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Securing and subsuming more-than-human value production in the 'mozzarella landscape' in Italy

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Abstract

This thesis investigates the securitization and subsumption of more-than-human value production in the 'mozzarella landscape' in Campania, Italy. Water buffaloes, essential in this landscape, have lived in the coastal marshlands of Campania for centuries, and buffalo milk has been used for the production of the famous mozzarella cheese. Currently, the Mozzarella di Bufala Campana PDO is an internationally acclaimed product. Nevertheless, buffalo farming and mozzarella production in the region has had to face various socio-ecological challenges in recent decades. My objective is to analyse how the processes of securitization and subsumption in the dairy farming sector contribute to more rigorous control over animal bodies, and interfere in their bodies and lives for more efficient value production. In exploring these issues, I have focused on three interrelated processes: the relationships between the subsumption of buffalo milk production and the market demand for mozzarella, the immunization of the mozzarella landscape by the means of biosecurity and traceability, and branding as the product of the landscape and the animal. My research has engaged with political ecology and political economy, animal geography and economic geography literature on value production, securitization, branding and the landscape.

This thesis is based on multi-sited field research carried out in Campania region in Italy mainly in 2018. One of the highlights of my fieldwork was a 7-week-long internship on a buffalo farm where I conducted participant and direct observation. My research has also included detailed textual analyses of newspapers, magazines and government and industry reports, in-depth and expert interviews, photography and videos. The empirical chapters of this thesis aim to investigate how the body of the buffalo has been subject to interventions for more efficient value production; how the animal body is controlled and secured as a response to socio-ecological struggles in the region; and how the buffalo body

and the landscape are incorporated in the branding of the mozzarella. The complexity of the issue made it necessary for me to engage with several concepts, but my objective is to maintain the body of the buffalo as the central theme of my analysis. My research argues that the securitization of buffalo farming and mozzarella production has indirectly made the cyclic reproductive activities of buffaloes a critical element of the political debates that can limit or enhance the globalization of the 'White Gold of Campania'. The securitization and the subsumption of the 'mozzarella landscape' with its human and nonhuman value producers demonstrate how processes of securitization, value production and the 'improvement' of biological reproduction are interlinked.

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List of abbreviations

ANASB: Associazione Nazionale Allevatori Specie Bufalina (National Association of Buffalo Breeders)

ANT: Actor–Network Theory

AOC: Appellation d'Origine Controlée (Protected Designation of Origin) is a French certification for providing geographical indications for French wine, cheese, butter, and other agricultural products. The certification is based on the concept of the terroir.

Asl: Azienda sanitaria locale (local healthcare unit, it is part of the Italian National Health Service)

CAFO: Concentrated animal feeding operation

CDO: Controlled Designation of Origin [In Italian: Denominazione di origine controllata (**DOC**)]

CReNBA: Centro di Referenza Nazionale per il Benessere Animale (Italian National Animal Welfare Reference Centre)

CReNBuf: Centro di referenza per l'igiene e tecnologia dell' allevamento e delle produzioni bufaline (National Reference Centre on Water Buffalo Farming and Productions Hygiene and Technologies)

DM: Dry matter

DOC: Denominazione di origine controllata (controlled designation of origin)

DOCG: Denominazione di origine controllata e garantita (Controlled and Guaranteed Designation of Origin)

DQA: Dipartimento Qualità Agroalimentare (Agri-food Quality Department)

HoReCa: Hotel/Restaurant/Café

IBMI: Indice di Selezione aggregato per la Bufala Mediterranea Italiana (Aggregate Selection Index for the Italian Mediterranean Buffalo)

IZSM: Istituto Zooprofilattico Sperimentale del Mezzogiorno (Experimental Zooprophylactic Institute of Southern Italy)

LSE or sometimes **LE**: Livestock equivalent [in Italian: Unità Bovine Adulte (**UBA**)= Adult bovine unit]

MiPAAF (currently: **MiPAAFT**)**:** Ministero delle politiche agricole alimentari, forestali e del turismo (Ministry of Agricultural, Food and Forestry Policies)

NYT: The New York Times

OBSM technique: Out-of-breeding season mating technique

PDO: Protected designation of origin (in Italian: DOP: Denominazione di Origine Protetta)

PGI: Protected geographical indication

PKM: Produzione di mozzarella in chilogrammi (estimated kg of mozzarella produced)

QR Code: Quick Response Code

SIAN: Sistema Informativo Agricolo Nazionale (National Agricultural Information System)

STS: Science and Technology Studies

SVIMEZ: Associazione per lo Sviluppo dell'industria nel Mezzogiorno (Association for the Industrial Development of Southern Italy)

TSG: Traditional Specialities Guaranteed

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And finally, I would like to dedicate this thesis to the memory of my great-grandfather Domokos Cseke (1888–1965). He was from a family of eight in Transylvania. Although his family did not have a whole lot of money for the education of their children, he managed to obtain a scholarship at the prestigious Eötvös József Collegium in Budapest in 1906, where he studied geography. 99 years later, I was also admitted to the Collegium as an undergraduate geography student. After his studies, Domokos Cseke became a secondary school geography teacher in Transylvania. My great-grandfather was also a member of the Hungarian Geographical Society.

Chapter 1. Introduction

1.1. From the landscape of buffaloes to the 'mozzarella landscape'

A marsh stretching along those mountains
contaminates what's been reclaimed so far;
to drain that stagnant pool as well
would be a crowning last achievement.
If I can furnish space for many millions
to live-not safe, I know, but free to work
in green and fertile fields, with man and beast
soon happy on the new-made soil
and settled in beside the mighty hill
a dauntless people's effort has erected,
creating here inside a land of Eden –
then there, without, the tide may bluster to its brim,
but where it gnaws, attempting to rush in by force,
communal effort will be quick to close the breach.
(Goethe: Faust, 2014:292)

When I first visited Ponterè, the buffalo farm where I ended up working for a few months, I took a regional train from Naples to Mondragone, the closest train station to the farm. This station is located in the countryside, at an equal distance from three nearby towns. When I got off the train, I saw a large pasture with several ponds beyond the railway lines **(Figure 1)**.

Figure 1. Water buffaloes grazing near Falciano-Mondragone-Carinola train station
(photograph by the author)

Approximately 40-50 buffaloes were grazing there and taking mudbaths in the ponds. It was a warm, sunny day, and the air was very humid after a fairly rainy spring. I could immediately sense the odour of the buffaloes and the nearby buffalo farms. This was not the suffocating smell of manure coming from intensive dairy farms, but the scent of the countryside. Buffaloes in their natural environment always offer an impressive sight. This image helped me to imagine how Terra dei Mazzoni, the marshy, bucolic landscape might have looked like a century ago, before the Fascist land reclamation projects. This time travel was very brief. Walking from the train station to the farm, I could see the signs of modern agriculture (e.g., greenhouses, large farms and monocultures) and a large amount of

Figure 2. The regions of Italy (Campania highlighted)
(basemap obtained from Marica Castigliano)

household waste dumped along the road. These were the reminders of 'la grande trasformazione' [in English: the great transformation; Di Gennaro and Innamorato (2005) used this expression to describe the transformation of the landscape in Campania region **(Figure 2)** after World War II, when agricultural areas were replaced by urban expansion at a massive scale] and the environmental degradation that altered the landscape.

Even though the original marshy landscape does not exist anymore, buffalo farming and mozzarella production are still associated with rural Campania. Over the past few decades, the Mozzarella di Bufala Campana PDO (in Italian: Mozzarella di bufala campana DOP) cheese has become one of the most popular and acclaimed Italian PDO products. Consumer demand in Italy and abroad is continuously increasing, and buffalo farming and

mozzarella production is a significant element of the regional economy (SVIMEZ, 2019). The buffalo mozzarella is often called the 'White Gold of Campania' and the 'Ferrari of the South', indicating both the economic and symbolic relevance of this cheese.

For the last two decades, however, Campania region, where most of the buffalo farms and mozzarella dairies are located, has been presented in the media news as an area permanently struggling with toxic waste pollution (De Rosa, 2017). The term 'Terra dei fuochi' (Land of Fires) was coined by Legambiente Campania (the regional branch of a national environmental organization) in 2003 in order to raise public attention to the socio-environmental conflicts (illegal waste dumping and burning) in the area between Caserta and Naples. The former President of Legambiente Campania, Michele Buonomo explained to me why this evocative name was chosen. *"We thought of the expression used by Magellan, […] we thought of all the people who travel on the ex-SS 162 NC Asse Mediano [Median Axis][1] and see these fires* [like Magellan]*"* (interview with Michele Buonomo, 14 November 2018). Some scholars and many activists have pointed at the possible links between human health conditions and waste dumping and burning in the region (e.g., 'Triangle of Death'; Senior and Mazza, 2004). Initially, the agricultural products were also suspected of containing traces of dioxin. News media both in Italy and abroad all dealt with the issue of pollution (Paravicini, 2016). Although these terms (Land of Fires and Triangle of Death) were instrumental in catching the attention of political decision-makers and in emphasizing the gravity of the problem, they also created negative and sometimes superficial media attention that had a temporary negative impact on the sales of local agricultural products. After the waste and dioxin crises and the export ban imposed by several countries, the sales of the buffalo mozzarella fell temporarily by 30%. Later, however, mozzarella cheese production has become one of the key sectors and symbols of the regeneration of the regional economy and the territory (Iuliano, 2016). In this regeneration of the mozzarella economy and the landscape, the securitization[2] and the subsumption of value production

[1] Asse Mediano or Median Axis is a dual carriageway that connects the main towns in the northern hinterland of Naples.

[2] Throughout the thesis, I have used the Oxford English Dictionary spelling (Oxford spelling), with the exception of direct quotations.

have become key mechanisms. These processes have been linked together through the body of the buffalo.

My research aims to uncover how the interrelated processes of securitization and subsumption in the buffalo farming sector in Campania contribute to more rigorous control over animal bodies and lives for more efficient value production. This chapter summarizes the research objectives and questions, my conceptual framework, and methodology. Since the empirical focus of this research is rather particular, I am going to give a brief overview of water buffalo farming in Campania, and the production of buffalo mozzarella, the 'White Gold of Campania'. Then, I am going to provide an outline of the main stakeholders of the 'mozzarella landscape', and finally, I am going to summarize the structure of the thesis.

1.2. Water buffaloes in the coastal areas of Campania

We crossed brooks and flooded places and came upon buffalo that looked like hippopotami.

(Goethe, 1787)

The water buffalo (*Bubalus bubalis;* **Figure 3**) that has become a 'charismatic' animal of the Southern Italian coastal landscapes over the centuries is a large bovid species spread across the world, especially in Southeast Asia and in other tropical and subtropical areas. The animal is the domesticated variety of the Indian wild buffalo (*bubalus arnee*; Borghese, 2005). Based on genetic, morphological and productive characteristics, water buffaloes can be divided into two main groups: swamp and river buffaloes. Humans have used swamp buffaloes mainly as draft animals and as a meat source. River buffaloes are considerably larger than swamp buffaloes, and they are reared for their high milk yield mostly in India, Pakistan and the Mediterranean regions. Water buffaloes in Europe all belong to the river type and are bred in Italy, Romania, Bulgaria, Greece, Albania, Kosovo and North

Figure 3. Water buffaloes after being milked at Ponterè on my first day at work
(photograph by the author)

Macedonia (Thurmond and Thurmond, 2017). Borghese (2005) points out that the number of buffaloes in Eastern Europe and the Balkans has decreased due to the 'holsteinization' (i.e., the replacement of regional, less productive cow and buffalo breeds with Holstein Friesian cows that have much higher milk yield) and the mechanization of agriculture (i.e., draught animals, such as buffaloes are not needed anymore), and the decreasing demand for food products made from buffalo milk. In Italy, however, the number of buffaloes bred in intensive farms has grown significantly since the 1950s.

Water buffaloes are not autochthonous animals in Italy (more about the significance of this fact on the reproduction of buffaloes in Italy in Chapter 4). They were brought to Southern Italy from Eastern Europe by the Goths at the end of the 6th century AD. Other

theories suggest that the Saracens carried water buffaloes with them to Sicily in the 10th century, and then the Normans brought the animals further to Campania in the 12th century. At that time, the extension of the marshlands in the coastal areas of Campania and Southern Lazio was the largest. The marshy areas (deadly for other grazing mammals) represented an optimum environment for the buffaloes (Pirozzi, 2007). I am going to discuss the relationship between buffalo farming and the landscape in more detail in Chapter 3 (3.4) and Chapter 6 (6.4).

The Italian Mediterranean Buffalo breed was officially recognized by MiPAAF in 2000. This recognition aimed to *"protect the characteristics* [of the breed] *developed through a process of isolation that took place over the centuries"* (ANASB, n.d.). The website of ANASB (Associazione Nazionale Allevatori Specie Bufalina, in English: National Association of Buffalo Breeders, see more details about the association in Section 1.6) describes the physical characteristics of the Italian Mediterranean Buffalo in detail.

As I have mentioned above, the number of water buffaloes bred in Italy has increased significantly over the past few decades, and they have been used almost exclusively as dairy animals. Currently, most of the buffaloes and buffalo farms are located in Campania (mainly in the Provinces of Caserta and Salerno), Southern Lazio (the Provinces of Frosinone and Latina) and Puglia (the Province of Foggia). These are also the areas where the Mozzarella di Bufala Campana PDO can be produced.

1.3. The 'White Gold of Campania': The Mozzarella di Bufala Campana PDO and the 'mozzarella landscape'

Make sure it's a good one. Grab it with two fingers,
push the mozzarella: if milk leaks take it, otherwise leave it.
[In the film called Poverty and nobility (1954),
the photographer Don Pasquale tells Felice
Sciosciammocca (Totò) how he should do the grocery]

The famous mozzarella scene[3] in the film called Poverty and nobility, starring the Neapolitan-born Totò [Antonio de Curtis (1898–1967), one of the most popular Italian performers of all time], demonstrates how vital the mozzarella cheese has been in popular culture in Southern Italy. The high-quality mozzarella being distinguished (based on its origin – Aversa[4] – and its organoleptic characteristics) from an average one has carried great value. The Mozzarella di Bufala Campana PDO is one of the most distinctive food products of Campania region (Schwartz, 1998). The cheese was officially recognized as a typical product (Protected Designation of Origin) in 1996. The provinces where most of the buffalo farms are located in Italy are also the major Mozzarella di Bufala Campana PDO producing areas. Buffalo mozzarella is a white (due to the absence of carotene in buffalo milk) fresh cheese, and it can only be produced from buffalo milk produced in buffalo farms within the certified area. The name mozzarella comes from the Italian verb 'mozzare' (in English: to cut off or to pinch off; **Figure 4**), and it indicates the practice of molding the filata curd by hand, and detaching the single mozzarella balls by using the forefinger and the thumb. By using this method, mozzarella producers manage to get the typical round shape of this fresh cheese.

[3] The mozzarella scene with subtitles is available at: https://www.youtube.com/watch?v=3sAjtmrn72M (accessed 8 May 2020).
[4] Traditionally, the buffalo mozzarella produced in Aversa has been considered the best and most authentic mozzarella cheese in Campania. Aversa is located halfway between the buffalo farming areas and Naples. In the past, buffalo mozzarella was sold at the local market (the Taverna) where prices were established every day according to supply and demand (Città di Aversa, n.d.).

Figure 4. A master mozzarella maker ('mastro casaro') is teaching a young apprentice how to pinch off the mozzarella
(photograph by the author)

The first written record of the cheese was from the Bishop's Archives in Capua from the 12th century, where the mozzarella was described as soft, fresh cheese, and it was called 'mozza' or 'provatura'.[5] Documents prove that by the 14th century, buffalo mozzarella was traded in the markets of Aversa, Naples and Salerno (Thurmond and Thurmond, 2017), and Benedictine monks offered the cheese to pilgrims visiting the San Lorenzo ad Septium Abbey in Aversa (Pirolo, 2017). The word 'mozzarella' first appeared in Bartolomeo Scappi's (the cook of the Papal court) text in 1770 (Thurmond and Thurmond, 2017).

[5] Provatura is a fresh cheese made from buffalo milk in Lazio region. It is similar to mozzarella.

Figure 5. The 'mozzarella landscape' on the poster of the PDO Mozzarella Consortium

(Source: PDO Mozzarella Consortium)

The production of the Mozzarella di Bufala Campana PDO is strictly regulated. Besides the exclusive use of the buffalo milk and the well-defined production area, the European Production Designation of Origin system rigorously defines the organoleptic and product characteristics of this cheese. According to the Consortium website, these characteristics are linked to the *"specific environmental conditions"* of the production area, and the traditional production methods. The environmental conditions of the coastal landscape (i.e., the marshlands where the water buffaloes used to graze), before the land reclamations, were associated with buffalo milk and mozzarella production for centuries. Although this landscape and the specific environmental conditions that were perfect for buffalo breeding do not exist anymore, the strong links between the cultural landscape of Campania and the mozzarella production are well-grounded.

The 'mozzarella landscape' is not just a symbolic idea, a historical element that is incorporated in the branding of the Mozzarella di Bufala Campana PDO (**Figure 5**). It also has strong material aspects. I argue that my conceptualization of the 'mozzarella landscape' is in line with Pike's argument about the geographical associations of wine brands. He claims that *"[m]aterial and symbolic geographical associations to particular places form integral elements of such wine brands: "their very existence and name cannot be separated from the production that is practised within their territory… place names and production are… inseparable"* (Moran, 1993:698 quoted in Pike, 2015:182).

The area where most of the buffalo farms are located in the Province of Caserta (Terra dei Mazzoni) is quite distinct, and different from the hinterland of Naples[6] and the coastal landscape between Pozzuoli and Mondragone which have experienced a rapid, and in many cases unregulated, urbanization process starting from the 1960s. Terra dei Mazzoni, however, has remained the agricultural heartland of the region. If someone takes the regular and not the high-speed train from Rome to Naples, the scenery that they can observe from the train window is dominated by buffalo farms between Mondragone and Villa Literno. Demand for buffalo mozzarella has risen both in Italy and abroad over the past few decades, and this has also led to the increase of the herd sizes and thus the cheese production, too. In addition, the European Union milk quotas that were introduced to prevent cow milk overproduction have also contributed to the growth of the buffalo population both in the PDO area and in other Italian regions (Liotta et al., 2015).

[6] This area, the part of 'Pianura campana' (Campanian Plain) on the border between the Provinces of Caserta and Naples, was also very fertile. Among other agricultural commodities, citrus and other fruits and olives were produced here (Andretta, 2009).

Figure 6. The approved areas (coloured in green) for the production of the Mozzarella di Bufala Campana PDO in the provinces of Campania region
(Source: Campania Region Agriculture Department)

Currently, the Mozzarella di Bufala Campana PDO can be produced only from fresh buffalo milk that comes from buffalo farms located in the certified PDO area **(Figure 6)**. Also, the mozzarella dairies have to be inside the PDO area, and they have to pass a strict certification process. The 'PDO area' consists of mainly the coastal provinces of Campania region, but specifically: the whole Province of Caserta and the Province of Salerno, three

municipalities in the Province of Benevento and nine municipalities in the Province of Naples. The Municipality of Rome and the southern part of Lazio region, a few towns around Foggia (Puglia) and a municipality in Molise region are also part of the official zone where PDO certified buffalo mozzarella can be produced (Mozzarella di Bufala Campana PDO Production Specification, 2008).

The PDO approved dairies are regularly monitored in order to ensure that they comply with the PDO specifications and quality standards. The 'Consorzio di Tutela della Mozzarella di Bufala Campana DOP' (Consortium for the Protection of the Mozzarella di Bufala Campana, from here: Consortium or PDO Mozzarella Consortium) that also monitors and represents these dairies in Campania has a strong interest in educating consumers to recognize the specific characteristics of the Mozzarella di Bufala Campana

Figure 7. A photo of a 'treccia' (braid-shaped mozzarella)
(photograph by the author)

PDO. For, example, their website (www.mozzarelladop.it/en/mozzarella) provides a detailed description of the packaging, labelling, trademarks and the warranty seal of the Mozzarella di Bufala Campana PDO.

The forms and the weight of the mozzarella are also strictly regulated. Besides the well-known rounded shape (the standard weight of the mozzarella ball is 250 grams), knots and braids ('treccia'; **Figure 7**)[7] are also produced (other accepted forms are the 'bocconcini' or mouthfuls that weigh 125 grams, 'ovoline' or eggs weighing 100 grams, 'ciliegine' or cherries of 15 grams, 'perline' or beads of 10 grams; DQA, 2014). The weight of the mozzarella can vary between 10 grams and 3 kilograms. Forming the smaller mozzarella balls is not cost-effective to produce by hand even at the small-scale dairies, and they are usually cut by machines. The larger forms are the 'aversana' (coming from the town called Aversa) of 500 grams and the famous 'zizzona' ('big boob', due to the particular shape of the mozzarella ball) from Battipaglia that weighs between 1 and 5 kilograms (this is not a PDO certified shape due to the weight limits; Thurmond and Thurmond, 2017).

Many people in rural Campania have their favourite dairies, and they know the exact hours when the mozzarella is produced, so they arrive at the counter when the mozzarella has just been cut (Schwartz, 1998). While the families wait for their weekly order of mozzarella at the dairy, they are offered cherry-sized mozzarella to eat (fieldnotes, Caseificio La Reale, Falciano del Massico, 7 October 2018). The cheese is traditionally consumed more during the spring and summer months. Day trippers who visit the beaches of Campania usually buy mozzarella at nearby dairies, and then they eat the cheese at the beach (Schwartz, 1998).

[7] A short video about the forming of the 'treccia' (braid-shaped mozzarella) in one of the dairies: *https://ln2.sync.com/dl/e2e4b1c20/6mt6q5dr-qdzm8n53-rfk9y869-wku3f587*

1.4. Research objectives, questions and original contributions

Buffalo farming and mozzarella production have been closely linked to the Campanian landscape for centuries. Nevertheless, existing literature has focused mostly on the health and veterinary aspects of the sector (Campanile et al., 2005, 2010 and 2011; di Francesco, 2010; Vecchio et al., 2018), the potential environmental impact of buffalo farming (Infascelli et al., 2007), buffalo behaviour and welfare in industrial farming settings (Faugno et al., 2015; Napolitano et al., 2013; Polikarpus et al., 2014) and the seasonal milk production of the animals (Zicarelli, 2016). Other researches have examined the potential environmental contamination risk in the food chain (Esposito et al., 2017, Santelli et al., 2006), the role of the PDO system in the marketing of the mozzarella (Bonetti, 2004), the effects of environmental problems and food scandals on consumer food choices (Cembalo et al., 2019), and the various ways in which the authenticity of the buffalo milk/cheese can be determined (so the PDO system would not be compromised; Brescia et al., 2005). Much less attention has been paid to the historical development and transformation of the 'mozzarella landscape' from a more-than-human perspective (except Gruppuso 2016 and 2018)[8], how the regulations and the seasonality of the buffaloes affect the globalization efforts in the mozzarella sector, and how the increasing demand for high-quality Made in Italy products puts pressure on the productive landscapes. Existing literature (outside veterinary medicine) has not discussed the effects of increasing control and securitization requirements in the agri-food sector on animal lives and bodies in Campania.

