

**A CROSS-DISCIPLINARY APPROACH TO THE STUDY  
OF TRANSHUMANCE AS TERRITORIAL IDENTITY  
FACTOR IN A LONG-TERM PERSPECTIVE:  
THE TRATTO PROJECT - SOUTHERN TUSCANY  
PATHS AND PASTURES FROM PREHISTORY TO THE  
MODERN AGE**

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**Abstract:** *A cross- disciplinary approach to the study of transhumance as territorial identity factor in a long term perspective: the Tratto Project – Southern Tuscany paths and pastures from prehistory to the Modern Age.* The paper presents a project related to the study of transhumance's paths and pastures in Southern Tuscany in a long-term perspective, from Prehistory to the Modern Age, in collaboration with the École française of Rome. TRATTO is the first project focused on the features of Tuscan transhumance as paths and pasturages with a cross-disciplinary approach (geographers, archaeologists and historians) and using a strong GIS structure for analyses and data-gathering. The information from literature, primary and cartographic sources, material culture, paleoenvironmental data will be integrated in a unique system and analyzed through different procedures, including predicting and postdicting analyses. The aim is reconstructing the transhumance's paths and the grazing land use in some case-study areas, understanding and explaining its different factors of influence and their role in the formation of territorial identities and landscape. The project is at its early stage, consequently we focus on critical questions and methodological problems necessary to carry on our goals.

**Rezumat:** *O abordare interdisciplinară asupra studiului transhumației ca și factor de identitate teritorială pe termen lung: proiectul Tratto – Sudul Toscanei din preistorie până în perioada*



*modernă*. Lucrarea de față prezintă un proiect legat de transhumanță în sudul Toscanei, pe termen lung, din preistorie și până în perioada modernă. Proiectul este în legătură cu școala franceză din Roma. Tratto, este primul proiect centrat pe procesul transumanței în Toscana realizat din perspectivă inter-disciplinară incluzând geografi, arheologi și istorici. Proiectul utilizează procedurile GIS, prin intermediul cărora sunt reprezentate datele obținute în urma cercetării realizate. Datele obținute din sursele bibliografice, din analiza documentelor cartografice și a culturii materiale au fost integrate într-un sistem unic și analizate din perspectiva investigației predictive și post-predictive. Scopul central al cercetării este reconstrucția căilor transumanței, prin intermediul unor studii de caz. Înțelegerea și explicarea factorilor care au influențat formarea identității teritoriale și ale peisajelor locale, reprezintă obiective deosebite ale lucrării. În acest moment, proiectul este în fază incipientă. În consecință, cercetarea va fi orientată spre problemele critice sub raport metodologic în vederea atingerii obiectivelor propuse.

**Key words:** *transhumance, Tuscany, GIS analyses, multi-disciplinary approach.*

**Cuvinte cheie:** *transhumanță, Toscana, analiza GIS, abordare multi-disciplinară.*

## 1. INTRODUCTION

The project<sup>1</sup> aims to approach in a diachronic perspective the transhumance practices in Tuscany focusing on the reconstruction of paths and grazing land use within the actual Provinces of Grosseto and of (the Southern part of) Siena and Livorno. The analysis and the explanation of the interrelations between landscape and transhumance is the main goal of the project, as reveals its acronymous: TRATTO = Transhumance and Territory in Toscana (Tuscany). It is developed by a research group of the Department of History and Cultural Heritage (DSSBC) of the University of Siena in convention with the École française of Rome research project on *La transhumance en Italie centrale de la Protohistoire à nos jours* (dir. S. Bourdin, *Programme de recherche 2012-2016*)<sup>2</sup>.

