore be used as a way to unite a group but also as a means of drawing distinction from others, leading to discrimination or social conflict (Loupa Ramos et al., 2016). Other empirical studies confirmed that the geographical area of residence could be an important source of social categorization, influencing the way we see ourselves and others (Bernardo & Palma-Oliveira, 2016). Within a community numerous individual and collective identities are present. The most prominent landscape identity in an area or community is based on the generally accepted collective identity. The sense of belonging also has aspects of scale. The landscape identity of mountain people will be different than of coastal people, even if they live in the same geographical area. Loupa Ramos et al. (2016) refer to the multiplicity of identity, referring to multiple concepts of it-self, or identities, for each individual that depend on hierarchical systems of classification. Depending on the situation of the individual, one or more identities are activated. The fact that landscape identity depends on the scale of perception has
to be taken into consideration during empirical research. However, the academic discussion on
the holistic approach of landscape identity, including both spatial and existential identity,
remains mostly on a conceptual level. Empirical examples dealt with the concept of place
identity in the context of ‘heritage’ landscapes (Brandt & Haugen, 2011; Shannon & Mitchell,
2012; Kaligaric & Ivajnsic, 2014; Rishbeth & Powell, 2013), and everyday landscapes (Wheeler,
2014). They mainly focused on the sense of belonging (existential) of people towards a place or
landscape, without approaching the interrelation with the spatial identity inherent to a
landscape. Only a small amount of literature emphasized the interrelationship between
collective identity, the character of the landscape and its impact on identity. The example in the
Alentejo region (Portugal) showed that the bridge between social sciences and environmental
sciences, with landscape research as the perfect scenery of combining the physical and
objective, as well as the immaterial and subjective, were an added value for policy and planning
(Carvalho-Ribeiro et al., 2013).

Within the context of changing landscapes, the connection between people and the landscape
character are getting lost (Renting & Van der Ploeg, 2001; Van der Ploeg & Long, 1994). This
idea of a so-called ‘lost’ landscape identity, resulting as a consequence of globalization and
continuous changing contexts, has created an atmosphere of ‘looking-for-my-identity’,
especially in rural areas (Antrop, 2005; Haartsen et al., 2000; Pedroli et al., 2007; Wiskerke,
2009). More and more landscape elements are being replaced or removed and consequently
the history of the landscape and the personal histories of the individuals do not always coincide
(Paasi, 2002). Moreover, the history and heritage of the landscape can be used in the
construction of new identities, aiming of reinforcing the economic value of a particular place
(Shannon & Mitchell, 2012).

Lastly, we ascertain that the temporal dimension of landscape is mostly forgotten within
discussions on landscape identity. Loupa Ramos et al. (2016) refer to temporal components
within the process of familiarization and attachment, through personal and community
processes of appropriation over time. They also questioned whether it is possible to identify the
so-called ‘tipping points’, or moments of trespassing from one landscape identity (both spatial
and existential) to another. At these moments, the landscape gains another character due to
gradual or drastic changes and the consequently change of peoples’ perception. Therefore a
historical approach is valuable to study landscape identity; firstly in relation to the spatial
identity, to understand the construction of current landscapes; secondly in relation to the
existential identity, for a better understanding to which physical landscape people refer when
identifying themselves. Moreover, this historical approach to landscape identity can be
important in the understanding of contemporary transformations and can lead to a better and
more sustainable development of a landscape (Vos & Meekes, 1999; Zimmerbauer & Paasi, 2013).

This chapter aims to obtain a deeper understanding of the concept of landscape identity, its applicability and use within the context of temporal and spatial changes. Moreover, this paper seeks to detect how much landscape and societal change is acceptable without affecting or losing landscape identity, focusing on three research questions:

- How does landscape identity evolve through time in dynamic landscapes?
- Can the ‘tipping points’ be distinguished?
- How do they influence the shift from an individual to a collective landscape identity?

This paper thus explores the possibilities of the concept of landscape identity in a continuously changing environment and examines whether identity mapping can help in understanding and resolving sustainable development challenges.

The empirical case study is situated in a rural mountain area in the Mediterranean Apennines (Piedmont), namely in the upper part of the valley ‘Val Borbera’. Starting with a description of the landscape character as the spatial identity of the area, a series of in-depth interviews were performed to detect the existential landscape identity. The changes within spatial and existential landscape identity are combined with a view to understanding the nature of the shifts in the more prominent identity through time.

5.2 Characteristics of ‘Val Borbera’

5.2.1 Major landscape transformations

Mountain areas in the Mediterranean basin were historically used as intensive rural landscapes where inhabitants lived from the exportation of local products in combination with self-sufficient farming or herding. The physical and social conditions created a balance between human management, restrictive environmental conditions and biological diversity (Naveh & Lieberman, 1994) with the aim of optimizing annual productivity. This interchange and equilibrium did not cause particular ecological degradation; moreover, it created a sustainable landscape with a specific cultural value (Pinto-Correia, 1999). However, several of these rural mountain landscapes underwent an extended abandonment of the land, from the 1950s until the 1970s. This land abandonment resulted in extensification processes that led to the transformation of a landscape where the rural communities had close relations and place attachments with the contextual physical environment. The equilibrium of the historic socio-cultural system, well adapted to natural resources and local environmental constraints, are threatened by degradation, which has led to the vanishing of valuable landscapes (Naveh &
Liebermann, 1994; Pinto-Correia, 1999). Those multiple land use systems of the past (mainly based on permanent crops and open wooded areas) are characteristic for Mediterranean rural areas, and are currently influenced by globalization. Their incapability of competition, together with free market strategies and the European agricultural rules (Common Agriculture Policy), put Mediterranean areas in a weak position, and led to a marginalization of these regions (Pinto-Correia, 1999; Vos & Klijn, 2000). The combination with strenuous work constitutes the main reason why people emigrated. As Pinto-Correia (1999) states, the rural management in the marginal areas affected by land abandonment are, due to an aging population or depopulation of young and active people, entailing a socio-economic depression for the area.

5.2.2 Spatial identity

The Apennine valley ‘Val Borbera’ (Piedmont) (see Chapter 2) is a rural mountain area that has changed from a well-maintained, rural landscape into a contemporary marginal and remote landscape. In order to understand the spatial landscape identity, it is important to identify the landscape character, including both socio-economic processes and land use patterns (see Chapter 4) through time.

Demographic change was one of the largest triggers of the socio-economic situation (see Chapter 2). At the end of the 19th century, the population density in Carrega Ligure was relatively high (57.8 inhabitants/km² in 1861); between 1936 and 1971 the population decreased by 82% as people started emigrating until the end of the 1970s. The emigration flows were directed firstly towards the Americas, and secondly to nearby cities (e.g. Novi Ligure, Genova) since emigrants were attracted by enhanced employment possibilities and security. Consequently, the current population of Carrega Ligure is largely comprised of elderly and middle aged people (average age of 62.2 in 2013). Since the 1970s, a new demographic dynamic has been detected when ‘newcomers’ have started to settle in the remote mountain villages. Searching for a better quality of life, a closer connection with ‘nature’ and a social network, many have taken up rural activities such as agricultural tourism, meat and/or cheese production and environmental education. The landscape has started receiving other users whom do not all live in the area but who frequently use it, e.g. hunters, hikers or people owning a holiday house. There is currently a large diversity of actors which all feel attached with the landscape, out of origin, interest, and future perspective.

Another socio-economic driving force is the change of the political and policy situation. Historically, socio-economic dynamics and rural practices in the region were governed locally. Whilst peoples’ decisions had a direct impact on land use, recent decisions are initiated at higher levels (provincial, regional, European level). This out-scaling of socio-economic decisions,
together with a large diversification of local stakeholders, has caused other dynamics in the study area. At the beginning of the 1990s, several areas were defined in the European Commission Habitats Directive (92/43/EEC) as sites contributing to the maintenance or restoration at a favourable conservation status of a natural habitat type or of a species. In Italy (2005), those Sites of Community Importance (SCI) coincide entirely or partly with areas protected by national or regional policy, although some were newly defined, as was the case for the SCI in the research area, ‘Massiccio of Mount Antola, Mount Carmo, Mount Legnà’. Consequently, several regulations started to have an impact on the traditional routine of daily land management.

Nonetheless, the historic landscape has also changed morphologically (see Chapter 4), mainly due to the invasion of secondary vegetation (shrub and woodland). The higher altitudes around Monte Carmo were characterized by meadow-grasslands, used for hay-production and grazing. Lower on the slopes, and especially in positions with a high pendency, there were stable meadows that were only used for grazing and some wood production. Around the villages, terraces were constructed for cultivation. Between the core area of terraced arable land and the river, woodland for wood production and chestnut plantations for fruit production dominated land use. Some of the historic land uses are still legible in the landscape, especially in the vicinity of the villages. Due to changes in economic activities (self-sufficiency towards animal husbandry and wood production), changes in land use have been realized. Since the arable land around the villages is no longer cultivated, there has been an expansion of the grazing land from the outfield (higher located former pasture land) to infield lands (former arable land).

In general, intensive land use, creating a heterogeneous landscape, has been abandoned and transformed into more extensive systems. The current landscape give the impression of being homogeneous whilst a profound heterogeneous history is hidden. These extensification and homogenisation processes were so drastic that people are challenged to believe that the current landscape was an area of agriculture and merchandising just 100 years ago.

5.3 RESULTS
During the selective coding step, and based on the combination of the concepts and categories, two major ways of identification were defined (Figure 5.1). On the one hand, people related with the historical landscape. Their existential landscape identity was related with the spatial landscape identity of a heterogeneous and intensively used landscape. On the other hand, people felt an attachment with the current, more extensive and homogeneous landscape. Their existential identity was therefore related with the spatial identity of the landscape of today. However, it was found that people advocated their sense of belonging towards a landscape,
both past and present, through a balanced argumentation. Four different types of arguments were defined; naturally, economically, socio-politically and technologically. In order to explain the argument and illustrate the findings, direct quotation derived from the interviews has been cited in Table 5.1 (translated from Italian to English by the authors).
### TABLE 5.19: ARGUMENTATION OF THE TWO MAIN TYPES OF IDENTIFICATION AND ILLUSTRATIVE QUOTES

<table>
<thead>
<tr>
<th>Identification Type</th>
<th>ARGUMENTATION</th>
<th>ILLUSTRATIVE QUOTES</th>
</tr>
</thead>
</table>
| Existential LSI     | Nostalgic view on the past - Reflection towards future | "I remember as a kid, when we went up with the cows every day, there were daffodils everywhere."
| Nostalgic view on the past - Reflection towards future | "...it's the smell of hay that brings back memories for me."

| Spatial LSI         | Innovation - Willingness to change | "Let's produce niche related products."
|---------------------|-------------------------------------| "...it's about being innovative and thinking out of the box.

**Multiple farming activities**
- Extensive way of cultivation
- Return to small siblings
- Loss of biodiversity
- Area has nothing to offer

**Economically based**
- Area has nothing to offer
- Small initiatives not enough for revival
- No chaos, back to nature
- Return wild animals

**Naturally based**
- Area has nothing to offer
- Small initiatives not enough for revival
- No chaos, back to nature
- Return wild animals
To imagine somebody doing an economic valuable activity in the higher Val Borbera, is not possible... And the higher valley does not have any services. Public administration does not almost have money left to clean the streets from the snow.

Hiking is the future, the valley is full with trails and pathways that could attract a lot of people. It could be interesting, because I think it could have a socio-economic output especially with the vicinity of the Antola Park [in Liguria].

Then you have meat with another taste, another quality, you can sell it to Eataly. I think it could be specialised livestock, specialised cultures, with the means and machinery of today.

How is it possible that people from outside are telling us what we need to do in our territory? We are completely located within a SCI-area. So if I would like to start a project on restoration of the woodland habitat of before, I have to present it to the superior management of the SCI, but I do not have money left to clean the streets or do a basic sanitizing (cleaning, pruning, grafting etc.).

Strong connections based on nostalgia. Even if I emigrated when I was a kid, my dream is to be buried up into the mountains, in my village. I cannot imagine to be buried here, in Novi Ligure, with all the chaos. My origin is there, in the mountains, with my ancestors.

How is it possible that people have a social network in the city? The sense of community got completely lost. And this is what we are looking for here in the countryside. With friends, but also with the people of Figino, the ex-owners of the house.

I think that the Adventure Park is a failure, because it is a project that is dedicated to stupid city-people, who want to go on adventure in the savannah, without living with all the chaos. But they spent a huge amount of money on it. And now the park is bankrupt.

Looking for a social network based on nostalgia, strong connections based on nostalgia.
not know who that is, if it is the province or the region. It is not clear. (Temporal resident, former mayor)

For example, a pasturing activity asks a lot of paperwork. We just cultivate vegetables, so it's less. But from next year on, we will produce some wine, so the paperwork will increase. … Let's say that a simplification of the bureaucratic legislation is necessary. (Newcomer & farmer)

Technologically based

Poor road infrastructure

The roads in Liguria are in far better conditions than the ones in Piemont. I think that the Ligurian Apennines are closer to Genova, while Alessandria and Turin are further away. And this already explains the bad road conditions. Obviously, the road is one of the most difficult valleys. Other valleys are wider, so easier to exploit. Here the valley becomes really narrow. There is another geographic situation. The valley is closer to Genova, while Alessandria and Turin are about 1 hour away. And this easily explains the bad road conditions. (Temporary resident)

We installed a hydroelectric central in the valley. It works really good because of the large amount of water that comes from Mount Carmo. The internet has only 1MB of large bandwidth. (Temporal resident, former mayor)

Wood production with adapted machinery

If you are well equipped with machinery, you can concentrate on wood production. You load it on the camion and bring it to the city. This could be a great possibility, because there is another geographic situation. The valley is closer to Genova, while Alessandria and Turin are further away. And this already explains the bad road conditions. Obviously, the road is one of the most difficult valleys. Other valleys are wider, so easier to exploit. Here the valley becomes really narrow. There is another geographic situation. The valley is closer to Genova, while Alessandria and Turin are about 1 hour away. And this easily explains the bad road conditions. (Temporary resident)

Not suitable for industrialization

There is no infrastructure, it does not exist. There is no infrastructure, it does not exist. (Temporal resident)

Other alternative installations

We just produced some wine, less but from next year on, more. (Temporal resident, former mayor)

We installed a hydroelectric central in the valley. It works really good because of the large amount of water that comes from Mount Carmo. (Farmer, permanent resident)

The roads in Liguria are in far better conditions than the ones in Piemont. I think that the Ligurian Apennines are closer to Genova, while Alessandria and Turin are further away. And this already explains the bad road conditions. Obviously, the road is one of the most difficult valleys. Other valleys are wider, so easier to exploit. Here the valley becomes really narrow. There is another geographic situation. The valley is closer to Genova, while Alessandria and Turin are about 1 hour away. And this easily explains the bad road conditions. (Temporary resident)
5.3.1 NOSTALGIA FOR PAST - RESIGNATION TOWARDS FUTURE

The argumentation of this existential landscape identification is related with the landscape of the past. Respondents identifying themselves in this way were mostly elderly people (>60), who are originally related with the area and still live there or have emigrated. They responded to a ‘fear of changes’ (Antrop, 2005; Rogge et al., 2011) in which a lack of coherence, legibility and stability of the current landscape explained their way of identification. They expressed negative feelings and resignation on landscape changes and its causes and consequences, especially when related to institutional decisions. Regarding possible future perspectives, they expressed a lack of belief and reluctance. Within a world-in-continuous-movement, the knowledge of the past provided them with a sense of security. They were considered as nostalgic viewers, who identified themselves with a landscape and a way of life that no longer exists, but in which they found counselling. Their arguments were emotionally coloured by sadness, anger, non-belief, reluctance, and even grief.

**Figure 5.42:** THEORETICAL SCHEME EXPLAINING THE DYNAMIC OF LANDSCAPE IDENTITY THROUGH TIME.
NATURALLY BASED ARGUMENTS

People connected the land abandonment largely with a loss of biodiversity within the homogenisation process. They also express anger about the reintroduction and domination of some species, such as the wild boar or the wolf, since they cause several problems for local inhabitants and farmers.

ECONOMICALLY BASED ARGUMENTS

The respondents did not believe in the current economic value of the valley and regarded the chance of new successful economic activities (wood or meat production, gastronomic or hiking activities) as rather low. They considered the initiatives of newcomers in the area rather as too extensive, small-scaled and individual, and do not consider them as catalysts for a revival of the entire area.

SOCIO-POLITICALLY BASED ARGUMENTS

Historically, the area has had a strong local organization of the landscape management, organized on daily basis, including every member of the community. With the population decrease, life has become much more individually organized and the locally based system collapsed. Meanwhile, there were two dominant dynamics that explain the socio-political context of the area. First, there was a shift of the management of the landscape from local to provincial or regional level whereby inhabitants felt excluded from the executed policy decisions, e.g. the delineation of the SCI was seen as counter-productive, and as such encountered resistance and negativity. Second, there was a lack of interest from higher policy levels into the area. People do not know the contact persons to question regulations or management and provinces or regions often do not have the means to intervene. Simultaneously, people remained closely attached to the valley. They looked back with a lot of nostalgia to the social conditions of the past, constructed out of an intensively organized community life. Some expressed the desire to be buried in the village of origin, even when they lived the majority of their active life elsewhere.

TECHNOLOGICALLY BASED ARGUMENTS

Respondents considered the industrialization of agriculture in the lowlands had a low impact on the area. The mountain landscape was, because of its geomorphological conditions, not suitable to introduce certain types of machinery, and was therefore not adaptable to the
industrialization process. Another technological argument was the poor condition of the road infrastructure due to a lack of interest in its maintenance. This implied the further infrastructural isolation and homogenisation of the area.

5.3.2 Innovation and willingness for change

The same four arguments were used to understand the second way of existential landscape identification. This type of identification contained a large variety of people, such as newcomers (including those who migrated to the area 20-30 years ago), second-generation emigrants, hikers, nature-lovers. Because of the large diversity, the ideas for future development were quite different and did not always coincide. However, they had in common that they identified themselves with the present landscape. They were considered as pioneers, identifying themselves with a landscape where it is difficult to construct a life, but one in which they can find peace and hope. Their arguments were emotionally coloured by hope, believe, joy, but also fear, doubt, etc.

Naturally based arguments

Whilst the homogenisation process in the former group encountered negative feelings, this group saw the wilderness of the area and the invasion of shrub and woodland as a positive evolution. Most of them escaped from the chaos and stress and were looking for a peaceful and quiet area in a remote area. Other actors, such as hikers or environmentalists, were moved by the ‘return of the biodiversity’ (e.g. deer, wild boar, etc.) and the beauty of the valley as it is now. The extensive way of cultivation, related with the geomorphological conditions of the valley, attracts a type of small-scale niche agriculture.

Economically based arguments

Most respondents agreed on the fact that possible future economic activities in the valley should be preferably multifunctional farming activities, for example the combination of agricultural and touristic activity. Additionally there was an interest in producing agricultural products that responded to a niche in the meat production market thereby ensuring high quality. Other sectors, such as the nature conservation and environmental touristic organizations, were also interested in creating initiatives. The Club Alpino Italiano is one of the organizations that saw a future in hiking tourism, with a network of Bed & Breakfasts. The
homogeneous landscape has, in their opinion, the characteristics to attract a certain type of tourism.

Socio-politically based arguments

Newcomers were looking for a way of life that is more connected with nature and environment and a place with a social network. Furthermore, they were interested to learn the history of the landscape and create a place for new initiatives in agriculture, culture, music, services, etc. However, there was a lot of criticism towards the policy decisions that were made during the last 40 years. Many projects imposed by higher political levels were considered as expensive and not as a benefit for the valley. Possibilities for subsidies are, in their opinion, full of bureaucratic paperwork that prevents small local initiatives. However, in contrast with the first group, people were trying to participate in the calls of the policy institutions when possible. They realized that in a similar abandoned area subsidies are necessary to survive, especially when related to an economic activity.