The buffalo farming and mozzarella producing sectors and the 'mozzarella landscape' have radically transformed after World War II. Despite the modernization of the industry and the changing living conditions of the animals, considerable efforts have been made to maintain some traditional elements in mozzarella production. Also, over the past few decades, multiple environmental issues have emerged in the area where many of

[8] More general (historical and geographical) English-language overviews about the 'mozzarella landscape' are Albolino, 2015; Pirolo, 2017; Pirozzi, 2007 and Thurmond and Thurmond, 2017.

the buffalo farms are located (and where a large percentage of the mozzarella is produced). The increasing efforts to industrialize mozzarella production and to sell the cheese on a global market while keeping some traditional elements of the production have required the optimization of food production. In addition, food safety regulations both at national and international levels have become stricter over the past few decades, and food contamination fears have corroborated the necessity of safety measures.

My aim in this research is to uncover how the interrelated processes of securitization and subsumption in the buffalo farming sector in Campania contribute to more rigorous control over animal bodies and lives for more efficient value production. This objective seeks to theoretically and empirically link the concepts of securitization and value production to the body of the buffalo. In order to understand why these notions are interconnected, I investigate the various mechanisms in which regulations, cultural and historical issues, and the physical characteristics, as well as limitations of the landscape, contribute to the transformation of animal lives and bodies through capital and science. Focusing on the body in this research helps not only to clarify how macroprocesses affect and impact individual lives and bodies [as Gillespie (2014a) argues], but my work also explores how the characteristics of the buffalo body influence political-economic processes at larger scales.

My main arguments in this thesis are the following:

1. Buffalo mozzarella production is unique in the dairy sector. Buffaloes cannot be adapted to intensive farming methods as easily as cows because of the seasonality of the reproductive cycles of the buffaloes and their udder morphology. Also, the strict regulation of the production of the Mozzarella di Bufala Campana PDO, and the fact that the mozzarella is a fresh cheese, affect both its production and distribution. The intensification of buffalo farming, market logics and the strict Protected Designation of Origin regulations have required the optimization of milk

production through the 'real subsumption of nature' (Boyd et al., 2001; more about the real subsumption of nature in Chapter 2 and Chapter 4). The markets for high-quality PDO food products are continuously growing. Still, regulations and branding processes aim to maintain the image of traditional and small-scale food production in the PDO sector. The real subsumption of nature, in this case, serves the intensification and globalization of the product in a way that the traditional elements from the consumer's perspective are maintained. The animals' lives, however, are increasingly circumvented in order to provide the raw material for a growing, strictly regulated and consumer-driven market.

2. My work investigates how both market mechanisms and food security concerns affect and impact animal bodies and lives through the processes of immunization, and what the immunization of the productive landscape means, in this case, referring to the 'mozzarella landscape' in Campania. I demonstrate that the securitization of food landscapes involves humans, animals and other nonhuman living and non-living elements. The immunitary logic is relatively successful in keeping the productive landscapes 'free from undesirable things', and it may seem that it improves both human and animal lives. Nevertheless, the improvement of animal lives is marginal, and the immunization also reinforces the human–animal divide.
3. I argue that humans and nonhumans, such as animals, co-create productive agri-food landscapes. Focusing on how food branding incorporates the value-producing animals and the landscape in the branding processes reveals that humans and nonhumans co-produce landscapes, and food branding involves both symbolic and material elements. I also emphasize the role of the body and the landscape in the branding process, and I move away from the idea that branding is purely a discursive and symbolic notion and process.

At a conceptual level, my work engages with political ecology, economic geography and animal geography literature on value production, securitization and the body to uncover the links between lively capital and 'more-than-human' securitization through the lens of

the body and the life of the buffalo. These issues are usually discussed separately in political ecology. However, as Neumann (2005) argues, political ecology as an interdisciplinary approach is particularly apt for investigating complex, multi-faceted issues.

Over the past two decades, political ecologists have paid increased attention to the relationships between value, nature and capitalism (Kay and Kenney-Lazar, 2017; Moore, 2015; Walker, 2017). Scholars have pointed out how the value of nature changes over time and different communities can value nature in variegated ways (Collard and Dempsey, 2017; Collard, 2018). In addition, critical analyses have started investigating the various practices that have aimed to 'improve' and subsume nature's value-producing capacities (Boyd, 2001; Boyd et al., 2001; Prudham, 2003; Boyd and Prudham, 2017).

A largely separate body of literature has examined the securitization of nonhuman nature (Philo, 2015). This scholarship has also investigated security from the perspective of critical geopolitics (Grove, 2009; Le Billon and Duffy, 2018), conservation (Massé, 2018; Massé and Lunstrum, 2016; Margulies, 2019a), biosecurity (Buller, 2008, Hinchliffe and Bingham, 2008; Hinchliffe and Ward, 2014; Barker, 2015) and health (MacLean, 2008). My objective is to explore the securitization (biosecurity, food security in its broadest sense, economic security) efforts from a more-than-human perspective and to examine how humans, animals and non-living elements influence these mechanisms and how they are affected by them.

Given the interdisciplinary characteristics of political ecology, this research has allowed me to explore the transformation of the mozzarella landscape in Campania from a variety of perspectives in a broader context. As I will uncover in the following chapters, the subsumption and securitization of the dairy buffalo farming sector in Campania are interlinked processes, and they have been developed in parallel. Buffalo bodies have been subject to various interventions in order to control and subsume their productive capacities. The decision to link the concepts of securitization and value production together in this thesis was based on my empirical findings in Campania. Although I engage with a number of concepts (such as the real subsumption of nature, immunization,

branding and landscape) throughout the thesis in order to explore the key mechanisms in the 'mozzarella landscape', I keep the buffalo body the central theme of my argument.

On the one hand, the various attempts to secure the 'mozzarella landscape' – via branding and biosecurity mechanisms, including traceability – have resulted in growing consumer demand and increasing control over the productive animal body. On the other hand, subsuming nonhuman value production has improved the economic security of the 'mozzarella landscape'. Nevertheless, the attempts to secure and subsume the buffalo body demonstrate that capitalist agri-food production still relies on non-produced inputs that cannot be entirely subsumed (e.g., the life cycles of animals and plants can be accelerated and transformed to some extent, but they cannot be completely eliminated; Baglioni and Campling, 2017).

Considering the topic of my research, a stronger engagement with Actor-Network Theory (ANT) in the thesis might have been appropriate. Although some key authors from the ANT and Science and Technology Studies (STS) appear in the text, I decided not to engage with this direction more deeply in the end. First, this thesis already draws from many theoretical works, and I believe that including more ANT-infused literature and concepts in the thesis would have created inconsistencies in the conceptual framework. Second, political ecologists' earlier engagement with ANT has increasingly been criticized (Lave, 2015). ANT does not sufficiently focus on structural inequalities – which is in the core of political ecology research (Lave, 2015) –, and it does not provide the necessary tools to differentiate between the various actors in terms of importance and power (Forsyth, 2013).[9] Instead, my work draws on other theorists (such as Donna Haraway) who argue not only against nature–culture dualisms, but they point out that human–nonhuman relations are embedded in race, class, gender and historical contexts (Lave, 2015). As we will see in the following chapters, humans and nonhumans affect one another, they co-produce the

[9] Although earlier contributions engaging with ANT described a 'flat ontology', more recent works (e.g., Thrift, 2007; Lieto, 2017) acknowledge the (material) differences between various actors/agents (Lorimer, 2012).

mozzarella landscape, but their relationships are embedded in gender, race, class, historical and speciesist logics.

In order to analyse the changing relationships between humans, animals and the landscape as well as the various mechanisms that seek to transform and 'improve' animal lives and bodies to conform to the market demand for mozzarella cheese, I have used a variety of research methods. These methods have included detailed textual analyses of newspapers, magazines, government and industry reports, in-depth and expert interviews, photography and videos. I have also conducted participant and direct observation in a multispecies 'contact zone' during my work experience on a buffalo farm. The methods used in this research have aimed to access and gather the necessary data to investigate **how the processes of securitization and subsumption in the dairy farming sector contribute to more rigorous control over animal bodies, and interfere in their bodies and lives for more efficient value production**, and to answer the following research questions:

1. How do market mechanisms and regulations force the Mozzarella di Bufala Campana PDO sector to optimize its milk production? To what extent and how do these processes circumvent animal lives? How does the cyclic reproduction of the buffaloes affect the globalization of the Mozzarella di Bufala Campana PDO cheese?
2. How does the immunization of the 'mozzarella landscape', as a response to food quality and food security concerns, control animal bodies and lives? How has the 'mozzarella landscape' been caught between increasing global demand for the PDO cheese and the efforts to immunize the productive landscape?
3. How does branding contribute to the securitization of the 'mozzarella landscape'? How are buffaloes and the landscape incorporated in

branding processes, and how does branding affect vital/material elements?

1.5. Outline of key stakeholders

This section provides a summary of some key stakeholders in the 'mozzarella landscape'. These organizations and groups overlook various economic, environmental and political aspects of buffalo farming and mozzarella production. Here I have listed only those key actors (from a policy perspective) who are going to appear repeatedly in the empirical chapters. The key organizations and people listed here are trade associations, research centres and university departments, environmental groups and individual scientists. This brief list covers only the human side of the story. Buffaloes, other nonhuman lives and the nonliving environment are not mentioned here, even though they affect and are affected by the securitization and subsumption of value production in the 'mozzarella landscape'. The relationship between human 'stakeholders', such as farmers, and nonhuman 'actors', such as farmed animals, is not symmetrical (Lave, 2015), but it is highly unequal in most cases (Emel et al., 2015).

A key stakeholder in this landscape is the Consortium for the Protection of the Mozzarella di Bufala Campana. The Consortium was established in 1981, and currently it is recognized by the Ministry of Agriculture, Food and Forestry for overseeing the protection, monitoring of the production, and promoting the Mozzarella di Bufala Campana PDO. The website of the Consortium lists their responsibilities:

- protecting the production and trade of the Mozzarella di Bufala Campana;
- protecting the denomination in Italy and abroad;
- continually improving the production means of the Mozzarella di Bufala Campana and improving the quality of its production;

- regular monitoring of the production and trade and the correct use of its designation of origin.

Since 2016, the headquarters of the Consortium is located inside the prestigious Regie Cavallerizze of the Royal Palace of Caserta. According to the Consortium website, they have 77 mozzarella producer (last updated in January 2020) and 77 buffalo breeder associates (last updated in September 2019). Among the associate dairies, there are both large ones (such as Garofalo, that sells its products even at the larger Italian airports) and small ones (such as Le Terre Di Don Peppe Diana mozzarella dairy). Many dairies in Campania are not members of the Consortium. Some of these non-PDO dairies are small-scale producers for the local market (and there are several well-known small, non-PDO producers, such as Ponte A Mare in Castel Volturno). Some of them are large and famous breeders and dairies, such as Tenuta Vannulo near Paestum in the Province of Salerno. By not being part of the Consortium, these farmers and mozzarella producers do not benefit from the marketing and international fraud monitoring of the Consortium, and they cannot use the PDO trademark sign on their products. However, they do not have to pay the 'membership fees' to the Consortium. The Consortium has also established a training school with various courses on mozzarella production, international marketing, buffalo breeding and biosecurity.

The following table (**Table 1**) provides a brief introduction of some of the main stakeholders in the 'mozzarella landscape'.

Table 1. List of key stakeholders in the 'mozzarella landscape'

Actor	Role
Experimental Zooprophylactic Institute of Southern Italy	It is one of the ten zooprophylactic institutes in Italy. The IZSM is a public health authority with managerial, technical and administrative autonomy, which operates within the National Health Service, as a technical-scientific instrument in Campania and

(Istituto Zooprofilattico Sperimentale del Mezzogiorno or IZSM)	Calabria regions. Among other issues, the Institute focuses on experimental scientific veterinary research, livestock hygiene, food (of animal origin) safety, animal health and nutrition.
Confagricoltura Caserta	Confagricoltura (Confederazione Generale dell'Agricoltura Italiana, in English: Italian Agricultural Confederation) is one of the largest farmers' unions in Italy (along with Coldiretti). The organization was founded in 1920, and initially, it represented larger agricultural entrepreneurs while Coldiretti had more members among small-scale farmers.
National Association of Buffalo Breeders (Associazione Nazionale Allevatori Specie Bufalina or ANASB)	ANASB was established in 1979, and it got recognition from the Ministry of Agriculture, Food and Forestry in 1994. Since 2000, ANASB is also responsible for managing the Herd Book of the Italian Mediterranean Buffalo species. This not-for-profit organization has also developed (together with researchers and other institutes) selection criteria (morphological assessment) for the genetic improvement of the buffalo herds. In addition to that, ANASB organizes training courses for farmers and farmworkers.
Department of Veterinary Medicine and Animal Production, University of Naples 'Federico II'	It is one of the departments of the University of Naples 'Federico II', the leading university of Naples and Southern Italy. The research and teaching focus of the department is not only on veterinary medicine but on animal production and food safety as well. Due to the significant buffalo farming sector in the region, several scholars at the department have specialized in the investigation of various aspects of buffalo breeding. They are also in close cooperation with other stakeholders of the 'mozzarella landscape', such as the IZSM.

Agri-food Quality Department (Dipartimento Qualità Agroalimentare or DQA)	DQA is responsible for providing various European certifications (Protected Designation of Origin or PDO, Protected Geographical Indication or PGI, and Traditional Specialty Guaranteed or TSG) to food products in Italy. In addition, DQA carries out quality controls to ensure that certified food products meet the product specification standards.
Slow Food Campania	Slow Food Campania is the local branch of the worldwide Slow Food Movement. Among other issues, some of the key objectives of the association are the protection of cultivated agricultural biodiversity and the promotion of local agricultural products with communication and marketing campaigns. As Giuseppe Orefice, the former president of the organization, has argued, Slow Food Campania is not an environmental organization, a consumer association, or an agricultural trade union, but 'something in between'. The organization also collaborates with farmers working on lands that have been confiscated from the camorra[10] (interview with Orefice, 31 October 2018).
Legambiente Campania	Legambiente, a nationwide Italian environmental movement, was founded in the 1980s. The 'trademark' position of the organization is scientific, fact-based environmentalism (similar to Slow Food).
SVIMEZ	SVIMEZ (Associazione per lo Sviluppo dell'industria nel Mezzogiorno, in English: Association for the Industrial Development of Southern Italy) is a private, not-for-profit association that focuses mainly on the investigation of the Southern Italian economic conditions in order to propose concrete action plans for economic development. Its origins can be traced back to the 1950s economic

[10] Camorra is an Italian Mafia-type organized crime syndicate based mainly in the region of Campania and its capital city, Naples.

	reconstruction programme for Southern Italy, the 'Intervento Straordinario per il Mezzogiorno' (Extraordinary Intervention for the Southern Development).
Agronomists/ journalists	Agronomists in Campania (including scholars at the Agronomy Department at the University of Naples 'Federico II') have been active in investigating the effects of the Land of Fires phenomenon on the agri-food sector in Campania, looking for eco-compatible solutions (e.g., ECOREMED[11]) and informing the wider public in various outlets (newspapers, blogs) about their results and opinions.
Rete di Cittadinanza e Comunità	Rete di Cittadinanza e Comunità (Citizenship and Community Network or RCC) was established in 2013. It is a federation of various local associations – not only from Campania – that aims to exercise citizen's rights and to develop a conscious presence in the area so-called Land of Fires. Also, the Network has been making efforts to connect local grassroots organizations and farming communities.

1.6. Thesis outline

This thesis unfolds in seven chapters, divided into two main sections. Following the introduction, the first section contains the theoretical and methodological chapters, and the second one consists of three research chapters. The three empirical chapters are fused together through the focus on the multiplicity of the issues that the body and the life of the buffalo raises: how the buffalo becomes a value producer, a subject to be managed, controlled and branded.

[11] ECOREMED is an EU-LIFE+ project that has investigated the possibilities of eco-compatible protocols for polluted agricultural soil remediation in Campania. Recently, the project received a prize from the European Commission (di Gennaro, 2018a).

Chapter 2 provides a review of the literature that I have used in developing a conceptual framework for my empirical research. I am going to start with an overview of the geographies of the body, and I am going to point out why the central notion of the animal body offers a productive way to explore the relationship between food production and consumption (Roe, 2006). I also consider Silvia Federici's (2004) work particularly apt to investigate the concept of the body in a way that recognizes the various forms of exploitation and inequalities that exist in dairy farming. Then, in the second part of the chapter, I am going to investigate the three key aspects of my research (more-than-human value production, immunization and branding), in order to create a coherent framework for my empirical analysis on the securitization and subsumption of more-than-human value production in the 'mozzarella landscape'.

Chapter 3 details how I approached the field, and it discusses the methodology used in this research. In this chapter, I am going to explain why Terra dei Mazzoni (Province of Caserta) was selected as my case study, and how the representatives of the 'mozzarella landscape' (such as the PDO Mozzarella Consortium and Ponterè Farm) were approached. I am also going to summarize the methods – interviews, document analysis, participant and direct observation, photography – that I used for data collection. This chapter clarifies my moral and ethical position, as well as the various challenges and limitations of this research.

Chapter 4 focuses on the techniques in which capital and science transform nonhuman lives and subsume value production. In this chapter, I am going to investigate how the 'liveliness' of the nonhuman value producers affects political-ecological debates in the agri-food sector. First, I am going to introduce the concept of the real subsumption of nature, and I am going to present the main issues of reproductive seasonality and its constraining effect on capital accumulation. Then, I am going to unfold the practice of deseasonalization, and I am going to analyse how science and capital 'improve' nonhuman lives for more efficient value production. Finally, I am going to consider how deseasonalization and the intensification of farming methods contribute to the

globalization of the Mozzarella di Bufala Campana PDO, and the changing of power dynamics between local stakeholders.

Chapter 5 investigates how food safety scandals and the immunitary reactions to safety and quality issues in the agri-food sector have transformed the 'mozzarella landscape' in Campania. First, I am going to conceptualize the securitization of the agri-food industry in a more-than-human context. Then, I am going examine how biosecurity measures and the traceability systems have been the main mechanisms of the immunization of the 'mozzarella landscape'. Also, I am going to analyse how the responses to the conflicts between market demand, the strict regulations regarding the geographical origin of the Mozzarella di Bufala Campana PDO and environmental concerns about intensive farming might affect not only the future of mozzarella production, but they would radically alter the lives of the buffaloes as well.

Chapter 6 investigates how the branding of the Mozzarella di Bufala Campana PDO has incorporated both the animal body and the landscape, as part of the efforts in the securitization of the 'mozzarella landscape' in Campania. First, I am going to provide a brief review of the geographies of branding and more-than-human landscapes. Then, I am going to unravel how this landscape (co-produced by buffaloes) has been 'reordered' over the past century. I am also going to examine how in branding the product, historical–cultural elements of the landscape and the value-producing animal are linked. In the second part of the chapter, I am going to consider how branding the Mozzarella di Bufala Campana PDO has been an effective tool to 'fix' and secure the 'mozzarella landscape', and how the historical and cultural 'elements' (including animals) have been utilized to promote the product, the Mozzarella di Bufala Campana PDO.

The concluding chapter, Chapter 7, reviews the main theoretical, methodological and empirical findings of this research. I am also going to consider the contributions that this thesis offers. Finally, I am going to provide suggestions for future areas of research.

Chapter 2. Conceptual framework

2.1. Introduction

This chapter provides a theoretical and conceptual framework for the thesis, and it brings together literature from political ecology, economic geography, animal geography and the geographies of the body. In doing this, emphasis on the landscape, and the centrality of the body literature will be helpful. The chapter aims to unpack the main concepts in this research for my empirical investigation (**Figure 8**). Connections are going to be made with the materials discussed in the subsequent three empirical chapters.

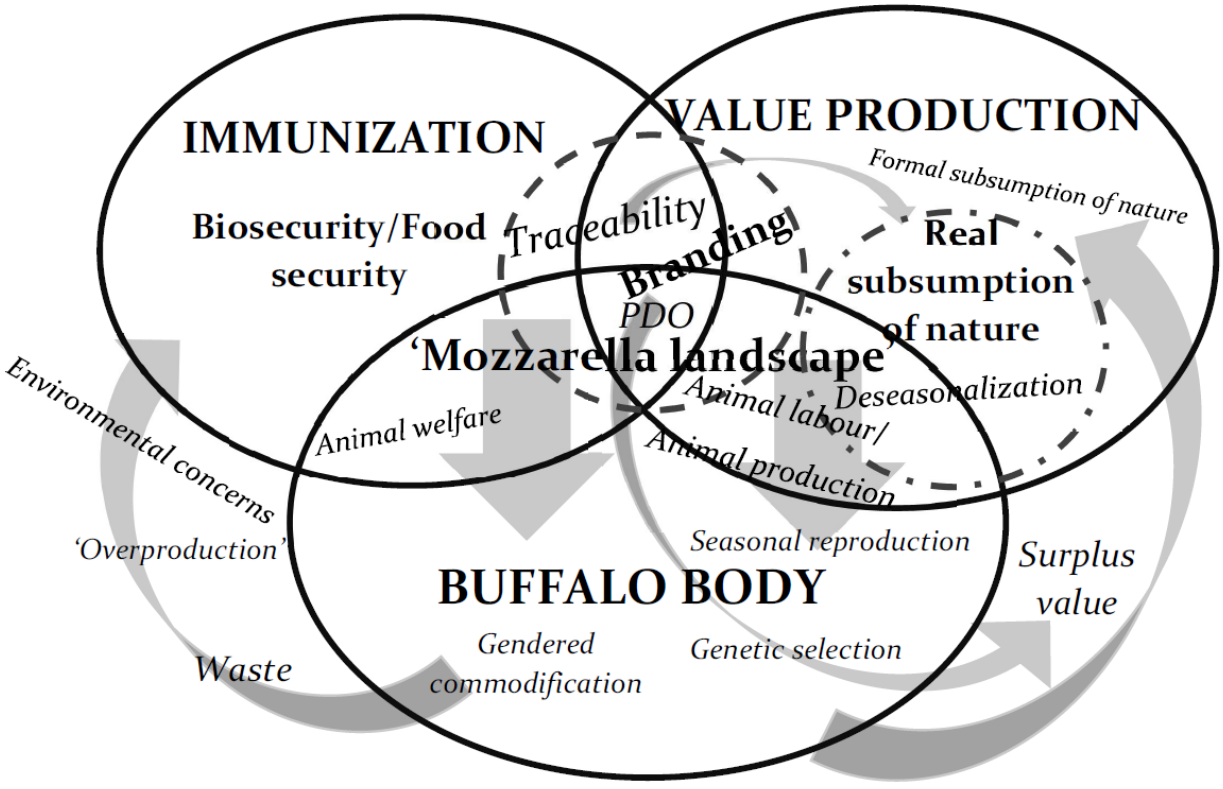

Figure 8. An overview of the main concepts used in the thesis

In this thesis, I engage with various concepts, such as value production, animal labour, biosecurity, immunization, waste and excess, landscape and branding. These concepts are not disconnected: they are linked together through the central theme of the body of the buffalo. In order to secure the 'mozzarella landscape', efforts have been made to force the buffalo body to produce faster and according to market demand. To reassure customers and producers about transparency in the mozzarella economy, the buffalo body has been controlled through the systems of biosecurity and traceability. Finally, to increase the value of the product and to strengthen the link between the mozzarella cheese and the historical landscape, the buffalo body, which has co-produced the same landscape, has become crucial. Different conceptualizations of the body exist in different contexts, but they are not separated from one another, argues Annemarie Mol in her seminal book, The Body Multiple (2002). This chapter explores and connects these different understandings of the body that materialize in the 'mozzarella landscape', from a conceptual/theoretical perspective.