The convention assures the first funds in order to gather and share data and actions with other institutional and private actors on the regional territory as well as to enlarge the further project fundraising. TRATTO is the first project focused on the features of Tuscan transhumance as paths and pasturages with a cross-disciplinary approach and using a strong GIS structure for analyses and data-gathering. This is possible thanks to the collaboration among geographers, archaeologists and historians with different expertise within the research group. The project is at its early stage, consequently in this paper, after this introduction, we focus on: 2) a brief overview of Tuscany transhumance in literature; 3) the critical questions and the general methodological problems; 4) the procedures and the actions necessary to carry on our goals.

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<sup>1</sup> This paper has been conceived in a full collaboration among the authors. In particular, the structure of the paper has been edited by: DC, MDS, GP. Moreover, DC worked on the historical issues, MDS on the geographical, GP, NV and EV on the archeological.

<sup>2</sup> See [www.efrome.it/fr/la-recherche/programmes.html](http://www.efrome.it/fr/la-recherche/programmes.html) and <http://www.dssbc.unisi.it/ricerca/progetti-di-ricerca/progetto-tratto> to consult the full presentation of the project and its completed bibliography.

## 2. TUSCANY AND TRANSHUMANCE: STORIES, PROBLEMS AND POTENTIALITIES

In this project, we assume the Braudel interpretation of transhumance practices as *longue durée* Mediterranean phenomenon. The historian, after the explanation of the three classical types of transhumance (normal, inverse and mixed) affirms that «it is impossible to do justice to this complex phenomenon by rigid classification. Transhumance implies all sort of conditions, physical, human and historical. In the Mediterranean, in its simplest form, it is a vertical movement from the winter pastures of the plain to the summer pastures in the hills. It is a way of life combining the two levels, and, at the same time, a source of human migration»<sup>3</sup>. We decide to start from this definition to use both archeological and historical assumptions and data to recognize transhumance as well as different forms of breeding, pastoralism and flocks mobility in the past. This is essential especially for study focused on Prehistory and Pre-Late Medieval Ages in general<sup>4</sup>.

Actually a wide range of historical and geographical studies has been dedicated to Medieval and Modern Age pastoralism in Tuscany, analyzing primary sources and offering a complex and dense corpus of information. These researches could pertain to three main types:

- those focused on limited areas or landscape units looking at transhumance as one of the main practice occurred in the district under study<sup>5</sup>;
- those focused on transhumance, but mostly dealing with the Maremma territory which represents the best case study of this kind of pastoral practices in Tuscany<sup>6</sup>;
- finally, those oriented to a geographical-regional approach to the phenomenon using cartographic and descriptive methodologies<sup>7</sup>.

The first two types of research, through an accurate approach on specific territories or sources, have increased our knowledge on transhumance features or segments visible in the regional landscape. Anyway, they do not provide a general interpretation on the Tuscan framework in a long time perspective. At the same time, the geographical oriented studies provide an interpretative framework connecting different territories of Tuscany, but they are mainly based on the Modern Age evidence. This framework allows one to develop a further step of analysis in order to provide deeper chronological range which considers also the previous periods spanning from Prehistory to Modern Age.

Indeed, several archaeological studies have analyzed evidence which testify pastoral practices and may be interpreted as traces of mobility and transhumance phenomena. They studied paleoenvironmental data and artifacts related to breeding activities as well as seasonal settlement strategies<sup>8</sup>. However, as concerns Tuscany, we can

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<sup>3</sup> Braudel, 1995, I, pp. 85-101: 86-87.

<sup>4</sup> See the debate summarized in Corbier, 2006, pp. 67-82.

<sup>5</sup> See: Marrara, 1961; Cherubini, 1974; Collavini, 1998; Ginatempo, 1988; Herlihy, 1973; Anselmi (ed.), 1985; Piccinni, 1989; Vaccari, 2011.

<sup>6</sup> See: Imberciadori, 2002a; Cherubini, 1981; Cortonesi, 1995-1997; Dani, 2012; Dell'Omodarme, 1996, pp. 259-303; Barsanti, 1987.

<sup>7</sup> See: Rombai, 1985, pp. 63-67; Dell'Omodarme, 1988, pp. 947-969; Id., 1990; Ciuffoletti - Calzolari (eds.), 2008; Marcaccini - Calzolari, 2003; Massaini, 2005.