Technologically based arguments

The intensive use of the land, which kept the precipitation water more uphill and made the water infiltrate in the fields, went into decline. The extensification process therefore fed the temporary streams with large amount of water that made the installation of hydro-electricity centres possible. One family constructed the centre privately, and received an income by selling the energy surplus to the energy company. The homogenisation of the area and dominance of secondary vegetation created the possibility of the economy of wood production with the necessary machinery.
5.4 DISCUSSION

Based on this empirical research, we consider the acknowledgment and valuing of the spatial landscape character as a reinforcement of the existential identity of both people and landscape and thus also of the interdependent relation and contribution to overall landscape identity (Loupa Ramos et al., 2016). Like the study of Carvalho-Ribeiro et al. (2013), we also assessed how a physical landscape component such as land cover or use can be deployed for addressing subjective landscape dimensions in the landscape of Europe. The two existential landscape identities, defined as a nostalgic view to the past and an innovation and willingness to change, were expressed by a group of individuals with the same feeling (Stobbealaar & Pedroli, 2011) or common characteristics (Loupa Ramos et al., 2016) and based on a combination of argumentations (Figure 5.1). Within the main community, the most prominent existential identification was linked with the historical landscape more than with the current one. This collectivity lies in the common relation with an area that distinguishes them from others (Haartsen et al., 2000; Kruit et al., 2004). Moreover, there were individuals that identified themselves with the current landscape, having a larger interest in the future development of the area. Even if they are internally very diverse (see Chapter 3 – Table 3.4), those individuals have a shared identity based on a common responsibility or engagement (Stobbealaar & Pedroli, 2011). This collective identity can have the ability to form a ‘new’ prominent landscape identity. The strength of this group is their positive argumentation (see Chapter 3 - Table 3.5) and the ability and willingness to look for progress, change and development. Their average age (around 40) is lower than the other group (around 60), and they consciously decided to move to the remote areas. The largest encountered difficulty is the internal variety of the group (Brandt & Haugen, 2011; Scott et al., 2009). This diversity of actors lies in the different sense of belonging and attachment towards the landscape, which is supported by their different argumentations. It can therefore be more difficult and take more time to create a collective identity.

Since both landscape and identity are dynamic concepts, we consider that an evolution is necessary so as to assure their survival. At those moments of evolution, there will be moments in which the landscape identity (both spatial and existential) will shift from one type to another. We call this the ‘trespassing of a tipping point’. Following this definition, the tipping point in the spatial identity (Figure 5.2 - TP1) has already been trespassed, since the landscape character changed gradually. Regarding two types of existential identification, the tipping point of the main existential identity (Figure 5.2 – TP2) has not yet been reached. To come to a balanced situation, both spatial and existential identity should trespass their tipping point and reach an overall tipping point in equilibrium (TPe). There are some requirements in order to arrive at such equilibrium tipping point TPe.
Firstly, time, as the temporal component, needs to be considered when talking about landscape identity. Landscape identity depends on the moment where both the people and the landscape find themselves in balance. Loupa Ramos et al. (2016) and Stephenson (2008) referred to a temporal component within the process of familiarization and attachment, through a personal and community process of appropriation over time. In our interpretation this refers to the existential aspect of the temporal dimension. However, the temporal dimension of landscape is mostly forgotten within discussions on landscape identity, especially within policy-decisions. A second requirement is the growth of a new collective identity. In a community, individuals can feel that they are not attached to the collective identity. If those individuals do not connect, no tipping point will be reached. If, as in the case study, individuals start to unite and collaborate based on a common purpose, a new collective identity can be established and an identity shift can be induced. Even if the individuals have different opinions, the possibility of creating a
tipping point lies in the strength of the collectivity and a common goal. Wheeler (2014) also mentioned the fact that in dynamic and changing places, the identities may be sticky and self-reinforcing, and that is the momentum when collective identities enable action for change and adaptation. In this study, the spatial landscape identity trespassed a tipping point through the sphere of action before existential landscape identity through sphere of perception (Figure 5.2). But even then a change in existential landscape identity is needed in order to make the complete identity shift and to an overall balanced landscape identity. Based on our results, a combination of natural, economical, socio-political and technological arguments and a positive attitude towards the future is necessary to reach a tipping point. If there are economic possibilities, and there is willingness to change, but due to an absence of socio-political or technical services, a shift in existential identity will be more difficult to reach. We consider that a complete landscape identity shift is desirable in order to promote an adaptation to changes. If the main community has a primarily negative attitude towards future developments, there is the risk that the real opportunities and strengths of the area will not be recognized, remaining with the weaknesses and threats.

We consider landscape identity as a wide and integrated concept, which can be used, in policy and in research, for a better understanding and therefore a more sustainable future development of an area, including the historical evolution of landscape identity (Stobbelaar & Pedroli, 2011; Zimmerbauer & Paasi, 2013). Firstly, to understand the historical construction and formation of the present landscapes, and secondly, for a better understanding of landscape that people refer to when identifying themselves. In practice, the concept of landscape identity can be used for the creation and working of social movements in marginalised rural areas. Social movements, based on solidarity and commitment, can be mobilized by collective landscape identity, especially when it makes people, who at first sight might have nothing in common, want to undertake action and collaborate in a more sustainable approach to the future of their landscape (Woods, 2011; Carvalho-Ribeiro et al., 2013). We therefore consider the concept to be very useful in the elaboration and construction of future measurements for the sustainable development of remote mountain areas. The case study underlines the fact that people require processes that give them control and responsibility over their destinies as part of a recognition of landscape identity and place (Adger et al., 2011).

Finally, the concept of landscape identity often refers to a loss of identity, especially in a continuously changing environment. The results show that even in the most remote landscapes, people did not lose their identity, but continued in having identities, even if they became diverse (Brandt & Haugen, 2011). Rather than a loss of identity, we prefer to consider a change of identity, based on identity-builders (Egoz, 2013). During the last decade, several rural marginalized areas have become the subject of policies with the aim of restoring or protecting
them in sustainable ways (Marsden, 1998; Cloke, 2006; Mitchell & Vanderwerf, 2010). Most of these initiatives focused on the revival of local production techniques, and authentic local products. Within the results, we saw a resignation towards policy-decisions who used ‘new’ identity-builders in this respect, and wonder if there is a lack of a certain profoundness that does not include the historical creation and background of the landscape identity.
CHAPTER 6
THE INTERPLAY BETWEEN DRIVING FORCES, PROCESSES AND MANIFESTATIONS
Chapter 6 – The Interplay Between Driving Forces, Processes and Manifestations

Over the past decades, land abandonment in the Apennines had large consequences on the evolution of the territory. Several changes occurred, driven by a mixture of decisions, actions and events resulting in a large transformation of the landscape. The land abandonment of the valleys of the Apennines, of which Val Borbera is a clear example, had a large influence not only on the spatial dynamics of the rural landscape (see Chapter 4), but also on the existential dynamics of actors in relation with their landscape (see Chapter 5). As described in Chapter 3, the empirical data for this chapter is primarily collected through two focus groups with local actors, in combination with the data collected from a literature review, documentary analysis (archival documents, lay literature, local journals and websites), field observations, semi-structured interviews with 20 owners/users located within or in the close vicinity of the area. This chapter analyses the driving forces or drivers behind the most important spatial and existential landscape changes of the Borbera valley (see Chapter 4 & 5) within a time span of the last 200 years, in relation with its actors. The main question to which this chapter responds to, is: how are the identified landscape changes result of interacting driving forces and actors?

The main objectives of this part of the research are to:

- Position the main landscape changes and events on a heuristic timeline;
- Determine the driving forces of those changes, including their mutual relation;
- Understand the relations between the most important driving forces and the institutional level of decision (local, provincial, regional, national, international);
- Grasp how local actors interpret the driving forces.

Before focusing on these objectives, it is important to introduce the concept of driving forces, when and where they are used in academic research and how we operationalize the concepts throughout our research.
6.1 UNDERSTANDING DRIVING FORCES

Within a context of a largely abandoned area, the question rose how land abandonment is treated within research on driving forces. Is land abandonment a driving force itself, or is it a process, as an effect of other driving forces? Driving forces are made up by a complex network of structures and processes, which is the central paradigm of landscape ecology (Forman 1995). Categorization allows consideration of structures and processes likewise: globalization, urbanization, (natural) global change, regulation (by policy or law) and mechanization are processes, while railroads, highways, smallholder schemes, population density and environment are structures. Van Vliet et al. (2015) consider land abandonment a major type of landscape change, being divided into intensification and disintensification/extensification of agricultural land use. Other authors consider it a cause or driver of landscape change, together with urbanisation, agricultural intensification, forest expansion, international commerce and trade, new demands of land for nature conservation and development of renewable energy uses (Plieninger & Bieling, 2013). And again others see it as a dominant land change processes between 1990 and 2006 (Levers et al, 2016 in Plieninger et al., 2016) or as the most prominent proximate driver of landscape change in the Mediterranean (Plieninger et al., 2016; Sluiter and de Jong, 2007).

This chapter focusses on the drivers of the main landscape changes during the last 200 years, but not only on land abandonment, even if it is considered to be the most impactful process that resulted in the current landscape. We consider land abandonment as the contextual background of the landscape and will treat it as any other process of landscape change.

6.1.1 DRIVING FORCES THROUGH LITERATURE

Driving forces are generally seen as independent, autonomous, ‘outside’ forces directly or indirectly affecting a (dependent) system, being the landscape (Chorley and Kennedy, 1971 in Klijn, 2004). As demonstrated in the previous chapters, landscape is considered as a complex system, so it is not surprising that the forces that drive the system are equally complex. Those drivers or driving forces have an array of different definitions, which is already a token for the complexity of the concept. Despite or maybe due to its complexity, the concept of driving forces gained attention in landscape change research since the end of the 20th century (Brandt et al., 1999; Bürgi & Schuler, 2003; Klijn, 2004; Bürgi et al., 2004; Antrop, 2005; Holmes, 2006; Schneeberger et al., 2007; Hersperger & Bürgi, 2009; Primdahl & Swaffield, 2010). Research on landscape change drivers has been carried out in all parts of Europe, using a broad range of disciplinary approaches, data sources, spatial and temporal scales, methods and publication outlets (Plieninger et al., 2016). The reason for its large applicability lies in its suitability to study
the mechanisms behind landscape changes. In turn, the diversity of approaches that study driving forces underlines the ambiguity of the term landscape and its plurality of meanings (Bürgi et al., 2004; Plieninger et al., 2016; Van Vliet et al., 2015). Every approach and author treated the term ‘driving force’ in a different way and came to a range of definitions.

In several approaches, driving forces are strictly related with a socio-economic origin, largely linked with the production and consumption climate and without considering any natural or cultural influences. For example in 2002, the European Environmental Agency defined driving forces as “social, demographic and economic developments in societies and the corresponding changes in life styles, overall levels of consumption and production patterns” (Drivers-pressure-state-impact-response – DPSIR model) (EEA, 2002; Klijn, 2004). Holmes (2006, 2012) proposed three main groups of driving forces linked to the three basic purposes underlying the human use of rural space: production, consumption and protection. Kristensen et al. (2009) related the accelerated transformations of the rural European landscape to the combination of intensification, specialisation and concentration of production. The process-based approach of Antrop (2004, 2005) presents four main driving forces based on the nature and causes of landscape changes in the past centuries that act simultaneously in varying mutual importance; accessibility, urbanization, globalization and calamity (Antrop, 2005).

It was the key work of Brandt et al. (1999) who constructed a first analytical framework, categorising different types of driving forces, including cultural and natural drivers. Their main aim was to gain insights into the driving forces of (especially rural) land use dynamics. Their proposed framework represented the variety of factors, called driving forces, such as technology, natural conditions, socioeconomics, public policies and cultural factors, that influence the landscape pattern dynamics. They concluded that these five ‘key’ driving forces are of relevance, especially in describing the marginalization of agricultural areas, and that a multidisciplinary analytical framework is necessary and useful to study land use dynamics. Following this first analytical framework, several authors have refined the categorization of the general concept of driving forces. Bürgi et al. (2004) were largely inspired by Brandt et al. (1999) in their definition of five groups of driving forces: political, economic, cultural, technological, and natural driving forces. They provided a short and illustrative definition of driving forces as the forces that cause observed landscape changes, i.e. they influence the trajectories of landscape development (Burgi et al., 2004, Schneeberger et al., 2007; Hersperger & Bürgi, 2009; Eiter & Potthoff, 2016). The five major drivers of Brandt et al. (1999) and Bürgi et al. (2004) were adopted in several approaches (Hersperger & Bürgi, 2009; Schneeberger et al., 2007; Van Vliet et al., 2015; Eiter & Potthoff, 2016; Plieninger et al., 2016) and as such in this research. These key or underlying driving forces can comprise economic, political, cultural, technological and natural factors (Brandt et al, 1999; Burgi et al, 2004).
**Underlying drivers** comprise the fundamental social and natural processes (e.g. human population dynamics, agricultural policies, markets, or culturally embedded attitudes and beliefs) that underpin proximate drivers that either operate at the local level or have a more indirect impact from the national or global level (Geist & Lambin, 2002 in Plieninger, 2016, in Van Vliet et al., 2015; Eiter & Potthoff, 2016). Underlying drivers tend to have a longer time span and a geographically larger extent, making them harder to detect and to control than the more local and short-term events (Klijn, 2004).

Besides these underlying drivers, there are also **proximate drivers**, which do not have a generally accepted categorisation as is the case for the underlying driving forces. Their interpretation depends largely of the author, the research question and the approach that was used. It was Geist & Lambin (2002) who proposed the hierarchical subordinate level of ‘proximate drivers’ or ‘causes’, which are defined as direct actions and/or human activities at the local level, resulting in landscape transformations such as agricultural expansion or extension of settlements (Geist & Lambin, 2002 in Plieninger, 2016, in Hersperger et al., 2010; Van Vliet et al., 2015). But the interpretation of proximate drivers depends largely on the research question and the spatial level of the research.

The overview of research on driving forces in Europe by Plieninger et al. (2016) proposed six categories of proximate drivers of landscape change: urban/infrastructure development, agricultural expansion/intensification, expansion/intensification of forestry, extraction of non-renewable resources, land abandonment/extensification, and nature/heritage conservation activities (Plieninger et al, 2016). Within this research, the spatial level is defined by a valley and two local case studies, which can be situated within the proximate driver of European land abandonment/extensification.

Van Vliet (2015) renounced the term of proximate causes and addressed them differently as **manifestations** of general landscape changes (Van Vliet, 2015) such as intensification and disintensification/extensification of agricultural land use. The manifestations of the latter were land abandonment, increase in landscape elements, decrease in management activities, change in agricultural land use activities and on-farm diversification. The research of Van Vliet (2015) analyses manifestations of agricultural change itself rather than their proximate causes, since he considers it not always possible to identify proximate causes for agricultural change itself. Other land use change processes such as deforestation and wetland conversion are frequently driven by agricultural land use change. Hence, agricultural land use change is often a proximate cause of other changes.

In this chapter, the proximate causes and manifestations are related with the major landscape changes that resulted from the spatial and existential analysis of **Chapters 4 and 5**. The most
important processes of changes are three spatial processes (homogenisation of the land cover, simplification and extensification of the land use – **Chapter 4**) and two existential processes (nostalgia towards the past together with resignation towards the future and looking towards the future together with the willingness to change – **Chapter 5**).

### 6.1.2 A complex system

In this dissertation, the five underlying driving forces of Bürgi (2004) were adopted (Brandt et al., 1999; Bürgi et al., 2004; Hersperger & Bürgi, 2009). All five are strongly interlinked:

- **Economic drivers** include consumer demands, market structure and structural changes, commercialization, urbanisation, industrialisation as well as governmental subsidies and incentives;
- **Political & institutional drivers** are strongly linked with the economic drivers, because of political programs, laws & policy. They include formal policies, but also the informal policy climate and property rights;
- **Technological drivers** include the appearance and spreading of new technologies;
- **Natural/spatial drivers** are about spatial configuration, topography, soil conditions, natural disturbances. They can be site factors, such as climate, topography and soil conditions, which are stable in the short term but variable in the long term. Other natural disturbances or calamities however can be fast-acting such as earthquakes, floods, landslides, plant diseases;
- **Cultural drivers** are the most difficult to define, since culture remains a rather vague concept. They include public attitudes, values and beliefs as well as individual and household behaviour (Geist & Lambin, 2002). These drivers leave a deep imprint on landscapes as culture structures landscapes and create the cultural landscapes, while in turn landscapes inoculate culture (Nassauer, 1995; Bürgi et al., 2004). Population (or demography) usually falls into the category of cultural driving forces but sometimes forms an additional driving force (e.g., Bolstad et al, 1998; Pahari and Murai, 1999 in Hersperger et al., 2010).

This last driving force was not always included as a key driver, but since culture can be recognised as a dominant underlying driver in Southern Europe (Plieninger et al., 2016), they are important to include in the analysis. Moreover, the cultural services of a landscape are influenced by the transformation of the landscape and vice versa (Kristensen et al., 2009). Throughout this chapter, the reason and importance of including culture as a driving forces will become clear.
The categorisation of driving forces can facilitate research, but the complexity of the whole concept must not be forgotten. Most drivers do not act independently, a particular landscape change is probably rarely connected to only one driving force and the causality is not one-way direction nor mono-causal (Klijn, 2004). Instead there are typical combinations of underlying drivers that explain certain changes (Van Vliet et al., 2015). Moreover, the various forces can work synchronously and interactively and create intricate chains or even webs of cause-effect relationships. However, the variation in proximate drivers of land use change and their underlying drivers indicate that it is difficult to find one-on-one relations between drivers and land use/landscape change. For some drivers the causality is clear, however landscape change is determined by a combination of underlying drivers. Often, the most common type of causation is a combination of all five categories of underlying, indirect (distant) drivers (Plieninger et al., 2016) on the one hand and proximate, direct drivers on the other hand (Klijn, 2004). The combination of drivers can also prevent land use to change (Van Vliet et al., 2015). Moreover, causes and effects may not always be identifiable, e.g. due to lack of available data or because of interaction or mutual influence among different forces (Eiter & Potthoff, 2007 in Eiter & Potthoff, 2016).

Consequently, driving forces form a complex system of dependencies and interactions and affect a whole range of temporal and spatial levels. It is therefore challenging to adequately analyse them (Blaikie, 1985; Burgi et al., 2004; Hersperger et al., 2010). Since both landscapes and driving forces are enormously complex systems, the general system is best described in the light of the question (Burgi et al., 2004).

### 6.1.3 Research Challenges

Studying the driving forces of a landscape has an added value when performed through empirical cases. The drivers can be detected on a very detailed scale, but enlarged on a higher level. In this dissertation, the case studies of Carrega Ligure and Figino were taken as example using the focus groups to get insights of the local actors, but the subjects of discussion were upscaled to the valley level. Within literature on driving forces, empirical cases were often used but economically marginal areas, such as Val Borbera, are mostly avoided (Plieninger et al., 2016). In this dissertation some challenges within research on driving forces is tackles. Moreover, the focus lies on a large temporal and small spatial scale, including the opinion of local actors.
**Spatial and Temporal Scale**

Scale is an important issue that challenges the study of driving forces. Bürgi et al (2004) show that driving forces can act on a large variety of spatial scales – from a couple of square meter to an entire continent (Eiter & Potthoff, 2016). Regional land use studies make it possible to compare the importance and the structure of the driving forces of land use changes at different spatial levels – national, regional and local (Bicik et al., 2001). Nonetheless, the overview of research on driving forces by Plieninger (2016) confirmed that most cases had a scale between 2 and 99km², assessing one study area only, with one spatial scale.