First, I am going to open with a general discussion on the geographies of the body, and how animal geographers have engaged with this notion (2.2). Then I am going to move on to investigate how the concepts of value production, branding and the landscape can be brought together through the focus on the body. While each section builds on the previous one, the conclusion of this chapter provides reflections on the whole that are employed in the subsequent methodological and empirical chapters.

2.2. The geographies of the body/The body as geography

> *The body is the most immediate terrain of the relations between politics and life, because only in the body does life seem protected from what threatens to harm it and from its own tendency to go beyond itself, to become other than itself. It is as if life, to preserve itself as such, must be compressed and kept within the confines of the body.*
>
> (Esposito, 2011:14)

Feminist thinkers, such as Maria Mies, Judith Butler, Elizabeth Grosz and Donna Haraway, have theorized the previously underexplored concept of the body from a variety of perspectives. Maria Mies (2014) argues that bodies are not only biological but social and historical categories as well. Mies (2014) problematizes how women and men act upon nature with qualitatively different bodies (something that is missing from Marx's analysis). She claims that in order to get a better understanding of the unequal division of labour, we are *"not to talk of man's (the abstract generic being) appropriation of nature, but of women's and men's appropriation of nature"* (Mies, 2014:52). Shildrick and Price (1999:2) claim that *"body matters – not just to women [...] but to all forms of theory"*. Butler and Grosz emphasize that the body is never fixed or solid, but it is always fluid and multiple. Also, Haraway aims not only to deconstruct the boundaries between the organic and inorganic, and to emphasize the category of the female, but to investigate the category of the human as well. Haraway points out that human and animal bodies are interconnected, and she highlights the agential – and not passive – characteristics of nature (Shildrick and Price, 1999).

The concept of the body has been an explicit focus of human geography research since the 1990s (for an overview, see Longhurst, 1997).[12] This increased interest was also

[12] From the late 1970s, humanistic geographers investigated how bodies move through and occupy space, influenced mainly by phenomenological approaches. These investigations, however, were later criticized by

linked to the 'cultural turn' in geography. Geographers started to pay more attention to topics such as consumption and leisure and how issues such as food, fashion and leisure could be examined from the perspective of embodied experiences (Johnston, 2009). These embodied experiences are connected to various processes at community, regional, national and global levels, as Neil Smith (1993) pointed out. By this, Smith argued that while the body does habitual tasks, it is also a site where various geopolitical conditions are expressed (e.g., commodification, poverty, violence; McKittrick and Peake, 2005). Gillespie (2014b:1323) has also pushed for further research on the geographies of the body in order *"to see the ways in which macroprocesses (e.g., political economy, commodification) shape and impact individual lives"*.

Jody Emel, Chris Wilbert and Jennifer Wolch (2002) set the direction of the future of animal geographies in their work and argued for the need for further investigations of the economies of animal bodies, among other themes. Focusing on the issue of commodification can be fruitful in addressing the problems of justice to animals and humans in the meat and dairy industries (Neo and Emel, 2017). For example, Emma J. Roe (2006) investigates the concept of embodied practices in organic food production in order to move away from the producer/consumer dichotomy to the bodies of humans and animals and to explore the complex relationship between food production and consumption.

Recently, geographers have increasingly used the Foucauldian framework for their analysis of the animal body. On the one hand, Foucault has argued that the body has been the main site of operation of the disciplinary power. On the other hand, the body is a key focus for capital accumulation (Marxist perspective). For instance, Neo and Emel (2017:42) investigated the various ways in which the *"commodified animal body is pushed to yield faster and more, with the aid of new technologies"*. I also argue that animal bodies and bodily processes are subsumed according to market demand (e.g., deseasonalization of buffaloes),

feminist geographers who argued that humanistic geographers did not take into account the subjectivities and identities of the bodies (Johnston, 2009).

and the body is a crucial site of biotechnological interventions that aim to achieve 'sustainable intensification' (e.g., decreasing the methane produced by livestock; Cooper, 2017).

Scholars such as Neo and Emel (2017), Morris and Holloway (2009) and Twine (2010) use the notion of biopower and Foucauldian biopolitical framework to analyse how technoscientific efforts transform animal lives and bodies. Neo and Emel (2017) argue that Foucault's work on the disciplining life and sustaining the health of some beings is very apt to investigate animal farming under industrial conditions (for a detailed overview, see Taylor, 2013). They note that *"artificial insemination, genetically determined breeding, pharmaceutical inputs, size control for processing ease, feed control for pollution control"* are the *"'ur-form' of Foucault's biopolitics in their most 'unchecked, nightmarish effects'"* (Wolfe, 2013 quoted in Neo and Emel, 2017:45).

Although the Foucauldian framework has become widespread among geographers in analysing animal agriculture, I argue that this approach might fail to recognize the various forms of exploitation and inequalities that exist in the dairy farming sector. Silvia Federici and Leopoldina Fortunati also criticized Foucault's work on power and discipline and the body in their book called '*Il Grande Calibano: storia del corpo sociale ribelle nella prima fase del capitale'* (The Great Caliban: History of the Rebel Body in the First Phase of Capitalism; 1984) because it ignored the reproductive processes of the body. Male and female histories were summarised together without any distinction, and Foucault was generally disinterested in the history of the disciplining of female bodies in the modern era, such as the witch-hunt (2004). Federici's Caliban and the Witch (2004) effectively addresses the differences between feminist and Foucauldian perspectives on the body, and she argues that 'disciplining' and forcing female bodies to reproduce the workforce has been essential to the rise of capitalist social relations. Federici (2004) also emphasizes the necropolitical (or thanatopolitical; on the difference between necropolitics and thanatopolitics, see Margulies, 2019a) aspects of capitalism, and how biopower does not

only support life but it also administers death (Colombino and Giaccaria, 2016; Mbembe, 2003).

Federici (2004) claims that within capitalist social relations, the body has been the primary site of exploitation and resistance for women, just the same way as the factory has been for male waged labour. Federici argues that it is necessary that the capitalist social–economic system justifies and mystifies the contradictions that are embedded in its social relations (such as racism or sexism). Collard and Dempsey (2017) point out that capitalist social relations create and rely on 'wasting' (some of) the bodies. They also argue that 'wasting' human and nonhuman bodies is not the result of a random process of selection (more about waste in Section 2.4.1). The selection is based on the gendered, racialized and colonial mechanisms of the capitalist social relations. Some theorists and animal geographers also claim that capitalism is linked not only to patriarchy and colonialism but anthropocentrism as well (Collard and Dempsey, 2017). The anthropocentric character of capitalism and unequal species relations, however, are not addressed by Federici and Foucault, either.[13]

Nevertheless, Federici (2004) points out that procreation can be a form of exploitation, something that is missing from Marx's Communist Manifesto. Federici claims that *"female body was turned into an instrument for the reproduction of labor and the expansion of the work-force, treated as a natural breeding-machine, functioning according to rhythms outside of women's control",* and *"women have often been forced to procreate against their will, and have experienced an alienation from their bodies, their "labor," and even their children, deeper than that experienced by any other workers"* (Federici, 2004:91). She argues that women could refuse to reproduce, and this resistance could be part of the class struggle: *"For while the body is the condition of the existence of labor-power, it is also its limit, as the main element of resistance to its expenditure"* (Federici, 2004:141)

[13] For example, Nicole Shukin (2009) criticizes Foucault's work on biopower for not theorising explicitly the 'speciesist' aspects of biopolitics (Taylor, 2013).

The focus on the unpaid labour of women has also led to increased attention to the labour and other social contributions of animals (Derrida, 2008; Haraway, 2008; Buller, 2014). Federici's work has been influential in animal geography and the wider political ecology literature as well. Barua (2019) claims that there are parallels between Federici's argument on the gendered division of work and the forcing of women's reproductive functions on the reproduction of the workforce and the conditions in industrial animal farming. The productive and reproductive work of farmed animals such as broiler chicken is controlled by capital at a continuously increasing scale. Barua (2019) also suggests that feminist perspectives on the primitive accumulation could provide fruitful adjustments to Foucault's abstract concept of biopower. Drawing on Federici, he points out that the concept of biopower has to be within the context of the capitalist development, where the focus on life forces is linked to the concerns about accumulation and the reproduction of labour power. In other words, capitalism aims to transform life forces *"into capacity to work and into dead labour"* (Federici, 2004:16 quoted in Barua, 2019:654). However, these processes cannot be understood simply *"from the viewpoint of a universal, abstract, asexual subject"* (Federici, 2004: 16). Barua (2019) and Gillespie (2014a) add that these histories cannot be written exclusively from a human perspective either.

Gillespie (2014a, 2018) effectively analyses how the gendered commodification of productive and reproductive animal forces in the dairy industry of the US Northwest is based on the system of sexualized violence. According to Gillespie, a cow's role from the perspective of industrial livestock farming is to *"stay pregnant"* (2014b:1329). At the same time, the animal is not allowed to stay with her calves and raise them (Barua, 2019). This form of accumulation by exploiting farmed animals was *"not just facilitated and held in place by difference, rather, accumulation itself was made possible by difference-making"* (Chattopadhyay, 2018:1301).

2.3. Nonhuman value production and the body

The relationship between value and nature has become a significant topic in academic debates in recent years due to various issues such as the global financial crisis and the increasing push towards green capitalism (Huber, 2017; Kay and Kenney-Lazar, 2017; Sullivan, 2017). Value has also been a central topic of analysis among Marxist scholars. For example, Hardt and Negri (2005) question the more traditional understanding of the concept by focusing on the immaterial and biopolitical production and the increasing relevance of financialization as a means of wealth accumulation. Kay and Kenney-Lazar (2017) remind us that the debates about the role of value in our contemporary capitalist systems have also raised the geographers' concerns about nature's role in value production and the continuous and increasing incorporation of ecological processes into the realms of capital accumulation (Prudham, 2009). This incorporation occurs via *"the production of nature, its commodification, and subsumption by capital"* (Kay and Kenney-Lazar, 2017:296; more in Boyd et al., 2001; O'Connor, 1988; Smith, 2010). According to Smith (2007:33), nature has become part and target of an accumulation strategy:

Capital is no longer content simply to plunder an available nature but rather increasingly moves to produce an inherently social nature as the basis of new sectors of production and accumulation. Nature is increasingly if selectively replicated as its own marketplace.

Kay and Kenney-Lazar (2017) identify value as a central analytical concept in society–nature relations, particularly in the contexts of the accumulation of wealth and of commodities versus nature. Robertson and Wainwright (2013) point out that addressing the notion of value is crucial for the exploration of the relationship between the biophysical world and capitalist societies. Although there is a general agreement among scholars that nature does work, it is debated whether nonhuman nature has labour power with value in the market (e.g., Kallis and Swyngedouw, 2018). In the AAG panel session organized by Kay and

Kenney-Lazar in 2015, there was a consensus among the participants that nature does work, and the panellists built this argument on existing scholarship on animal labour (Hribal, 2003; Porcher and Schmitt, 2012; Barua, 2019). However, the question remains whether nonhuman labour/work and bodies produce value [Emel and Neo (2015a) claim that animal bodies do that], and if this value can be considered a material and not a social category.

In order to move forward with the debates on the work of nature and value production, focusing on the notion of waste can be helpful (Kay and Kenney-Lazar, 2017). Modern capitalist (and some non-capitalist) production systems depend on the wastage of human and nonhuman bodies and the possibility to produce waste by using the biophysical world both as a source and sink with no or minimal restrictions. Vinay Gidwani (2013) suggests that the production of value is possible because of the production of waste – or the 'recurring other', the antithesis to value. Nonhumans can be used for value production, but they can also be categorized as waste or 'useless' to capital (Collard and Dempsey, 2017).

The relationships between bodies and values are reinforced in various legal and normative forms. The law produces the bodies that are worthy of protection, but it also creates the ones that are inferior. Collard and Dempsey (2017) quote Silvia Federici in arguing that the colonial states were very successful in establishing laws that created and maintained racial hierarchies and prevented solidarity between different classes (Collard and Dempsey, 2017). The law has also both a capitalizing and caring effect on nonhuman bodies and lives. Collard and Dempsey (2017) consider 'five orientations' in which bodies can be categorized, and these orientations are formalized and maintained by laws. The five orientations that nature can occupy in capitalist social relations are the following: officially valued, the reserve army, the underground, outcast surplus and threat. The orientations of the bodies can be place-specific, and they can change over time. In addition, there are no uniform capitalist relations for various natures to be oriented in the same way. In some cases, firms and sectors rely on specific natures for production and in other cases, those natures are considered as 'useless'. Gidwani and Reddy (2011:1649) also suggest these natures can obtain different categorisation in different places and over time.

Among the 'five orientations' mentioned above, the 'outcast surplus population' is particularly important for this thesis. The outcast surplus nonhumans are not registered in capitalist production systems. These surplus animals can be wild or domesticated animals (e.g., former pets such as stray dogs that can become threats). In some cases, 'human ignorance' may have a positive effect on the lives of these animals (e.g., feral animals if they do not live in the proximity of direct human control) but in many instances, being outcast means death (e.g., surplus puppies in puppy mills, male chicks in laying factories, male buffaloes in the mozzarella sector). I also argue that the capitalist and non-capitalist industrial livestock farming systems and their products (e.g., eggs, dairy products) would be impossible to exist without the constant production of a surplus animal population.[14] Porcher (2014) effectively describes how the increasing number of animals in farms and the transformation of work distribution in the sector have made the elimination of the animals with 'no value' more difficult. For instance, slaughterhouses refuse to accept animals that are below the market 'standard', and the farmers have to slaughter those animals on the farms. Farmers also carry out selections early on in order to eliminate animals that are not productive enough (Mouret and Porcher, 2007; Porcher, 2014). Environmental concerns, regulations and the lack of space on large farms make it impossible to keep some of the animals that are considered 'less valuable' than others (e.g., male buffalo calves in the PDO area in Campania, see Section 5.5).

In the end, Collard and Dempsey (2017) conclude that value production involving nonhuman lives is a complex issue that includes formal commodification and the ensuring of social order and management. In establishing social order, an important aspect is the territorialization of nature so the law could protect property and value (Gidwani and Reddy, 2011). The multiple natures presented by Collard and Dempsey (2017) are anthropocentric and capital-centric, and they are necessary for the functioning of capitalist social relations. However, the law itself is not sufficient to create and maintain the different

[14] Intensive farming is constantly looking for technological fixes to address the economic and ethical problems of surplus animals (e.g., sexed semen, new methods to check eggs and destroying the ones that contain male fetuses), so the sector could depict itself as efficient and ethical, without any radical changes in its operation (treatment of the animals, environmental impact, etc.).

orientations of nature. Those orientations have to be 'secured' as well. I am going to discuss this in more detail in Section 2.4 of this chapter.

2.3.1. The animal as a worker

Blanchette (2015) suggests that nonhumans need to be considered as workers while he develops the notion of posthuman labour that builds on the idea of posthumanism (Wolfe, 2009) and puts it into practice. Bennett (2010) raises the issue of distributed worldly agencies and argues that humans never work alone. For example, Emel (2017:63) quotes Donna Haraway (2008:73) and argues that focusing on labour instead of rights could be a better instrument for a *"nurturing responsibility with and for other animals"*.

The term 'animal production' is often used in policy documents and academic papers in veterinary science. This concept dates back to the 19th century. The development of animal science (zootechnics) as *"a science of the exploitation of animal machines"* in the 19th century was based on the ideas of energy and yield (Porcher and Schmitt, 2012:41). The work of farm animals has been conceptualized as 'animal production', and since economic rationale is dominant in animal production, there has been a strong trend towards specialization. Farmed animals and farms can be dairy, beef, poultry or pork. The specialization of breeds has also led to a decrease in the diversity of species. For example, cows can be dairy or beef, but "*they can no longer be both"* (Porcher and Schmitt, 2012:41; Gillespie, 2014a).

Porcher and Schmitt (2012) suggest that animal work is more relevant in the systems of animal production than in animal husbandry. They argue that in animal production, the farmed animals are entirely removed from (or deprived of) their natural environment. Their living conditions and relations with humans are parts of work relationships. Porcher and Schmitt use the example of modern pork farms where the relationships with sows are called 'staff management' instead of 'herd management'. They argue that the newer term makes some of the necessary activities in industrial animal farming more implicit. For

example, the selection of productive and unproductive sows, the verification process to identify the animals that are able to produce the required yields, and the increasing focus on the product quality as well (Porcher and Schmitt, 2012). To use Heidegger's words, *"man is the shepherd of being"* (quoted in Wolfe, 2013:39). Humans select the most productive animals that can tolerate the conditions of the industrial farming methods (e.g. the ANASB selection index, see in Section 6.5.6). However, the selective manipulation of nonhuman lives goes beyond this, and it is going to be discussed in the next section of this chapter.

2.3.2. The real subsumption of nature

Karl Marx famously made a distinction between the formal and real subsumption of labour under capital. After Marx, the concept of real subsumption was primarily used by Michael Hardt, Antonio Negri, Christian Marazzi and other post-Marxist scholars (Rossi, 2012a). In their book (Empire, published in 2000), Hardt and Negri introduce Marx's concept of the formal subsumption of labour under capital. Marx uses the term to define processes in which workers become subordinated to the capitalist production process and they become living part of it (Marx, 1992; Joyce et al., 2015). Hardt and Negri (2000) argue that capitalist expansion can rely on the formal subsumption of labour only up to a certain point. The expansion of capitalist production and capitalist markets has its limits. Under the conditions of the real subsumption, capital integrates labour more intensively, and society becomes even more shaped by capital. Hardt and Negri (2000) point out that the real subsumption of labour does not rely on the same type of expansion and on the outside as the formal subsumption does. They indicate that it is possible that (some of the processes of) the real subsumption can exist without the world market, but there is hardly a real world market without the real subsumption.

Hardt and Negri (2000) argue that capital expansion happens through subsumption in a cycle of reproduction, but it subsumes not the non-capitalist environment but its own capitalist landscape. As they note, *"capital no longer looks outside but rather inside its*

domain, and its expansion is thus intensive rather than extensive" (2000:272). Hardt and Negri also point out that within a biopolitical context, capital subsumes not only labour but the social life itself, too. Capital subsumes life because *"life is both what is put to work in biopolitical production and what is produced"* (Hardt and Negri, 2009:142).

Hardt and Negri (2009) suggest that under the conditions of the current globalization, a parallel movement from the real to the formal subsumption can also be observed. They note that this process does not signal a return to the past. The formal and real subsumption can coexist in global capitalism. David Harvey calls this type of formal subsumption – the extraction from all over the world – accumulation by dispossession. Hardt and Negri (2009) list several examples for the formal subsumption in our times, such as the new interest shown towards the extractive sector in African resources. The formal subsumption continues to exist in animal farming and the dairy industry as well. The deforestation and the increasing number of livestock farms in Amazonia, or the current pressure to recognize frozen Mozzarella di Bufala Campana as a PDO product, so local dairies could increase their international export, are prime examples of the process of formal subsumption.

In addition to concepts like the formal and real subsumption of labour, a number of geographers and environmental social scientists interested in nature–society relations have started reworking Marx's theory of value with the focus on biological reproduction and co-labouring (Emel, 2017; Ingold, 1980; Prudham, 2005). Boyd et al. (2001) coined the term 'real subsumption of nature', and they argued that the concept could provide a conceptual tool to investigate how biological systems are incorporated into capitalist and non-capitalist industrial value production. Drawing on the real subsumption of nature, David Harvey pointed out that *"the environment has become so deeply subsumed that under capital accumulation, there are certain ecosystems that can no longer function outside of capital"* (Kay and Kenney-Lazar, 2017:304). These new ecosystems and species that humans have created in order to adapt to the temporal variations of consumer demand and the accumulation logics of capital might have unknown long-term consequences (Kay and

Kenney-Lazar, 2017). The real subsumption of nature, the control over animal bodies and their reproduction in intensive animal farming settings are particularly prevalent.

There has been an emerging focus on how animal bodies are controlled and managed in intensive farming (including the dairy sector) to satisfy consumer demands and to increase commercial profits (Rasmussen, 2012). Animals and their bodies produce value, and their bodily growth and reproduction are increasingly regulated within the capitalist social relations by various technological interventions (Rasmussen, 2012), especially in industrial farming (Emel and Neo, 2015a). Emel and Neo (2015a:6) argue that the *"livestock industry is a prime example of a bioeconomy"*. They also note that animal bodies produce value and their bodily growth and reproduction are incorporated within capitalist social relations.

In Chapter 4, I am going to review the real subsumption of nature in more detail, and I am going to point out how this concept is linked to nonhuman value production and animal labour. In the next section, however, I am going to build a conceptual framework on the securitization of animal bodies and agri-food systems.

2.4. Securing/immunizing the body

Elizabeth Johnson, drawing on the work of Frederic Neyrat, argues that the focus on our survival as humans has led to *"an expanded discourse and practice of securitization into new spaces and into the bodies of nonhuman organisms"* (Johnson, 2016:61). And according to Foucault, the emergence of biopower was linked not only to the management of human bodies but to the management and circulation of *"lively things"* as well (Johnson, 2016:62). Johnson notes that the idea of ensuring the circulation of 'lively things' is particularly relevant in the case of agricultural production. Scholars have focused on how nonhuman bodies and their circulation can be framed from a biopolitical perspective (Johnson, 2016; also in Shukin, 2009; Braun, 2007; Hinchliffe et al., 2013; Wolfe, 2013; Braverman, 2012).