<sup>8</sup> See for Prehistory: Arcangeli, 2007, pp. 137-168; Cocchi Genik, 1990, pp. 73-80; De Grossi Mazzorin, 1985a, pp. 131-171; De Grossi Mazzorin, 1985b, pp. 77-92; De Grossi Mazzorin, 1995, pp. 167-177; De Grossi

hardly find a research which takes into consideration all these approaches together, integrating historical and archaeological perspectives projected on a geographical layer. Often these works have individuated and highlighted different factors which influenced and ruled paths and pastures management. Despite this, they focus on their specific fields without foreseeing a systematic in-depth comparison of different explanations and driving forces. Moreover, the analyses of these factors often do not provide categories to describe different types of evidence and weight them in a long term perspective.

Furthermore, even if the role of transhumance in shaping the landscape have been treated within the historical debate of rural and economic transformation of marginal lands, the impact of transhumance on landscape changes has not deeply studied or assessed<sup>9</sup>. The same could be said about the archaeological field<sup>10</sup>.

In the light of this literature overview, transhumance emerges as one of the most important territorial identity factor of the old regime Tuscany. This phenomenon could be mainly defined, always according to Braudel classification, as inverse transhumance, from mountains to plains: its causes lies in the malaria presence in the coastal swampy plains, traditional end points of the flows until the 20th century, as well as in the concentration of intensive cropping system in the central hills. Furthermore, Tuscany transhumance is characterized by some peculiarities which can be summarized as follows:

- **Regional scale.** Tuscany (23.000 km<sup>2</sup>) is characterized by three main landscapes: the mountains of the Apennines (20% of the regional surface), the central hills and plains (40%), the southern area (40%) with the M. Amiata (1738 m.) and the so-called Maremma (from the latin *maritima* = coastal land). Plains, placed along the rivers (Arno, Serchio, Ombrone, Chiana), are scarce and, until the 19th-20th centuries, usually swampy and waste for the malaria. The climate, the proximity among mountains (characterized by harsh winters with scarce fodders) and lowlands (characterized by a good grass production in winter), the concentration of intensive cultivations and demographic pressure on the central hills and plains, could allow the development of many forms of moving pastoralism with different scale in the long-time and different form of integration with other agricultural practices<sup>11</sup>.

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Mazzorin, 2001, pp. 323-330; De Grossi Mazzorin, 2004; pp. 38-49. De Grossi Mazzorin, 2010, pp. 243-246; Fusi, 2008, pp. 37-50. For the Roman age: Ciacci, Firmati, 2009; Barker, 1977, pp. 725-735; MacKinnon, 2006; Quilici, 1987, pp. 143-164; Vaccaro *et alii*, 2013, pp. 129-179; Vaccaro, 2007, pp. 227-242. For the Middle Age: S. Campana (ed.), 2013. Anyway, there is not in tis overview of archaeological studies on the relationships between pastoralism and landscape a research program and a study as the one carried on by G. Barker on the Biferno valley in '70-'80 years: Barker, 1977, pp. 725-735; Barker, 1986, pp. 7-29; Barker, 1995; Barker, Hodges, Clark, 1995. An interesting and detailed overview of questions and methods of archeological researches on transhumance see the two volumes: Barker, Maggi, Nisbet,(eds), 1990-1991.

<sup>9</sup> See, among the others, the authors intervened in the debate on the causes of the Maremma underdevelopment and in particular on the transhumance growth allowed by the medieval commune of Siena in 14th-15th century and on its impact on the Southern Tuscany ecology, economy and demography: Imberciadori, 2002b; Marrara, 1961; Collavini, 1998; Ginatempo, 1988; Piccinni, 2006; Dani, 2012.