Considering the temporal scale, the emphasis of research examples lies between 20 and 99 years and between 2 and 4 points in time. This indicates a shift from bi-temporal detection of landscape change to the analysis of multitemporal trajectory analysis and rates of change, as advocated by Burgi et al. (2004) (Plieninger et al., 2016). Historical land use studies clearly confirm that the recent state of land use is also the result of long-term nature-society relations (Bicik, 2001). Long-term studies are needed to go beyond the use of satellite imagery, considering diverse types of data on landscape change (Fuchs et al, 2015; Plieninger et al., 2016). Moreover, with the combination of historical maps, cadastral data, social surveys, literature and archival sources and expert interviews, long-term studies on driving forces have been pointed as a missing link in previous research (Plieninger et al., 2016). These long-term studies are however less frequent within academic research (Plieninger et al., 2016) and little is known on the local landscape dynamics in a longer term perspective (Kristensen et al., 2009).

**Including actors**

Although research on landscape change drivers has been executed widely in Europe (Plieninger et al. 2016), the role of actors and how they relate to driving forces is not considered on a systematic way.

It is a specific combination of actors and driving forces that triggers a specific landscape change, since they both shape land change (Hersperger et al. 2010). Therefore, it is necessary not only to define the involved actors and driving forces but to consider the interrelations between these different actors and driving forces in order to understand landscapes in a better way (Schneeberger et al., 2007). Such an integrative perspective is also needed if one is interested in changing societal demands due to an altered physical environment (Burgi et al., 2004).

An improvement of conceptual clarity is needed with regard to the role and identification of actors versus driving forces of landscape changes and the interplay between driving forces and actors (Hersperger et al., 2010; Plieninger et al., 2016). Especially since the actors are the ones
who make decisions, act accordingly and influence other actors and the environment with their actions (Hersperger et al., 2010). Generally, land change research is broadening its approach to assess the decisions of people and institutions that execute these actions (often called actors or agents) (e.g., Baudry et al., 1999; Lambin et al., 2001 in Hersperger et al., 2010), especially after the introduction of the European Landscape Convention (2000) and the linked definition of landscape, where actors were formally included as important factors within the landscape.

Especially in rural environments actors seem to play an important role in relation with the landscape they relate with. The future development of rural landscapes is largely dependent on the land managers’ responses to changing conditions and their impact on agricultural land use (Brandt et al., 1999; Van Vliet et al., 2015). Van Vliet (2015) included the farm and farmer characteristics even as an extra category of underlying driving forces. Farm(er) characteristics are identified as a key driver of change, which can especially explain why land use changes take place on one location and not on another under otherwise comparable conditions (Van Vliet et al., 2015).

Actors can be individuals, agencies and institutions, representing the whole range of organizational scales (sensu Bürgi et al., 2004; Hersperger et al., 2010). Their opinion on driving forces of the past influences their current actions on the field and stimulate the driving forces of today, and thus the landscape changes of tomorrow. Many studies synthesize the relationship between underlying drivers and proximate causes of land changes, but in doing this they ignore the diversity in actors and their decisions (Hersperger et al., 2010; Van Vliet et al., 2015).

6.1.4 Why studying driving forces?

As stated before, the concept of driving forces has been widely studied in landscape research (Bürgi et al., 2004), with the aim to contribute to the understanding of the reasons behind landscape changes.

Considering the European landscapes as the result of an interaction between anthropogenic activities and decisions and environment, and therefore as cultural landscapes (e.g., Salbitano, 1988; Bürgi & Russell, 2001) (see Chapter 2), we can assume that the understanding of those interactions is an important aspect in landscape research. Such an integrative perspective is also needed if one is interested in changing societal demands due to changing environment (Bürgi et al., 2004).

The analysis of driving forces of land use and management is crucial to understand the past and present anthropogenic impact on ecosystems and landscapes, which provide valuable knowledge for the understanding of the present state of those systems (e.g., Farrell et al., 2000;
Bürgi & Schuler, 2003). Constructing a timeline with the changes in environmental features and in human activities reveals important aspects of interactions between society and environment (Bürgi & Russell, 2001). Another added value for studying driving forces is found in an interdisciplinary and integrative approach with the aim to fully grasp the complexity of the system under study. The design of multi-scale studies that consider distant relations between actors, drivers, and patterns of landscape change is recommended (Eakin et al., 2014; Plieninger et al., 2016).

Studying land use change processes and their driving forces can also enable us to better assess potential future development, to make more informed projections, to anticipate future development trajectories and assess the influence of land related policies (sensu Clark et al., 2001; Bürgi & Schuler, 2003; Van Vliet et al., 2015). Especially landscape changes in rural areas have important consequences since they provide a wide range of goods and services, such as the provision of food, feed and fibre, but also biodiversity preservation, climate change mitigation and landscape aesthetics. At the same time, those areas are largely dependent on policy measures and regulations at the European level. In those cases, the question rises if the capacity of those landscapes is resilient enough to provide long-term, landscape or ecosystem services essential for maintaining and improving human well-being. These sustainable landscapes, might be currently at risk (Selman, 2012; Wu, 2013).
6.2 Driving forces through time

The study area underwent a process of drastic land abandonment during the last 200 years (see Chapter 2 and 4). But when we split up the whole time period in different phases, land abandonment is not always the dominant process. Depending on the temporal scale of the research, the main trends of landscape changes differ, being the outcome of different driving forces.

Also related with the importance of the historical/temporal context (see 6.1.3), a heuristic timeline for the whole time span was constructed based on the knowledge gathered of the two case studies, including the manifestations of landscape changes in the field. Those manifestations represent certain proximate drivers, which, in their turn, are related with underlying driving forces. These three aspects - underlying driving forces, proximate drivers and manifestations - are represented and described in four time schemes (see Figures 6.1 to 6.9) corresponding largely with the time slices used in the spatial analysis (see Chapter 4). Only the first spatial time slice (19th century) was split in two time periods of the driving forces (1796-1850 and 1850-1900) because of the large amount of material on driving forces, in comparison with the amount of material for the spatial analysis. This exercise provides insights in the main processes of landscape change and their relative importance. However, most drivers do not act independently; instead there are typical combinations of underlying drivers that together explain changes. The arrows between the different types of drivers correspond with those interrelations and combinations. The description of the driving forces is largely based on those interrelations. Throughout the text, the most important underlying (in bold) and proximate (subscribed) drivers that are presented in figures 6.1 to 6.9 are described. Finally, a general overview is constructed with the most impactful driving forces of the last 200 years.

Seen in a long term perspective, this section summarizes the most significant events and manifestations in the history during the last 200 years, which mirror the proximate and underlying drivers. The list is not exhaustive, but contains those which are of most relevance to the subject in this research. The following description was based on literature of local historians like L. Tacchella, R. Botta, P. Bartolini, F. Castelli, P. Derchi, P. Ferrari, E. Leardi (Tacchella, 1961; Tacchella, 1989; Botta, 1980; Ferrari et al., 2008; Sisto, 1956), added with information from archival documents, focus groups and the semi-structures interviews.

6.2.1 1796-1850: Political instability and first migration trends (seasonal) - see Figures 6.1 & 6.3

In the beginning of the 19th century, the north of Italy was the scenery of a sequence of major political crises and agitations, a series of changes of the power institutes and a campaign of
land privatisation. After the fall of the Feudal Empire (1796) and the annexation of the territory under France by Napoleon (1805), the former Ligurian Republic was conquered by the royal family of Sardegna (1815). In the Borbera valley, these changes of power created a climate of political instability, which was noticeable in the administrative shifts and military actions. There was a huge lack of transparency on who was in charge in the area and, consequently, the local people organised themselves independently and created a climate of local autonomy and self-governance. Archival documents indicate of a large autonomy when it comes to land management, but also a good social cohesion, shown by the large amount cultural activities (feasts, processions, ...) or the social network in case of disasters. An example of this autonomy was the request by the local actors of Carrega Ligure in 1819 to re-establish the ‘controllio’, a local control system of pasturing and hay cutting that was abolished in the years of institutional change (Serie 3 Corrispondenza e registri di copialettere - 1.5 1819-1821 - Corrispondenza del 1819 coll’Ill.mo Vice – Intendente di Novi et altre autorità). The system was still operational on an informal way, thus the request contains the official recognition of the local ‘law’.

![Figure 6.44: Events and proximate driving forces on a heuristic timeline for the period 1796-1850.](image-url)
From the convention of Vienna (1815) onwards, the area became part of the Kingdom of Sardegna and consequently peace returned to the Val Borbera. However, this political stability did not contribute to a stable economic climate of the valley. The changes in political power caused a lot of market insecurity and local people were asked to contribute to the ‘new’ state through taxes.

The **privatisation of land**, of which the Napoleonic land register map (1811) is the largest source, contributed to the local autonomy of land management and the land use intensification. All former common land was privatised and divided into small parcels, which were easier to cultivate individually instead of using them for grazing activities. The intensification of the land use is therefore also linked with the political climate.

![Local Farmer Opening the Irrigation Channel ‘Bego’ to Flood His Field with Beans (Fagioline) in Figino](photo: Giuseppe Crespi, August 2016)

The economy of the valley was largely organised around the merchandising routes that led from the Ligurian sea towards the Po plain. With the construction of the communication road ‘Strada dei Giovi’ (1821) in the lower part of the valley, the economic centre shifted from the merchandising routes of the mountains towards the low lying Scrivia valley. This **structural change of the market concentration** had a large impact on the economy of the higher positioned villages, as e.g. Carrega Ligure, where the local economy was largely based on selling large quantities of their production to the merchandisers along the routes. When the **market**
became more locally organised, the social cohesion and the intensive land use was stimulated, but it resulted also in a seasonal migration.

The political/institutional and economic underlying drivers are rather dominant in this time area. Those difficult political climates, together with demographic growth (see Chapter 2) and the high population density, made that a lot of inhabitants, especially men, decided to migrate away during the winter months (October – May) and left the villages to the women, children and elder people (Sources: Casalis Volume I (1833) – Albera Ligure; Volume III (1836) – Carrega Ligure). Another surviving strategy was the maintenance and cultivation of the land with new products such as wheat, potatoes and corn. Those were introduced in the valley and gave people the possibilities to vary their diet and survive in a more self-sufficient way.

Figure 6.46: Manifestations (bullet points), proximate (top) and underlying (bottom) driving forces and their interrelation for the period 1796-1850.

The technological modernization did not only result in the construction of a main road but also in the installation of irrigation networks, like the ‘bego’ in Figino. This modernization therefore
motivated the local responsibility for the land management, and therefore the autonomy and self-governance.

The mountain topography and its related isolation stimulated the local identity and the social cohesion. People were considered ‘montanari’ and were very attached to their landscape.

6.2.2 1850-1900: Political stability, economic insecurity, large migration to the America’s - see Figures 6.4 & 6.5

Since the union of Italy (1861) and the construction of the national kingdom, the political situation in the region stabilised. The nationalisation of the political power included some administrative shifts, but also a proposition to change the names of the villages in the Val Borbera to ‘Piemonte’ instead of ‘Ligure’, since they became part of that region. This proposition was neglected by the local population and was never approved. The social cohesion of the local population was probably very high, their identification with their land very intense and the change of names of the localities would have affected this cohesion (Leardi, 1997). At that time, people were more dependent on each other. The local autonomy was more based on self-sufficiency than 50 years earlier, when the political administrative situation was different.

While the ‘feudi imperiali’ were decentralised empires of wealthy families with a restricted territory, the kingdom of Italy was much bigger and more difficult to rule and control. Even if the state was organised in regions, provinces and districts (mandamento), the Borbera valley found itself physically far away from the central state. The large social cohesion and the local self-governance can be related with this type of institutional abandonment (Leardi, 1997; Ferrari, 2013).

The economic growth on international level continued until the beginning of the 1870s. This favourable climate in the valley was recognised by the introduction of wheat and corn, which was even supported by the state through a political agreement that reduced the taxes on wheat production. But also the wine culture increased largely. The slow, but continuous increase of the prices of both wine and grapes played an important role in the valorisation of the vineyards. Between the 1860s and 1880s, a lot of vineyards were constructed in combination with the deforestation of the areas. Especially in the lower positioned hilly areas (e.g. Figino), wood- and shrubland almost completely disappeared, because of the increase of vineyards. But at the end of the 19th century, Europe found itself in a serious agricultural crisis (1874-1896). From 1887 onwards, the effects were also visible in the wine cultures, through a huge reduction of wine export and the raise of prices. But an additional crisis was the arrival of the diseases downy and powdery mildew (peronospora and oidio) and finally the phylloxera infestation. All these factors obliged farmers to invest in new techniques and in the construction of wine cellars to elaborate
the production process, to improve the wine and to assure its durability. Most of the vineyards were abandoned after the phylloxera crisis and the terraces are left behind covered by woods.

**Figure 6.47: Events and proximate driving forces on a heuristic timeline for the period 1850-1900.**

Together with the first impacts of the economic crisis, a new emigration flow (in addition to the seasonal ones) was noticeable. People were influenced by the pioneering fever of the America’s. New land, for everybody, a message that attracted a lot of young people to take the step to migrate to the other continent. The demographic situation of the valley in the second half of the 19th century had become unbearable. The population continued growing and the population pressure became very high. According to Ferrari (2013), especially young men left in search for a job to save some money, but with the idea to come back and buy land and housing in the village of origin. Because the families were numerous and the land was scarce, people were forced to leave to save earnings for creating their own family. Some of them succeeded their mission and came back, others stayed in the ‘new’ land.

A shift in agricultural production strategy from mainly arable to animal production at the end of the 19th century also influenced the agricultural land use, as it helped maintain grasslands for
cattle fodder and also increasingly linked grain production. During the transition from arable to animal production at the end of the 19th century, crop production was unprofitable and field afforestation was encouraged with state subsidy. Many of these new forests were planted for a variety of reasons, wood production and land investment.

The second half of the 19th century was also the period when transportation and infrastructure improvement, for example the construction of the railway connections between the big cities of Milano-Genova-Turin. This improvement of the transportation network accelerated the merchandising traffic between the big cities and moved the economic trading routes away from the historical mountain routes. Another manifestation was the construction of a central connection road of the whole valley, starting from Vignole Borbera to Pertuso. This connected the higher positioned villages with the ‘new’ traffic connections in the lower valley.

**Figure 6.48:** Manifestations (bullet points), proximate (top) and underlying (bottom) driving forces and their interrelation for the period 1850-1900.
The high population density and the new cultivations made an intensification of the land use possible. Intensive cultivations which, after a few decennia, started having their own problems like diseases and infections.

6.2.3 1900-1950: Two large political conflicts, economic and demographic decline - see Figures 6.6 & 6.7

The first half of the 20th century is characterised by the two main political conflicts of the century, the two World Wars. The era is recognised by political, but also economic instability.

**Figure 6.49: Events and proximate driving forces on a heuristic timeline for the period 1900-1950.**

After the agricultural crisis of the end of the 19th century, the living conditions in the marginalised areas of Europe were not so favourable.

Until the 1930s, rural emigration mainly affected the poorest classes of the mountain population (farm workers, younger sons without property, etc.). This emigration had little consequence for the landscape, because the main farms were maintained. The importance of
Cattle farming increased because it was more adapted to larger farms and to new economic circumstances. This did not provoke the abandonment but the transformation of cultivated land into meadows.

**Figure 6.50: Manifestations (bullet points), proximate (top) and underlying (bottom) driving forces and their interrelation for the period 1900-1950.**

In the Interbellum (1925), the ‘battaglia del grano’ (Leardi, 1997 - p.154), an economic investment in wheat production organised by the fascist regime had large consequences on the development of marginal rural areas. This agricultural specialisation of wheat production largely reduced the livestock production, on which the higher positioned mountain areas were economically dependent. For example, the introduction of inorganic fertilizers during the early 20th century meant that the use of manure as organic fertilizer became less decisive for the ability to cultivate, although it only exceeded organic fertilizer use after WW2. Hence, extensively used grasslands and meadows, which had been used for hay production, were cultivated or abandoned in many cases. The wine production also suffered from the national expansion of cereal production and even partly disappeared in combination with decennia of...
the phylloxera infestation. The inflation of the Italian Lire in 1926 and the big economic crisis of 1929 are manifestations of an economic difficult period.

After the second World War, the conditions of agriculture were quite miserable. At the same time, the industrialisation process in the cities started creating jobs in factories and was attracting people. Attracted by job and income security and longing for better living conditions, people started migrating away from the mountain areas in large quantities.

The demographic decline is clearly related with the aging of the population in this century, but also by the emigration flow after the second World War. This later started already in the 19th century and continued until the 1950s. The growing mechanisation, and the consequently new job opportunities in the nearby cities of Milan, Genova, but also Novi Ligure, Arquata Scrivia, Serravalle Scrivia, made that the destinations of emigration changed. Finding a job nearby home made commuting possible, at least for the nearest villages, e.g. Figino. After World War II, emigration changed: farmers left the villages, land abandonment started and a rapid spread of fallow lands began.

### 6.2.4 1950-TODAY: DEPOPULATION, REWILDING, NEW INSTITUTIONS AND INITIATIVES - SEE FIGURES 6.8 & 6.9

The landscape changes of the second half of the 20th and the 21st century are naturally and structurally characterized by a large process of rewilding. This had consequences for the livestock farmers but also made the landscape more vulnerable for landslides. Two different agricultural processes of productivism and post-productivism (see Chapter 7 - Kristensen et al., 2009; Wilson, 2001; Woods, 2011) lie at the base of this major change.

With the creation of the European Economic Union (EEU - Treaty of Rome, 1958) and later on the European Union EU (Treaty of Maastricht, 1993), the political stability returned. The union started investing largely in the European territory. It was the Common Agricultural Policy (CAP) (*1962) who had a large impact on the agricultural activities of the rural landscapes. In the beginning, the focus of the CAP was on food security (60s-70s-80s), but with time, it shifted to a more competitiveness of the market (90s), sustainability cohesion (2000) and policy efficiency (from 2000 onwards). Rural development became part of the rural policy agenda in 2000 (Messely, 2014). European Union (EU) policies may currently be the most important single factor in rural processes of transformation. Thus, the 1992 reforms of the Common Agricultural Policy (CAP) had immediate impacts on rural land use (Brandt et al., 1999). The international policy decisions had regional outcomes, which had direct consequences on the development of the valley, as for example the introduction of the Leader program and the Local Action Group.
FIGURE 6.51: EVENTS AND PROXIMATE DRIVING FORCES ON A HEURISTIC TIMELINE FOR THE PERIOD 1950-TODAY.
Driving Forces

(LAG/GAL) ‘Giarolo’ (www.giarololeader.it). **Subsidies** and alternative economic entrances were assigned to rural marginalized areas within the Leader programs (*1991), with the aim to support rural marginalized areas in different land management and land uses.

Secondly, a process of an alternative way of farming was started up, combining multiple functions within the same small-scale context.

Aside from the agricultural policy, also the decisions on **nature conservation policy** had an impact on the development of the landscape. In the beginning of the 1990s on European level, a network of core breeding and resting sites for rare and threatened species and some rare natural habitat types which are protected in their own right were set up. Several areas were defined in the European Commission Habitats Directive (92/43/EEC) and Bird Directive (79/409/EEC and 2009/147/EC) as sites that contribute to the maintenance or restoration at a favorable conservation status of a natural habitat type or of a species, the so called Natura 2000 sites. In Italy (2005), those Sites of Community Importance (SCI) coincide entirely or in part with areas previously protected by national or regional nature conservation policy, although some were newly defined. This was the case for the SCI’s in the research area, named ‘Strette della Val Borbera’ (IT1180009) and ‘Massiccio of Mount Antola, Mount Carmo, Mount Legnà’ (IT1180011). These programs reflect a new phase in societal demands and needs for rural landscape functions, in which the agricultural production objectives are increasingly challenged by nature conservation interests and also recreational needs. The recent shift in objectives is mirrored in the decrease of farm numbers and in particular in the number of full time farmers, who have been a minority among agricultural property owners since the late 1970s.