To understand how this mechanism works, Roberto Esposito's paradigm of immunization can be helpful. Esposito builds his argument on Michel Foucault's work on biopower, and he claims that Foucault does not accurately address the problem of turning the politics of life into the politics of death (Grove, 2014). Esposito (2011:7) points out that the immunitary mechanism is a "***reaction*** – *rather than a force, it is a repercussion, a counterforce, which hinders another force from coming into being"* (original emphasis). He also claims that *"life combats what negates it through immunitary protection, not a strategy of frontal opposition but of outflanking and neutralizing"* (2011:7). Esposito (2011: 32) notes that *"the stated aim of law is to preserve life"*, but the *"preservation is not painless. On the contrary, it requires a preventive condemnation of what it seeks to save: by being condemned, life is reduced to pure material, it is subtracted from any form of right life or shared life."*

Roberto Esposito's central argument in Bíos: Biopolitics and Philosophy (2008) is that the *"paradigm of immunization"* has dominated modern Western political thinking (2008:45, quoted in Lemke, 2011:89). Lemke (2011:89) points out that Esposito convincingly demonstrates that the *"modern concepts of security, property and freedom can only be understood within the logic of immunity"*. Lemke (2011:89–90.) also argues that there is an "*inner connection between life and politics"*, in which immunity protects and preserves life while it limits *"life's expansive and productive power"*. To put it differently, although immunity secures and preserves life, it also negates the uniqueness of life processes. The immunitary logic allows two opposing sides of biopolitics (the advancement of life and the destruction and elimination of life) as two constitutive perspectives of a common issue. To conclude, immunization can explain how affirmative and thanatological aspects of biopolitics are joined together in a single mechanism (Wolfe, 2013:37).

Both Wolfe (2013) and Esposito point out, however, that this modern biopolitics acts principally on the flesh, and not on the person or the body. According to Wolfe (2013:49), the flesh is the underlying layer that is shared by humans and other forms of life, and it is *"through which the body is both sustained and threatened"*. Wolfe warns us that the more we try to manipulate the 'flesh' in order to maximize its production, the threat further increases. He uses the example of modern factory farms that affect public health, the

environment, and through large-scale subsidies provided by the governments, the spending of public money as well. Wolfe (2013) also argues in his work on modern factory farming that what protection in our current social systems aim to defend is, in reality, produced by the protection itself.[15]

Pandemic outbreaks created by these *"disease incubators"* (Shukin, 2009:47) can also affect those members of the society who live in an *"unhygienic"* (187) environment, and who need to be taught about new sanitary standards. Shukin (2009:212) cites Hardt and Negri (Empire, 2000), who argue that *"disease is a sign of physical and moral corruption, a sign of a lack of civilization. Colonialism's civilizing project, then, is justified by the hygiene it brings."* Hardt and Negri (2000:136) point out that contemporary globalization processes have made flows easier around the world, but *"a certain nostalgia for colonialist hygiene"* has persisted. When 20th and 21st-century pandemics have been mapped, and their sources have been identified (Central and West Africa, Haiti), these places have been described in ways that have fit in colonialist imaginaries, such as "*unrestrained sexuality, moral corruption, and lack of hygiene"* (Hardt and Negri, 2000:136). This description of people, animals and places is directly linked to the lay representation of foreign people, animals and places that are often depicted as sources of diseases and pandemics (Brown and Nettleton, 2017). The pandemic projects have also aimed to correct inferior ethnic others' unhygienic relationships with animals in a global era.[16]

Roberto Esposito's immunitary paradigm has been influential in human geography and critical animal studies as well. For instance, Allen and Lavau (2015) provide an excellent analysis of the modern poultry farming sector. They point out that *"tens of thousands of virtually genetically identical animals indoors in densely crowded conditions, pump them full*

[15] Roberto Esposito's term of autoimmunity is very suitable to be used here. Esposito argues that autoimmunity expresses *"the logic of the immune system in its pure state, so to speak"* (Wolfe, 2017:108). Shukin uses the case of the antiviral drug Tamiflu and the autoviolence that the drug has created to emphasize Derrida's argument that the *"perversion by means of which the immune becomes auto-immunizing"* (Shukin, 2009:221).

[16] See more about the effects of the SARS epidemic in Toronto, Canada in Keil and Ali, 2006; Braun, 2007 and Shukin, 2009, and about the cholera outbreak in Naples, Italy and its impact on the local agri-food sector in Chapter 5.

of enriched feeds and veterinary medicines that stimulate growth and weaken their immune systems, and you have what is said to be more or less a perfect ecology for disease incubation" (2015:8). They argue that when life is taken charge of in this form, and it is stripped down to the bare minimum that is needed for value created, the lives of animals are *"reduced to the edge of 'living'"* (2015:14). Also, Allen and Lavau (2015:2) demonstrate how increasing control over factory-farmed chickens in the forms of *"standardisation, acceleration and concentration"* can end up creating potential harms and risks. Dixon (2015:91) also confirms this controversy about the intensification of the agri-food sector that is *"characterized by efforts to create increasingly coercive production environments, on the one hand, and multiplying threats to production, on the other hand"*.

Hinchliffe et al. (2017) point out that pandemics, infectious animal diseases and food contamination issues can have radical consequences on our economic and social lives. Therefore, they are considered security challenges, and they require some kind of planning to prepare for, to avoid and mitigate these events. Hinchliffe et al. (2017:4–5) remind us that the concept of biosecurity is

often used in relation to the threat of emerging infectious diseases, and refers to the raft of measures and policies that governments, commercial and other organisations seek to put in place in order to reduce the risk of a disease event and/or prepare for the consequences of such an event in terms of emergency response.

In other words, biosecurity is a mechanism *"to separate diseased from healthy life, to contain infectious outbreaks and to police the flow and movement of anything potentially threatening to life"* (Hinchliffe et al., 2013:531) Although biosecurity has become a fundamental element of security issues, I use the concept of security in a broader and more flexible sense in this thesis. My work attempts to engage with other relevant 'material' factors in the processes of securitization (Cudworth and Hobden, 2015) as well. I argue that the securitization of economic and social lives of agri-food landscapes, especially in the 'milieu' (Bingham and

Lavau, 2012) of the 'mozzarella landscape' in Campania, require not only biosecurity practices, but food quality control such as traceability systems, the subsumption of the reproductive activities of farmed animals and the increasing regulation and reinforcement of waste–value dynamics. My aim is to look at the processes of securitization from a more-than-human perspective and to examine how humans, animals and other nonhuman living and non-living environment influence and are affected by these processes. Lougheed's and Hird's (2017) definition of food security lies closest to my framing of security. They argue that *"[s]ecuring the food system is a matter of trying (often failing) to control the conduct of humans and the exuberant and proliferate bacteria, viruses, prions, machines, and other "things" comprising that system"* (2017:500).

Biosecurity measures are closely linked to traceability. Traceability systems are some of the crucial mechanisms in the securitization of agri-food landscapes. Smith (2018:36) argues that traceability in agriculture can be defined as a system that captures *"information at all points on the supply chain of a food item to allow each step – production, handling, and processing – to be identifiable"*. Traceability systems can serve various objectives: crisis management can be cheaper, faster and simpler in the event of food contamination crises (Verbeke and Roosen, 2009). Traceability can be an essential and trusted information source for consumers and other participants in the production and distribution chains about the product. Finally, traceability systems also help manufacturers to optimize their production capacities because they can see how their goods move through various channels (Hall, 2010). Traceability can mark the exact provenance of certain products, and it has also become a 'branding tool'. Smith (2018) reminds us that traceability and 'terroir' are closely linked. She argues that *"[w]hile consumers may not use the term traceability, they expect that terroir products can be specifically traced back to a particular named location. The higher the quality, the more specific the identification"* (Smith, 2018:43).

Traceability, however, controls not only the product but affects the conditions of the nonhuman co-producers, the animals as well. Gray (2016) notes that the welfare of farmed animals can sometimes be compromised in order to keep the food industry safe through traceability systems of quarantining animals and tagging them. Regulations

protect human health and the safety of the food industry, not livestock animals, such as dairy cows (Gray, 2016).

2.4.1. Wasting of the bodies and bodily wastes

"Waste" is the political other of capitalist "value." (Gidwani and Reddy, 2011:1625)

In intensive farming environments, the increasing number of animal bodies and, consequently, the growing environmental impact of these large farms require specific management and regulations. I argue that the waste–value dynamic provides a useful analytical tool to explore how certain animal bodies are considered valuable, while others become 'waste'.

Gidwani (2013) argues that waste is un-valuable excess and value-in-waiting at the same time. On the one hand, Nading and Fisher (2017) suggest that in the case of value-in-waiting, waste precedes capitalist transformation. On the other hand, waste as un-valuable excess, the product of capitalist accumulation, *"poses jeopardy to capital precisely because it confounds capital's attempts to discipline and contain life within the domain of utility and accumulation"* (Gidwani 2013:781). Gidwani (2013:781) also notes that *"'waste' begins as capital's external frontier but has now come to mark, both, its external and internal frontiers: 'an enemy to be engaged and beaten'"*.

Sarah Moore's (2012) review on the geographies of waste suggests that waste can also become an actant. In this case, waste affects the material world and social relations as well. Drawing on the work of Jane Bennett (2004), Gabrys (2009) defines waste as a spill because 'the sink' cannot absorb it. Moore (2012:792) cites Gabrys (2009:200) in arguing that *"spilling over, rather than cleaning up, is a figure that is as much political as it is ecological"*. In addition, Moore (2012:792) points out that waste can exceed not only the categories that we create for it "*but also the physical limits and boundaries"* that we create to contain it.

Gidwani and Reddy (2011:1649) argue that waste can be considered as a negative category for *"material excess"*. They suggest that *"Wasteful "natures" – bodies, spaces, conducts – have to be territorialized for ordered "society" – the society of law that safeguards property and value – to be possible*". In order to reach social order, law has become an important *"biopolitical tactic"* (Gidwani and Reddy, 2011:1649). Collard and Dempsey (2017) point out that law is also a device that orientates nonhumans within the contexts of capitalist values.

To conclude, it is essential to think about how bodies, spaces and 'things' become excess as waste depends not only on the law, but the geographical location, economic sectors, cultural traditions and physical limits to contain those bodies and things. The next part of this chapter is going to look at these issues: how traditions, laws and the material and cultural characteristics of the landscape affect the orientations of bodies and products within the waste/value dynamics.

2.5. 'More-than-human' landscapes, branding and the body

> *[T]he body is not taken for granted as a fixed entity but is instead seen as having a plasticity or malleability which means that it can take different forms and shapes at different times, and so also have a geography.* (McDowell, 1999:39)

> *Pieces of the world… do not come with their own labels, and thus representing 'out there' to an audience must involve more than just lining up pieces of language in the right order. Instead it is humans that decide how to represent things, and not the things themselves.* (Barnes and Duncan, 1992:2, quoted in Johnston and Sidaway, 2016:258)

The last section of this chapter focuses on developing a framework to conceptualize how (animal) bodies and landscapes are incorporated in branding processes, and how branding

reworks these bodies and landscapes. I argue that engaging with the concept of the body allows us to investigate not only the discursive and symbolic understandings of the branding and the landscape but the material aspects of these concepts as well. I also claim that a focus on branding and the landscape can provide links between the concepts of value production and securitization.

Landscape research in human geography increasingly uses non-representational approaches (Neumann, 2011). Scholars such as Gareth and Metzo (2008:225) even argue that non-representational theory (Thrift, 2007) has *"changed the terms of debate .. . over the production, meaning and significance of landscapes"* (Neumann, 2011:2). Others have even wondered whether non-representational, vitalist approaches have made the concept of the landscape outdated (Rose and Wylie, 2006). Besides non-representational approaches, political ecology has also criticized the limitations of the landscape concept developed by the 1980s New Cultural Geography (in which landscape emerged as a cultural metaphor or representation; e.g., representational landscapes). There have been several attempts to link landscape studies and political ecology together (Neumann, 2011; Walker and Fortmann, 2003; Connolly, 2016; Pries, 2018). On the one hand, however, political ecology has failed to mention the non-representational approaches to landscape studies, and as Neumann (2011:845) pointed out: *"while the materiality of landscapes has been a strong theme in political ecology, virtually all studies that have engaged the landscape concept have been drawn to NCG's*[17] *focus on symbolic meanings"*. On the other hand, non-representational landscape research has also overlooked the critical engagement of political ecology on the landscape. Neumann (2011) notes that this is unfortunate because there have been some commonalities in the two bodies of literature on landscape studies.

Some of the main themes that non-representational landscape studies tackle are the everyday experiences and daily lives of social actors. The focus on the embodied and everyday experiences is in stark contrast with New Cultural Geography's interest in the elite representation of the landscape. The localized and everyday experiences are at the centre

[17] NCG: New Cultural Geography.

of attention in the political ecology studies as well. However, as Neumann argues, non-representational and political ecology research on the landscape are more distant (and not mutually intelligible) if we move beyond these commonalities, the everyday, embodied experiences [*"what is the starting point for much political ecology (e.g., embodied experience) is, it seems, the endpoint and sole interest of much non-representational landscape"* (Neumann, 2011:847)]. The majority of the non-representational contribution to landscape studies fails to ask or answer *"the question of how or why the embodied, self-knowing subject appears in any particular landscape at any particular moment, hence emptying from that moment all social and political content"* (Neumann, 2011:847).

My work is influenced mainly by political ecology and more-than-human geography literature on the landscape (Barua, 2014; Connolly, 2016), and it investigates how buffaloes and the landscape are incorporated in branding processes, and how branding is linked to vital/material elements. Focusing on the individual agency of the buffalo is crucial in order to understand how water buffaloes have co-produced the 'mozzarella landscape'. It is important to emphasize that the 'mozzarella landscape' is also linked to macroprocesses (e.g., global export; negative media attention on the agri-food sector in Campania; elite representations of the landscape such as branding), that all have considerable material consequences on human and nonhuman lives and the non-living environment.

2.5.1. Linking landscapes with branding

Branding has become a key concept in economic geography (for a thorough review, see Pike, 2009). Pike (2009:623) defines branding as a *"process of adding value to goods and services by providing meaning and seeking to engender consumer trust and goodwill through positive associations in the brand"*. Investigating branding processes can de-fetishize commodities by uncovering their relationships to uneven geographical development (Harvey, 1990; Pike, 2011).

Linking branding and landscapes can help us to understand why value production and the securitization of more-than-human branded places are also connected. Pike (2015) argues that branded goods and services that have strong geographical links to places can have significant effects on the development of territories in which they are based or associated with. The original meaning of branding has a direct link to farmed animals. The expression derives from the practice of marking the skin of the animals with a hot iron tool to indicate the ownership of the animals (Gillespie, 2014a; Ermann and Hermanik, 2018). Generally, branding is considered a process that creates *"added value and meaning to branded objects"* (Andersson, 2014:144; Pike, 2013). Van Ham (2008) notes that branding is not only about selling products but creating and managing identities, loyalty and reputation (Andersson, 2014). By using the example of Burberry, Pike (2013:329) argues that branding can provide a way to secure the meaning and the value of a product in order to run it in an *"emergent and expanding spatial circuit of production, circulation, and consumption"*. It can also improve consumer trust by building positive associations in the brand (Pike, 2013). At the same time, branding can be used for dissociations, by cutting or weakening the links between a particular product/brand and negative elements (Ibert et al., 2019). However, Klein (2009) and Goldman and Papson (2006) remind us that success in branding is a 'double-edged sword'. It raises the profile of particular corporations or products, but at the same time, these corporations and products become more vulnerable to various attacks. The same media news that supports the value increase of the brands can also play a key role in providing sometimes unjustified links between corporations and products and stories about corruption and fraudulent activities (Goldman and Papson, 2006). For example, unfounded news about potential food contamination appeared in the newspapers about the Mozzarella di Bufala Campana PDO cheese in Campania after the waste emergency and dioxin crisis in 2008. News outlets were prompt to create a link between the socio-environmental problems and the mozzarella production in the same area, and they published articles with titles such as 'Italy's Trash Crisis Taints Reputation of a Prized Cheese', 'Dioxin threatens Italy's famed mozzarella' and 'Mozzarella Meltdown: Cheese Deemed Unsafe'. Although a variety of agri-food products come from Campania

region – that was hit by the waste and dioxin emergencies –, the attention of the news media was mainly on the potential contamination of the Mozzarella di Bufala Campana PDO cheese. According to Pier Maria Saccani, the Director of the Consortium (for the Protection of the Mozzarella di Bufala Campana), the Mozzarella di Bufala Campana PDO has simply become a 'terrain' of political debates because it was a famous product of Southern Italy. However, in reality, the debates were not about the mozzarella.

Pike (2015) argues that the geographical associations of branding are particularly strong when elements of the brands are place-specific and there is no alternative site for cost-effective production elsewhere. Also, the geographical links are even more evident in the agri-food sector *"because the various mixtures between the organic and inorganic are hard to detach from space and place"* (Morgan et al., 2006:10 quoted in Pike, 2015:182).

In the case of agri-food products, the internal characteristics of the products are place-specific, and specific attributes may not be replicable elsewhere (Parrott et al., 2002, Pike, 2015). Geographical conditions may permit to create/produce certain products elsewhere, but this might compromise its value and meaning. As in the case of the French wine, the context of 'terroir'[18] is particularly important in shaping the characteristics and the quality of the product. Amy Trubek defines terroir as a conceptual category that frames and explains the sensual, practical and habitual relationships between humans and the lands. Wine and other food products express this typicity of a place (Paxson, 2012).

In France, the concept of the 'terroir' is strengthened by the bureaucratically regulated system of the geographical origin labelling (in French: Appellation d'Origine Controlée or AOC). According to this regulation, specific agricultural products can be produced and sold under registered place names – Champagne, Camembert de normandie – only if they are produced within designated geographical areas and comply with specified regulations. Geographical origin labelling rules about cheese can regulate the breed of the

[18] The French notion of 'terroir' often used in wine geographies (Banks et al., 2007). It is a special feature of the landscape that give a local product its unique characteristics (Smith, 2018). Terroir describes not only large wine regions in France but farmers use this term to define smaller fields in individual farms as well (Smith, 2018; Black and Ulin, 2013).

animal (not only species) milked, decide whether animals have to graze on alpine slopes or in the valleys (e.g., the differences between Parmigiano Reggiano and Grana Padano cheeses[19]), determine whether heat treatment of milk is permissible, and set the recipe for how a particular cheese is made (Paxson, 2012). Pike notes that

Material and symbolic geographical associations to particular places form integral elements of such wine brands: "their very existence and name cannot be separated from the production that is practised within their territory… place names and production are… inseparable" (Moran, 1993:698, quoted in Pike, 2015:182).

In the agri-food sector, if there is a strong association between the product and its origin, producers often claim the authenticity of longstanding and enduring provenance. The notion of terroir links the taste of the food to the geographical and geological features of the lands. Scholars and practitioners argue that food products, including artisanal cheeses, have the potential to revitalize the agricultural landscapes and rural economies (Paxson, 2012).

Although typically, the specific place-based characteristics would be given to artisanal cheeses on the basis of what ruminants eat when they graze outdoors, many producers emphasize the instrumental value of artisanal production. Focusing on what animals eat emphasizes the significance of animal workers (and yeast, moulds and bacteria) that can circumvent human attempts to control the systems of production (Paxson, 2012). Paxson (2012) also argues that the new, American wave of the terroir concept is rooted in the Lockean idea of improving society through the improvement of lands. By focusing on artisanal cheese production in California, Wisconsin and Vermont, she argues that the new

[19] Some of the main differences are the following: the geographical area where Grana Padano can be produced includes the area where Parmigiano Reggiano is made, but its size is much larger. Also, in the case of Parmigiano Reggiano, the cows have to be fed with grass and cereals grown in the Parmigiano Reggiano PDO area, while cows for the production of Grana Padano can be given silage as well.

movement of creating artisanal food landscapes aims to create places in rural America where people would like to live, to visit or to taste at least. Colombino and Giaccaria (2016) point out that the development of artisanal production and food landscapes in Europe is not more 'organic' than in North America. They argue that the production of an allegedly gourmet meat, the Piedmontese beef, is the result of several decades of cultural politics and scientific intervention (Colombino and Giaccaria, 2016)

2.5.2. Linking branding to the animal body

The postindustrial concept of branding has been very effective in dissociating capital from its material conditions, points out Nicole Shukin (2009). This thesis aims to restore this connection by connecting branding, and the cultural and material characteristics of the landscape. I also argue that in the case of the Mozzarella di Bufala Campana PDO, branding has managed to partially reconnect the product with the value-producing animal and the landscape.

Branding and animals have been linked together for a long time. Shukin (2009) notes that although cars were fetishized as animals during the early Fordism, later, during the second half of the twentieth century became capital diverted to the symbolic and material production of cars. Massive capital investments in advertising and branding signified the shift towards post-Fordism, and from the material to the symbolic economies (see in Shukin, 2009).

Merskin (2017b) points out that corporations have used cartoons and images of animals as brand images and parts of advertising campaigns (e.g., Tony the Tiger has been the spokes-animal of Kellogg's since 1951; the Mozzarella di Bufala Campana PDO with a caricatured body of a cow, see **Figure 9**). Institutions working with animals have also attempted to (re)brand themselves. For example, zoos have rebranded themselves as places where animals that are in danger of extinction could be protected, and in a distant future, those species could 'rewild' the planet. Merskin (2017a) notes that the most popular animal

Figure 9. A poster branding the Mozzarella di Bufala Campana PDO with a caricatured body of a cow.

The translation of the text: 'Only buffalo milk. There are no exceptions.' (photograph by the author)

in the US advertising sector is the dog. Research has also shown that the anthropomorphized animals used in advertising are also linked to the types of products companies try to sell. Non-anthropomorphised positions are used in advertising campaigns that include animals when the aim is to show the work the animals do for us, how and why they can be considered as food, or to demonstrate the recreational aspects of animals (for humans). Merskin (2017a) argues that the non-anthropomorphized type of representation of animals in advertising reinforces the species barrier between humans and animals.

Although these examples of branding engage with animals in a discursive/symbolic way, I argue that branding – as a form of securitization of agri-food landscapes – can operate as a socio-material process, too. Branding is not simply *„a performative process whose effect is to make a commodity authentic"* (Ermann and Hermanik, 2018:4), but as an outcome, it can also alter and increasingly control nonhuman lives and the non-living environment that are associated with the product.

2.6. Conclusion

This chapter has elaborated on the various perspectives that I use as my theoretical/conceptual approach. In the first section, I have provided a brief review of the geographies of the body in order to justify why the body remains the main entry point for my analysis of the securitization and subsumption of more-than-human value production in the 'mozzarella landscape'. The second part of the chapter has focused on the three key aspects of my approach. First, I have analysed nonhuman value production and animal labour. Then, through the concept of the real subsumption of nature, I have pointed out how capital works less and less around nature (and the body) and more and more through it. Second, Roberto Esposito's immunitary paradigm is helpful in revealing how biosecurity and traceability measures can affect animal bodies and lives in more-than-human economies, such as intensive animal farming. Third, I have argued that focusing on branding via the landscape and the animal body helps us to re-connect the material and symbolic understandings of the landscape. More-than-human focus on the landscape does not investigate nonhumans as 'nature', but it looks at how humans and nonhumans co-create landscapes.

These perspectives are analysed in the next chapters to demonstrate how value production and securitization are interlinked through an analysis of buffalo farming and mozzarella production. Although I focus on spelling out and investigating the securitization of the 'mozzarella landscape' in detail in the following empirical chapters, I

will often return to the theoretical and conceptual ideas presented in this chapter in order to make connections between the abstract concepts and the day to day relations between humans and farmed animals, and how the lives of the animals and their bodies are used within intensive farming conditions. First of all, however, I am going to discuss how I conducted my empirical research in Campania.