<sup>10</sup> See the works cited at the footnote n. 5. An example of archaeological research direction is the hypothesis about the transhumance influence on the parcel structure of the Grosseto plains during the 14th century in Citter - Arnoldus-Huyzendveld, 2011, pp. 137-140.

<sup>11</sup> It is possible to find in 13th-19th centuries, nearby 1) the large scale Tuscan transhumance from the Apennines to the Maremma, 2) the medium scale transhumance as the ones from the Orcia valley and the Monte Amiata to the low Ombre and Albegna valley or from the Garfagnana (North-west Apennines) to the plains around Pisa, and 3) the small scale livestock movements through the coastal territories as it is testified in the 14th century

- **The cities as political and economic driving forces** of transhumance development (12th-15th centuries). The Late Middle Age Tuscany is usually defined as a «land of cities»<sup>12</sup> to describe a region fragmented in 13 territories ruled by a city-state, an exception within the prevalent rural and feudal framework of the others European countries. This structure went on during the centuries offering the institutional, economic and social organization of the old regime Grand Duchy of Tuscany. The Tuscan cities became very soon (12th century) the economic and political centers of the territories around them. As a consequence, they began to manage and tax the transhumant flows which passed through their new lands, creating early complex institutions and offices to deal with this business (e.g. the Sienese *Dogana dei Paschi* = Custom of pasturages, which had the monopoly of Southern Tuscany pastures since 1353). At the same time the city merchants invested capitals in herds of cattle and sheep in order to produce meat, drought oxen, wool and cheese for the city and the country markets, while others introduced intensive cultivations through land-purchasing and share-cropping development. This process boosted during the 14th century crisis and the transhumance became the most well-run system to exploit the waste Apennines and coastal lands, as happened also in Spain and Southern Italy. However, unlike these countries, in Tuscany transhumant flows had to pass through the high urbanized and cultivated central areas, creating a unique system of balances and relationships among peasants, shepherds, investors and the city regimes. Furthermore, this system went on also after the development of a regional Grand Duchy, which solely reform partially the old institutional structures for transhumance management<sup>13</sup>.
- **Lack of institutional sheep-tracks** for transhumant flows unlike it happened in Spain or in Southern Italy. In Tuscany, herds used mainly common trails, roads and paths, as the medieval Via Francigena, less long (180-250 km at the most) and broad (especially through the cultivated hills areas) than the sheep-tracks created, protected and controlled by institutions as the Aragonese Custom or the Spanish Mesta. Moreover, there is an unresolved question about the continuity of use of these trails in a long-time perspective. In some case their use is testified since the Etruscan Period, but it is not clear how and when this path network changed from Prehistory to Modern Age<sup>14</sup>.

### 3. QUESTIONS AND METHODS

**The research object.** The transhumance phenomenon leaves very ephemeral traces on the ground since the related structures and pastoral facilities, by their very nature, are almost always temporary. Even the tracks (the ‘scars’ in the landscape, quoting Martín

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Maremma. For the geographical framework of Tuscany see Pinto, 1982 and the volumes C. Greppi (ed.), 1990-1993.

<sup>12</sup> See Cherubini, 1977, pp. 7-16.

<sup>13</sup> See Piccinni, 2006 and the first resume of a Ph.D. Thesis: Cristoferi, 2015.

<sup>14</sup> See: Barbieri, 1964, pp.232-234; Dell’Omodarme, 1996, p. 275; Marcaccini, Calzolari, 2003, pp. 11-15; Imberciadori, 2002a. About continuity of use of transhumance sheep-tracks see the debate on Southern Italy transhumance during Roman and Medieval Age, and in particular: Gabba, 1985, pp. 373-389; Wickham, 1985, pp. 400-455; Corbier, 2006, pp. 67-82; Martin, 2011, pp. 145-147.

and Raverdy<sup>15</sup>), are often recognizable only for short periods after their abandonment. Moreover, transhumance sometimes shares paths and facilities (roads, rest places, bridges, fords, etc.) with other types of mobility, resulting difficult to recognize its presence and characteristics. Most substantial and permanent traces are those that arise from historical documents and place-names. This fact - combined with the almost total absence of permanent material evidence - makes increasingly difficult studying the transhumance proceeding backward in time. This happens when the historical record becomes more rarefied (or absent) and the historical memory of places is lost.