In the 70s-80s, there was a trend of development of **local self-governing entities and/or partnerships**. The water and road maintenances, which was historically always done as common practice following the local laws of the community, were ‘institutionalised’ in consortia or other forms. At the end of the 20th century, the community was in need of a ‘legal’ entity who took care of the management of such matters. Locally organised consortia for irrigation systems, water supply, road maintenance, … were formed and are currently still in use.

With the law of 3 December 1971, local institutions on valley level were created all over Italy. The **Comunità Montana** were horizontal inter-governmental partnerships at the local scale, which assist smaller rural authorities in service delivery and economic development. This local territorial public entity had the aim to enhance the mountain areas with own independent functions in collaboration with the municipalities. During the last decennia, they changed structurally and were finally abolished in 2012 with the regional law of 28th September. Instead, the former territories of the Comunità were pushed to organize themselves in ‘unioni di comuni’, based on the amount of inhabitants (not less than 5000). This current situation is quite
chaotic since the municipalities themselves form their unions, based on political and economic interests (see also Chapter 7).

This last period is characterised by the complete collapse of population. The mountains were completely deserted, resulting in abandoned and neglected land and empty or secondary housing. At the same time, from the 1980s onwards, a trend of new arrivals of newcomers is noticed which continues growing exponentially during the last five to ten years.

Technologically, the transportation network continues to be improved after the World Wars, but starts going into decline during the first decennia of the 21st century. Other processes were the extensification of the land use and the overall mechanisation process of agriculture. A rather new process is the increasing demand for renewable and alternative energy.
6.3 **Driving forces from an actors point of view**

Landscape research is broadening its approach to assess the decisions of people and institutions that execute these actions (e.g., Baudry et al. 1999; Lambin et al., 2001). Consequently, a prevalent research question is how driving forces and actors together affect landscape changes and how the link between the three elements can be conceptualized.

Actors make decisions, act accordingly, and influence other actors and the environment with their actions. Including actors in the research on driving forces has not yet been a great success. An improvement of conceptual clarity considering the role and identification of actors versus driving forces of landscape change (Hersperger et al., 2010; Plieninger et al., 2016) is therefore needed. Van Vliet et al. (2015) introduced the characteristics of the farmer as an extra key or underlying driver, since it explains why land use changes take place on one location and not on another under otherwise comparable conditions (Van Vliet et al., 2015). There are two types of actors: actors that affect driving forces and have an indirect, regulating power, like political parties and institutions, and actors that directly change land, like farmers or local inhabitants (Hersperger et al., 2010; Hagerstrandt, 2001). The latter are mostly related with proximate drivers and the first with underlying drivers.

In this dissertation, we consider the driving forces and the actors to be in close interaction and, as a result of this interaction, landscape changes occur. The aim is to understand the causal chain between the three elements and to identify specific combinations of driving forces and actors that lead to change, referring to the Driving Force-Actor-Change model of Hersperger et al. (2010).

The overview of the most important proximate driving forces (see Table 6.1) will be combined with the input of local people on those drivers and by whom they were affected. The information was collected through two focus groups that were organised, in combination with a series of in-depth interviews (see Chapter 3 and 5). Certain quotes are included in the text to illustrate the found results. Those quotes were translated from Italian to English by the author.
Table 6.20: Overview of Most Important Proximate Driving Forces Through Time, Indicated by Their Level of Decision (IN: International, N: National, R/P: Regional/Provincial, V: Valley, L: Local)

<table>
<thead>
<tr>
<th>DRIVERS</th>
<th>1796-1850</th>
<th>1850-1900</th>
<th>1900-1950</th>
<th>1950-today</th>
</tr>
</thead>
<tbody>
<tr>
<td>1796-1850</td>
<td>Political instability (IN/N)</td>
<td>Local autonomy &amp; self-governance (V-L)</td>
<td>Poor economic climate (N - R/P - V)</td>
<td>Good social cohesion (V-L)</td>
</tr>
<tr>
<td>1850-1900</td>
<td>Political stability (IN)</td>
<td>Local autonomy &amp; self-governance (V-L)</td>
<td>Economic increase and decrease (N-R/P)</td>
<td>Good social cohesion (V-L)</td>
</tr>
<tr>
<td>1900-1950</td>
<td>Major political crises/agitations (IN)</td>
<td>Local autonomy &amp; self-governance (V-L)</td>
<td>Economic decline, decline of prices of agricultural goods (IN - N)</td>
<td>Eldering of population (V-L)</td>
</tr>
</tbody>
</table>

6.3.1 International political impact

After the protective and even paternal relation with the feudal states (Feudi Imperiali), the valley became part of a large and cumbersome institutional and autocratic system, first under Napoleon, then under the Sardinian Kingdom and finally as part of the Italian Nation. The new heads of state had a complicated relation with the mountain area, since it was located far away from the regional (Liguria and later Turin) and provincial (Novi Ligure and later Alessandria) capitals, difficult to reach and without any important natural resources. The emperors asked for taxes, made statistics and overviews of the amount of cattle and production of agriculture and introduced the first demographic counting (Tacchella, 1961). However, local inhabitants
perceived this ‘control’ as rather negative. For example, when the local communities were asked to participate financially for the construction of the main road from Vignole to Carrega in the end of the 19th and beginning of the 20th century. The local inhabitants complained this case at the Province of Novi Ligure about this investment, which consequently delayed the road works. The collection of financing was started in the middle of the 19th century and the road works for Carrega started in 1914 (Serie 15 Strade comunali - Municipal roads - 25.2 1869-1877 - Elenco delle strade comunali obbligatorie).

Also today, local actors still express negative feelings towards policy decisions of the past and speak of a lack of interest as an agricultural or a cultural-historical area. Some of them even speak of Val Borbera as a ‘forgotten area’ of Piedmont. The absence of interest goes together with the absence of money to invest:

“Since the time of the ‘Feudi Imperiali’, nothing has happened here anymore. Nobody has invested in this area anymore.” (farmer-member of the Comunità Montana)

In the second half of the 20th century, international regulations and subsidies arrived in the area. Both the environmental and the rural development strategies on European level had a very local impact. When it comes to environmental policy decisions, some attempts, like the foundation of a national park in the area of Carrega (1995) were disapproved by the local actors at the time. Instead of this national park, the Site of Community Interest (SCI) ‘Massiccio of Mount Antola, Mount Carmo, Mount Legnà’ was created. At that time, the natural and rural strategies were quite contradictory. It was the remaining farming public that voted against the installation of the natural park, fearing the limitations for future rural activities. Consequently, the park was not installed, but the area became nominated as a SCI. Currently, inhabitants and especially farmers within the SCI-area feel limited by the presence of the Site:

“Now we are in a SCI-area, which means that everything is prohibited, blocked, interdicted. One that has in mind to start a project, doesn’t do it because it costs more money to project than the intervention itself.” (farmer)

Moreover, they blame the fact that there was no dialogue with the local population concerning the installation of the SCI-area and that there is still no transparency or communication between the policy makers and farmers. In this case, it was the major of one of the villages who said:

“We are completely situated within a SCI-area. If I would like to start a project on recuperation of the woodland habitat of before (cleaning, pruning, grafting etc.), I cannot do it autonomously as local authority. I have to present it to the superior
management of the SCI. But I don’t know who that is, if it is the province or the region. It is not clear.” (local inhabitant – former major)

Temporary residents, visitors, but also farmers and inhabitants of the valley outside the SCI-area have a different view on the SCI. They do not see its existence as a limitation, but even as a possibility for (environmental) development. This argument is interesting considering the fact that Val Borbera was not organised as a natural park (as happened for the Ligurian hillside with park Antola) because of too many protest by local people. The former mayor of Carrega Ligure mentioned the following:

“The characteristics of the SCI-area tells us to respect some rules to maintain the integrity of the woodland. But that doesn’t mean that we cannot cut. It means that we can cut with certain criteria.” (local inhabitant – former major)

Currently, the municipalities who are located in the SCI, and especially the municipality of Carrega Ligure, are lobbying to be incorporated in the management of the nearby national park ‘Appennino Piemontese’ (previously known as ‘Capanne di Marcarolo’), at least to improve the daily management of the SCI and the communication and transparency towards the local actors (Quattropagine – anno 7, n°4, aprile 2016).

When it comes to rural development (see Chapter 7), one major change has had an impact on the field, namely the installation of the LAG/GAL (Local Action Group) within the Leader program of the CAP. The contact person and president of the GAL Giarolo, established in 1996, made a clear division between the upper and lower parts of the valley. It needs to be taken in consideration that the area of the GAL takes a much larger part than only the val Borbera. This valley is one of the most remote valleys of the whole territory of GAL Giarolo. Asking the president of the GAL what a future strategy he would formulate for the valley, he answered:

“So the marginal areas from a marginal territory are clearly more punished than others. The GAL already includes marginal areas. The marginal of the marginal is quite difficult to develop. So maybe there is a future for specific agritourisms, widespread accommodation, recovery of tradition, ... that can be of service for the tourist, who doesn’t want to see cars, machinery, ... Instead he wants to see how cheese was made in the past, how pigs were grown. Activities that are strictly related with tourism can be productive.” (president GAL Giarolo)

When he refers to the ‘marginal of the marginal’, he underlines the importance of accessibility of areas in their level of ‘marginalisation’. The presence of the GAL is therefore mostly represented in areas which are ‘easier’ attainable and are more suitable for the production of
competitive products, like fruit, wine, salami, ... But the GAL, and therefore the subsidies on European level, remain the only financial help for new initiatives in the valley.

There is a large discontent about the role of local institutions in helping people to remain in the area and/or to create a liveable situation. This lack of interest is already linked with the emigrations of the 19th century and recur as important driver during the depopulation of the 20th century. Therefore the running atmosphere is one of non-believe and lack of interest of the local institutions. This feeling has also been detected by newcomers, who perceive a lack of help and incentives of local policy and the incapacity to promote new initiatives:

“The local institutions do not take any responsibility. They do not support new initiatives and, moreover, do not support or stimulate newcomers. Their sceptic position is detrimental for the evolution of new activities, and has a counter effect on local people.” (farmer – newcomer)

This expression of dissatisfaction reflects the overall idea of the local actors towards policy:

“To imagine somebody doing an economic valuable activity in the higher parts of Val Borbera is not possible. The higher valley doesn’t have any services. Public administration almost has no money left to clean the streets from the snow.” (temporary visitor)

However, a large need for local political support is needed. At least in the provision of services, like schools, infrastructure, etc.

“For example, multifunctional farming is a possible resource. One can have beasts, but also fruits, make marmalades, etc. That is where the public entity needs to intervene and support those possibilities.” (farmer)

6.3.2 Local autonomy & Self-governance

The poor local political presence and the lack of interest by institutions in the development of the rural mountain area were already grasped in the beginning of the 19th century. This situation was of benefit for the construction of a certain local autonomy and self-governance, which continued being strong until the large exodus after the second World War.

This local autonomy is so historically intertwined with the management of the land, since decisions from outside were perceived as a threat and as an invasion of their responsibility and therefore their identity (see Chapter 5). With the range of environmental and rural policy decisions, the local autonomy and self-governance went slightly in decline from the 1950s onwards, criticising the policy measures.
“In the 1950s, agriculture was largely subsidised for plain and easy arable areas. Together with the industrialisation, the mechanisation of agriculture made that this land was not fruitful any more. So people left.” (farmer and stayer)

Currently, the state, regional and local institutions are almost completely absent and the local autonomy finds itself in a depression. Nonetheless, blood is thicker than water, and thus the local cohesion is still present. An example is the water supply system, which was historically managed and maintained by the local maintenance groups and later by the municipalities. Today, private companies are lobbying to take over the water network. Local and small municipalities experience difficulties to continue maintaining the water network autonomously. The current major of Carrega explains in the local paper ‘Quattropagine’ why the privatisation of the water network should remain in hands of the municipality.

“Does the municipality of Carrega Ligure really cause a problem? A mountain village with a population far beneath 1000 inhabitants, an where the aqueducts are managed by ‘Consorzi Frazionali’, where villagers lend their own labor to save and offer a good service? Do we need to hand over our aqueducts that were made by sacrifices and sweat of our ancestors, for free, just to support a public-private idea? Do we need to accept a surely exponential increase of costs without not even having received an environmental plan of what investments will be made in our territory?” (major Carrega Ligure)

This battle against the privatization is an example of the local autonomy and the choice and willingness of local people to continue maintaining an independent status in relation with higher institutional levels. The choice for autonomy is made by local people, in this case by paying taxes for the maintenance of the water system, but is not everywhere supported by the local institutional level. There is a clash between the willingness for autonomy and development by a group of local people, but the negligence and disinterest by the local institutional level.

6.3.3 Economic fluctuations and ‘new’ rural initiatives

The economic situation of Europe oscillated largely during the last 200 years. The raise of a self-governing community after the ‘feudi imperiali’ lead to a more self-sufficient economy. Until the second half of the 20th century, the economy in Val Borbera was completely focussed on self-supply and survival. Everybody cultivated their own products on their land and used the common grounds (woodland or pastures) for wood production or pasturing (Moreno, 1990; Cevasco, 2007). Some products like charcoal and chestnut were produced for export to larger villages or even the city of Genoa, but the main aim was to be self-sufficient and provide the
own family. The relation between the actor and the land was situated in a small-scale context. The local economy was dominantly self-sufficient, the road infrastructure existed out of a network of paths that led to the neighbouring villages, social and cultural activities were organised in and around the villages, etc. Apart from some exceptions, like merchants, everybody lived and worked in the village. The vast and impactful abandonment created changes within the landscape, but caused also a swift in scale in the organisation of the rural life and the local economy. The highly populated local communities of the early 20th century lived in a rather limited ‘world’. Social, political and cultural activities were organised within the scale of the (surrounding) villages. And people only came in contact with the ‘outside’ world through merchants or seasonal migration.

The European economic crisis at the end of the 19th - beginning of the 20th century triggered people to migrate towards the America’s. This trend lasted until the 1950s because of the continuous economic difficulties and the political instability in the beginning of the 20th century.

“Both the transoceanic and seasonal migration have their origin in the economic need and moved the mountain people to abandon their own community and face new and often hostile environments.” (Ferrari, 2013)

The post second World War climate was dominated by the economic investments of the USA (Marshall plan) in the reconstruction of Europe and the recuperation of the agricultural market. These investments were perceived as beneficial for the industrialisation of agriculture, through machinery and crop selection, but had large consequences for the rural development in mountain areas. People see this economic booming period as the last trigger for a complete depopulation and abandonment of the area, offering jobs and stimulating industrialised agriculture in other areas. And this without offering any alternatives for the mountain areas:

“From 1965 onwards, it was no longer possible to get a sufficient salary to live from, based on agriculture. From the 1980s-90s onwards, there were no selling points anymore to sell your [agricultural] product. You could not sell your product anywhere.” (Farmer & resident)

“The investment in an intensive agriculture and animal husbandry has been crucial for the non-competition of the local agricultural products.” (Inhabitant)

Nowadays, when the mountains are almost empty, the life of the inhabitants is focussed on the outside. Social, political and cultural activities are still organised, but in combination with other large villages from the lower valley or even cities as Milan or Genoa. This ‘new’ scale corresponds very well with the living conditions before 1800 and the self-sufficient economy, when the merchandising routes had a dominant role in the local economy and the local
production was focussed on export towards the lower valleys and larger cities. The local economy of the Val Borbera nowadays consists out of four types of farms:

1) Animal husbandry with bovines, in combination with hay production to feed the cattle;
2) Animal husbandry with sheep and goat, and some bovines for cheese production mostly;
3) Wood production in combination with animal husbandry (bovines) for private production;
4) Wine production in combination with vegetables for private production.

Most of them are organised in combination with an agritourism and for example use their products (vegetables, meat, wine, ...) in the restaurant. The economy is focussed on the biological/organic and niche markets in large cities as Milan and Genoa in combination with visitors who buy the meat directly at the farm. Farmers and habitants expressed their fear for the latest economic crisis in Europe:

“This terrible economic crisis [referring to the recent economic crisis from 2008 on] will affect us first. Because we are already selling a high valued product for nothing. If the crisis continues, people can buy chickens of €2/kg and will not buy our meat. And we will not be able to survive.” (farmer)

Older farmers see their farming existence as temporal and without any following-up in the future. In their opinion, they survive because they already have a certain age and continue doing what they have been done for years. But they see no future for young people and a wholesale return to the countryside is not possible. But at the same time, they state that a better future development could be possible if there was a better road infrastructure, available housing and social and public facilities. In that case, some possibilities for economic activity could be possible. They consider the combination of multiple activities to be a viable option:

“For example, multifunctional agriculture is a possible resource. One can have beasts, but also fruits, make marmalades, etc. That is where the public authorities need to intervene and support these possibilities.” (farmer)

The other economic possibility is the production and selling of products for a niche-market, where qualitative and genuine products are sold at a relatively higher, or maybe more correct considering the production chain, a price in comparison with the conventional market prices. Young farmers even quoted that the selling of their products, often of biological/organic quality, is not a problem. The problem lies in the production:
“The problem is not the selling of the products. Everything we produce can be sold easily on local markets, to groups of people in the cities, etc. The problem is to find land, investment and local support to get a proper production.” (farmer and newcomer)

“That means having a livestock of cows, grown by grazing outside and fed with hay from the place itself. Then you have meat with another taste, another quality, you can sell it to ‘Eataly’.” (provincial and municipal employee)

The perception about the support of local institutions through subsidies and the meaning on the running subsidies are quite unanimous. Especially local farmers considered the financial instruments for rural development, the inadequate market and the weak support of local government as the main problems for a lack of ideal management.

6.3.4 Good social cohesion

An interesting aspect that popped up during the focus groups was the term ‘campanilismo’, which refers to the ‘campanile’ or the church tower. Locals perceive their culture as very closed and protective. Even between the villages, people prefer not to mix. An example of this protectionism and conflicts was the story of the construction of the road between Albera and Volpara. The villagers of Vigo and Figino were in conflict because both wanted the street to take a different route, so during the night they changed the pickets and indications on the wharf:

“When they opened the road from Albera to Volpara, they wanted to pass by Vigo, but the people of Figino did not agree. There was a lot of discussion, and during the night the pickets were removed alternately. ... Finally, the street passed first by Figino, we won.” (farmer & resident)

The still present campanilismo became clear when the story was told during the focus group by a villager of Figino. The only participant from Vigo reacted quite annoyed or even irritated by this example. This example illustrates the social cohesion that was on the one hand the basis of the local autonomy and self-governance, but, on the other hand, could be perceived as a limitation. One of the aspects that every newcomer quoted was the difficulty of the integration in the rather closed, local community:

“Being a newcomer is not always easy. It is difficult to integrate. Now, after four years, we do feel accepted, but there is still a distance and a certain non-believe on what we do. The community remains rather closed.” (farmer & newcomer)

This local closeness certainly had an impact on the relation with newcomers (see also Chapter 5). A large part of the local community is rather sceptic about the arrival of newcomers in the
area and the success of their initiatives and activities. Also the newcomers perceive a difficult acceptance by the local community. They will always remain ‘forestieri’ (foreigners).

New cultural initiatives, such as the foundation of several socio-cultural associations (see table 7.1, Chapter 7 - Forestieri, La cattiva strada, socio-cultural environmental association of Fontanachiussa, etc.), and the survival of ‘older’ associations are a sign of the remaining social cohesion of the area. Their activities range from the maintenance of roads, irrigation systems to the organisation of dancing parties, ceremonies, mostly linked with the celebration of a catholic patron and/or a historical, environmental or agricultural event:

“In 1887 there was an enormous landslide which moved the entire village of Figino, it was the day of Saint Antony of Padoa, and the yearly ceremony is celebrated in his honour.” (local inhabitant of Figino)

6.3.5 DEPOPULATION, ELDERING AND COUNTER URBANISATION

The depopulation is unanimously seen as the main cause of the land abandonment. And, as stated in 6.2.2, the large population pressure from the beginning of the 20th century, the economic difficult situation and the attraction of industrial growth and job opportunities elsewhere were considered to be the main attractions of the large exodus of the Apennine mountains. People left because elsewhere the living conditions were promised to be better (Ferrari, 2013). The depopulation of mainly the younger generations created an additional problem in the valley: elder people did not move away, no more children were born and the population eldered rapidly (cfr. vicious cycle of rural decline (Gilg, 1983)).