Chapter 3. Research methodology

3.1. Introduction

I conducted the most extended interview during my fieldwork (8 hours) with a veterinary researcher (Domenico Vecchio) at the Experimental Zooprophylactic Institute of Southern Italy in Salerno on 4 December 2018. One of the most memorable moments of this meeting was when Domenico described how he carried out animal welfare assessments on buffalo farms. He used not only statistical data to analyse whether the buffaloes in any given farm had sufficient space for their movement, but he also walked through the corridors and stalls that the buffaloes used. He looked at those places and walkways as if he had been partly a researcher and partly an adult buffalo. This story reminded me of a documentary/beast fable film called Lost and Beautiful (Scott, 2016). The movie attempted to capture human–buffalo relations and multispecies stories from the perspective of the animal, a male buffalo calf. I found the 'careful anthropomorphism' used in these two cases very productive for my own research on the mozzarella economy in Campania from a less anthropocentric way. Domenico, the veterinary researcher, thoughtfully recognized the animal behind the statistical numbers, and he tried to imagine himself as a buffalo while he was walking in the places the animals were confined to live in. The film, however, used a voice-over to narrate the thoughts of the buffalo calf, and this documentary/beast fable recognized not only the agency of the animal but also the fact that the animal can look back at us humans (Collard, 2013:63; Derrida, 2008:82). Throughout the thesis, I tried to carefully consider these perspectives as well, and not only the humans' viewpoints.

Buller (2015:376) criticized the approaches that look at farmed animals from the perspective of their 'function', location and species as *"all-too-easy collective and abstract categorizations of the non-human"*. By citing Taylor (2012:40), he argued that we should *"focus rather upon animals as 'embodied individuals living their lives entangled with humans*

and their own wider environment'". In my analysis, I let some of the individual animals *"speak"* from time to time (Derrida, 2008:82). Many times, however, it was necessary to focus on water buffaloes in Campania region as 'a group in a particular location' in order to investigate what kinds of political-economic macroprocesses affect their bodies and lives, and how their 'liveliness' and their reproductive cycles influence the political economy of the Mozzarella di Bufala Campana PDO. I also acknowledge that my investigation of the mozzarella economy and human–buffalo relations in Campania still remains slightly anthropocentric.

This chapter unravels how I approached the field, and it defines my moral and ethical position as well. I also discuss the various challenges that influenced my empirical research. I argue that exploring these challenges can help understanding the 'messiness' of the field. In this chapter, I justify why I selected Terra dei Mazzoni (Province of Caserta) as my case study, and how and why the representatives of the 'mozzarella landscape' – such as the PDO Mozzarella Consortium and Ponterè Farm – were approached.

In the next section (Section 3.2), I am going to provide a brief review of human–animal ethnographies, and in Section 3.3, I am going to discuss my positionality and ethical considerations. In Section 3.4, I am going to lay out why Terra dei Mazzoni was selected as my case study, and in Section 3.5, I am going to explain the methods that I used. Finally, in Section 3.6, I am going to discuss some of the challenges and limitations of the research, and in Section 3.7, I am going to provide a brief conclusion.

3.2. Human–animal ethnographies

Seymour and Wolch (2010) note that a renewed interest in animal geographies emerged in the 1990s (see Wolch and Emel, 1995, 1998; Philo and Wilbert, 2000). Over the past decade, this interest has surged further. However, as Seymour and Wolch (2010:305) point out, the

challenging question remains the following: *"How do animal geographers actually go about their research?"* Hodgetts and Lorimer (2015) suggest that the majority of papers and books written by animal geographers focus on the spatial orderings of animals while the lived experiences and geographies of animals ('beastly spaces') gain much less attention in the field. They indicate that one of the reasons for this asymmetry is the problem with the methodology. They argue that the continuous human focus, such as using anthropocentric methodologies in animal geographies, operates against the more-than-human aspirations of animal geographies (and to some extent, of political ecology). Recently, scholars have commenced tackling the issue of including nonhumans in research not only conceptually but methodologically as well (Hamilton and Taylor, 2017). Although animals and other nonhuman living beings are rarely or never part of ethnographic research, scholars using posthumanist approaches have argued *"that an inability to speak human language and to live within human behavioural norms should not be a basis for exclusion from social scientific research"* (Hamilton and Taylor, 2017: 12).

Urbanik (2012:186) adds that probably the most problematic and challenging issue for the investigations on human-animal interactions is *"developing the methodologies that will allow us to move closer to the animals themselves as individual, subjective beings"*. In considering the methodological difficulties of these endeavours, Hamilton and Taylor (2017) argue that new posthuman or multispecies methods are needed. They define these methods as ones that, at the very least, acknowledge the difficulty of doing research on animals' geographies. Despite all the challenges in finding appropriate methods to investigate animals' geographies, Hodgetts and Lorimer (2015) highlight a few reasons why focusing on methodological issues is still important and significant. First, they argue that investigating the spatial behaviour of animals can give us a *"thicker sense of the Earth"* (2015:286). Second, animal geographers should believe that animals are ethical and political subjects, therefore we need to better understand and improve their life experiences. Moreover, investigating animals' geographies would also allow us to explore the research gaps *"in animal science towards nonhuman experiences in humanized spaces"* (Hodgetts and Lorimer, 2015:286).

Borrowing the terminology from Kirksey and Helmreich (2010), Hamilton and Taylor (2017) argue that the new direction for including animals in ethnography can be labelled as a 'species turn'. This species turn has also been crucial in further problematizing the relationship between nature and culture (see more on this in Candea, 2010; Helmreich, 2009; Kirksey and Helmreich, 2010). As Strathern (2004) points out, ethnographic methods can create 'partial connections' with other species under investigation. Hamilton and Taylor (2017) claim that ethnographic methods (such as participant observation) have the potential to be more inclusive towards human–animal research because they pay close attention to the various practices and discourses of everyday life. Collard (2013) notes that participant observation is a suitable method for investigating human–animal interactions because extended and repeated observation gives the researcher the possibility to learn more about animal behaviour and collect nonverbal data.[20] This type of engagement with other species facilitates a shift from seeing them as research 'objects' to seeing them and working with them as research 'subjects' (Hamilton and Taylor, 2017).

In addition, despite the problems with the photographic and video methods, such as the power dynamics that taking pictures and filming creates between humans and animals, these methods are becoming increasingly popular among animal/more-than-human geographers (Margulies, 2019b; see also Dowling et al., 2017, 2018; Hodgetts and Lorimer, 2015; Lorimer, 2010; Richardson–Ngwenya, 2014). As Collard (2016) argues, visual methods provide an excellent way to partially capture and show the 'liveliness' of animal subjects. In addition, photography and video methods were practical to move away from the discursive and metaphorical associations of the animal body (Barthes, 1980; Watson, 2015), branding and landscape themes.

Greenhough and Roe (2019) argue that learning from animal technologists about their interactions and experiences with animals can provide specific skills and insights on

[20] My 'more-than-human' ethnographic approach attempts to engage with the emerging methodological field of multispecies ethnographies. Multispecies ethnographic approach is a growing trend in anthropology and geography where "*ethnographers are studying the host of organisms whose lives and deaths are linked to human social worlds* [and whose lives] *shape and are shaped by political, economic and cultural forces"* (Kirksey and Helmreich, 2010:545).

how to study human–animal relations. Gillespie (2014a), drawing on Philo (2005), argues that we, as scholars interested in human–animal research might be reluctant to think about how animals might feel and experience certain things to avoid the stigma of anthropomorphism. The case of the veterinarian who makes animal welfare assessment not only by using a quantitative assessment form, but his own imagination and senses as well is an excellent example of a 'careful anthropomorphism' (Johnston, 2008; Gillespie, 2014a). Human terms and experiences are used in this case to uncover and explain animals' emotions and experiences. However, Gillespie (2014a), citing Whatmore (2002), points out that our understanding and knowledge of animal experience will be partial and incomplete in the same way as we cannot fully comprehend what another human being experiences.

3.3. Positionality and ethics

There has been an increasing awareness among scholars of how their institutional and geographical positionality can affect knowledge production, especially when researchers are based in the Global North and conduct research in the South (Sharma, 2019; see also Potter, 1993; Sidaway, 1992, 1993). In my case, I conducted field research in the same country (Italy) where my institute was based, but the North–South divide emerged from time to time during my fieldwork. I was a foreign PhD student at the Polytechnic University of Turin, which is located in the more affluent Northern Italy, and the institute was, and still is considered one of the best technical universities in the country. I moved to Southern Italy, almost 900 kilometres away from Turin, to one of the poorest provinces (Caserta). England (1994:251) suggests that it is essential to *"locate ourselves in our work and to reflect on how our location influences the questions we ask, how we conduct our research, and how we write our research"*.

As Noh (2019:330) argues, my positionality was related to the *"multiplicities of identity"* (also in Ruppel et al., 2008). Although the significance of reflexive practices in qualitative research has been recognized (i.e., it is essential to acknowledge how the

researcher's presence and the research activities influenced the situation that they researched; England, 1994; Fisher, 2015; Sultana, 2007), scholars have argued that focusing too much on reflexivity can raise various concerns (Noh, 2019).

Scholars have pointed out that being an outsider during the fieldwork has various limitations regarding acceptance, openness and the accessibility of data (Dwyer and Buckle, 2009). When I moved to Italy at the beginning of my doctoral studies, I was barely able to speak any Italian. At the end of my first year, when I moved to Naples for exploratory fieldwork, I was able to use the language in simple situations. Still, sometimes the fact that I did not understand the local dialect that is commonly used in Naples and Campania region made me feel somewhat uneasy.

At the beginning of my field research, I had to rely on my previous experiences (i.e., doing physically demanding jobs before and during my studies in the UK) and my secondary sources on the local context. Working in various languages (English and Italian while my mother tongue is Hungarian) has also been challenging. Despite my difficulties in using the Italian language, most of my informants were impressed that I made an effort to learn the language in a relatively short period. Learning their native language was considered a proof of my genuine interest in their culture and history, and generally, they were keen to share information with me, and overcome linguistic barriers. Researchers have argued that just as in single, bounded site field research, multi-sited fieldwork – that has a long tradition in human geography – often includes language learning, too (Marcus, 1995). Even at the beginning of my fieldwork, when I most struggled with the language, I felt welcomed by the staff of the PDO Mozzarella Consortium. I also did my best to understand the local cultural and historical context during the first few months of my fieldwork. Although I still was an outsider (or a partially insider) for the people of Campania, my outsider status was sometimes beneficial for the research. The people were more open to share their perspectives in detail and to provide a more comprehensive historical-cultural background in order to help me better understand the contexts of buffalo farming and mozzarella producing sectors in Campania. They assumed that I had no knowledge of those topics, and I had fewer preconceptions/prejudices about life in

Campania than Italians living in other regions of the country. Although I officially was a PhD student from Northern Italy, my foreign status was probably helpful not to be regarded as a Northern Italian with prejudices about the Italian South. My Eastern Central European background and my keen interest in Southern Italian culture allowed me to connect with the participants of my research.

In Campania, I was purposefully reflexive about my presence in the field, but I also recognized that a multitude of factors influenced and affected my research. I was not separated from the other human and nonhuman research participants. Some of my informants were more open to talk with me than others, and I even made friends with some of the research participants. In addition, I have become very passionate about Southern Italian culture and the history of the place. I worked on a farm for seven weeks where both the modern (biosecurity, traceability, mechanized milking parlour) and traditional elements (grazing and bathing animals) of the buffalo farming sector were present. I also had the chance to work with the buffaloes and see their interactions with my colleagues every day. All these people, the animals, the place and the local culture and traditions have influenced my research and the narrative of this thesis. Reid-Henry (2003) claims that a strong analytical focus on the self results in privileging the position of the ethnographer/researcher, and reflexivity might end up reinforcing the conditions it tries to avoid. Reid-Henry argues that a different type of reflexivity is necessary to avoid looking at the 'agents' as only sets of processes, and the researcher is a 'contingent site' where all the processes meet and realize. The researcher's self is still a focal point. Nevertheless, this type of reflexivity resists the tendency to look at the ethnographer *"as separate"* from other participants in the research process (Reid-Henry, 2003:186).

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From an ethical perspective, I faced various challenges during this research. First of all, many Italian universities (including mine) do not have an obligatory and formal ethical review process for research projects in social sciences. Also, research methodology courses do not necessarily include topics on the ethical challenges of doing research in most cases.

Second, the focus of my PhD research project on human–animal interactions not only required alternative methodologies (Whatmore, 2006; Hobson, 2007; Lorimer, 2010; Buller, 2015) but it involved somewhat different ethical considerations as well (Collard, 2015).

Drawing on the work of Judith Butler (2016), we can ask, whose lives count as grievable in my research. Are the farmers' whose livelihoods have suffered from the adverse effects of various socio-environmental crises in the region? Are the buffaloes' who 'work' on the dairy farms? Are the male calves' who are in many cases separated from their mothers immediately after their birth **(Figure 10)**, and slaughtered a few days later? Are the farmworkers'?

Figure 10. Newborn calves separated from their mothers on a farm near Battipaglia
(photograph by the author)

Le Billon (2015) points out that the search for justice is one of the main motivations of many political ecologists. As an animal geographer, I have also had moral and ethical responsibility to consider how farmed animals are treated, and how they are affected due to their commodification (Gillespie, 2014a; Emel and Neo, 2011; Wolch and Emel, 1998). Le Billon (2015:601) emphasizes that environmental justice includes two perspectives: the "*justice of ecological distribution among people, and the justice of relationships between humans and the non-human world".* A multispecies approach towards animals in research can include very different categories: 'close others', such as pets and 'charismatic' wild animals, and 'distant others', such as billions of slugs that are killed every year by nature-loving gardeners (Ginn, 2014; Le Billon, 2015). My analysis of the buffaloes fell somewhere in between these two examples. On the one hand, the water buffaloes are charismatic animals of the 'mozzarella landscape' (e.g., in Goethe's writings), and they are increasingly used in the branding of the Mozzarella di Bufala Campana PDO. On the other hand, they are farmed animals, and their ontological status permits us *"to simply look away and to ignore their fates"* (Wolch and Emel, 1998: xi, quoted in Hobson, 2007:252).

Animal geographers conducting ethnographic fieldwork on farmed animals in intensive farming environments have sometimes managed to access places without disclosing their identities as researchers. Their method involved deception, and those scholars argued that it was one of the very few ways to access slaughterhouses, chicken farms, etc. (e.g., Pachirat, 2011; Striffler, 2007). For my own field research, I did not consider using the method of deception for various reasons.

First of all, while British and North American universities have an established ethics board approval process to review research involving human participants (and animals for laboratory research[21]), this was not the case at my home university, as I mentioned above. There was no official guideline regarding the research ethics that could guide me through the tricky terrain of deception. Second, I was interested in understanding human

[21] Prior Kathryn Gillespie conducting empirical research on dairy farming, had to participate in a course and learn the best methods to decapitate rats but nothing about doing ethnographic research on farmed animals (Gillespie, 2014a; Collard, 2015)

perspectives as well, not merely how industrial farming conditions treat animals. If I had not revealed my identity or the objectives of my research, it would have been impossible for me to gather quality data about the mozzarella economy and the challenges of buffalo farming in Campania. Third, the buffalo farming and mozzarella producing sectors are relatively small realities, and it would have been complicated (almost impossible) to get and maintain a job on a farm without having my identity as a researcher revealed, especially as a foreign scholar. For this reason, I did not consider using pseudonyms or disguising locations in this thesis. And fourth, the representatives of the sector were not against collaborating in this project, therefore using deception during my research would have been unnecessary.

This does not mean that finding an internship was easy. It took me several months until I managed to go through the formal application process and become an intern on a buffalo farm. I received the 'green light' at the beginning of September 2018, and a few days later, I started my internship on a farm outside Naples.

3.4. The context: Terra dei Mazzoni and Ponterè

As many argue, the time constraints of the PhD (three years) in several European countries such as Italy or the UK (Reid-Henry, 2003) makes it rather difficult to conduct long-term field research abroad or in other parts of the country. When I finished the first year of my doctoral studies in Turin, I had an outline and a broad idea about what I wanted to do during my fieldwork in Campania. However, after I moved to Naples in November 2017, I still needed two months (as exploratory fieldwork) to find the main focus of my empirical work and sharpen my research question. My principal supervisor suggested that I should obtain a visiting fellowship at the Department of Architecture at the University of Naples Federico II (DiARC) while doing my field research in and around Naples. In this way, I could have a comfortable and supportive work environment between various fieldwork

related activities, and I could interact with the local academic community, including postgraduate researchers. At DiARC, I had the possibility to make some initial contacts with local academics, test and adjust my hypotheses and research questions, and obtain further contacts that helped me to start the empirical research.

I contacted academics who conducted empirical research on the waste conflicts and other agricultural issues in Campania. I also travelled to the Sele Plain to see a well-known buffalo farm ('Tenuta Vannulo', Province of Salerno) that accepts visitors without any prior notice, and I visited a small but renowned mozzarella dairy at the Domiziana Coast ('Ponte a Mare' in Castel Volturno) to get a broad idea about the conditions of the buffaloes, the 'anatomies' of the farms, and the various practices of the mozzarella dairies. In addition, I visited the PDO Mozzarella Consortium at the Royal Palace of Caserta. The Consortium unites many of the producers in the region, and it also has an extensive book collection ('Mozzateca') on mozzarella production, buffalo farming and the agricultural sector in Campania in general. I could use the books and other resources of the Consortium, and I also talked with the staff about my research interests. Building a rapport with the staff members of the Consortium while exploring its book collection was helpful to get more insights on my topic and to understand their perspectives better. Spending more time with this group without formally asking them to be interviewed or to find an internship for me on a farm was also helpful to enter this community not only as a detached observer but as a participant, too. There were presentations for school groups, workshops for botanists, meetings with producers, so staying there provided me with an entry point to the 'mozzarella landscape'. The informal, more open-ended exchanges were also beneficial for me to prepare for more formal interviews during the second part of my fieldwork.

When I visited an educational farm for the first time in order to ask them whether I could do my internship on their farm, it was a good reference point that I had already spent some time at the Consortium, and this also helped me build an initial trust with the farmers. My experience as a foreigner in Campania was somewhat similar to Reid-Henry's (2003) work on the Cuban biotechnology sector. I think that if I had come to the field only

to conduct some interviews and immediately push for getting an internship on a farm, I would not have been able to obtain high-quality data. Moving back and forth between the different sites of my research (buffalo farms, the PDO Mozzarella Consortium, university departments and research centres, mozzarella dairies, etc. – even though, my focus was a specific area/landscape) made it possible for me to familiarize myself with various contexts and perspectives regularly. I wanted to present myself as a scholar who understood the complexity of the problem and to be transparent regarding my research question and objectives.

The landscape was a key concept in my research. Whenever I had the chance, I visited various parts of the Sele and Volturno Plains, where the majority of the buffalo farms and mozzarella dairies are located. It helped me to better understand how the modern agricultural landscape has been ordered, and how the Fascist regime and then, the post-World War II urbanization transformed the landscape and human–animal relations. Many times, I travelled on my own and used public transportation, including the infamous M1B bus line that connects Naples and Mondragone via Castel Volturno, and carries immigrant workers, low-income families and students. I travelled across the region by train, bicycle and on foot. I was also taken around the Sele Plain by one of the staff members of the PDO Mozzarella Consortium (Gaetano), and in the Lower Volturno Valley by one of my colleagues in Ponterè (Vincenzo). These excursions were helpful for me to understand what buffalo farming means to local communities, the role that agriculture, and more specifically, buffalo farming has historically played in the lives of the families. I have also had the chance to learn about the local families' perceptions about the Fascist land reclamations and the post-World War II transformation of the landscape as well as the more recent socio-environmental problems. One of the highlights of these trips was a visit to the Persano Dam (**Figure 11**) that was built on the Sele river in 1932 (Province of Salerno, more about this in Chapter 6). These massive infrastructure projects made not only the land reclamations possible, but they provided electricity and fresh water for the new settlements and intensive agriculture on the reclaimed areas (fieldnotes, 23 June 2018).

Figure 11. The Persano Dam near Battipaglia
(photograph by the author)

3.4.1. Terra dei Mazzoni, the land of the buffaloes

Currently, the Province of Caserta is the largest Mozzarella di Bufala Campana PDO producing province in Italy. A significant proportion of the PDO certified buffalo farms (610 farms out of 1345; see **Figure 12**) and mozzarella dairies (44 out of 97; see **Figure 13**) are in the Province of Caserta (DQA presentation at the ANASB meeting in Priverno, 4 December 2019). On the one hand, this province is the 'homeland' of buffalo farming and buffalo mozzarella production. On the other hand, farmers and mozzarella producers in

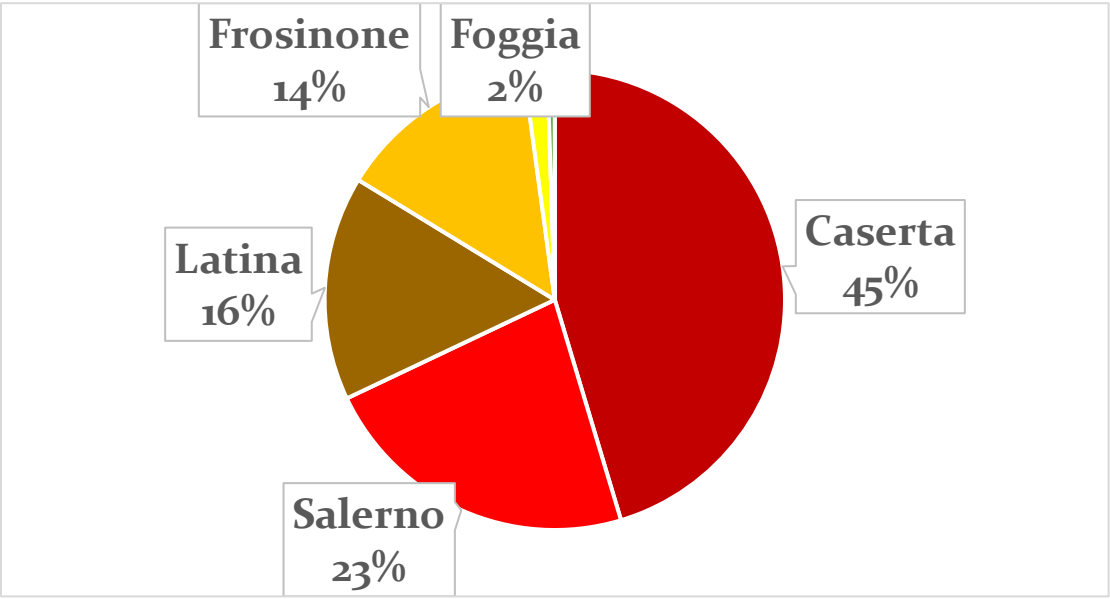

Figure 12. Distribution of buffalo farms in the provinces inside the PDO Mozzarella area (%), 2019

(Source of data: DQA presentation at the ANASB meeting in Priverno, 4 December 2019)

this area have suffered most from the effects of the Land of Fires phenomenon (Cembalo et al., 2019) and the brucellosis and tuberculosis infections. All these issues and controversies have led me to choose the Province of Caserta, and more specifically, Terra dei Mazzoni, for my field research.