Paths and pasturages are two essential material evidence of transhumance. At the same time they are the grounds for the development of transhumance and the means to shape the landscape. Moreover, their availability was the matter of conflicts and negotiations among shepherds and the other actors involved in rural activities (peasants, farmers, shepherds, cattle-owners, landholders, local and State officials, community members). Paths and pasturages were not only two parts of the same system, but often a single structure: the trails must have for each daily step enough resting areas for flock, while great pastures were usually crossed by tracks. The availability and the quality of pasturages, as well as the presence of springs, secure passages and fords strongly influenced the transhumance tracks. At the same time, the control of these resources for different forms of exploitation (breeding, cropping, fiscal revenues, manure production) was another main driving force of this complex system.

**The area.** Even if Tuscan transhumance is usually considered as a regional phenomenon, our need of setting up methodologies for in-depth analyses, leads us to circumscribe the research on a medium extent delimited territory as Southern Tuscany. This area was a seasonal target for long-distance transhumance from Apennines to Maremma (see supplemental file, p. 153). However, the medium and small distance flows occurring between M. Amiata and Maremma coastal belt constitute a complete system and are entirely included in our study area. This was characterized by a great variety of the landscape. The territory have been characterized by swampy plains and lagoons, wooded and cultivated hills, the M. Amiata, some internal small valleys and high centralized settlements. For example, during Medieval and Modern Age, mountain, hills and plains formed a strictly interrelated economic system, within which the most important economical activities (grain cropping, saltworks, grazing) were carried out in the plains in a seasonal way, because of the presence of malaria, while people lived in the highest settlement to control the territory and to escape floods and anopheles. The role played by transhumance in shaping this landscape is still object of debate. Anyway, we consider very interesting to focus our research on such variable landscape, which could be studied also as an semi-independent ecological niche. Furthermore, the project aims to create a methodological procedures to analyze the phenomena and to apply them on the whole regional territory. This is possible, in our opinion, solely setting-up the procedures on a restricted and limited area, where it could be available, as starting point, a precise quantity and quality of data and where the sources are well blended and interwoven among written and archaeological ones. Southern Tuscany has these peculiarities, thanks to a great bibliographical production and to many archaeological excavations and surveys.

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<sup>15</sup> Garcia Martín, Raverdy, 1992, pp. 361-372.

Furthermore, as we have saw in the introduction, transhumance and moving pastoralism characterized the economy of this area since the Middle Age and probably over.

**The approach.** Our approach will be characterized by: long-time perspective; landscape archaeology perspective; multi-disciplinary approach; in-depth analyses.

The long-time perspective allow us to verify the continuity or less of the phenomenon and its variation during the centuries. This approach involved contributions from archeological and historical studies. Furthermore, until now, transhumance has been studied in Tuscany focusing usually on the Late Middle Age-Modern Age period. We would offer new data for the academic debate and integrate the previous studies on Tuscan transhumance, analyzing how the use of paths and pastures changed from Prehistory to Modern Age in a area traditionally characterized by different forms of pastoralism. We are aware that continuity of use of paths or pastures could not mean exactly continuity of transhumance: in fact also in Middle or Modern Age, through primary sources, we can observe the presence different pastoralism practices running in the same area.

Transhumance is an activity performed through territories in different times using different resources. Analyzing it implies studying human-environment interrelation in a multi-disciplinary approach. Landscape archaeology offers the best tools to do it, overturning the old site-centered approach to reconstruct the whole context in which pastoralism activities developed<sup>16</sup>. Moreover, landscape archaeology, integrates different kind of methods and sources in order to carry on its goal. We consider this approach could fit very well with the object of our research, allowing to share the outcomes of different disciplines (Archaeology, History, Geography) and to compare in a deeper perspective the scenario of different periods.