Respondents did not unanimous agree on the process of counter urbanisation, a rather new trend. Newcomers are often seen as individual cases and not as a more general trend of counter-urbanisation:

“Yes, there are new people arriving in the area since 20 years. Because they are in retirement, because they have money to live here without an income and have no financial worries. ... The others who start a farming business, do not realise that there is no future. I don’t think this will become a trend.” (local inhabitant and member of the Comunità Montana)

The newcomers themselves have a different opinion. They consider their arrival as the start of a trend of ‘new rural’, looking for a different type of life:

“When you look at the last 5 years, a lot of new people came to the area to start an own business. We are still little in number but we have a lot of energy and are young.
However, when you look at the nearby valleys, you can clearly see an active trend of new rurals. In the Borbera valley, this is rather slow, probably because it is not an easy valley.” (newcomer & farmer)

It must be said that the majority of the newcomers have, within their family unit, an additional economic entrance, related with a non-agricultural job, and often not even executed in the valley itself. All newcomers confirmed the difficulty to live exclusively from agricultural activities and see an additional income as an insurance for their main, farming activity.

### 6.3.6 Migrations

The migration flow after the second World War was a real exodus. It was connected with a high population pressure, but was especially triggered by the offer of comfortable working places in factories in the lower valleys of the river Scrivia (Novi Ligure, Serravalle Scrivia). The contrast of an easy, well paid job with the heavy, unsecure existence of a farmer in a highly populated area is a concept that reappears in all interviews (Ferrari, 2013). Even so, there is a difference between the emotions given to this exodus. The temporal residents and visitors still feel that they left because everybody did:

“I didn’t go very far. But in the 60s, when there were no cars, nothing, it was far. 50km from here, to Serravalle, Novi Ligure. Now it is not far, but when my family migrated, like everybody else, it was a huge distance.” (temporal resident)

The current habitants, mostly farmers, argue that the ‘others’ left because they had no other possibility and that they were even forced or largely stimulated to leave, also by the state:

“At the end of the 70s, there was the migration because the whole agricultural sector was abandoned...They (the state) wanted to reduce the agricultural population to 5%, so they didn’t do anything for the remaining farms.” (farmer)

However, the ones that remained did it for several reasons. Some stayed because of the health care their parents needed, elderly people did not want to migrate anymore, some because they continued having a small rentable farm. Mostly their decision to stay was not so much related with a conscious decision of a life on the countryside.

### 6.3.7 Transportation and Infrastructure Improving and Degradation

The industrialisation became largely visible in the valley through the road and railway constructions, the electric connection and the water supply of the 1950s/60s. The connection of
the mountains with the lower parts of the valley are perceived as the opening of the valleys towards the civilised world and, moreover, are seen as a large trigger of land abandonment. Instead of bringing civilisation towards the mountain villages, the increased accessibility facilitated the exodus of many people. The mechanisation had a large impact on the working conditions, for example with the introduction of the tractor (first one in 1958 in Figino) and the replacement of oxen to pull the tools:

“The agricultural mechanisation seemed to have brought an improvement of the living conditions, but soon it became clear that it was not sufficient to prevent the depopulation.” (Former bank employer & temporal resident)

The improvement of the infrastructure of the mountain areas was intertwined with the economic and industrial booming in other areas and attracted people to migrate away (see 6.3.6).

Currently, the use of alternative energy is becoming an interesting secondary income, especially in the higher positioned areas of the valley. The water of the mountain rivers is not retained anymore through irrigation networks for farming activities, which means a larger decline and a bigger energy production. In 2016, two new hydro-electric installations were constructed in Figino (Quattropagine, anno 7, numero 2, febbraio 2016). These are small installations with respect for the territory and are installed close to two old watermills of the valley, which originally had the same function; providing energy:

“With the central we have assured a continuous occupation for at least 40 years. Moreover, we have created a didactic route that leads us to the history of the old mill from 1929 until today.” (Quattropagine – Febbraio 2016 – anno 7 – numero 2)

The road infrastructure is largely in decline since the last 5-10 years. Local inhabitants relate this situation with the lack of investment from the provincial level, since large part of the connection roads are provincial responsibility. Every year, landslides and local inundations harm the road network badly and the street works are always rather superficial and not constructive:

“The streets are terrible. They are full of holes and become sometimes very dangerous, especially when it rains or in winter. Every year we have to wait for several months until the province comes to repair, so the municipality sometimes takes the most urgent reparations in their own hands.” (local inhabitant)
6.3.8 INTENSIFICATION AND EXTENSIFICATION

Chapter 4 already underlined the intensively used rural landscape of the agro-silvo-pastoral system that was typical for the rural mountain areas before the large land abandonment. This historic intensive landscape is considered as beautiful, clean, neat, useful, ... all adjectives that are related with beauty of the scenery on the one hand and agricultural production on the other. Moreover, a large nostalgic feeling is expressed in relation with this former landscape, often expressed by emotions.

The remaining population (mostly elder people who did not want to migrate) were not able to maintain the land and thus consequently changes in the landscape appeared. A re-wilderness invaded the rural land and a large part of the interviewees perceived those changes as a decline of biodiversity and beauty and pity the loss of their cultural rural landscape:

“I remember as a child, when we went up with the cows every day, there were daffodils everywhere. And when you arrived on the Antola, it was a tapestry of arnica Montana. Now you don’t find them anymore.” (farmer)

The temporary residents and visitors see the extensification of the rural landscape and the dominance of the woodland as a return of nature and connect the return of disappeared mammals like the wild boar, deer and wolf as a positive aspect for biodiversity. Nevertheless, farmers react furious on this phenomenon and blame the reintroduction to a bad policy of nature conservators (of the natural park Antola) and the lobby of the hunting society. Farmers are confronted with the loss of small calves and destruction of their cultivations on a daily basis.

This ‘(re)wilderness’ had several consequences for the landscapes, but also for the inhabitants. For example the local farmers perceive the landscape changes differently from other landscape actors, like the temporary visitors or policy makers.
6.4 DISCUSSION
The general correspondence between the proximate and underlying drivers during the period of investigation and landscape changes for every time period are sketched out in figures 6.1 to 6.9 and an overview is made in table 6.1. The total amount of underlying driving forces through time was 54 and the proximate drivers (7 per time period) count up to 94 manifestations. The different schemes for every period give a good idea and overview of the evolution and impact of both underlying and proximate drivers through time. Comparing the timelines of changes in environmental features and changes in human activities reveals some important features of interactions between society and nature (Bürgi & Russell, 2001). But it is not always possible to establish clear links between drivers and manifestations, as they may result from site-specific conditions or from a combination of different drivers.

The ‘metro-maps’ (figures 6.2, 6.5, 6.7, 6.9) show clearly that driving forces are a complex system and that it is the combination of driving forces and not one-on-one relations that caused land use/change changes. The most common type of causation is a combination of all five categories of underlying, indirect (distant) drivers.

This analysis gave us a much better view on the continuously change in balance between driving forces, the role of actors and their perception on driving forces and the impact of driving forces for as sustainable future development. Moreover, this study underlines the importance of including culture as driving force (Hersperger et al., 2010; Bürgi, 2004), responded to the demand to go beyond the use of aerial photography and to include different types of data on landscape change (Fuchs, 2015). This demand is interlinked with the need for long-term studies, with a historical perspective (Russel, 1997; Bürgi, 2004).

The following section discusses the change in the balance between the different underlying and proximate driving forces. Secondly, including the data collected from focus groups and interviews, it contributes to search for the role of actors on driving forces, and to a conceptual clarification of actors in similar research. And finally, it supports the added value of studying driving forces in a future sustainable development mind set.

6.4.1 Change in balance important drivers
The long term study is certainly an added value for the understanding of the evolution of the different drivers. Especially because their balance changes and fluctuates through time. In general, factors which determine landscape changes will be expected to be influential at different spatial scales and with variable strengths. The relative importance of these factors varies considerably with time (Brandt et al., 1999). Drivers can have an impact on long or short
terms and their mutual ratio can change. Often, research on driving forces concludes that the main drivers were from political or economic origin: being demographic changes, changing economy by trade, the introduction of new crops, intensification of land use by innovative techniques in agriculture and related land reforms (Overton, 2002; Butlin, 1992; Antrop, 2005). Economic driving forces were considered as the most important for shaping the landscape, followed by political driving forces (Hersperger & Bürgi, 2009).

Also in this dissertation, the economic and political underlying drivers play an important role. In the first two time phases, the interplay between the political and economic driving forces plays an important role in the development of the landscape, even if they remained on international and national level. The economic crisis and the political instability are important drivers for the land abandonment and no measures were taken on the valley or local level to avoid the depopulation flow. In the third time phase, when the land abandonment became completely dominant, the political decisions shifted more towards a local level. There was the local policy measure of the organisation of the ‘Comunità Montana’ in the 1970s, with the aim to protect and conserve the territory. The European rural and environmental development strategies of the mountain areas were introduced on valley-level starting from the 1990s. Since then, people could apply for subsidies for the recuperation of marginalised rural areas. By that time however, the damage was already done and there was virtually no target audience left to apply for these subsidies.

Generally, the economic fluctuations during the last 200 years had a large impact on the proximate drivers and their manifestations: migration, political (in)stability, land intensification and extensification, new initiatives, ... The self-sufficient economy of the 18-19th century became more and more dependent on market trades and price decisions, mostly because of the large impact of international policy decisions, even on a local level. Global and regional economic changes are increasingly influencing local landscapes (Woods, 2011). The economic booming of the lower areas of the valley and the industrialisation of the cities attracted the majority of the local inhabitants, looking for a more secure economy. The population would move to follow the economy, which is what happened throughout most of history (Woods, 2011). But this also applies to the future. A recent economic crisis attacks the job opportunities and security that was offered by the cities. Consequently, people are starting to migrate back to the countryside, looking for another type of economic security, in combination with other factors. It is rather early to speak of the term ‘counter urbanisation’, but in the lower part of the valley and in neighboring areas, the term ‘ritorno alla terra’ is already widely accepted.

The timeline with the main events and the proximate driving forces, showed that changes in market conditions, technology and policies corresponded with the extensification of land use,
which led to the almost complete disappearance of chestnut plantations, coppice woodland, cultivated land, etc. This change led to poor conditions for many bird and mammal species related to these areas. In contrast, the increase in forest area has improved habitat conditions for many forest species (Kristensen et al., 2009). So, even when agriculture remains the main land use through the whole study period, the long term ecological consequences of the landscape changes identified in the present analysis are very impactful.

This research also underlines the importance of culture as a driver of landscape change: the influence of culture on landscape change has recently gained increased attention since it was included in the frameworks presented by Brandt et al. (1999) and Bürgi et al. (2004). In this case, the strong social cohesion of the past, which apparently disappeared with the large abandonment, is still an important driver today and is strongly linked with a lack of political and institutional investment through time. It is true that the driver has changed, also because the landscape and its actors have, but it remains a strength in the future development of an area (see Chapter 5).

6.4.2 Role and perception of actors

The role of actors in this research was studied on two different levels. Firstly, the level of decision on which driving forces originate from, and secondly, the perception of current actors in relation with the main changes of the past and their most important drivers.

The first part was executed to study the overall question on the interrelation between drivers, changes and actors through time. The results show clearly that the local and valley levels of decisions are mostly related with the underlying cultural driving force. The proximate drivers that correspond with those lower levels are the local autonomy and self-governance, new rural initiatives, depopulation, degradation of road infrastructure and land intensification/extensification. It is noticeable that the local decision levels seem to have a larger impact on the manifestations of the current situation. The underlying political and economic drivers are mostly situated on international and national level. They correspond with proximate drivers as protection and conservation, major political crises, economic increase and decline, transportation and infrastructure improvement and migration. Therefore, when it comes to the level of decision, the natural/structural and cultural driving forces where organized on the local and valley level. The economic and political drivers have a larger impact when they are derived from an (inter)national and regional level. Moreover, there is a clash between the valley and local level on the one side and the national and international levels of decision on the other side. Almost no driving forces find their origin on regional/provincial level. Generally, the perception of driving forces on supra-local level is rather negative.
The second part underlines the fact that actors are the ones who take the decisions and implement the changes (Hägerstrand, 2001). It is important to understand their perception, since their position can have a large impact on the landscape changes of the future. Some driving forces were seen as important after the document analysis but were not even mentioned during the interviews and focus groups with stakeholders. When asked for, they seemed to be less important for the local actors.

The people that participated to the interviews and focus groups represented the variety of the local actors in the current landscape. As explained in Chapter 5, the identity clash was largely present. Considering the past main changes and their driving forces, all the local actors did agree about the origin of the drivers and their impact on the living conditions in the area. The discussion started with the changes and drivers of the last decennia and their impact. Age and background remain an important aspect. While newcomers are rather positive on the economic potential of the area, older people who are originally from the area do take a rather negative position. This clash between generations and background (newcomer or not) confirms the analysis of Woods (2011). At the same time, newcomers experience difficulties in the integration process. Woods (2011) stated that knowledge about the landscape and, in this case, the rural activities can help in the integration process. Especially in a mountain landscape that has a enclosed reputation, which is based on a culture of survival and autonomy, caused by the lack of interest by political institutions through time.

6.4.3 Towards a sustainable rural development

Understanding the driving forces and its actors of landscape changes leads to a better assessment towards the formulation of a potential future development, to make more informed projections and to create more reliable scenarios of future ecosystems change (sensu Clark et al., 2001; Bürgi & Schuler, 2003).

The agricultural systems in Europe have gone through significant changes in the course of the last 100-150 years. The historical analysis of changes revealed that several pathways of change lead to the present landscape pattern. The land use changes must be seen on the background of the restructuring of agriculture during the 20th century, which has been conceptualized as a shift between food regimes or between a productivist and a post-productivist phase of agriculture (Wilson, 2001; Woods, 2011). In very simple terms, they have changes from a relatively closed agro-ecosystem, relying mostly on local natural and human resources as inputs, to a widely open agro-ecosystem which relies heavily on import of nutrients and energy to sustain production levels.
Policy measures and regulations at the European level directly influence agricultural and environmental land use and its impacts. Different national and EU initiatives that promoted rural development and/or nature conservation interest in recent decades have not resulted in as many and significant landscape changes as anticipated. The historical analysis of landscape changes allows the identification of the best particular interests for future development (rural production, nature conservation, etc.) and it may therefore provide important inputs to spatial planning (Kristensen et al., 2009).

Consequently, understanding agricultural land use change processes and their drivers is important to anticipate future development trajectories and assess the influence of land related policies. Economic driving forces are largely intertwined with the constantly growing technological modernization like new installations, but also the importance of the road infrastructure. This underlying driver can play a key role for development, since it can speed up the economy and therefore the political interest. The added value of alternative energy resources could be an example. But to start with initiatives, a cultural and social cohesion and believe in development is necessary. The history of local autonomy in the valley can create small and new initiatives which bring up a dynamic and energy to a territory which can have counter effects.
CHAPTER 7
TOWARDS A SUSTAINABLE RURAL DEVELOPMENT OF RURAL MOUNTAIN LANDSCAPES
Il territorio non è lo spazio geografico né il suolo della pedologia, ma un soggetto vivente ad alta complessità, esito di processi coevolutivi, sinergici fra insediamento umano (organizzato su basi culturali) e ambiente (organizzato su basi geologiche e biologiche). In questa relazione di fecondazione e domesticazione, le società umane producono incessantemente neoecosistemi (città, infrastrutture, bonifiche, spazi agroforestali ecc.) il cui equilibrio, in quanto frutto di una relazione, richiede la continuità evolutiva di quest’ultima. Il territorio dunque cresce, si ammala, muore quando la relazione sinergica si interrompe (crisi delle civilizzazioni); rinasce, nel tempo lungo della storia, con le civilizzazioni successive.

(A. Magnaghi in Beccatini, 2016)

This chapter underlines the social relevance and the added value of landscape research for the sustainable development of rural mountain landscapes. It grasped into literature to understand the possible rural development theories and discourses (7.1) that could be of interest for the study area of the Borbera valley (7.2). Further, it defines the different roles of territory, local actors, policy and institutions for a future sustainable strategy, underlining the possibilities and opportunities and giving recommendations for further management and development (7.3). And finally, a theoretical framework is presented as the result of the aspects of rural development found in literature, in combination with their relevance for a future development of the rural mountain landscape of Val Borbera (7.4).
7.1 Rural sustainable development: not that simple

The aims of rural sustainable development are relatively straightforward: sustainable economic growth and improved living conditions, bringing rural areas up to national standards of development and ensuring that rural regions are attractive places to live and able to contribute positively to the national economy (Woods, 2011). Woods (2011) also stated that rural development strategies discursively construct the problems and challenges facing rural regions, they need to evaluate the capacities that exist in a region and lastly, they set out a vision for the future of a rural area, which becomes the objective of its actions.

But this seems easier than it is. How can strategies be developed for a valley like Val Borbera, for an area with the specific landscape changes, identity, actors and driving forces like described in chapters 4, 5 and 6? Which key elements should be tackled? What are the opportunities that the area offers? Which institutions and actors can play an important role? And which spatial and existential landscape characteristics/identity can be mobilized to enrol actions for rural development?

7.1.1 Modernization > New rural development > neo-endogeneity

After the second World War, agriculture in Europe started a modernization process, oriented towards increasing agricultural productivity and aiming for rural economic growth (Messely, 2014). This growth implied industrially driven agriculture, maximum production and farm modernization (Pinto-Correia & Kristensen, 2013; Van der Ploeg et al.; 2000; Wilson, 2001). This process caused a concentration of agricultural activities in suitable rural areas but was consequently a large driver of land abandonment of rural mountain areas (see Chapter 6). Between the 1980s and 1990s, questions were raised on the environmental impact of many modernization projects and the sustainability of its economic benefits. The modernization paradigm became increasingly questioned (Woods, 2011, p.137) and a gradual shift towards a new rural development paradigm initiated (Van der Ploeg et al., 2000). This shift corresponds with a larger interest in inward investments for endogenous development, a bottom-up innovation instead of top-down planning and territorially based integrated rural development instead of sectoral modernization (Woods, 2011- p.140-141). One of the most important shifts in comparison with the modernisation time is the aspect of endogeneity. With endogenous is meant the development of the resources found within a rural region (Ray, 1999). It is a way to come to a more resilient type of agriculture and is therefore an important strategy for abandoned rural landscapes.

Both modernization and new rural development are rather polarized and idealized typologies, and therefore not representative in reality. The introduction of the neo-endogenous rural
development, as a continuation of the shift from modernization to a new rural development, was therefore presented as a more realistic and hybrid form of rural development (Ray, 2006). In reality endogeneity needed to be pushed to another level, being attractive enough to create an image of the whole territory for people outside the area, but respected, accepted and represented by people from inside the territory. As Woods said (2011), (neo-) endogenous rural development depends on the construction and mobilization of networks of actors and resources from both within and outside a rural locality, comparable with the ‘insiders’ and ‘outsiders’ categories of Selman (2006). Or as Van der Ploeg et al. (2000) state, it is not just about ‘new things’ being added to established situations. It is about newly emerging and historically rooted realities that currently reappear as rural development experiences avant la lettre. But not only the historical background is important as a base, also the link with the spatial context, or the landscape, is unneglectable. Therefore, the prefix ‘neo’ was added, which refers to the need to reach out beyond the locality in order to be successful, including also extra-local actors (Ray, 2006). (Neo-)endogenous rural development therefore depends on the construction and mobilization of networks of actors and resources from both within and outside a rural locality (Woods, 2011; Ray, 1999).