In order to understand the significance of buffalo farming in Terra dei Mazzoni, I provide a brief overview of the historical relationship between buffalo breeding and the landscape. Thurmond and Thurmond (2017) point out that there is a good reason why the majority of the buffalo farms and mozzarella dairies in Southern Italy are located in previously swampy areas subject to flooding. The landscape of Terra dei Mazzoni radically transformed during the 4th and 5th centuries (AD). Bradyseism[22] in the Phlegraean Fields (Campi Flegrei, a large volcanic area situated to the west of Naples), the earthquakes during

[22] Bradyseism means slow and vertical ground movements (underground hydrothermal activities and the filling and emptying of magma chambers can generate these movements). The term has a Greek origin, and it literally means 'slow movement'. Bradyseism has been present in the Campi Flegrei area since the Roman times (De Vivo et al., 2010).

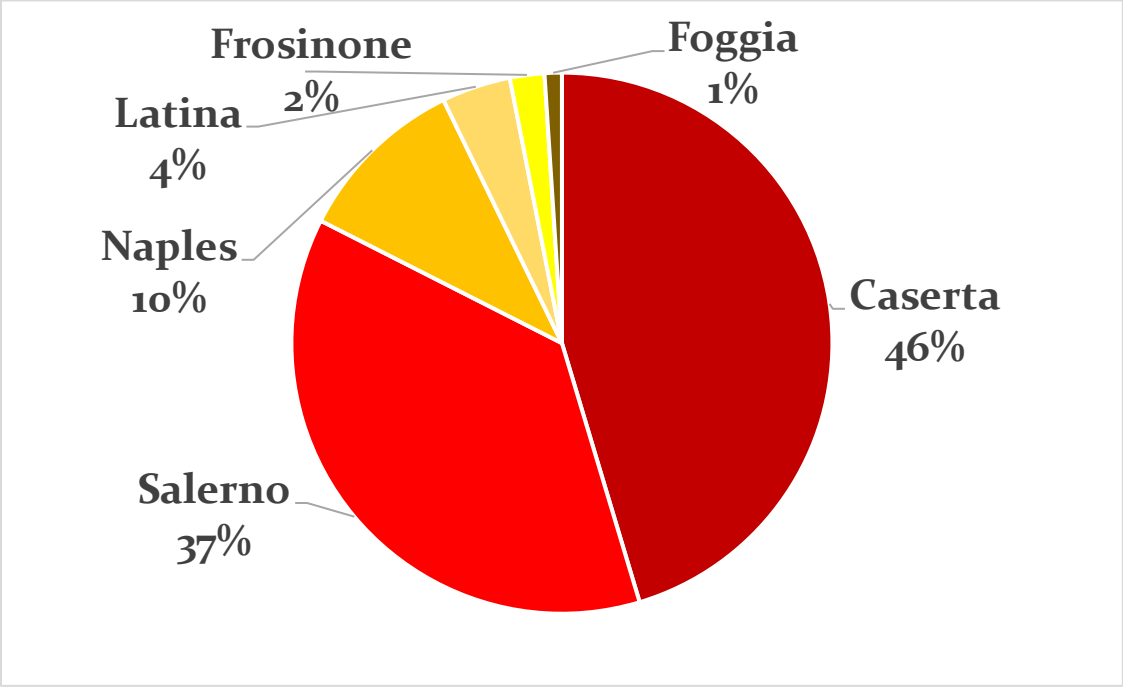

Figure 13. Distribution of PDO mozzarella dairies in the provinces inside the PDO Mozzarella area (%), 2019

(Source of data: DQA presentation at the ANASB meeting in Priverno, 4 December

the 4th century, the eruption of the Vesuvius in 472AD and the periodical flooding of the Volturno, Garigliano and Clanio rivers all contributed to the transformation of the landscape. Terra dei Mazzoni **(Figure 14)** became an extensive marshland. Lands that were unsuitable for arable farming were used for herding animals, but cattle, sheep and goat could not adapt to the environmental conditions in the marshy areas (Thurmond and Thurmond, 2017). The swamplands, however, provided the perfect environment for water buffaloes (Pirozzi, 2007). Water buffaloes relied on wallowing in ponds and rivers in order to lose body heat because they had a limited number of sweat glands in their bodies (De Rosa et al. 2009). Also, covering themselves with mud protected them against diseases and insects. I am going to discuss these issues in more detail in the following chapters.

The production of buffalo mozzarella also has a long history in the area. The first written record of the cheese is from the Bishop's Archives in Capua from the 12th century. Documents prove that by the 14th century, buffalo mozzarella was traded in the markets of Aversa, Naples and Salerno. The first experimental cheese laboratory was established by

Figure 14. The orange triangle indicates the rough extent of Terra dei Mazzoni in the Lower Volturno Valley between Capua, Lago di Patria and Mondragone
(Basemap: ESRI (obtained through QuickMapServices QGIS plugin)

the Bourbon kings inside the Palace of Carditello (in the centre of Terra dei Mazzoni) at the end of the 18th century. At that time, there were around 8000 buffaloes grazing in the region (Thurmond and Thurmond, 2017). Mozzarella production started in the Sele Plain near Salerno as well, where the marshlands owned by the Bourbons were used for buffalo breeding. In the Salerno area, the *bufalare* (the circular building with a large chimney in the middle; **Figure 15**) is still a characteristic element of the landscape. These buildings were some of the first signs of more organized labour in the production of the mozzarella cheese (Pirolo, 2017).

During the 20th century, however, the landscape transformed utterly. On 11 June 1925, Benito Mussolini launched the 'Battle for the Corn', and then the campaign was later

Figure 15. A 'bufalare' on a buffalo farm near Battipaglia, Province of Salerno. These characteristic circular shaped masonry constructions date back to the 15th century. *(photograph by the author)*

called the 'Battle on the Swamps' (Thurmond and Thurmond, 2017). Although the reclamation works created space for intensive agriculture, and it improved human lives in the previously malaria-infested marshlands, they destroyed the natural living environment of the buffaloes.[23] These processes radically reduced the number of the buffaloes as well: unofficial statistical records note that there were around twenty thousand buffaloes grazing in the plains of Campania at the beginning of the 20th century and the buffalo population started to decrease after the land reclamations (16000 heads in 1931). At the end of World War II, the numbers dropped to 12000 heads (1947), and most of the buffaloes were found

[23] Thurmond and Thurmond (2017) indicate that there is evidence that even Mussolini tried to discourage or eliminate buffalo herding, as he saw it as a backward and primitive farming activity.

around Salerno because the retreating German soldiers killed many of the animals in the Caserta area. At the beginning of the 1950s, the buffalo was nearly extinct in the area, the natural conditions, the marshlands were not available anymore for their survival (Pirozzi, 2007). However, over the past three to four decades, the number of buffaloes increased rapidly because intensive farming techniques, developed initially for cattle farming, have been applied to the buffalo farming sector as well (Napolitano et al., 2013).

3.4.2. Why Ponterè?

Ponterè, an organic educational farm ('fattoria didattica'), is located halfway between Mondragone and Cancello ed Arnone in the heart of Terra dei Mazzoni **(Figure 16)**. Mondragone is one of the traditional centres of mozzarella production, while buffalo farms are historically concentrated around Cancello ed Arnone **(Figure 17)**. The human to buffalo ratio is 1:8 in Cancello ed Arnone, and there are more than 33000 buffaloes in 156 farms around the town (ComunicaCity, 2019).

Ponterè is a small but well-known farm in the area. Around 300 animals are kept at any time in the farm (the owners do not want to increase the number of the animals in order to maintain the Livestock Unit [LSE or sometimes LE; in Italian: Unità Bovine Adulte (UBA)] and a hectare of land ratio. Maintaining this balance is also necessary so that the farm can keep its organic certificate (personal communication with Nicola Cecere buffalo farmer). The animals are milked only once a day (in intensive farms, the animals are milked twice daily), and they live in semi-wild conditions: the buffaloes spend most of their days grazing outside, and they can choose the herbs they prefer (Scatozza, 2014). The animals are given organic fodder produced elsewhere when they are kept in the stalls due to poor weather conditions or when sufficient feed is not available on the pasture. Not keeping the buffaloes in the stalls all-year-round is relatively uncommon in the buffalo farming sector in the region since most of the farms are intensive ones.

Figure 16. Monte Massico, the highest peak around Terra dei Mazzoni, in the background
(photograph by the author)

The educational part of the farm was established after the multiple socio-environmental crises (waste, dioxin and brucellosis) that impacted the buffalo farms in the region. The economic effects of the crises pushed the farm owners to diversify their activities and open the farm to the public as well. The owners also argue that the crises taught them to *"focus on the communication of our work and our land. Nowadays, those who do not communicate do not exist"* (Confagricoltura, n.d.).

To some extent, Ponterè differed from other buffalo farms in the region because many of those farms were larger, intensive ones. Working there was very helpful to understand the main mechanisms of buffalo breeding and milk production for the

Figure 17. Ponterè Farm and the surrounding area. Most of the buildings at the bottom half and the left side of the picture are buffalo farms and mozzarella dairies. *Basemap: ESRI (obtained through QuickMapServices QGIS plugin)*

Mozzarella di Bufala Campana PDO sector. Issues that I was interested in observing, such as milking animals with machines, deseasonalization, biosecurity and traceability, functioned in the same way as in intensive farms. The slightly slower 'rhythm' of the farm work activities and the fact that the animals had more freedom than in other farms provided me with the opportunity to observe animal behaviour and the interaction of buffaloes with each other and with humans. In addition, the farmworkers at Ponterè were local Italians who had been working there for 25 to 40 years, and their fathers and grandfathers worked for the farm owner's father and grandfather. This is unusual in the sector nowadays because, at the majority of the farms, the farmworkers are foreigners, mainly from India and Pakistan. Listening to the stories about their work experiences has

been helpful to understand how the buffalo farming sector, including the living conditions of the animals in the farms, have changed over the past few decades.

3.5. Research methods/data collection

In order to investigate the relationships between humans, buffaloes and the landscape in the Province of Caserta, I have used a variety of research methods. These methods have included detailed textual analysis of local and national newspapers (e.g., Il Mattino, Corriere del Mezzogiorno, Il Sole 24, Il Foglio and the regional sections of La Repubblica) and magazines (such as L'Espresso and Napoli Monitor), trade publications (e.g., Bufala News, Il Fatto Alimentare), brochures from conferences and workshops, government and industry reports on mozzarella production and buffalo farming, and both academic and policy papers on the waste emergency and its effects on the local agricultural production. These documents were valuable resources to understand and reconstruct the public discourses of the political economy of the Mozzarella di Bufala Campana PDO, the recent socio-ecological crises in Campania, and their effects on human–animal relations. Also, some of the documentary sources helped grasp the cultural links between buffalo farming and the area (Campania). They were essential to understand critical local issues and to prepare for the interviews and my internship at a buffalo farm. The documents also provided me with useful resources to triangulate my findings after conducting the interviews.

Besides the online versions of national and regional newspapers, I used other online resources as well. For example, I followed two blogs (Horatio post and Curiamo la terra) of a renowned local agronomist, Antonio di Gennaro. In these blogs, di Gennaro commented on current issues and events related to the local agriculture, the socio-environmental struggles and positive initiatives as well. I regularly checked the online news and statements of the PDO Mozzarella Consortium in order to keep myself up to date with

relevant cultural, economic and political issues affecting the mozzarella economy and on the position of the Consortium on those matters. Also, I closely followed a Facebook group ('Bufalando') for buffalo farmers in Campania. The farmers' posts and their comments provided me with very valuable indications about the effects of various political decisions and events on their livelihoods. The discussions in this Facebook group helped me to identify the multiple perspectives and viewpoints among the buffalo farmers. This type of 'internet ethnography' complemented my findings obtained by using other research methods, such as interviews.

Semi-structured and expert interviews with scientists, researchers (e.g., political ecologists and environmental historians, urban planners, agronomists, botanists and veterinarians), and the officials of the PDO Mozzarella Consortium in Caserta, and oral histories with farmers and farmworkers have helped me gain a clear insight into the various challenges of buffalo farming, interspecies (buffalo–human) relationships and animal experiences through human informants. In total, I conducted 32 interviews with 25 people. Some of these meetings, especially the ones with researchers or higher officials, were more structured. Nine interviews were recorded, two interviews were conducted by a series of emails, and in other cases, I took careful notes during or after the conversations. In one instance, I was asked not to use a voice recorder during the conversation, and at another time, I had to turn the recorder off for a few minutes while we talked about more sensitive information. Some of the interviews were more informal, especially at the beginning of my field research. Keeping the interviews more informal was at times necessary due to the sensitive nature of the topic (the sometimes unfair media attention on local socio-environmental issues impacted the livelihoods of many of the farmers and mozzarella producers). Obtaining quality information and building trust would have been somewhat challenging to manage in more formal interview settings.

Relevant films, documentaries and news programs (featuring buffalo farming, mozzarella production and the waste crisis in Campania) have also been analysed. These sources were useful in the initial phase of my research (pre-fieldwork, exploratory

fieldwork) to have an overall view of the human–animal relationships portrayed in those programs and what kind of discourses are dominant on agri-food production and socio-ecological struggles in the surrounding area of the so-called Land of Fires. Interestingly, these sources presented buffaloes not only in the perspectives of neutral media news or animal rights, but one of the films (Lost and Beautiful) tried to understand how a buffalo might have experienced various events, and how he (the film has presented a male buffalo calf) felt about his interactions with humans.

I also used photographic methods, and wherever possible, I took photos and I made some videos as additions to my fieldnotes. Finally, participant and direct observation helped me to document the complexities of human–animal interactions over time (Hamilton and Taylor, 2017). Also, participant observation allowed me to better understand the complexity of various socio-ecological issues, and the links between macroprocesses and localized events and practices.

In February 2018, I started to use the archive collection ('Mozzateca') of the PDO Mozzarella Consortium in Caserta. The staff members of the Consortium were very open to my research from the beginning. Apart from getting help in finding important primary resources, I was invited to their public events (e.g., Campania Stories, an annual event that promotes the wines of Campania and other local food products, such as the Mozzarella di Bufala Campana PDO) and some of their internal events and workshops (e.g., a seminar for journalists on the issue of 'fake news' in the agri-food sector; a workshop for botanists who investigate the possibility of using large mammals – such as buffaloes – as biodiversity 'managers' in wetland areas). These events were essential to understand the key challenges and future objectives of the buffalo farming and mozzarella producing sectors in Campania.

I visited several farms both in the Caserta and the Salerno areas in order to better understand the spaces and senses of those interspecies farm environments. Among those, there were a variety of farms: high-tech, more traditional and organic buffalo farms as well. These visits helped me observe several issues: how technological development had impacted the sector, quality demands, what kind of challenges farming communities were

actually facing, how animals were 'disciplined' (fieldnotes, 5 February 2018), and what types of human–buffalo relationships existed in those farms. I also went to see a number of mozzarella dairies in the Province of Caserta. Once, I had the opportunity to spend a morning shift (8 hours) in a mozzarella dairy (near Castel Volturno), observing the various stages of the production of the mozzarella, and talking with the associates and the workers in the dairy.

In September and October 2018, I completed a seven-week-long internship at an organic buffalo farm. Working there provided me with an additional opportunity to capture the challenges of buffalo farming and the farmer community, to get access to further informants, and to develop a sensitivity to understand human–animal relations in a

Figure 18. A buffalo after taking a mud bath at Ponterè
(photograph by the author)

multispecies contact zone. Also, I was passionate about getting some hands-on experience on a farm. Although the farm showed some patterns of modern industrial farming, the animals could spend most of their days outside grazing, wallowing and taking mud baths on the pastures **(Figure 18)**.[24] These facts helped me to conduct a 'working participant observation' (McMorran, 2012) without constantly being exposed to the realities of intensive animal farming. Gillespie (2014a, 2014b) writes in detail about the problems of showing emotional responses while conducting ethnographic field research on intensive dairy farming.

Gillespie (2014a) argues that farmed animals are rarely rendered visible as singular animals,[25] and they are not rendered visible as living beings with emotions. On this farm where I worked for seven weeks, there were around 200 adult buffaloes. It was a small-size farm since the larger, more intensive farms housed more than 1000 animals. After spending several weeks there, I managed to recognize some of the buffaloes: the older male animals, the youngest and most scared female buffaloes in the milking parlour, buffaloes with white patches on their heads and finally, Saint Rocco and the Dog (despite the confusing name, both animals were buffaloes).[26] Working in the milking parlour every morning and helping my colleagues herd the buffaloes enabled me to observe individual animal behaviour. After lunch, while my colleagues were taking a nap, I used to walk around the pastures, observing the animals and taking photos of them. During these afternoon walks, the multispecies character of the farm was even more evident. Besides the buffaloes and the human farmworkers, there were cats (they were spoiled by my colleagues because of their ability to kill rodents on the farm), stray dogs, flies, dragonflies, spiders, nutria and various birds.

[24] Bathing buffaloes: *https://ln2.sync.com/dl/9a910afe0/cnbbvhww-3ygc5t5g-f9hd7kvj-f7i2zczc* and *https://ln2.sync.com/dl/34d078ee0/9t4qurh5-qernm72g-pdti7xu6-p2f37y5u*

[25] One of the few exceptions would have been Angelica (the octopus) in Christopher Bear's (2011) work. However, after a certain time he realized that the octopus was not the same because, when one died, it was replaced with another one (and named Angelica) without Bear knowing about it.

[26] One of the workers (Camillo) gave these names to two female buffaloes who always entered the milking parlour at the same time, and they walked and grazed next to each other. Paintings and statues depict Saint Rocco (Roch) accompanied by a dog with a loaf of bread in the dog's mouth. According to the story, the ill Saint Rocco was saved from death by a dog, who brought him a loaf of bread every day, until he recovered. Later Saint Rocco became the patron saint of dogs.

Figure 19. Cattle egrets (bubulcus ibis) and a water buffalo on the pasture
(photograph by the author)

Pheasants were a rare sight on the pasture but cattle egrets (in Latin: *bubulcus ibis;* **Figure 19**)[27] were everywhere due to their special symbiotic relationship with grazing animals. Cattle egrets remove flies and ticks from the grazing mammals (Lingis, 2004).

I also accompanied my colleague Vincenzo on the pasture when he examined the female buffaloes whether they were pregnant or not **(Figure 20)**.[28] We used to bring fodder to the herd on the meadow every day **(Figure 21)**, and we did maintenance work outside.

[27] Cattle egrets on the pasture: *https://ln2.sync.com/dl/db3c99480/4x79r38q-uppbutfh-uqrnwyrr-hiq2hqdk* and *https://ln2.sync.com/dl/c5dc7c7a0/hpkx3gde-b82awa4d-w43x39vz-xb579pbf*
[28] Vincenzo examining the buffaloes on the pasture: *https://ln2.sync.com/dl/694725330/ct7s9qwu-hkjqm3ba-e43ch9jj-yqycg2wq* and *https://ln2.sync.com/dl/d24d26fc0/id72mvtg-2ucixagw-9pgajv3p-nhrwyrmv* and *https://ln2.sync.com/dl/7362ca140/rfy9fct4-8demjq37-smzvyi8a-uq7ttbdn*

Figure 20. Vincenzo examining the buffaloes on the pasture
(photograph by the author)

While doing work outside, I observed how my colleagues interacted with the animals and how animals behaved. I had numerous unstructured and open-ended discussions/interviews with the farmworkers.

As a 'worker' myself on the farm, I participated in various activities. These activities involved 'dirty work' such as milking the buffaloes, cleaning the milking parlour, moving the animals between the stalls and the pastures, feeding the calves hay, repairing the fence, tagging the buffaloes as well as registering them in the office **(Figure 22)**.

In general, my daily routine was the following:

Figure 21. Feeding the buffaloes with fodder in the afternoon
(photograph by the author)

I usually managed to leave the flat in the centre of Mondragone just before 7:30AM. In the morning, I got head wind, and it made the bike ride to the farm [9-10 kilometres] *a bit tiring. There were not many people riding bikes outside the town: in the first two weeks, I saw only two African and a Sikh men on bicycles. We greeted each other. When I arrived at the farm, the lactating buffaloes were already near the milking parlour. As soon as I put on a pair of rubber boots, I went to help the two Vincenzos and Camillo feed the calves. They 'assigned' some babies to each lactating buffalo [the ones that were not milked in the parlour]. My job was to leave some fodder or hay in front of the mothers, so they stayed calm in the meantime. Then, we prepared the milking parlour, and in a few minutes, the first buffaloes entered. The first four or five groups [10 to 12 buffaloes each] were easy to handle. Vincenzo or Camillo whistled, and they came. I had to be aware that some of the buffaloes preferred a specific*

Figure 22. Vincenzo registering the newborn calves
(photograph by the author)

position, so I had to be ready to open the doors for them to choose their 'preferred' positions inside the milking parlour. When Vincenzo or Camillo saw a buffalo, they already knew whether that animal could be relaxed only in the fifth or sixth stall. I did not have this knowledge, and sometimes I quickly locked those animals in the first individual stalls. In those cases, the animals became very nervous and started kicking. It made me feel that the whole milking parlour was about to collapse. Camillo or one of the Vincenzos jumped in, and they opened the gate quickly, so the buffalo could move to the fifth or sixth position. Then, we washed the udders of the animals, and we attached the teat cups.[29] *After four or five turns,*

[29] The author of this thesis is attaching the milking cups: *https://ln2.sync.com/dl/7b55d1540/4xu37mf4-a9v33s6y-8hpwmvtw-uajibwiz*

we had to go outside with a stick and bring the rest of the buffaloes – the animals that were less willing to go through the milking process – closer to the milking parlour.