Within this research pattern, we will carry on two directions: a general reconstruction of the transhumance context for each period of study (Prehistory, Etruscan-Roman Age, Middle and Modern Age) and an in-depth analysis of some case-studies and spatial units. The latter could allow us to verify the general context derived from literature and to verify it through the new data. These spatial units will be analyzed for every chronological phases in order to obtain a long-time vision of pastures and paths use.

#### 4. PROJECT ACTIONS

**GIS and Database.** The project involves the acquisition, management and analysis of large amounts of data from different types of sources. The data - and the objects to which they refer - differ by type (archaeological evidence, historical information, etc.), chronology (spanning from prehistoric to modern ages) and geometry (spot evidence, linear paths, surfaces or areas). This implies, before starting to gather information, to develop a conceptual framework concerning the involved entities and their mutual relations. This scheme constitutes the essential starting point to design and build up an efficient data management system able to represent a complex phenomenon as it is transhumance. In other words, we have to imagine a geo-database that can manage information referred to

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<sup>16</sup> See for example Barker, 1995.

heterogeneous and complex entities, their ‘geometry’ (position, shape and topology) and the related sources attesting to their existence. In order to set up a general framework for the whole region of Tuscany, some basic informative layers will be acquired. In addition to the physical and topographic setting (altimetry, slope, hydrography, etc.) we will collect data regarding known paths, facilities and toponym related to the transhumance. With regard to this issues, the previous study *I percorsi della transumanza in Toscana* (Marcaccini, Calzolari, 2003), constitutes the fundamental reference work in so far as it represents the most complete, accurate and detailed reconstruction of the Modern Age transhumance system in Tuscany at a topographic scale. The information collected from this work are the result of cartographic and historical analyses and field survey activities recording also important traces related to the social memory of this phenomenon.

**Archaeological literature and published data.** At concern archaeology issues, a first step is constituted by the analysis and monitoring of published archaeological data related to breeding, pastoralism and flocks mobility. As we have already mentioned, pastoral activities generally produce ephemeral evidence which are difficult to be preserved and identified in the field. For this reason peculiar attention will be dedicated to record information on temporary or seasonal pastoral structures (i.e huts, temporary shelters, other type of short term structures) and on artifact or ecofact evidence of secondary product transformations. Site and off-site data as well as artifact scatters will be recorded into the database according to a specific standardized criteria and geo-referenced. Evidence reserved to different periods will be collected in a unique database paying attention to record different typologies of evidence with their metadata. This allows to calibrate and evaluate the weight of artifact material culture and structures according to different cultural and preservation conditions. Attention will be also dedicated to record palaeoenvironmental data associated to archaeological finds (see above).

The exam of archaeological literature and archives will include every sort of evidence which may be connected to pastoral activities. Attention will be paid not only to direct evidence but will include also information which are indirectly related to the transhumance phenomenon. In this perspective salt production and consumption may provide interesting hints to be added to our interpretation of transhumance dataset. Salt, used to preserved meats and other animal product as cheese, may also be necessary to provide an addition and essential ingredient to animal diet. A possible suggestion could be the fact that shepherds, during the winter-pasturing, were involved in the production of salt blocks, that they used for dairy production and as exchange goods during the summer pastures in the Apennines. In the coastal zone of our study area we take into consideration the recording of evidence of salt production, probably obtained with different techniques, spanning from Prehistory to Medieval time<sup>17</sup>. It is therefore necessary to reconsider data from past archaeological excavations to analyze the record in a new perspective so that the use of salt production can be included in our dataset. Other information related to the management of animals may be connected to natural resources. For example, we can take into consideration the treatment with sulphureous water as an important therapy for some