7.1.2 **Productivism > post-productivism > multifunctionality**

Simultaneously, a second discourse discussed similar and overlapping concepts and shifts within rural development. For analytical reasons both discourses are presented here as two separate sections, revolved around the dichotomy of two concepts. The time era after the second World War was inspired by a large sense of productivism, which was at a certain point largely criticised. From that criticism arose the post-productivism, a term which does not have a clear definition (Pinto-Correia et al., 2014). As a reaction to the productivism – post-productivism transition and the lack of consensus on the meaning of the latter, the concept of ‘multifunctionality’ was proposed in the late 1990s, respecting the complexity and multi-layeredness of the rural development (Wilson, 2001; Woods, 2011). Multifunctionality has large similarities with the neo-endogenous rural development and a prominent feature of multifunctional agricultural regimes is the re-assertion of forms of farming that present agriculture not just as a means of capital accumulation, but also as a component within a wider rural system (Woods, 2011, p.87), including the production of social and environmental benefits next to food and other resources.
7.1.3 Not a linear process

Both dichotomies described before are largely interwoven and, depending on their background, other theories, concepts and reasoning were formulated. Each of them originates from:

- a more institutional and political background: modernization versus new rural development and the introduction of neo-endogenous rural development as a “way out”;
- a more academic and research background: productivism versus post-productivism and the introduction of multifunctionality as an alternative.

This gives the impression to be a linear evolution, which in practice is rarely so (Marsden, 1999, 2003; Wilson, 2001, 2007). The post-productivism transition and the new rural development do not necessarily mean the end of the productive and modernised agriculture, but rather the co-existence of this type of production with more extensive types of production (Ilbery and Bower, 1998). Only a part of the farmers in EU developed alternative approaches to manage their farm business, which led to a polarisation of the farming community into large, specialised and highly productive farm units on the one hand and smaller farms with more diversified and extensive production systems on the other hand (Kristensen, 1999; Nevens et al., 2008; Rogge, 2009).

Some landscapes, especially in Southern Europe, are characterised by multifunctional extensive farming systems, for example the historical agro-silvo-pastoral system. But this does not mean that productivism and modernisation is absent. Often, the current mentality is still focused on production and modernisation only. Those discourses demonstrate two opposing trends. A first trend is the specialisation in for example livestock production and a progressive intensification. The opposing trend is an extreme reduction in land care and further abandonment, when the outcome from production is not sufficient. Both trends result from dominant productivist strategies and a lack of seeing other, multifunctional management options (Rodrigo & Veiga, 2009 in Pinto-Correia et al., 2014). Land managers may keep a multifunctional system but they may still be aiming for being more production oriented, even when their land use system is highly valued due to its multifunctional character. With this context of inconsistency in land managers’ options and attitudes, the question rises what they will decide in the future, and thus the future of the landscape. For those landscapes, the risk lies in the disappearance of former agricultural systems, being invaded by intensification of the farming system, or the rewilding process in largely abandoned areas. At the same time, as Pinto-Correia & Kirstensen (2013) state, these areas have the strength that their specific landscape character is highly valued by society due to its potential for non-commodity functions (see Chapter 5). A transition towards a more complex and variable mix of production, consumption and protection goals (Pinto-Correia & Breman, 2009 in Pinto-Correa et al., 2014) is possible, but a shift in terms of mentality,
discourse and management practices is needed. Therefore, the non-commodity functions need to become compensated and acknowledged, so the landscapes can be managed through new forms of management of adaptation.

A neo-endogenous and multifunctional rural development visualizes a differentiated countryside, in which landscapes have unique social, cultural and environmental resources that can be harnessed in individual and divergent development paths (Woods, 2011) with the aim of sustaining the local culture and environment (Ray, 1998). Therefore, performing a landscape analysis (spatial and existential) on the land use management from a historical perspective and mapping the underlying and proximate drivers of change, can provide this knowledge and consequently facilitate the interpretation of trends of change and the role of agriculture in the rural landscape management (Pinto-Correia et al., 2014) (see Chapters 4, 5 & 6). Landscape research, based on a spatial and temporal analysis, including landscape, actors and its interactions, is a suitable way to understand and map the assets and challenges of a specific area and to define well founded recommendations for the future development of the landscape.
7.2 DIFFERENT RURAL DEVELOPMENT PATHS FOR MOUNTAIN AREAS

Since the study area of this dissertation is largely marginalized and can therefore not compete with an industrialized agriculture, its rural development should be focused on a type of agriculture that is more suitable for and in equilibrium with the landscape and the people who live in it. So what type of development path could be of value for rural mountain areas? In this section, alternative rural development paths found in literature and having a potential in the study area are being described and evaluated.

7.2.1 THE DUALITY WITHIN RURAL DEVELOPMENT PATHS

Rural development paths often include the duality of rural development policies on the one hand and rural development practices on the other. They might seem like two coherent aspects, but in reality, rural development practices do not always correspond with the outcomes of applied rural development policies. Since the practices are more related with a locally based process, they often have a higher application of the endogenous, bottom-up theory than the rural development policies, even if endogeneity is seen as primordial for the rural development policies. A large part of what Van der Ploeg (2008) calls ‘the social struggle’ lies in the range of contradictions that emerge at the interface between widespread rural development practices and the new rural development policies that now function at supranational, national, regional and local level. In Chapter 6, the discontentment of local actors towards decision-making at national and supra-national institutions was clear. While the policies were created at supra-national level, the execution and following-up of the decisions were done by the member states, which is for example the case with the LEADER program. A strict control and a high degree of formalization became the ways member states implied rural development policies. Moreover, the selected local partners often were large organizations instead of a variety of small farmers, since the higher facility to work with the first (Van der Ploeg, 2008). A situation which creates conflicts and duality within the same rural landscape.

To get to a sustainable rural development strategy, both practices and policies are needed. Literature offers a theoretical background for both, respecting the sustainability aspect for rural mountain landscapes.

A SUSTAINABLE POLICY: MULTIFUNCTIONALITY

Rural development became institutionalised on the European agenda since 2000, with the Agenda 2000 reform of the Common Agricultural Policy. It was the first time that multidisciplinary and diverse rural initiatives were promoted and farmers were motivated to
restructure their businesses. Keeping the results of the landscape analysis in mind (see Chapters 4, 5, 6), the multifunctionality debate seems to contain interesting assets for application in the study area. And more specifically because of the following reasons:

- The concept of multifunctionality refers to the multiple outcomes of agriculture, which include not only the production of food and other resources, but also social and environmental benefits (Woods, 2011);
- Multifunctionality is seen as a characteristic of national or regional agricultural regimes, focusing on the combination of farming practices across a territory (Holmes, 2006) or the holistic practices and functions of a regional industry (Hollander, 2004);
- Multifunctionality recognizes that farms (that cannot be sustained through the free market for agricultural produce) have a value to the countryside over and above their production of goods for the mass market, and seeks to enable these wider functions to be valorised in order to achieve economic sustainability (Woods, 2011, p. 82).

To get to a multifunctional agricultural regime, the meaning and purpose of the rural landscape needs to be rethought. A shift from a strictly production focus towards a view to production, consumption and protection is needed (Pinto-Correia et al., 2014; Holmes, 2006). As said before, in practice this transition is not linear, and productivism, post-productivism and multifunctionality can be present in the same landscape, even within the same farm.

**A Sustainable Practice: Repeasantisation**

Van der Ploeg (2008) proposes the concept of peasantry as a future way for rural development practices. The process of recuperation of this type of agriculture, is called **repeasantisation**. The meaning of repeasantisation is not to go back to historical multiple rural systems, but to reconsider the role of the farmer within its farm/household without losing the entire socio-economic context. Production should be oriented towards the market as well as towards the reproduction of the farm unit and the family (Van der Ploeg, 2008). From the end of the 20th century onwards, a repeasantisation process is noticed in Europe. This transition process is a counter-reaction to the modernization and specialisation processes of the post-war period and is a modern expression of the **fight for autonomy and survival in a context of deprivation and dependency** (Van der Ploeg, 2008). It involves enlarging autonomy and widening a resource base that was largely narrowed by those previous processes (Van der Ploeg, 2008, p 151) and is basically being built upon the sustained use of ecological capital and oriented towards defending and improving peasant livelihoods.
In practice though, repeasantisation has different expressions. Pluriactivity is a minor one and includes a disappearing peasantry, but is largely present in the rural mountain landscape under study (Van der Ploeg, 2008). It contains farms where a large part of the income originates from outside the farm, but nonetheless, there are strong indications that the agricultural activity will continue in the future. According to Holmes (2006, 2012), pluriactivity is both based on production and consumption, but finds itself rather far away from a vision of protection. It especially includes families that chose consciously for a rural living, in a rural landscape, executing farming activities for hobby, cultural identity or family commitment (Van der Ploeg et al., 2000). Moreover, pluriactivity is also responsible for keeping the countryside attractive. It represents a new form of social capital and makes it possible for farms that would have been forced to disappear to survive (Van der Ploeg, 2008). Farmers seek ways of reducing high levels of external input and try to develop new forms of farmers’ co-operation or pluriactivity on the bases of new, non–commodity circuits. In this way, farmers are able to ‘cushion’ their enterprise against the pressures of a globalizing agricultural market (Van de Ploeg, 2000). It is therefore a perfect application of a struggle for autonomy and survival.

7.2.2 Basic needs for rural development paths

To apply repeasantisation and multifunctionality in a rural mountain landscape, two key elements, with roots in both concepts, are necessary to get to a more integrated approach of the theories (Holmes, 2012). Firstly, the local embeddedness or the attention to territorially embedded and interconnected nature of relevant actors (Renting et al., 2009) and secondly the importance of the collectivity within a social environment (see Chapter 5).

Territory and local embeddedness

As was already stated throughout this work, the local landscape is the spatial entity in which various drivers and demands meet (Selman, 2009). The rural development approach is largely territorially based, since it combines economic, social and environmental goals within a defined territorial area (Woods, 2011). Moreover, the relation with the territory and its culture is essential to create a rural and solid development (Ray, 1999; Woods, 2011). Also in this case, there is the importance of locality or local embeddedness. Rural development paths or strategies are generally connected with the local story of a landscape (see chapters 4-5-6) and therefore need to evaluate its capacities. This is referred to as endogenous development within the new rural development paradigm (see 7.1.1).
COLLECTIVITY AND SOCIAL NEGOTIATION

As discussed in Chapter 5, the collectivity is an important asset to promote a future sustainable development of a rural landscape. The ability to get things done collectively is defined as social capital, a widespread term in rural development literature (Van der Ploeg & Marsden, 2008). In our interpretation, collectivity contributes to achieve common goals based on relations between different types of actors (individuals, groups, firms, organisations...). The common goal is to improve the quality of life in rural areas and the synergy goes beyond the individual farm enterprise (Van der Ploeg et al., 2000). Particularly important are the (potential) synergies between local and regional eco-systems (Guzman Casado et al., 2000), specific farm styles, specific goods and services, localized food-chains and finally, specific social carriers and movements (Van der Ploeg and Saccomandi, 1995). This can result in mutual benefits and ‘win-win situations’ between different activities (Van der Ploeg et al., 2000, p.392-393). Putnam’s (1993) research on the Italian civic culture interprets social capital as a complex set of interlinked and well-functioning networks that tie people together through sets of shared norms and beliefs. (Van der Ploeg, 2008, p.163).

For both multifunctionality and repeasantisation, the collectivity is an important aspect. The role of the collectivity in rural areas is strongly related with the positive judgement of agriculture’s role in the making and maintenance of the qualities of that rural area. The presence of multifunctional agricultural regimes generates new networks that become important ingredients of social capital and therefore improve the livelihood of rural area (Ventura, 2007; Van der Ploeg, 2008).

Also within the repeasantisation, collectivity plays an important role. The ability to get things done collectively makes it possible for farms, which would have been forced to disappear, to remain in business. It is therefore an essential part of this way of life, since the choice for a peasant life is largely intertwined with the choice for a livelihood in the countryside and farming (out of hobby, cultural identity or family commitment) (Van der Ploeg et al., 2000).
7.3 Val Borbera: A Suitable Landscape for Multifunctionality and Repeasantisation

The Borbera valley is part of the larger territory of the Local Action Group ‘Giarolo’ (Figure 7.1), including Val Borbera, and contains an area that is known as a border territory, with continuously changing frontiers, without any collective identity, but with a plurality of identities, expressed by the variety of given names (Quiligotti, 2015). Historically, the area has been part of different empires (see Chapter 6), with changing objectives, structures and policies. A historical name that covers the whole area is not known. In archival documents, the valley and even the villages were referred to singularly. From the 1970s onwards, several ‘new’ names came up, given by socio-cultural associations, political-administrative institutions, etc. Table 7.1 gives an overview of the associations and institutions from the 1970s onwards and the names they gave to the territory. Several attempts were made to introduce one name for the whole territory, but the identity on the scale of the valley or even of the villages remained predominant (cfr. ‘campanilismo’ - see Chapter 6). The search for a collective identity of this territory with 1001 names and the proposal of ‘new’ names remained inventions of modern times and institutions.

In comparison with the other valleys of the common territory, Val Borbera is often not actively included in the aims and objectives of the institutions and associations. Is it because of its logistic inaccessibility, because of the fact that not one typical product can be used for economic branding of the whole area? Until now, the strategic moves and developments of the other valleys do not include the Borbera valley as such and the valley itself does not seem to invest in a unique identity.

Moreover, Val Borbera is difficult to link with one typical product or image, since its individual productions are not strong enough to be economically valuable. The strength of the valley lies in the variety and plurality of the landscape and its people. The meat and cheese production, the wood production, the possibilities for alternative energy, the wine production, the local beans, the ‘natural’ aspect, etc. All this together form the image of the valley. Moreover, there is a need for an increased acknowledgement of the Borbera valley as a highly multifunctional land use system. This will open up multiple possibilities for new market driven activities as well as for increased support through public policies (Pinto-Correia et al., 2014). But such new orientations would require a paradigm shift, not only in policy targeting, but mainly in the land managers’ goals and strategies (Marsden & Sonnino, 2008; Wilson, 2009). Even if the area did not undergo the modernisation – post-modernisation – multifunctionality shift, the mentality of farming and the idea of economic profitable activities is still largely linked with modernisation and production. Evidences suggest that Mediterranean countries may not have fully entered the productivist phase, not to mention towards post-productivist modes of thinking (Wilson et al, 1999; Peco et al, 2000, Louloudis et al, 2000 in Wilson, 2001). There may be a large gap in
Mediterranean countries between post-productivist policies imposed by Brussels and farmers with staunchly productivist attitudes.

Figure 7.53: Situation of the territory of the GAL Giarolo and the two case studies of Carrega Ligure and Figino (Albera Ligure)
Thus, what is needed for the construction of future development paths of rural mountain areas, specifically Val Borbera?

The strength and the opportunities for development of the Borbera valley are clearly positioned in a multifunctional land use management and a diversification of the agricultural production. To get a better grasp on the modern way of a multifunctional agricultural regime, the history of the multifunctional land management through time is indispensable. The understanding of landscape and its changes through time is an added value for the construction of modern landscape management.

Additionally, the support of the local community and the collectivity is important because of the struggle for autonomy and its importance within a peasant mode of farming. But also the support of state institutions is important, since it can give a generative power to stimulate action, innovation, struggle and resistance, to release potentialities, to generate new struggles and to transform governance itself (Shucksmith, 2010).

When it comes to successful future development strategies, they need to be multiple, non-linear, complex and continually emergent rather than conforming to a rigid development plan. This will present a huge challenge of cultural change to actors in rural development and its realisation will depend partly on the institutional capacity of these actors in terms of knowledge resources, relational resources and mobilising capabilities (Shucksmith, 2010).

7.3.1 Local actors and their initiatives

When the multifunctionality of rural landscapes is under focus, land managers are a key target group. Future landscape changes are critically depending on the land managers’ responses to changing conditions and these responses can differ widely between different groups of farmers (Van Vliet et al. 2015). Therefore, understanding land managers’ self-concept and the different roles they are aiming at fulfilling is of crucial importance. The Borbera valley has historically been used as a multifunctional rural area. But land abandonment caused a decline in the continuous management of land and a change in types of land managers. The variety of local actors, farmers and land managers today is rather high in Val Borbera (see Chapter 5 & 6). All have other backgrounds, interests and even ambitions, resulting in different rural identities and lifestyles, co-existing with each other in the same rural territory, sharing spaces of interactions and practices (Woods, 2011). Both the rural communities and the landscape they act in are dynamic, variable and inherent to continuous changes of their environment, while in the past, the communities and landscape were rather considered to be stable and static.

Currently, three types of land managers were detected in the area:
1) Firstly, there are the remaining farms, who combine a variety of activities (livestock, a vegetable garden, picking mushrooms and wild plants, hunting, wood production, ...) with the aim to maintain their family and additionally produce for selling.

2) Secondly, there are the hobby farmers, mostly with a second house in the area, who execute more or less the same farming activities as the first group (apart from the animal husbandry), but on a less intensive scale.

3) And thirdly, there is the group of newcomers, who aim to farm professionally, but who, necessarily, need to find an income from off-farm activities, since they are not economically strong enough to survive. Thus a large part of these households combine a farming activity with an extra income source found in nearby cities and combine it therefore with commuting.

The first group is economically less dependent from the markets and has a larger form of autonomy than the last. They have a more conservationist behaviour even if they are related with a multifunctional farm. This does not necessarily mean that they have a post-productivist or even multifunctional strategy, since production remains their main goal (Pinto-Correia et al., 2014).

The second group has an opinion on rural activities that is closely related with the one from the first group, namely focused on production. Since they are not economically dependent from agriculture, their farming practices are largely multifunctional and sometimes even innovative. They do not believe in an economic potential based on agriculture of the valley.

The last group strives for a multifunctional or sometimes even a productivist mode of farming, but does not have the financial capital yet to ‘jump’. These ‘multifunctional innovative’ land managers show that it is possible to keep the Val Borbera as a multifunctional system, exploiting its multiple potentialities in an integrated way. These land managers’ rationales may be an example for others, as they all maintain well in the valley and its spatial and production outcome, likely enhancing its resilience in the face of changing markets and policies (Pinto-Correia et al., 2014). Large amount of those ‘new rurals’ are attracted by the quality of life expressed by the countryside through a social (the social cohesion and social networks that link people and allow them to obtain a grip on their own situation), economic (the availability and quality of services and productive activities) and physical dimension (the landscape, its qualities, its accessibility and the capacity to maintain it). The presence of the farmers/peasants often relates positively to that quality of life, to the quality of our food and to the need to make sustainable and efficient use of water, energy and fertile land (Van der Ploeg, 2008).

In the case study area, the need for collectivity was already stated (see Chapter 5). It is by discussing and doing things together that synergies can be created. Therefore, the role of socio-
cultural associations is quite important, because, by organising activities with and between different actors (farmers, artisans, visitors, inhabitants, ...) , they can create cohesion which appears to be a crucial, strategic element.

Several local initiatives came up from the 1970s onwards. Initially the socio-cultural aims were promoted by socio-cultural associations, for example ‘Quattro Province’ (see Table 7.1). From the 1980s onwards, socio-cultural associations started executing political-economic activities. For example ‘La strada del Sale’, founded by local farmers, was the first association that had a political and economic agenda, which was the recognition and valorisation of the local products by presenting a logo or brand. The protection of the territory was strongly related to the protection of the products, a role that was normally taken by the Comunità Montana. This first example of bottom-up decision by local actors is an example of the counter-reaction towards the modernization and the beginning of a new rural development. After a few years, the association also took up the role of raising awareness and educating farmers on biological agriculture.