[…]

After milking[30]*, we herded the animals back to the pasture*[31]*, and we opened the gate for the older calves, so they could walk and graze outside the stalls during the day. Then, we took a coffee break in the office. After the break, I joined Vincenzo to cut some fodder in the fields. Another day, we went to check and fix the fence with Camillo.*[32] *Most of the days, however, I stayed with Vincenzo G., and we cleaned the milking parlour. While the teat cups and the machines were being cleaned, we were washing the walls and the floor. This job was considered some of the dirtiest activities on the farm, but I always enjoyed cleaning the milking parlour. It was almost noon when we finished the cleaning. We could start preparing (heating on the stove) our lunches. Almost every day Camillo or Vincenzo invited me to have lunch with them. I accepted their invitation many times, so I could try really tasty local dishes. After lunch, Camillo and the Vincenzos took a nap, leaving the TV on. When I was not tired, I walked around the fields taking photos of the buffaloes. There were exceptions when we had to interrupt our nap time. For example, one day, a truck came to pick the male buffalo calves up in order to take them to the slaughterhouse. Camillo asked me if I wanted to make a video of the process, but I preferred not to join them. This was one of the very few activities on the farm that I did not want to do or observe. […]*

In the afternoon, sometimes I joined Nicola and Alessandra, and they showed me around the office, answered my questions, and when they had visitors on the farm, they always introduced me to them. For example, a group of young people – the owners of a pizzeria chain

[30] Vincenzo counting the buffaloes after milking: *https://ln2.sync.com/dl/13ccc5830/zfs756ak-d6ig96y6-esi2usrw-e3j8k5xf*
[31] Herding buffaloes to the paddocks after milking them in the morning: *https://ln2.sync.com/dl/18f41b270/cr7a5jbn-t2qzyukd-dqsyj4cg-xkut7d3e* and *https://ln2.sync.com/dl/a4019afe0/eke3r7hd-wgg56iqw-q2b4fsr2-3kiqpt4f*
[32] Repairing the fence with Camillo: *https://ln2.sync.com/dl/51c10ac20/zwmr7ndt-mqqzrtf4-gtnkzf9i-979id2tw*

Figure 23. Returning from the pasture in the afternoon
(photograph by the author)

from Bologna – came to renew their contract with Nicola's farm last week. Another day, the officials of Asl visited the farm, and measured the level of dioxin in the milk.

Otherwise, I went with Vincenzo or Camillo to unload the fodder that we collected in the morning on the pasture.[33] *Then, we herded the resting buffaloes and the older calves back to the stalls* **(Figure 23)**.[34] *It is interesting that different rules apply to the resting and the lactating herds.*[35] *The lactating ones could stay outside on the pasture all night, they would*

[33] Feeding buffaloes on the pasture: *https://ln2.sync.com/dl/6bd92fee0/wprfpnrk-987ipsxb-zpmtkibd-3trupmnu*
[34] Buffaloes returning from the pasture in the afternoon: *https://ln2.sync.com/dl/84d609490/e2hu4qrh-i8xef423-mt3y5bz2-vhk5e3ct*
[35] Separating pregnant buffaloes from the lactating herd: *https://ln2.sync.com/dl/a804258e0/mdw3f2ya-w4hrb8ar-umh2cn3y-3uvb3zbr* and *https://ln2.sync.com/dl/931ff76e0/4h23b3fx-iz2yvwim-hrf9h98s-8z9p5g9f*

not try to leave the farm. However, as Vincenzo told me, it had already happened that some animals from the resting buffaloes tried to leave the farm.[36] *That is why my colleagues preferred to keep this herd inside the stalls while they were not present on the farm. Our work finished at around 3:30/4PM. My colleagues washed themselves, they changed, and they left their overalls that were covered with mud and buffalo feces behind in our changing room. They always left the farm clean and well-dressed. This ritual reminded me of Robert Linhart's*[37] *observation in a Citroen car factory in the 1960s, where he saw his colleagues – who did rather dirty and menial tasks at the factory – taking particular care of themselves at the end of their shifts and always leaving the factory immaculately dressed.* (fieldnotes, 5 October 2018)

Besides the planned and well-known routine activities, several unexpected events helped me to better understand animal behaviour. For example, a random truck unloading forage next to their path disturbed the animals to the extent that they turned back, and instead of going to the milking parlour, they went ran to the pasture. A new person, a stranger to the buffaloes in the milking parlour could make the animals nervous, just as much as windy weather. Also, I had the chance to observe how the modernization of the dairy farms affected buffalo lives (I am going to discuss this in more detail in Chapter 4).

Spending time with the farmworkers was very helpful for me not only to get new information to answer my research questions but their relationship with animals provided *"useful insights into the specific skills, expertise and relationships required in order to study human–animal relations"* (Greenhough and Roe, 2019:367). Previously, before modern milking machines were introduced, and the majority of the livestock farms became

[36] Pregnant buffaloes, just separated from the lactating herd, are running to the 'resting' paddock: *https://ln2.sync.com/dl/b85793b90/d8mfhkes-8r6rv5du-85m2yb5g-4rfbphcx* and *https://ln2.sync.com/dl/305d35440/ysxf4cdj-xukqqray-2bzricvu-8ryvj4aw*

[37] Robert Linhart was a French sociologist, and in 1968, he managed to work undercover at a Citroen car factory for nine months. He wrote about his first-hand experiences in his book titled The Assembly Line (1981).

intensive, buffaloes and other animals in the dairy farming sector were milked manually. Buffalo calves were used to stimulate the lactating buffaloes before milking. However, this option was not available anymore. Milking of the animals was sometimes quite complicated and upsetting. Although I saw the farmworkers hitting the animals and injecting them with oxytocin, I was also impressed by how they were able to 'read' the needs of the animals. When the buffaloes were agitated in the milking parlour, some of my colleagues understood immediately what the problem was: they preferred to stay in a different stall, the teat cups were not attached correctly, or the animals needed treatment on injured teats, etc. I aimed to capture both human and animal stories as well and present them in a 'balanced' way. For example, Greenhough and Roe (2019) note that Gillespie (2016) presents the lives and sufferings of cows in a form in which humans working with those animals are described in caricatured ways. For me, it was necessary to talk with human participants (farmers, farmworkers, veterinarians) as well and to understand their perspectives, too. I was interested in how various global processes affected both animals and humans. Speaking with humans and making efforts to understand their viewpoints helped me to conceptualize animal agency more precisely. I talked with veterinarians and researchers, farm owners and Italian farmworkers. I saw immigrant labourers (currently, a significant number of Indian and Pakistani immigrants work with the animals at the larger buffalo farms in Campania), but I did not have the chance to talk with them or observe how they work with the buffaloes.

The stories of the animals became visible mainly through Nicola's (the owner of the farm) Excel tables that listed the birthplaces and dates of birth of the buffaloes, their parents' identification codes, the dates when they gave birth, their calves' identification numbers, their average milk yield and the date and location of their slaughtering. The Excel tables showed clearly when and where farmed animals become individuals for the industry. However, this 'individualization' did not mean visibility for the animals 'as living beings with emotion'. Philo (2005:829) argues that it can be difficult for a researcher to understand *"what animals possibly think, feel, experience, intend, etc."*

As I have mentioned above, the animals did not have names.[38] They only had identification codes: Vincenzo could tell the last four digits of these code numbers of every buffalo, even from a distance. One day during my internship he proved his ability, telling the last four digits of the code numbers of any buffalo from a distance of 50 metres. We checked, and he was always accurate (fieldnotes, 30 October 2018).

By working on a 'semi-wild' farm and by visiting several intensive ones, I could observe the behaviour of buffaloes in relative freedom, and I could also learn more about the specific mechanisms and techniques that are used for optimizing animal labour and production in factory farms. Although it was necessary to understand the political economy of the Mozzarella di Bufala Campana PDO through document analysis, interviews and participant observation in mozzarella dairies, multispecies ethnography helped maintain the body of the buffalo as the main focus of my thesis.

Working alongside the farmworkers and observing human–animal relations were helpful to understand the complex ways in which 'species meet' (Haraway, 2008). It was also essential to get a first-hand experience to understand how animals are forced to work. Without this experience, the milk-producing animal is a 'black box'[39] (Latour, 1987). The work experience was essential for me in understanding how seemingly minor details can be important factors in animals' lives and the profit they produce as well. The internship also provided me with a possibility to refine my research questions and the chance to interview visitors and business associates on the farms.

[38] At Ponterè, the animals did not have proper names, they were recognized by their identification code. At some other farms (e.g., Bellelli), the animals were also given human names (Nunziata, Lalla, Ronda) or sarcastic nicknames (Lavori in corso, Senza segreto, C**** vostri). For a detailed list of the traditional buffalo names, see Thurmond and Thurmond, 2017.

[39] This Latourian term means that an item operates without question and in an invisible way.

3.6. Research challenges and limitations

While I argue that a multispecies and multi-sited ethnographic approach was the best way to analyse how the transformation of the 'mozzarella landscape' has affected human–buffalo relations in Campania, I had to face various challenges during my research.

First of all, as some of my informants told me during the early stages of my fieldwork, entering the world of activists, farmers and food producers required trust. Distrust has also emerged over the last few years from the fact that many journalists and researchers have 'investigated' those groups. Approaching particular areas such as the buffalo farm where I ultimately did my internship required months of organization. For example, the communities and farmers that have suffered either from the adverse effects of waste dumping and burning in Campania, or the dioxin scandal and its drastic impact on the sales of local food products (mozzarella cheese in particular) can be reluctant to repeat their experiences through interviews or oral histories. I addressed these challenges through being engaged in the field long term, doing the internship on a buffalo farm mentioned above and building trust with local communities. Although I conducted my field research in Campania region only, I did not stay in a single site (organization, town, etc.) all the time. In order to have a good understanding of the political economy of the Mozzarella di Bufala Campana PDO production, I had to visit various sites and understand multiple realities.

3.7. Conclusion

This chapter aimed at explaining how I approached my research (from a methodological perspective), and justifying my methodological choices. While the broader political-ecological dynamics of the toxic waste crisis in Campania and its effects on local

agricultural products might have been answered through (semi-structured) interviews and document analysis, the focus and political nature of my research topic (qualitative research on human–animal relations, the controversies of the waste conflicts and the economic effects of the dioxin scandal) required a deep immersion, a multispecies and multi-sited ethnographic approach. Although human perspectives (landscape, branding, product, political debates on pollution, etc.) still dominate my thesis, my aim was to find a less anthropocentric (methodological and theoretical) approach and to be aware of the uneven power dynamics between human and nonhuman participants of my research.

Reid-Henry's (2003:193) claim that *"the researcher who leaves the field is different from the one that arrived"* is very appropriate here, I think. During my fieldwork, I had to rework my research questions and some of my initial ideas. The field and my informants interacted with me, and they influenced the outcome of my research. However, this did not mean that the fieldwork was entirely open-ended, and there was no unequal relationship between the researcher and the research participants.

In the following chapters, I am going to investigate human–buffalo relations in the 'mozzarella landscape' of Campania in detail: how the body of the buffalo and animal reproduction are conditioned to follow the fluctuations of the market demand, how animal bodies are controlled and secured, and how branding the product uses the animal and the landscape. Throughout the empirical chapters, the body of the buffalo remains the main entry point.

Chapter 4. Subsuming buffalo milk production in the 'mozzarella landscape'

4.1. Introduction

Deseasonalization is a crucial practice to control and manage the reproductive process in buffalo farming in Southern Italy. Normally, the water buffalo has a seasonal reproductive activity. This animal is considered photoperiodic in subtropical areas and tends to reproduce more when the daylight hours decrease (during the autumn and winter seasons) due to genetic and environmental factors. This seasonal reproductive activity also means that most of the buffalo calves would be born in autumn and winter (after ten months and ten days of pregnancy), and the milk production would be the highest in autumn and winter, too. The problem is that the consumption of this fresh cheese[40] is the highest in spring and summer. In the past, surplus milk from winter was frozen, and then it was used when the demand for mozzarella was higher. The current regulations of this PDO cheese do not allow the practice of freezing buffalo milk for mozzarella production anymore. The farmers, cheesemakers and veterinarians had to come up with a different solution in order to deal with the imbalances between the seasonality of milk production and mozzarella consumption.

Although the deseasonalization of the buffalo reproductive activities was introduced in the sector in the 1980s in order to meet the fluctuating milk demand in the market, the traceability system, biosecurity measures (discussed in Chapter 5) and consequently, the increase of price have made farmers more interested in managing animal reproduction activities. This method allows mozzarella producers to provide a continuous supply of fresh cheese and follow the seasonality of market demand, and not the seasonality of the buffalo reproductive cycles. Deseasonalization affects not only the conditions of the

[40] Almost 100% of the milk produced in buffalo farms in Campania is used by the mozzarella dairies.

animals but the farmers' activity, the power relations between farmers and cheesemakers, legal issues related to the mozzarella, and the possibility of globalizing this very local product.

Another challenge in the industrialization of the dairy farm was the particular udder morphology of the water buffalo. The cisternal areas of the udder in buffaloes are much smaller than in cows, and an optimal quantity of milk (95%) can only be obtained if the animal has an elevated level of oxytocin. In the past, the pre-milking stimulation of the lactating buffaloes was attained through the presence of buffalo calves, but using this method in industrial farms is not possible anymore. Either the farmworkers have to stimulate the buffaloes before milking (by properly washing their udder and teats), or some of the animals have to be injected with exogenous oxytocin (Cavallina et al., 2008).

These two examples, the seasonal reproduction of the buffaloes and their particular udder morphology, suggest that the bodily characteristics and functions are significant impediments for the industrialization of buffalo farming as well as the globalization and 'improvement' of mozzarella production. Circumventing buffalo lives has been crucial for intensifying and optimizing milk production.

This chapter explores why the reproductive seasonality of buffaloes matter in mozzarella production, and how the body of the buffalo has been subject to various interventions to improve the performance of animal labour and value production (i.e., to achieve higher milk yield and an optimized level of milk production). In order to gain a better understanding of these issues, this chapter engages with research on the geographies of the body and the concept of the real subsumption of nature.

The chapter is organized as follows. First, after providing a conceptual introduction on the real subsumption of nature (4.2), in a 'parenthesis' (4.3), I am going to investigate how the udder morphology of the buffaloes has become an impediment in using these animals in modern dairy farms. Then, I am going to review the key points of reproductive seasonality and its constraining effect on capital accumulation (4.4). In the subsequent section (4.5), I am going to examine how science and capital have developed the practice

of deseasonalization in buffalo farming in Campania. Then, I am going to analyse how deseasonalization and the intensification of farming methods contribute to the globalization of the mozzarella, to the debates on 'what Mozzarella di Bufala Campana PDO should be' and to the changing of power dynamics between local stakeholders (4.6).

4.2. Deseasonalization: the real subsumption of nature

"It is possible, arguably, to track a distinction between formal and real subsumption not only in the material history of labor, as Marx does, but also in the material history of nature." (Shukin, 2009:69)

Deseasonalization works as an environmental fix, or an accumulation strategy under capitalism in which nature is increasingly internalized by capital (Smith, 2007, 2010). In order to examine the relationship between Prudham's (2003:638) claim that *"capital circulates less and less around nature and more and more through it"* and the deseasonalization of the buffaloes in Campania, I am going to revisit and expand on the concepts of the formal and real subsumption of nature introduced in Chapter 2.

The formal subsumption of nature refers to the conditions in which capital circulates around nature, it makes money from using the natural environment, but it is not able to transform its material properties. The real subsumption of nature, on the other hand, is the alteration of the biophysical, material properties of nature/the environment to increase capital accumulation capacities. It is important to note, however, that the real subsumption of nature occurs in economies working with the biological nature, and not in the extractive sector (Castree, 2008).

Marx (1992) argued that the real subsumption of labour prescribes, *"within the context of capitalism, the conditions of labour to such a degree that workers (the living labour) are subordinated to the needs of the production process"*, and they become a *"living*

part of that process" (Joyce et al., 2015:96). While Marx's focus was on labour, Boyd et al. (2001) argued (by citing Marxian labour theory) that the real subsumption of nature can provide a conceptual tool to explain how biological systems are industrialized. In other words, this concept helps to clarify *"how nature matters to the dynamics of industrialization"* (Boyd et al. 2001:556).

The formal and the real subsumption of nature to capital compel us to take the materiality of nature seriously in political–economic analyses. Boyd et al. (2001) argue that nature's limits do not always mean an 'absolute' barrier to human activity. Within biological production systems, there is the possibility for a distinct manner of industrialization. Boyd et al. (2001) claim that *"increases in or intensification of biological productivity"* can be achieved, resulting in *"higher yields, shorter turnover times, improved disease resistance, etc. Nature, in short, is (re)made to work harder, faster, and better"* (Boyd et al. 2001:564). In this case, the increased productivity of nature can be accomplished without improving the productivity of labour. The *"intimate relationship with nature"* of some biological sectors is seen as facing *"a unique set of obstacles, opportunities, and surprises to firms as they seek to subordinate biophysical properties and processes to the dictates of industrial production"* (Boyd et al., 2001:556; McCarthy, 2009). Cooper (2017) points out that Boyd et al. (2001) portray the real subsumption of nature as an inherently capitalist way of nature transformation, but the authors do not specify what aspects of the real subsumption of nature are unique in industrial capitalism. Cooper argues that the history of the real subsumption of nature is much longer than the history of industrial capitalism, and he uses the case of animal domestication to substantiate his point. To contrast this view, I suggest that the massive and ever-expanding scale and depth of the transformation of nature make the real subsumption of nature inseparable from capitalist development.

The transformation of nature is not without unforeseen consequences, however. Boyd at al. (2001:566) argue that the *"efforts made at intensifying the real subsumption of biological processes will inevitably be confronted with further surprises and uncertainties"*. If

society imposes more and more changes to ecological processes, it is more likely that they will face new and unexpected outcomes. These outcomes also depend on what kinds of 'entities' or processes are subsumed, and to what extent. Castree (2003:289) argues that *"some natures 'resist' complete commodification… while others are more readily subsumed"*.

Prudham (2005) reminds us that the capitalist subsumption of nature is never 'complete': the 'natural conditions' always affect and restrict the movement of capital to some extent. For example, the life cycles of animals and plants can be accelerated, but the time necessary for biological processes cannot be ignored completely. In other words, *"no matter how far down the current commodification of life and the associated remaking of biological reality goes, from salmon crossed with tomatoes to the spectre of the new eugenics, capitalism will always rely to some extent on non-produced input"* (Prudham 2005:7). In this sense, while capitalism is continuously engaged in the social production of nature (Smith, 2010), *"it simultaneously and necessarily relies on non-produced nature"* (Baglioni and Campling, 2017:2441).

Castree (2008) reminds us that sometimes the materialization of the real subsumption of nature in real life can be somewhat problematic. For example, it can meet public opposition, as in the case of genetically modified food production. Also, it can change the power dynamics between stakeholders in the agri-food sector, as the deseasonalization of buffalo reproduction has affected the relations between buffalo farmers and cheese producers. Finally, 'remaking' nature can have unforeseen and uncontrollable ecological consequences.

Boyd et al. (2001), Boyd (2001) and Prudham (2003) argue that the main objective of the real subsumption of nature is capital accumulation. Cooper (2017) questions the total validity of this argument. He points out that accumulation is not always the sole driver behind the human interventions in biological processes. Cooper argues that the reengineering ruminant digestion serves a 'sustainable intensification'. The aim here is to minimize the effects of livestock farming (that is responsible for 35% of the total methane emission of the world and its contribution to nitrous oxide emissions is also very

significant) while producing more meat and milk. Cooper (2017) argues that a regulation approach[41] can explain why, in some cases, the real subsumption of nature is mobilized more in order to resolve or minimize crises than to increase capital accumulation. Cooper claims that all these efforts to rework the biological processes of ruminant farmed animals aim to reduce the environmental impact, and to mitigate the political and public concern that could affect the continuous global growth of the livestock farming sector. Although Cooper argues that the real subsumption of nature is not always 'accumulation-oriented', his example of the biotechnological interventions into the digestive systems of ruminant farmed animals seeks to maintain accumulation. This environmental or socioecological fix (for an excellent review of these 'fixes' see Bok, 2019) does not explicitly try to increase productivity. Instead, the efforts are made to avoid environmental crises, so the current system of intensive farming can flourish, without any radical changes in it. The ultimate aim is still maintaining the level of capital accumulation. The regulations regarding the emission levels of the livestock farming sector ensure only that intensive farming as a particular mode of producing meat and milk remains stable.

In this chapter, I argue that the deseasonalization of the water buffaloes in Southern Italy, a particular mode of the real subsumption of nature, was a response to a variety of issues: 1. Meeting consumer demand and providing more fresh milk when the demand is higher; 2. Indirectly fulfilling regulatory requirements and consumer expectations; 3. Stricter control after various socio-environmental crises in the sector. Besides deseasonalization, the use of oxytocin injections in intensive farms meant a faster milking process and higher milk yield. Deseasonalization and the use of exogenous oxytocin come at a cost, though. Jönsson (2017:845) points out that the real subsumption of nature framework demonstrates well the complexity *"where nature can be simultaneously socially produced and impossible to fully socialize"*.

[41] Regulationists emphasize the relationships between accumulation and the social regulations, such as rules, conventions and institutes (Cooper, 2017).

In the next section, I am going to examine how the udder morphology of the buffaloes and the intensification of the production in dairy farms have affected the milking process of the buffaloes. Then, I am going to discuss briefly the seasonal reproduction of water buffaloes, and why this seasonality creates a problem for the Mozzarella di Bufala Campana PDO market.

4.3. Water buffaloes as 'slow and hard milkers'

The reproductive cycles of the water buffaloes have a significant effect on milk production, and the particular udder morphology of the buffaloes also affects the milking process. Generally, the ejection of milk from the udders is similar to that of the dairy cows. The complete vacating of udders is dependent on elevated concentrations of oxytocin release during the milking process (Borghese et al., 2007). However, the total cisternal areas are much smaller in buffaloes (they can contain only 5% of the total milk released during milking; Cavallina et al., 2008) than in cows, goats and sheep. According to Bava et al. (2007), this means that buffaloes have species-specific requirements for a proper milk letdown: more prolonged teat stimulation is necessary for the proper release of oxytocin before the teat cups can be attached on buffaloes. Without any pre-milking stimulation, the milk release may be delayed by 3 to 7 minutes, and in some cases, the buffaloes might not give milk at all (Borghese et al., 2007). Borghese et al. (2007) note that buffaloes are *"slow and hard milkers"* due to their slower oxytocin release reflex. Therefore, it is a common practice (but not well-documented, Bava et al., 2007) in modern, intensive farms in Italy (in some other countries, such as India, the retail sale of oxytocin is banned; Pulla, 2018) that farmers use oxytocin injections for a faster milk release.

Bava et al. (2007) argue that oxytocin treatment before milking does not affect the milk flow and milk yield of the buffaloes significantly. Nevertheless, the amount of time

Figure 24. Milking the buffaloes in the morning at Ponterè
(photograph by the author)

needed for milk ejection and the lag time before milk ejection was slightly lower in the group of buffaloes injected with oxytocin. Bava et al. (2007) question the efficiency of oxytocin treatment on buffaloes, and other studies (e.g., Bruckmaier, 2003) indicate that in the long-term, the regular injection of oxytocin can have an opposite effect and it can reduce milk yield among buffaloes. Borghese et al. (2007) argue that regular oxytocin injection can progressively develop addiction, and sometimes buffaloes do not respond to pre-milking stimulation.

At the buffalo farm where I completed my internship, Vincenzo, my colleague who has worked there for almost four decades, told me that during the early years, before the introduction of modern milking parlours **(Figure 24)** and the use of milking machines,

milking the buffaloes was performed by hand. At that time, the stimulation of the animals was carried out by the presence of the calves. Sometimes a calf died, and the farmers skinned the dead calf and put the skin on another calf. The mother could recognize the odour of her calf, and farmers had to use this technique for a few days until the lactating buffalo got used to the odour of the 'replacement calf' (fieldnotes, September 2018). Scholars also demonstrated that the presence of the suckling calf enhances the release of oxytocin, and this helps to initiate the efficient milk ejection from the udder (Borghese et al., 2007). Even today, in some countries such as India and Pakistan where the milking of the buffaloes is carried out mainly by hand, calves are used in the milking parlour (Cavallina et al., 2008). The common practice is that buffalo calves are let to suckle for a limited time (a couple of minutes) before each milking to initiate milk ejection (Borghese et al., 2007).