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<sup>17</sup> See for example the excavations and results for some Southern Tuscany areas as: Negroni Catacchio, Miari, 1991-1992, pp. 393-402; Negroni Catacchio, Cardoso 2002, pp. 157-78; Aranguren, 2008, pp. 77-96; Baratti, 2010, pp. 123-142; Poesini, 2012, pp. 553-566 and bibliography; Citter, Arnoldus-Huyzendveld, 2011, pp. 54-58; Citter, Arnoldus, 2012, pp. 1-11.

epizootic diseases and other cattle illnesses which were a constant threat to sheep farmers<sup>18</sup>. The presence of sulphureous water will be acquired into the GIS as they may constitute an important elements in areas exploited for large scale transhumance favoring the maintenance of such large herds of animals as those present in the area. Also the marker of the ritual landscape can be used to analyze the presence of pastoralism. For example, as concerns Etruscan and Roman Ages, we can investigate the cults of some deities as *Hercules* (related to mobility) *Diana* (liminal area between fresh and salt water) and *Selvans/Silvanus* (management of open space in the forests and borders between cultivated and un-cultivated areas) to explore spatial relationship between them and the archeological information that attest pastoral activities<sup>19</sup>.

Other indirect information may derive by the analyses of circulation of raw materials, special goods, specific artifacts or cultural markers which may attest the existence of communication ways and circuits to which transhumance could be related<sup>20</sup>.

The recording of this wide range of archaeological information will be standardised through the compilation of a relational database which allows us to build up a set of geo-referenced information. This step is fundamental in order to organize our data to reconstruct the archaeological landscape according to different phases, type and intensity of transhumance activities. Furthermore, experimental archaeology activities will be also performed in order to explore ways, spatial and temporal conditions of transhumance itineraries.

**Literature and primary sources (History, Cartography).** Within the data gathering, an important action will concern information from historical and geographical literature and from primary sources as written documents and maps. This kind of information, both derived from archival sources, allows us to testify the transhumance phenomenon at wide regional level and, furthermore, to develop some in-depth analyses in precise areas. Anyway, this information implies some management and entering problems within the Database and the general GIS system: the wide range of their nature, their high variety of detail levels, their geometrical reproduction and finally the lack of continuity of some useful data series in a long-time perspective. As an example, we find within the rural community statutes or the Sieneese commune resolutions, some punctual information about the presence of transhumant flocks in the pasturages of a castle during a year<sup>21</sup>. Moreover, the same kind of sources testifies the continuity of the use of common lands linked to

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<sup>18</sup> See Frizell Santillo, 2004, pp. 80-93.

<sup>19</sup> The literature about the cult of Hercules is very wide: to support our suggestion we refer to the works of: Bonnet, Jourdain-Annequin, Pirenne-Delforge, (eds), 1998; Bowden, Rawlings (eds) 2005; D'Agostino, 1995, pp. 7-13; D'Agostino 1999, pp. 25-33; Stek, 1994, pp. 55-58, on the relation between Hercules and pastoralism. About the cult of Hercules in Etruria (the region between Southern Tuscany and Northern Latium during Etruscan and Roman Age) see: Naso, 1995, pp. 57-62; D'Agostino 1991, pp. 125-128; Fusco, 2008-2009, pp. 443-500. About the cult of Diana see: Nielsen, Rathje, 2009, pp. 361-301. About the cult of *Selvans/Silvanus* see: Rendeli, 1993, pp. 163-166; Chiadini, 1995, pp. 161-180; Sani, 2006; Sani, 2011, pp. 364-371. For an interpretation scheme see the PhD Thesis of Vanni, 2014, pp. 310-460.

<sup>20</sup> See for example Sarti, Morabito, Pizziolo, Poesini, in press.