Currently, there is the association Forestieri (see Table 7.1), which took up the role to support newcomers in the installation in the rural areas, starting with the search for housing and land, but also offering logistic support in the installation of a local (farming and non-farming) activity. Moreover, they organise several encounters to make it easier for newcomers to construct an internal network. Members of the association are not only farmers or people interested in farming, but include a large variety of local actors (see Chapter 5).
### Table 7.2: Active Institutions and Associations in the Giarolo-Territorial Last Time Slice (1950-Today)

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>Covers</th>
<th>Year</th>
<th>Aim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quattro province</td>
<td>Socio-cultural association</td>
<td>Val Curone, Grue, Ossona, Val Borbera, Sisola, Spinti, and half of valle Scrivia</td>
<td>°1970</td>
<td>The naming comes from etnological and musical research done in the 1970s. It corresponds with the 4 administrative areas, where the musical tradition, the instruments and the traditional dancing occurred. From the 2000s onwards, the name was adapted for the identification of the territory, also based on historical and geographical characteristics. Until than, the local population never gave a name to the area.</td>
</tr>
<tr>
<td>Comuni tà Monta na ‘Val Borbera e Spinti’</td>
<td>Political-economic institution</td>
<td>Municipality of the named valleys</td>
<td>1973-2009</td>
<td>See 7.3.2</td>
</tr>
<tr>
<td>La strada del Sale</td>
<td>Socio-cultural Association</td>
<td>°1989</td>
<td>To promote biological agriculture and to self-management in cases of lacking normatives. After 1993, when the ‘Agribiopiemonte’ was born, the Strada del Sale dedicated itself to raising awareness to a large public and farmers on principles of biological agriculture. This was done through courses, encounters, local actions and the publication of an informative and debate-stimulating cultural journal: IL GIORNALE DELLA STRADA DEL SALE.</td>
<td></td>
</tr>
<tr>
<td>GAL Giarolo</td>
<td>Local Action Groups–EU funding association</td>
<td>56 municipalities in the south-east of the province of Alessandria</td>
<td>°1996</td>
<td>Valorization of the marginalized areas in terms of culture, tourism and landscape.</td>
</tr>
<tr>
<td>Comuni tà Montana ‘Terre del Giarolo’</td>
<td>Political-economic institution</td>
<td>30 municipalities around Giarolo, but not the same territory as the GAL</td>
<td>2009-2012</td>
<td>Development agency of the mountain territory, in order to take effective measures to support mountain areas, promoting local socio-economic development, strengthening the culture of the area and raise the awareness of the mountain territory in order to take effective measures to support mountain areas, promoting local socio-economic development, strengthening the culture of the area and raise the awareness of the mountain territory.</td>
</tr>
<tr>
<td>Place</td>
<td>Association</td>
<td>Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terra di Marca Obertenga</td>
<td><a href="http://www.marcaobertenga.com">www.marcaobertenga.com</a> Simulation and collaboration of the already existing gears.</td>
<td>2013</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foresti-e-i</td>
<td><a href="http://www.forestieri.org">www.forestieri.org</a> Campania's project to reconstruct the territory at a human scale.</td>
<td>2015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unione di Comuni 'Terre Alte'</td>
<td><a href="http://www.terralerme.it">www.terralerme.it</a> Economic recovery of municipalities with less than 5000 inhabitants, to make the territory more accessible and usable.</td>
<td>2016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bisboccia Obertenga</td>
<td><a href="http://www.bisbocciaobertengo.it">www.bisbocciaobertengo.it</a> The Bisboccia Obertenga is a project that aims to create a common identity among the people of the area.</td>
<td>2016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circolo Cattiva strada</td>
<td><a href="http://www.ciclusul%E7%A2%91heel.it">www.ciclusul碑heel.it</a> A group of friends who want to make a difference in the community by creating ecological and social responsibility.</td>
<td>2015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foresti-e-i</td>
<td><a href="http://www.forestieri.org">www.forestieri.org</a> Campania's project to reconstruct the territory at a human scale.</td>
<td>2015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terra di Marca Obertenga</td>
<td><a href="http://www.marcaobertenga.com">www.marcaobertenga.com</a> Simulation and collaboration of the already existing gears.</td>
<td>2013</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.3.2 INSTITUTIONS AND THEIR POLICY

From the beginning of the 1970s, the political-economic activities were executed by a recognized institution as the Comunità Montana. This is a horizontal inter-governmental partnership at the local scale, which assists smaller rural authorities in service delivery and economic development – see Chapter 6. Their aim was to:

- Effectuate the measures of support that were given to mountain territories;
- Promote the local socio-economic development;
- Strengthen the culture of the territory;
- Continue the harmonious balance of the livelihoods of mountain people through social cohesion and economic development.

During the last 40 years, the Comunità Montana executed several projects, not always with great success, but generally they were responsible for the protection of the territory, which was strongly related to the protection of the products. Since the Comunità Montana has been dissolved, (Legge Regionale 28 settembre 2012 n.11; disposizioni organiche in materia di enti locali) there was no institution or actor responsible for the management of the mountain communities. Currently, the municipalities are stimulated to group independently themselves in ‘Unioni di Comuni Montani’ and take over the management of their territories. This process is rather devious and exhausting, since the municipalities themselves need to create their own ‘groups’. Once again, the territory needs to create new borders, new groups, new identities, etc.

A different example of policy impact is the largely known application of the (neo-)endogenous rural development concept, namely the LEADER programmes of the Common Agricultural Policy. The programmes were implemented through ‘Local Action Groups’ (LAG/GAL), each covering a territory with less than 100.000 inhabitants. The local aspect lies in the fact that the qualified territories were required to have ‘some real local identity, rather than simply respect established administrative boundaries’, not necessarily corresponding with administrative boundaries (Moseley, 2003 in Woods, 2011; Messeley et al., 2014). In 1996, the LEADER programs arrived in the area and covered a slightly larger area than the Comunità Montana, by whom it was supported from the beginning. The presence of a local entity as the Comunità Montana was necessary for the installation of the Local Action Groups, since they played an important role as partner and as voice between the institution and the locals. Within the context of LEADER II, different types of consortia where created (1999), representing the most typical products of the area: Consorzio Carne all’erba (www.carneallerba.com) for the production of meat by grazing cattle on the higher grasslands, Consorzio Salame Nobile del Giarolo (www.salamenobilegiarolo.com) for the production of the typical ‘salame’ made from the best pieces of the pig, Consorzio Piemonte Obertengo (www.piemonteobertengo.it) for the
production of wine. Those consortia were the formalization of already existing, unofficial networks in the area and were an important outcome of the LAG.

The historical research of the landscape and its driving forces underlined the social difficulties caused by modernisation: fragility of the rural institutional framework, absence of capacity building networks, lack of social fabric open to new developments. Currently, the transition to a multifunctional management model is an option, but is certainly not an easy way. Chapter 6 stated that the need for a political and institutional support for new initiatives was considered as a large lack of trust in the actors. Also, a mentality transition from productivism to post-productivism and multifunctionality is necessary. Especially since its political mobilisation is not planning techniques which will have the power to carry the place-focused decentralisation movement into the remoulding of the landscape (Healey 2006-78 in Shucksmith, 2010). With no clear definition of policy goals and support mechanisms, the future trends in management may go in multiple ways.

7.3.3 Products and their landscape

An attempt to valorise a territory by using its products was done at first by the association ‘Strada del Sale’ (see Table 7.1), which promoted biological agriculture as a future strategy to sustainable productions and sustainable management of the territory. Later, with the Leader programs, the construction of the consortia was and is an important step in the recognition of local products. The consortia focused on wine, salami and pasture produced meat. But also the local cheese ‘Montebore’, the peaches of Volpedo and the cherries of Garbagna are also locally promoted products within the area of the Leader program. It is striking that the products produced in Val Borbera are still less commercialised than in other parts of the Local Action Group (GAL – Leader). Table 7.2 gives an overview of the recognized farms in Val Borbera that produce one of the consortia products, in relation with the total amount of farms in the GAL territory. First of all, it is clear that the strongest qualities of the Val Borbera are the cheese and meat production, being quite evident in an area of higher mountains with pasture land. The wine production is rather poor in comparison with the rest of the territory. Also the ‘salame’ is mostly produced in the other valleys.

The ‘Carta enogastronomica’, published by the GAL, does not include all the products and producers of the area but only the registered farms who participated to the GAL. This selection is therefore not representative for the whole area. In both case studies, also other products and producers were observed. Some of them are not registered as producers but rather in the category ‘Ospitalità’, since they are seen as B&B’s or agriturismi. The latter category is interesting, since the term implies an agricultural activity as primarily income and the hospitality
and tourism as secondary income. Both agritourisms of Carrega are registered as ‘hospitality’, but are not reflected in the ‘production’ part, even when they rely mostly on their livestock and the production of meat and hay, together with for example a small family run restaurant that gives them the opportunity to elaborate their homemade products and sell them directly to the customers. In Figino, the production of the white beans is a local specialty, which is a good example of the historical importance of the product, since its relation with the landscape is strongly linked with the local irrigation system (beginning 19th century). This product is an example of the many products in the area that are linked with the territory, but not considered economically powerful to be part of the LAG.

**Table 7.22: Locations in Val Borbera that are part of one of the Consortia in the GAL ‘Giarolo’**

<table>
<thead>
<tr>
<th>Consortio</th>
<th>Locations in Val Borbera (x/total number in GAL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piemonte Obertengo</td>
<td>Mongiariino Ligure (1/21)</td>
</tr>
<tr>
<td>Salame Nobile del Giarolo</td>
<td>Albera Ligure, Borghetto Borbera, Cabella Ligure, Mongiardino Ligure (4/22)</td>
</tr>
<tr>
<td>Caseifici</td>
<td>Mongiardinigo Ligure, Roccaforte Ligure (3/9)</td>
</tr>
<tr>
<td>Carne all’erba</td>
<td>Albera Ligure, Cabella Ligure (2/4)</td>
</tr>
</tbody>
</table>

Currently, there are certain processes ongoing on the identification of the territory using an emblematic product such as the Timorasso wine e.g. Colli Tortonesi, Valli Curone, Grue, Ossona, and the area around Gavi. The Val Borbera has a rather low presence of the Timorasso wine in comparison with the rest of the represented territory. The valley remains in a difficult position since they are rather absent in the production chain of wine and do not entirely represent the product. But the territory, which is characterised by a multifunctional land use management and a diversification of the agricultural production, can be used as part of its identification and development process.
7.4 A SUSTAINABLE DEVELOPMENT PATH FOR RURAL MOUNTAIN AREAS

Chapters 4 and 5 described the landscape context of the Borbera valley and more specifically the spatial (referred to the local embeddedness) and existential (referred to the social capital) understanding of the landscape. It is clear that Val Borbera is a good example of a rural area that historically was used in a multifunctional peasant way and that currently finds itself blocked between a trend of total abandonment and a difficult-to-reach production mentality. The combination of the rural practice of repeasantisation and policy of multifunctionality are an option for this area. But what are the strategies that should be made? Literature underlines the need for new knowledge on those type of strategies at the farm, local and institutional level, within its landscape context and based on empirical research (Marsden, 2003; Pinto-Correia et al., 2014).

To come to a well-considered development path for rural mountain areas, with a resilient landscape management, and a large importance for agriculture, a conceptual framework was created and illustrated with examples from the case study (Figure 7.2). The presented framework is a result of the aspects of rural development found in literature, in combination with their relevance for a future development of the rural mountain landscape of Val Borbera. The individual aspects are described below.

7.4.1 RESOURCE GOVERNANCE

A large part of the autonomy within repeasantisation is the development and governance of resources. Instead of investments from outside, the emphasis is on developing the autochthonous resources of the rural landscape (Woods, 2011), preferably from a bottom-up innovation. As stated Van der Ploeg et al. (2000), there was a need for a new rural development paradigm that can help clarify how new resource bases are created, how the irrelevant is turned into a value and how, after combining with other resources, the newly emerging whole orientates to new needs, perspectives and interests (Van der Ploeg et al., 2000). This situation might seem outdated, but it is still rather new in a lot of European rural mountain landscapes. In those areas, one needs to have the knowledge and understanding about the current resources of the landscape and how they can be extracted, transformed and combined into a tool for rural development of a whole area (Whatmore, 1998; Van der Ploeg and Frouws, 1999; Van der Ploeg et al., 2000). In our opinion, the governance of resources is strongly related with the following five factors (Figure 7.2):
A first resource for a well-considered and resilient agriculture is to have an idea on the way of farming. In the cases studied in this dissertation, there is the possibility of **eco/biological farming** in response to the abundant use of chemicals in modernised and conventional agriculture. Within the modernization process, the multidisciplinary farms and the self-sustaining policy of rural life of the past centuries got lost. Currently, new multifunctional farms, with respect for the wider rural system, have growing possibilities. Organic farming is one of the most high-profile alternative models for this type of agriculture (Woods, 2011, p.87-88). Rural mountain landscapes have a large potential when it comes to this type of peasantry. One of its strengths is the pluriactivity and multifunctionality applied by the current farms and/or farming households.

Secondly, one wants to explore the possibilities of production options of the valley and find an adequate market. The production possibilities lie in the variety of products (wine, cheese, meat, beans, vegetables, ...) produced in a biological/organic and sustainable way, looking for a so-called niche-market (Woods, 2013). These niche-markets consist of strongly requested products
that, apart from having a good quality, are representative for the territory they were produced in (endogenous), looking for a unique identity and exclusiveness. This leads to a second resource, the **valorisation of products and flavours that are linked with the territory**.

A third resource is the search for **quality production**. During the modernization of the rural landscape, quality stood for large machineries, large quantities and excesses, which were impossible to use in mountain landscapes. A sustainable rural development links quality with the quality and uniqueness of the products but also of the whole production chain: the quality of land, cattle, plant varieties, labour, irrigation systems, buildings, instruments, etc. are improved, thus allow higher productive results (Van der Ploeg, 2008).

In addition, **technological modernisation and improvements** made small-scale farming more profitable and prevented the disappearance of this type of peasantry. The highly diversified flow of outputs, the re-grounding of productive activities in relatively autonomous and historically guaranteed types of reproduction and an increasing control over the labour process result in higher levels of technical efficiency (Van der Ploeg et al., 2000). Even when the productivist era is characterised by a technological and input-driven ‘treadmill’, post-productivism, which is closely linked to new types of farming techniques, benefits from technological modernisation and improvements, respecting the reduced intensity of farming and reduced use or total abandonment of biochemical inputs (Morris and Winter 1999 in Wilson, 2001).

With the change of the rural context, also the actors changed. **Different types of actors** are considered: full-time farmers, hobby farmers, recreational actors, visitors, commuting actors, ... They all feel connected with the landscape and feel that the rural landscape is ‘theirs’. Within the resource governance, it is important that different types of actors try to collaborate and form a collectivity (see 7.2.2). Evidently, strengthening the resource base is not only about resources as such, but also about the relations and networks that govern their mobilization, use and valorization (Schneider, 2006 in Van der Ploeg, 2008).

Generally, through a (re)moulding of resources (such as changing a degraded field into a more fertile field), as well as through the construction of new resource combinations and governance, higher levels of productivity might be obtained (Van der Ploeg, 2008). Not only one strategy is to be chosen, they can be stronger on weaker depending on the local embeddedness and the collectivity, but important is that they are in balance.
7.4.2 Cooperation and co-production with an Ethos & Morality

Once the resource base is governed in a well-considered and balanced way, it is through social negotiation, as there is cooperation and co-production, that the objectives of a sustainable rural development come into sight.

Cooperation is a perfect way to reunite individual interests and prospects and to extend the struggle for autonomy beyond the level of the individual farm unit (Van der Ploeg, 2008). Moreover, cooperation is a good way to stimulate collectivity, especially when local actors face the same threats and difficulties, uniting them and forming one front can make them overcome the problem. Facing a hostile environment, being ecologically, socio-economic, politically, technologically based, nearly always require some kind of cooperation (Van der Ploeg, 2008 - p34; Schejtman, 1980; Tepicht, 1973). Cooperation in those cases can lead to mutual arrangements with the aim to fight collective battles.

But the willingness to battle needs to come from the local actors, they can be catalysts for change through collectivity, but also through neo-endogenous action (Ward & Ray, 2004 in Schucksmith, 2010). There is need for an agreement/consensus on what the new rural places could be, not only focussing on private profit, but to re-assert the identity of place and the people self. Therefore, the social organisation needs to be based on mutual bonds, a feeling of togetherness and collective goals (gemeinschaft) rooted in its environment and territory, instead of individualism (gesellschaft) (Tönnies, 1887; Schucksmith, 2010; Woods, 2011). Coproduction is done between different actors, but also between actors and their environment, their landscape. It changes the relations between objects of labour, instruments and labour force and are strongly locally embedded. Producing in group creates more labour input and a certain process of intensification, this with the same amount of resources. The difficulty of cooperation and co-production in rural, abandoned mountain areas lies in the clash between the different types of identification with the landscape (see Chapter 5), more than the variety of actors. Even when actors were variable through history, the motivation for action was the collective identity. Since the collective identity is currently linked with a rejection towards innovation and investment, the rural development founds itself in an impasse.

The use of cooperatives as mechanism to create a larger autonomy was proposed by Van der Ploeg (2008). Those territorial cooperatives became quite fashionable in the beginning of the 1990s, as an effective mechanism of supporting repeasantisation. But also today, in a climate of insecure rural economy and especially for marginalised rural areas, the cooperation can be a new form of self-regulation and autonomy where rural actors are considered as active participants to the rural development of the farm and its territory or landscape.
Based on a balanced resource governance, both mechanisms, cooperation and co-production, can lead to a rural sustainable development. But how this is achieved will largely depend on the morality or ethos that is present in the landscape and its actors (Quiligotti, 2015; Van der Ploeg, 2008). This extra factor is linked with the ‘peasant battle’ and is based on shared values which origin from the history of the actors, the products and the landscape. In literature, the closest reference is the concept of ‘moral economy’ (Scott 1976 in Van der Ploeg, 2008), which forms the baseline for the present and future creation of the peasantisation. Moral economy falls back on the sense of community, the constant struggle and the focus on potential superiority. Ironically, within the modernisation climate, this moral economy remains limited to a non-modern environment and is still often linked with tradition, not economically profitable peasanting. Van der Ploeg (2008) contradicts this statement by underlying the role of moral economy in the repeasantisation discourse. Becattini (2016) speaks about a collective ‘consciousness’ that obliges inhabitants and producers to finalise the local production with the aim to valorise ‘chorally’ the patrimonial goods of the territory. Carlisle (2015) goes beyond this and states that moral economy emphasises that resource governance is a matter of social negotiation and that even state-backed laws and powerful elites must draw on popularly-held notions of legitimate practices.

### 7.4.3 Summarizing: Arriving at a Sustainable Rural Development

Resource governance together with a strong co-operation and co-production and a specific ethos and morality, will lead to a well-considered sustainable development of rural mountain areas. The development is largely linked with a specific type of agriculture, namely a peasant mode (Van der Ploeg, 2008), including mechanisms as pluriactivity and multifunctionality.

Table 7.3 gives an overview of the principles of the peasant mode of agriculture by Van der Ploeg (2008). The seven principles are applied to the case of Val Borbera. Through the **previous chapters**, several opportunities for a sustainable peasant mode were already mentioned. This table gives an overview of possible future strategies for sustainable development of rural mountain areas.
<table>
<thead>
<tr>
<th>The peasant mode (Van der Ploeg, 2008)</th>
<th>Opportunities for Val Borbera</th>
</tr>
</thead>
</table>
| Building upon and internalizing nature; co-production and co-evolution are central | - High ‘nature’ value and potential for Val Borbera (hiking, cycling, ...)  
- Historic farming system in large respect with ‘nature’ and through co-production and co-evolution |
| Distancing from markets on the input side; differentiation on the output side | - Local markets with local products  
- High quality products, perfectly adapted for a niche market |
| Centrality of craft and skill-oriented technologies | - Specialised craftsmanship as added value for the valley  
- New technological initiatives (hydro-electric installation) |
| Ongoing intensification based on quantity and quality of labour | - Intensification of land use, respecting the multiple land management with historic origins |
| Multifunctionality | - Combination of the production of wood, meat, cheese, hospitality, vegetables, wine, ...  
- Multifunctionality within the farm, but also on a valley level |
| Continuity of past, present, future | - Historic land management system still has large opportunities for current land management |
| Increasing social wealth | - Social cohesion and sense of community as attraction for moving to the countryside |
7.5 \textbf{Discussion}

Constructing a theoretical model on how to achieve a sustainable development of rural mountain areas is one thing, following the model and arriving at a sustainable system, is another. The last section of this chapter underlines the importance of the roles of the local community, institutions, landscape and policy in the rural sustainable development path.

Rural sustainable development is about the construction of new networks, the revalorization and recombination of resources, the coordination and (re-)moulding of the social and the material and the (renewed) use of socio, cultural and ecological capital (Van der Ploeg et al., 2000). In all this, it is important to know (1) the strengths and opportunities of the landscape, (2) the need to work with people, (3) the need for a decent policy response and, finally, the (4) need for a historically based struggle for autonomy.

7.5.1 \textbf{Knowing the strengths and opportunities of the landscape}

In an area where land abandonment caused large changes in biodiversity, ecosystem services, and human well-being, those changes require locally adapted management strategies for example towards purposeful rewilding or towards conservation and development of valuable cultural landscapes (Plieninger et al., 2016, p.212). But not only agriculture remains an important asset of the area, whatever its location in time and space, agriculture always articulates with nature, society and the prospects and interests of those directly involved in farming (Van der Ploeg, 2008 - 10).

The future prospects for a similar area could be nature conservation, rural development or even alternative energy production – or a combination. But considering the fact that development should also care for the conservation of landscape resources as a cultural value and for the quality of life, future strategies should not be limited to one objective, but should consider the divers character of the valley. The largest strength of the Val Borbera is certainly its variety of characteristics and its presence of a historically based multifunctional rural system. Also when it comes to branding, the valley has the possibilities to promote itself as an historical rural area, with a current variety of activities, products, personality, etc. As such, the LEADER programmes have frequently prompted the formation of new institutionalized rural territories, which have in turn become ‘brands’ for the selling for regions.
7.5.2 Need for policy response

If multifunctional landscape assets are to be enhanced and contribute to the higher resilience of the Borbera valley in the face of a changing global context, there is an urgent need to clarify policy objectives. Multifunctionality needs to be accepted as an attribute of rural landscapes at large and not be limited to farming systems. This includes a recognition of the dynamics of landscape functionality, including variability over space and time, and an attention to the current persistent trend towards complex multifunctionality (Holmes, 2012).

Current and past policies largely degraded the economic role of the landscape as an added value for typical products and tourism and decreased the quality of life for citizens who prefer a more diverse landscape and feel a very strong cultural relationship with their historical landscapes. Moreover, the lack of attention to the role of landscape resources as an added value for rural economy, protecting and favouring the upkeep of traditional practices, creating markets for typical products linking them to their landscapes, promoting the role of landscape for agritourism have been neglected in favour of other choices (Agnoletti, 2006). It is the moral economy that forms the basis for understanding alternative food network governance (Carlisle, 2015).

Moreover, the system of subsidies has contributed to the disappearance of the typical elements of cultural landscape. There is a need for spatially based approaches, where the physical characteristics of a landscape are combined with the socio-economic and cultural drivers that affect its changes (Pinto-Correia & Kristensen, 2013). The role of land managers becomes important in the valorisation of landscape qualities of their landscape within their farm management. These changes would require a deepening, re-grounding or broadening in farm activities (van der Ploeg & Marsden, 2008). But this would also require new policy orientations and targeting of the related tools (Pinto-Correia et al., 2014).

7.5.3 Need to work with people

There is also the need to work more comprehensively with land managers for a broader understanding of their options, supporting them with targeted policy tools facilitating their innovative empowerment and the construction of new land manager identities (Pinto-Correia et al., 2014). Rural regions are composed of many different communities, each with their own identities, needs, aspirations and capacities to act. Rural development strategies are no longer about imposing solutions or blue-prints for development, but are more about helping rural communities to identify their own objectives and implement their own plans for development. This transition in itself reflects a significant change in the discursive framing of rural areas, from
being perceived as ‘backward’ regions in need of assistance to being represented as capable and self-reliant regions with the capacity to develop themselves (Woods, 2011 - p159).

The development of a rural mountain area therefore needs to take into account the variety of actors and their expectations, based on a careful analysis of the new forms of cooperation and contradictions that are emerging between agricultural and non-agricultural economic actors (Van der Ploeg et al., 2000). The inclusion of the actors is important to avoid mechanisms such as social exclusion, since these can occur in rural development programmes that are used by local elites to restore their legitimacy or in the interests of clientelism. These pitfalls for development can be a risk for those institutions that were created to ‘develop’ the landscape and which end up to invest only in the development of a certain (economic) aspect of the area, excluding the more marginal and needy actors and sectors. This is a criticism that lives largely in the case study area when it comes to the role of the Comunità Montana.

7.5.4 Struggle for autonomy, historically based

This whole process of transition is found in the concept of repeasantization, being a social struggle for autonomy, but with respect for the historical background of the rural landscapes (Figure 7.3a). A background which was based on the autonomous relation between actors and landscape, having a variety of actors, but with a large collectivity aspect, which resulted in a well-managed heterogeneous landscape (multiple land cover and intensive land use). The role of the institutions was a role of control system. Through taxes and regulations higher policy levels were only interested in similar areas because of their (economic) contribution to the public treasury. But at the end, the local actors were the land managers, but also the landscape managers.

This balance of autonomy changed (Figure 7.3b). Institutions started increasing their impact on both actors and landscapes through policy decisions and regulations, towards the actors and the landscape directly. The high variety of actors also creates different expectations on the landscape, and different types of identification (Chapter 5). The landscape became homogeneous (single land cover and extensive land use) also because of the lack of land management by local actors. This system represent an heteronomous relation between actors and landscape. The local landscape is not known, interpreted, and acted by the local actors anymore. Not as producers of local products, and not as producers of a social network (Magnaghi in Becattini, 2016).
Today, a new historical perspective including rural landscapes of historical interest in its field of vision has emerged. This new type of autonomy is based on the balance between actors (heterogeneous but with a collective identity), the landscape (homogeneous but with a multifunctional identity) and the institutions (forming policies and regulations with respect for the landscape and the needs of the actors) (Figure 7.3c). The resulting local productions of such a balance have a broader positive impact on the ecology of environmental resources insofar, as they act as a ‘positive externality’ within a *produits de terroir* economy (Moreno & Poggi, 1996; Berard et al, 2006 in Cevasco & Moreno, 2015).
Chapter 8 – Conclusions

This final chapter looks back on the (hi)story that has been told throughout this dissertation and formulates general conclusions. We start by recalling the research objectives and the four major research questions that were proposed in the first chapter. We explain how each of the questions was handled in the course of this dissertation and we formulate the answers to each of these questions.

8.1 Recalling the research objectives

This dissertation had one overarching goal, namely to examine how rural sustainable development of mountain landscapes with a historical cultural and environmental value can be established, with respect for the different actors and their landscape.

We have operationalised these objectives through four research questions:

- RQ1: What is the spatial character of the landscape and how did the land abandonment process change this character through time?
- RQ2: What is the existential character of the landscape and how do actors relate themselves with this landscape through time?
- RQ3: What were the driving forces behind the spatial and existential changes and what drivers will have an impact on the future?
- RQ4: How can empirical landscape research lead to sustainable policy-making for rural mountain landscapes?

The answers to these four research questions were formulated throughout the empirical research in chapters 4, 5 and 6 and discussion of chapter 7, by using an integrated analyses combining quantitative and qualitative research methodologies. Figure 1.1 and table 8.1 give an overview on how the different chapters contributed to each research question. Chapters 1, 2 and 3 described the general introduction and theoretical framework and more specifically Chapters 2 and 3 contributed to the research questions on a more theoretical (chapter 2) or methodological (chapter 3) way. Moreover, these chapters are important to set the scene and to put the research and the results of this dissertation in a broader perspective.
**Table 8.24: Overview of the research questions and the chapters where they are handled**

<table>
<thead>
<tr>
<th>Research questions</th>
<th>Chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ1: What is the spatial character of the landscape and how did the land abandonment process change this character through time?</td>
<td>4 x 5 x</td>
</tr>
<tr>
<td>RQ2: What is the existential character of the landscape and how do actors relate themselves with their landscape through time?</td>
<td>x x</td>
</tr>
<tr>
<td>RQ3: What were the driving forces behind the spatial and existential changes and what drivers will have an impact on the future?</td>
<td>x</td>
</tr>
<tr>
<td>RQ4: How can empirical landscape research lead to sustainable policy-making for rural mountain landscapes?</td>
<td>4 x 5 x 6 x</td>
</tr>
</tbody>
</table>

### 8.2 Answering the questions

#### 8.2.1 What is the spatial character of the landscape and how did the land abandonment process change this character through time?

In the studied cases of Val Borbera, the spatial arrangement of present-day land use still reflects the agricultural structure of the first decades of the 20th century, which gradually developed from presumably the 15th century onwards. Therefore, it is important to include a historical approach into the spatial analysis and to better understand the historical dimension of the landscape to be taken into account for future strategies. The (hi)story of the landscape changes gives a better understanding of the dynamical aspect of the current spatial character of the landscape, which can only be an added value when it comes to thinking about future strategies for the same landscape.

The landscape character of both cases Carrega and Figino was detected through a long-term historical regressive spatial analysis (+/-200 years) for which multiple sources (carto- and photographic material, archival documents, field survey, semi-structured interviews and focus groups) formed the base of well-constructed GIS database. The resulting analysis showed the evolution of a landscape with an agro-silvo-pastoral system towards a largely invaded by woodland landscape, due to land abandonment. The analysis visualised the impact of the historical land management on the construction of the cultural landscape, characterised by coppice woodlands and chestnut plantations, large meadows alternated by coppice beech woodland on mountain tops and higher slopes, cultivations on less steep and fertile slopes and
shrublands on steep and southern oriented ones. The results showed that the spatial landscape character of Val Borbera remained quite stable from the end of the 19th century until the first half of the 20th century. But with from the second half of the 20th century, the spatio-temporal changes undertook a large turning point; modernization, industrialization and consequential rural depopulation led to a progressive abandonment of this mountain landscape with a more complex and intense land cover. The typically rural area underwent a spatial transformation of an increase of woodland and secondary vegetation and a decrease of coppices, plantations and cultivated land. Fallow land or shrubland and the spread of forests are a direct consequence of the end of the traditional agro-silvo-pastoral system. The speed and intensity of landscape transformations is clearly shown by diachronic analysis of resulting maps.

The spatial transformations detected in the two case studies of the Val Borbera during the last 200 years led to a conclusion of three main trends for similar rural mountain areas. Those trends caused a loss of both a cultural and environmental diversity in similar valleys, which is characteristic of the current landscape:

- From heterogeneous to homogeneous landscape;
- From multiple to single use;
- From intensification to extensification.

None of the agro-silvo-pastoral systems, combining trees, cultivation and animal production, that were common until the 1820s in the Northern Apennines are still active. Such systems had their legal basis in local bylaws: they are not fully described in the official literature as they are considered marginal and indicative of mismanagement, the result of technical and environmental poverty (Moreno, 1990). But many remembrances of this landscape survived time in the vocabulary, in the place names, in the archives, in the field (e.g. ronco, scabbia). Those tree-land systems emerge as complex and differentiated systems (both technologically and biologically), needing specific practices and knowledge to succeed. Their meaning is never taken for granted and they do not seem to lack an internal justification in the control and renewal of the resource. We know very little about the working of these historical systems and about their short and long-term environmental effects. Much work is needed to find out the threads linking such practices to the history of local society. With this example of the Val Borbera in the northern Apennines, we are starting to verify that a special cultural-historical and environmental value is connected to these multiple and local systems when they are fully working.
8.2.2 What is the existential character of the landscape and how do actors relate themselves with their landscape through time?

In cultural-historically valuable landscapes, the relation between landscape and people has changed through time. Changes in landscapes have made people feel less attached to their environment and has created an identity crisis. Through the empirical research of Chapter 5, this 'loss-of-identity' and the following need to construct a new one was not recognized, but moreover an evolution in the landscape identity was identified. This evolution or shift was detected through the spatial landscape identity (Chapter 4), but also a shift of the existential landscape identity is required to promote an adaptation strategy of both the people and the area to achieve a sustainable future development. Spatial identity is based on a broad sense of the features by which people recognize landscapes, e.g. landscape forms, patterns and elements, and are related with the landscape character itself; existential or place identity refers to a sense of belonging or attachment to a specific landscape, based on a combination of the physical and socio-cultural environment.

Considering the importance of an individual versus a collective landscape identity, we conclude that a collective landscape identity is needed to create an identity shift or evolve in the more prominent identity. The trespassing of a tipping point is therefore only possible when considering a collective and not an individual landscape identity. Generally, we conclude that the concept of landscape identity and related research topics require the employment of a temporal dimension. Empirical research has shown that a historical approach strengthens the understanding within the evolution of both landscape and people, and their interrelation, as well as helping within the use of the concept as an instrument for a future sustainable development of an area.

8.2.3 What were the driving forces behind the spatial and existential changes and what drivers will have an impact on the future?

Studying landscape changes requires a sound understanding of the underlying processes. A historical approach bears the potential to analyse processes, since processes clearly have a temporal component. But convincing examples of integrative studies of processes and the related driving forces of landscape change are still missing (Bürgi et al., 2004).

As Bürgi et al. (2004) stated, there are some major challenges to study landscape changes; namely studying processes and not merely spatial patterns, extrapolating results in space and time, linking data of different qualities, and considering culture as a driver of landscape change. Within this dissertation, and especially Chapter 6, those challenges were tackled.
Driving forces do not act alone; they often consist out of a combination or an interaction that creates proximate drivers and manifestations. Through time, the balance of the drivers changed. Driving forces of 100 years ago have lost their impact today and a new interrelation of drivers is detected. Nonetheless, certain drivers, such as economic and political ones, do have a large impact on the landscape changes through the whole time period, especially due to decisions and measures for higher institutional levels. Other driving forces, like the cultural and natural/structural ones, have more connection with the local level and are not always so dominant and clear through time. Technological drivers are mostly related with supra-local levels, but have a large impact on the local landscape changes, both in the past as in the future.

Another result is the insights in the influence of actors, especially on local level, and therefore more related with cultural driving forces. The political driving forces of the past were also largely influenced by local actors, while today there is a large aversion towards political institution and large part of the non-willingness to change is related with the lack of political, and also economic, interest on every political level.

Studying driving forces has an impact on the construction of sustainable rural development strategies for mountain areas. It gives a good overview of the societal dynamics and processes of the last 200 years, which explains the current situation of the landscape and its actors.

8.2.4 HOW CAN EMPIRICAL LANDSCAPE RESEARCH LEAD TO SUSTAINABLE POLICY-MAKING FOR RURAL MOUNTAIN LANDSCAPES?

A landscape with a historical autonomous management system converted in a heteronomous system through large scale abandonment. Both the spatial and existential changes had a degrading effect on the interrelation between actors, landscape and institutions. Since the studied landscape has a main agricultural component, the sustainable development of the landscape includes an important focus on rurality.

The climate of productivism and modernisation, with a focus on production, had its impact on the landscape changes and identity (Chapter 4 & 5) of rural mountain areas. European examples described how a post-productivist attitude and discourse is in opposition to the more productivist management, explained by land managers as needed in relation to economic survival (Marsden & Sonnino, 2008; Pinto-Correia et al., 2014). What this Southern European example shows is another combination of attitudes and practices.

Instead of an economic increase, the rural mountain landscapes became more and more marginalised and the economic role of the rural landscape degraded largely. This declining economic role of agriculture happened simultaneously with the decline in rural livelihood of the
local actors. Moreover, there is a growing perception that the rewilding of former rural areas is a favourable process, increasing the environmental value of the territory. The fact that a forest is ‘untouchable’ is representative of a hierarchy of values paying little attention to cultural landscape and denying the role of spaces and actions in biodiversity.

Parallel to these trends, there is the emergence of a bigger diversity of societal demands to the functions of rural landscapes. But it seems that no policy domain has been enhanced to change these trends – on the contrary, many European Union directives concerning rural development and nature conservation are speeding up these trends. The lack of attention given to the role of landscape resources as an added value for rural economy has been neglected in favour of other choices. This local rural economy can comprise the protection and favouring the upkeep of historical rural practices, the creation of markets for typical products linking them to their landscapes or the promotion of the role of landscape for agritourism.

The strengths of the Borbera valley lie in the multifunctional rural development. This framework with new forms and mechanisms is currently under construction. Building up new forms and development activities is largely dependent on the actors, which are, again, largely variable. Those actors compete for access to opportunities and resources in new arenas such as rural tourism and nature and landscape conservation. Therefore, potential tensions and conflicts are a rather new problem to tackle. Van der Ploeg (2000) posed some specific questions: Who will move forward and profit from this new development? Will it be large-scale agribusiness or new, ‘grass-root farmer’ co-operatives? Is division of labour and coordination possible between these various actors?

In a climate of spatial and existential change, tensions and conflicts pop up. But instead of seeing them as a threat, they create possibilities for change. A multifunctional autonomous rural system is a well-considered strategy for similar mountain areas. Executing such a strategy implies having a good knowledge of the strengths and opportunities of the landscape, a good collaboration and coproduction with the local actors, and a positive response from policy, both on local as supra-local level. Those aspects form a solid base for a historically based struggle for autonomy and therefore, a future sustainable development for rural mountain landscapes.
8.3 **Topics for future research**

In this dissertation we have focussed on the spatial and existential interrelation between landscape and actors through time. This study is academically constructed, but can have an important output for policy. Especially in Italy, where the patrimonialisation process of landscapes, but also of local products, does not necessarily include the cultural-historical and environmental value of the rural mountain landscapes.

**Buzz words**, such as *landscape, identity, sustainability, development*, are used often in patrimonialisation, but without any solid foundation. This dissertation proposed definitions, methods and analysis to give more sustenance to the terms. There is a need to see the landscape as the result of manipulations that often precede the actual ‘agrarization’ of economies. At any rate, they are ‘cultural landscapes’, shaped by productive systems in the context of historical foraging economies with a more or less continuous history (Cevasco & Moreno, 2015). A historical, interdisciplinary approach is therefore necessary. We consider that the small scale, long term analysis is important in providing evidence and context for discussions about the future of rural areas.

Future research will also be necessary to translate the results to concrete policy recommendations and into practical guidelines. Using the fashionable terms in a well-considered way and within the context of a multidisciplinary research, meaning the collaboration between academic research and stakeholders and institutions, can have an added value for the future sustainable development of rural mountain areas.
REFERENCES


Archivio - Inchiesta Istituto Nazionale di Genova della ‘Republica Ligure’ (1798-99)


Ferrari, P., (2013) *Lassù in montagna non si poteva stare. Territorio, emigrazioni e nuovi assetti sociali nelle valli alessandrine delle Quattro Province*. Menüssie de gea. 4


Geist, H. J., & Lambin, E. F. (2002). Proximate Causes and Underlying Driving Forces of Tropical Deforestation Tropical forests are disappearing as the result of many pressures, both local and regional, acting in various combinations in different geographical locations. *BioScience*, 52(2), 143-150.


References


Kitzinger, J. (1994). The methodology of focus groups: the importance of interaction between research participants. *Sociology of health & illness, 16*(1), 103-121.


Lambin, E. F., Turner, B. L., Geist, H. J., Agbola, S. B., Angelsen, A., Bruce, J. W., ... & George, P. (2001). The causes of land-use and land-cover change: moving beyond the myths. *Global environmental change, 11*(4), 261-269.


Waterton (Eds.), The Routledge companion to landscape studies (pp. 12–22). London, UK ; New York, NY, USA: Routledge.