<sup>21</sup> For example in a Sieneese General council resolution of 1412 was testified the presence of 127 transhumant heads of cattle in the winter Magliano pastures came from the Apennines area between Florence and Bologna (Firenze): Archivio di Stato di Siena, Consiglio generale cc. 125v-126r, 3 June 1412.

breeding during the time<sup>22</sup>. Sometimes we know for the latest period the boundaries and the placement of these commons, but often these rights and properties shifted, enlarged or restricted during the centuries. Anyway, they can be acquired as a polygon in a digital form, in order to identify the zone as a pasturage area in the past. Information that may be recorded as linear data are very scarce between Medieval and Modern Age: for the beginning of 14th century we know solely the flow directions of flocks through the Sienese territory, while the unique notice of a sheep-tracks dates 1419<sup>23</sup>. However, there are also historical cartographic sources that could give information about Modern Age trails networks or common lands boundaries: of course, they could not be always input in the GIS system<sup>24</sup>.

**Paleoenvironmental dataset.** The project aims to collect different type of paleoenvironmental data derived by archaeobotanical and archaeozoological analyses mainly referred to archaeological sites. These datasets will be used to understand the subsistence strategies occurred in the study area and individuate trends or peculiarities in the animal breeding. Other important information will be collected from paleoenvironmental analysis referred to cores, logs and other samples used for chemical analysis and soil characterization. This type of data, generally referred to single locations, will be interpolated and compared with areal or surface data derived by other cartographic and remote sensing sources (thematic maps, satellite imageries, aerial photographs) in order to attempt a reconstruction of the landscape of the past. It is very important to create a geo-referenced paleoenvironmental archive to detect individuate landscape transformations occurred in different periods.

**Survey and field activities.** A fundamental task of the project is constituted by archaeological field activities, organized in field surveys and excavations, aiming to verify hypothesis and validate interpretations derived by the elaboration of data previously input into the system. In fact, beyond the building up of thematic maps which may the distribution of archaeological and historical evidence during different phases we need to go further and investigate possible paths and pastoral corridors as well as individuate the resting pastures and places still unknown. A further step is oriented to analyze modalities and natural resources which may rule transhumance phenomenon.

The procedure is organized as following: a) analysis and comparison among the different variables related to direct and indirect pastoral evidence previously input into the system, b) Data processing and comparison with cartographic and remote sensing sources, c) Correlation of data and building up of predicting models to highlight areas with best archaeological potentialities; d) Field activities organized in archaeological survey and eventual test pits to verify archaeological potentialities related to transhumance phenomenon e) validation process and possible postdictive analysis; f) use of new data derived from field activities to update and formulate new hypotheses in virtuous

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<sup>22</sup> See for example the case of Castiglione in the Orcia valley, on the slope of M. Amiata: common lands related to breeding and transhumance are testified in: an agreement act (1328-1341), the community Statute (1440), the community *Liber iurium* (1505-1580), the reports of the Grand Duchy auditor Bartolomeo Gherardini (1676-1677), all conserved in the Archive of Siena and of Castiglione d'Orcia (Chironi, Giorgi (eds) 2000; Farinelli, Giorgi, 1998, pp. 157-263).

<sup>23</sup> See Imberciadori, 2002a; Cristoferi, 2015.

<sup>24</sup> The bases for the consulting of cartography is the catalogue published by the Geography lab of DSSBC on [www.imagotusciae.it](http://www.imagotusciae.it).

investigation cycle. Field survey activities provide also very important contributions in the analysis of landscape as a unique system and in perceiving spatial relationships among natural and anthropic transformations.

**Conclusion.** The research procedures listed above highlight the main peculiarities of this project, which aims to analyze from a systemic perspective such complex phenomenon. From integration of historical, archaeological and geographical methods we expect to obtain a new vision of synchronic scenario and diachronic processes related to transhumance. The single information will be anchored to territorial settings and the reconstruction of landscape transformation and transhumance itineraries will be performed taking advantage of data comparison. These results will be presented and discussed at different levels and will be also oriented in the analyses and appreciation of territorial identity factor. The possibility to produce cartographic and visual representation could be oriented not only to scientific purposes but also to spread the knowledge of this ancient practice and culture as well as its role in the making of Tuscan landscape.

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