Nevertheless, the introduction of intensive farming methods has radically altered the milking process. Using buffalo calves for higher oxytocin release in buffalo cows is not practicable in large farms. In addition, the proximity of the calves to their mothers causes a longer intercalving period. Therefore, the pre-milking stimulation of the animals is carried out in other ways, such as feeding during milking or applying strong manual prestimulation (Borghese et al., 2007).

Washing the teats and the udder of the animals has a positive effect not only on milk hygiene but on the milk release as well (Cavallina et al., 2008). As I mentioned above, the pre-milking stimulation of the buffaloes is indispensable for a proper endogenous oxytocin release. Buffaloes are notably very sensitive to changes in their daily routines. Even small alterations in the milking routine can affect their behaviour, their oxytocin release and milk yield. These changes can be new people in the milking parlour or the stalls, windy weather, an object (for example, a truck) or a person blocking their way between the pasture and the stalls. Farmworkers who do not know well the side and position preferences of some, more sensitive buffaloes (or they do not read well the subtle signs of the animals) in the

milking parlour can cause stress among the animals.[42,43] If a buffalo is scared or feels uncomfortable, she can withhold milk, and this can reduce the milk yield significantly. This issue is usually prevented on the farms by injecting exogenous oxytocin into the body of the animal before milking. (Cavallina et al., 2008).

The use of oxytocin injections tells us a lot about human–animal relations as well, according to Napolitano et al. (2013). The authors argue that the incidence of panicking and trampling of buffaloes (and defecating, urinating, vocalizing, pulling the teat cup off the teats) during milking are positively correlated with the frequent use of oxytocin injections. In contrast, it is negatively correlated with positive farmer interactions with the animal, such as talking quietly, gentle touching and petting the animal. According to Napolitano et al. (2013), the use of oxytocin injections is occasional in dairy cows, but it is a lot more common in buffalo farms (especially among primiparous buffaloes).

Although restlessness can occur for a variety of reasons, Napolitano et al. (2013) suggest that at least a proportion of this behavioural pattern in the milking parlour may be interpreted as a response to the farmworker. Cavallina et al. (2008) also note that the milking process can affect animal behaviour, especially among buffaloes. Buffaloes can be even more difficult to handle during milking than dairy cows. Dealing with some of the buffaloes can be time-consuming and sometimes dangerous for the animals and the farmers as well. Although Cavallina et al. (2008) note that the animals' experience during milking (including the oxytocin injections) also results in further kicking and trampling, they argue that this behaviour is more common among primiparous buffaloes and it wanes significantly over time.

During my work experience on the buffalo farm, I had the opportunity to observe the effects of the oxytocin injections on the animals. The first four or five turns (ten to twelve buffaloes in each turn) in the milking parlour were uneventful. The animals were

[42] Studies have demonstrated that buffaloes show higher side and entrance preferences in the milking parlours and stalls than other ruminants kept in intensive farms (Polikarpus et al., 2014).
[43] The following video shows buffaloes entering the milking parlour: *https://ln2.sync.com/dl/bea80c80/f44azcj8-j58k39vs-c8fdrez7-u9dik2zb* (video by the author). You can see how farmworkers call the buffaloes, and how the animals choose their 'preferred' stall positions.

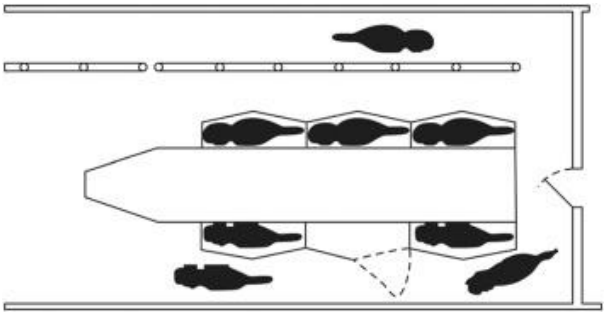

Figure 25. Side open or tandem milking parlour
(Source: Reinemann and Rasmussen, 2016:5)

quick in finding their places in the old-style side opening (or tandem) parlour **(Figure 25)**. They did not kick us, and they let us attach the teat cups without any resistance. Generally, these buffalo cows were the older, multiparous animals. Then, at each turn, the situation became more and more difficult. Some of the buffaloes had to be escorted into the parlour, and they did not enter by themselves. Some of them had their legs tied to the metal bars, so they would not kick us or the teat cups. Some of them had to be injected with oxytocin because otherwise, they would have given just a bit of milk. After being injected, the animals were visibly in stress. They started to defecate, and their legs were shaking. A few minutes later, however, milk began to flow through the pipes and into the container.

My colleague on the farm (Vincenzo) pointed out that the use of injection was needed mostly among primiparous animals (and some older animals that were more difficult to handle from the farmer's perspective). Over time, the buffaloes learnt the 'routine', and they became more obedient in the milking parlour. Vincenzo said that in modern farms where buffalo calves cannot be used anymore to stimulate buffalo cows before milking, in certain cases it is almost impossible to milk some of the animals without the use of oxytocin injections (fieldnotes, October 2018).

A specific way of dealing with this problem at Ponterè was the following:

I arrive at the farm at around 8AM. My colleagues have taken the 'resting' buffaloes out to the pasture, and the 'lactating' herd is already waiting to be milked. Around 7-8 buffaloes are separated from the herd because they will not be milked in the milking parlour. The stall where the buffalo calves are kept is quite loud, the calves are already calling their 'mothers'.

This separate group of lactating buffaloes feed the suckling calves. I am told that the calves here are given buffalo milk, and not formula or cow milk. This is healthier for the calves. More importantly, as Vincenzo and Camillo tell me, they always select those buffaloes – seven or eight animals – that are most difficult to handle in the milking parlour for this job. This means that one adult buffalo feeds multiple calves, and not every calf is fed by their own mother. Inside the stall, the lactating buffaloes do not seem nervous, even though 20 calves are mobbing a buffalo, and Camillo and the two Vincenzos have to line up the calves, so each of them to be fed properly. My job is to put fodder in front of the adult buffaloes, so they stay calm and eat in the meantime. When my colleagues decide that the calves have eaten enough (after 15 to 20 minutes), they herd the adult buffaloes outside the stall. This is not that easy. Although the mothers leave when they are 'told' (with a stick), the babies are following and mobbing them, until they are outside the stall (fieldnotes, 3 October 2018).[44]

With the increase of milking robots in dairy farms, this situation might change in the future. Robotic dairy farms and human–animal–technology relations have been significant aspects of inquiry in animal geographies (e.g., Bear et al., 2016; Driessen and Heutinck, 2015; Holloway et al., 2014a, 2014b). Some scholars argue that these milking robots or automated milking systems can improve the wellbeing of the animals because the cows and buffaloes have to go to the milking parlour voluntarily, and they are free to decide when they are milked. De Rosa and Trabalzi (2016) provide a positive description of the only buffalo farm in Campania that is equipped with milking robots (it is Tenuta Vannulo, but they do not mention the farm by its name). They argue that this system *"allows the buffalo to decide when it is time to release the milk"* (2016:307). According to De Rosa and Trabalzi (2016), the robotic milking system, the clean conditions and the adequate space for the animals made the use of oxytocin unnecessary on this farm.

[44] After feeding the buffalo calves in the morning: *https://ln2.sync.com/dl/aa1398150/5prvnswy-peysbvkj-53yf2fdw-vta427t5*

The use of oxytocin in dairy farms is linked to the intensification of livestock farming. While the adaption to the intensive farming conditions was slightly 'easier' for cows, milking buffaloes in industrial farms was more drastic due to the removal of the 'natural conditions' during milking (i.e., the presence of the calf) and the particular udder morphology of the animals.

4.4. The seasonal reproduction of water buffaloes

Reproduction in the buffalo farming sector and the reproductive seasonality of the water buffaloes are crucial for the mozzarella industry. Female buffalo bodies produce commodities, both in the form of newborn calves and milk. However, this nonhuman commodity production process is characterized by a reproductive seasonality that affects and is affected by market mechanisms.

Reproductive seasonality is a 'strategy' among many mammal species to ensure that their offspring are born during the most suitable period of the year (e.g., when sufficient food and water are available, and the temperature is mild enough). Although domestication[45] has altered reproductive seasonality among farmed animals compared to what can be observed among wild animals, seasonality is still present among some extensively bred bovine species (di Francesco, 2010). Water buffalo is a short-day breeder, but buffaloes living in the equatorial zone might show oestrous cycles throughout the year if adequate nutrition is provided.[46] In subtropical areas and higher latitudes, the reproductive activities of buffaloes (occurrence of regular oestrous cycles, duration of oestrous, and the period to a resumption of ovulation postpartum) are determined mainly by the length of the day, in addition to nutritional parameters (Campanile et al., 2010).

[45] According to Alaimo (2008:177), *"domestication refers to the situation in which people actively force changes in the seasonal subsistence cycles of animals to make them coincide with particular human needs"*.

[46] Water buffaloes are very resilient, and they can adapt to harsh environmental conditions and poor forage quality, but their reproductive cycles can be affected by the external conditions (Perera, 2011).

Without any intervention, seasonal cycles would be present in the conception, calving and milk production of the buffaloes (di Francesco, 2010).

Buffalo has an ovarian cyclic activity throughout the year, and this activity increases when the daylight hours decrease. Zicarelli (2016) argues that the tendency to seasonality increases proportionally with the distance from the Equator. He suggests that around the equatorial belt where the ratio between light and dark hours varies very little during the year, the reproductive seasonality is conditioned by the forage availability. Zicarelli points out that seasonality is part of the process of adaptation of the animal to the surrounding environment. Buffaloes try to find the best period for giving birth and weaning during the year when the temperature is milder, food sources are more accessible, and infectious agents are less present. For example, data show that the Surti buffaloes in Rajasthan, India, calve mainly in the rainy (July to September) and winter seasons (October to January; Borghese, 2005). In a Mediterranean climate such as in Italy, however, where buffaloes are fed a constant, balanced forage, the distinct seasonal reproductive pattern is still present. Based on this observation, scholars have argued that *"seasonality is influenced by photoperiod and mediated by melatonin secretion"* (Perera, 2011:196; see also Zicarelli, 1997; Borghese, 2005).

Besides the tendency towards seasonality, buffaloes have other species-specific reproductive characteristics such as delayed puberty, long intercalving period and prolonged postpartum ovarian inactivity (Singh et al., 2000). In tropical countries north of the Equator, the summer anoestrus period of buffaloes is caused by heat stress and forage scarcity. In Italy, the calving distribution is similar, even though feed is available throughout the year, and the temperature is milder than in tropical countries. Zicarelli (2016) points out that buffaloes have been moved to various parts of the world, however, their seasonal reproductive pattern[47] has not changed.

Scholars believe that the reproductive seasonality of the buffaloes is also related to nutritional factors in those areas where the animal is autochthonous. In areas where 97%

[47] The hypothalamic hypophyseal axis sensitivity to the dark/light ratio (Zicarelli, 2016).

of buffaloes are bred, the breeding period coincides with the time when forage availability is the highest. In the areas north of the Equator, the higher availability of forage is between July and November (when the daylight hours decrease). In Italy, where the out-of-breeding season mating (OBSM) technique is not used, the reproductive activity takes place from September to January. Sensitivity to the negative photoperiod is also present on farms where the constant balanced diet is provided all year round. Zicarelli (2016) suggests that this type of seasonality in which reproductive activity is not synchronized with forage availability demonstrates that buffaloes are not autochthonous in Italy because they calve during the months when forage is scarce (after June, pastures are relatively poor in Southern Italy where most of the buffaloes are bred in the country; di Francesco, 2010), and the temperature is lower. The scarcity of the forage and the cold weather in winter even decrease the possibility of survival for the newborn calves (Zicarelli, 2016).

Due to the reproductive seasonality of the animals, milk supply is the lowest in spring and summer under natural conditions, when market demand for mozzarella is higher. In order to produce milk throughout the year and achieve the continuity of market supply, hormonal treatments are necessary for OBSM techniques (Zicarelli, 1997). However, buffaloes that are bred outside of their breeding period often have a higher rate of embryonic mortality than buffaloes bred during the 'regular' breeding season (Baruselli et al., 1997; Campanile et al., 2005, 2010). In order to deal with this problem, specific breeding programs and genomic selections make the identification of 'genetically superior' animals possible at a much earlier age, even before reaching sexual maturity (Neo and Emel, 2017).

4.5. Science, technology and commodification: deseasonalizing buffaloes and the seasonal demand for mozzarella

Allen and Lueck (2002) indicate that seasonality is the main feature that distinguishes the farming sector from any branch of the industrial sector. In addition, agricultural

economists, such as Holmes (1928:40–41) argue that in livestock farming *"in no case can a man be put to a single specific task and be kept at it uninterruptedly for a month or a year as is true in the factory"* due to the different stages of development of the animals. Efforts to improve animal bodies and their productivity in intensive farming are not new. One of the most cited examples is the broiler chicken and the persistence of capital and science to 'improve' the efficiency of those animals. Neo and Emel (2017:52) note that *"two-kilogram birds that used to be sent to slaughter at four months are now sent at five to six weeks*". William Boyd (2001:632) adds that *"by the 1960s the broiler had become one of the most intensively researched commodities in U.S. agriculture, while complementary changes in the structure, financing, and organisation of leading firms created an institutional framework for rapidly translating research into commercial gain"*. Boyd (2001) argues that intensive confinement was a crucial first step for the industrialization of broiler chicken 'production'. Also, Allen and Lueck (1998) note that the seasonal character of agricultural production is a significant difficulty for the industrialization and specialization of labour. They argue that technological development in agriculture (increasing crop productivity, better transportation) over the past century has led to a decline in the dependence of the animal farming sector on weather conditions. In addition, advancement in veterinary sciences made the confinement of farmed animals possible. In short, the confinement of animals and the controlled supply of feed all-year round have made the sector less dependent on seasonal cycles, and they have opened up new possibilities for the industrialization and further intensification of the dairy industry as well.

Just as the chicken breeding in the US, the buffalo farming sector in Southern Italy has also transformed radically. After World War II, the land reclamations and rural electrification projects (Dickinson, 1954) made possible the development of intensive production in buffalo farming in Campania and Southern Lazio during the second half of the twentieth century. Intensive farming methods previously used in cattle farms have been utilized (Napolitano et al., 2019), and Napolitano et al. (2013) even suggest that farming system in dairy buffaloes has become more intensive than it is in dairy cattle farms, and this may potentially have a higher impact on the conditions of buffaloes. However, capital

and science have not only developed intensive farming conditions for dairy buffaloes (sometimes without any access to grazing areas or water for wallowing), but they have also modified the reproductive seasonality of the animals.

When the issue of seasonality is successfully addressed in agricultural production, argue Allen and Lueck (2002), farming becomes organized like other industrial sectors focusing on the production of intermediate goods. In other countries with advanced dairy sector, the seasonal milk production has been a critical issue, too. For example, in New Zeeland, Fonterra (one of the largest dairy companies) has struggled to maintain stable milk supply all year round. The mainly pasture-based dairy industry in New Zeeland was able to produce milk only for nine months of a year. Under pressure by international competitors, Fonterra was forced to find a solution to meet customer demand for milk over the full 12 months of the year. Fonterra increasingly sourced its milk from abroad and entered into partnerships with foreign companies. Through this step, Fonterra was able to work around the need to provide a constant milk supply. Nevertheless, the question of quality control emerged because Fonterra had to prove that the quality of the product was the same as the quality of milk produced in New Zeeland (Stringer et al., 2008).

Heinschink et al. (2016) demonstrated that the Irish dairy sector was similarly seasonal because it was a grass-based, spring calving system. This system was beneficial enough to keep the cost of milk production lower, but the seasonal pattern meant additional expenses for milk processors (i.e., they had to create additional processing capacities that were not used at full capacity all year round). Traditionally, Irish milk processors offered seasonal bonuses to encourage autumn and winter calving, so that allowed a more stable off-peak milk supply. Nevertheless, Heinschink et al. (2016) argued that farmers that focused on winter milk supply had higher production costs per litre compared to spring calving herds. Heinschink et al. (2016) indicate that the Irish milk processors would be able to gain only a small financial benefit from an aseasonal milk supply pattern, but the cost for dairy farmers would increase more significantly if they attempted to modify calving dates to reduce the seasonality of milk supply. They also argue that the seasonal feature will probably remain dominant in the Irish dairy sector. The

authors suggest that the low cost, grass-based and seasonal milk production generates more benefit for the entire system than a move towards a more aseasonal milk supply pattern (Heinschink et al., 2016).

The reproduction of water buffaloes in Southern Italy has not been deseasonalized to create an aseasonal milk production system, and to make milk supply stable throughout the year for the Mozzarella di Bufala Campana PDO chain. Here, the real subsumption of nature has tried to achieve something more than merely increasing and intensifying milk production. Mozzarella is a fresh cheese that is consumed mainly during the summer months, and the market demand in winter is much lower than during the summer. In the past, farmers and mozzarella producers overcame the milk shortage in spring and summer by freezing surplus milk produced in the low season. However, when the mozzarella cheese gained Controlled Designation of Origin (CDO) status in 1993, and it became a PDO product in 1996, the PDO Mozzarella Consortium changed the regulation of the product, and they prohibited the use of frozen buffalo milk for the production of the Mozzarella di

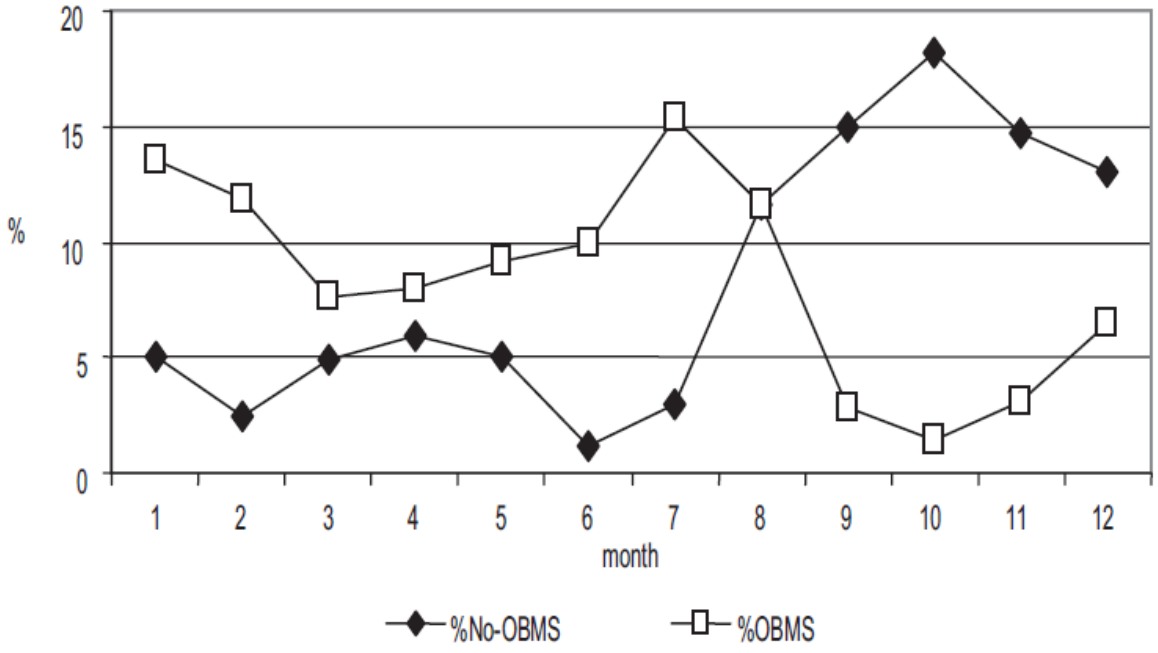

Figure 26. Monthly calving percentage in farms that use (%OBMS) or do not use (%No-OBMS) the out-of-breeding mating strategy (OBMS) technique
(Source: Zicarelli, 2010)

Bufala Campana PDO (di Francesco, 2010). Currently, only fresh milk (the time limit is 60 hours after milking) can be used in the PDO certified dairies because research has shown that mozzarella produced from frozen milk has got significantly lower organoleptic characteristics[48] than the cheese made from fresh milk. Through deseasonalization, the real subsumption of nature made the animals (and the farmers) adapt to the consumers' taste and demand.

In order to meet market demand and stay in business, farmers had to adopt the OBSM technique in breeding (**Figure 26** and **Table 2**). The OBSM technique means that mating is avoided when the industry and the market 'do not require reproduction'. In practice, the OBSM technique implies that animals would be forced to reproduce from the end of March until the end of August, so the calves would be 'delivered' from the beginning

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
2003	18	15	19	12	28	24	25	25	13	9	17	16	**221**
2004	18	19	14	10	7	19	41	48	9	0	3	40	**228**
2005	26	20	14	12	10	12	10	2	1	1	3	26	**137**
2006	65	25	24	16	13	5	21	3	0	0	4	38	**214**
2007	26	26	31	21	23	20	18	3	1	2	9	30	**210**
2008	27	26	15	16	25	18	28	3	0	2	4	36	**200**
2009	39	14	19	14	11	20	26	17	2	3	13	22	**200**
2010	21	15	10	26	23	16	32	12	1	2	5	34	**197**
2011	13	25	17	11	19	27	33	2	1	0	1	39	**188**
2012	27	24	20	6	13	52	27	3	2	0	3	21	**198**
2013	49	22	11	5	22	47	29	0	2	0	4	28	**219**
2014	37	41	12	13	16	24	5	0	3	3	12	15	**181**
2015	50	45	21	18	26	17	0	0	0	0	1	21	**199**
2016	39	46	32	28	26	24	16	0	0	1	3	20	**235**
2017	20	27	30	30	36	30	20	3	2	1	1	22	**222**
2018	42	24	30	41	47	22	19	5	2	3	0	10	**245**
2019	31	27	14	26	40	51	25	0	1	0	0	20	**235**

Table 2. The monthly calving distribution of a buffalo farm where out-of-breeding season mating (OSBM) technique has been progressively applied between 2003 and 2019

(Source of data: Gianluca Neglia)

[48] Organoleptic properties are the aspects of food, water or other substances that an individual experience via the senses – including taste, sight, smell, and touch.

of February until the beginning of July, and milk production would be highest when the market demand for mozzarella is higher (interview with Gianluca Neglia, September 2018). However, even with proper management, some animals 'lose' a cycle from time to time, so they may not produce milk for more than a year. Managing the OBSM technique is a complex task, and considerable progress was necessary before this technique became practicable in buffalo farms. Farmers and veterinarians regularly select both female and male buffaloes that are less sensitive to photoperiod. Animals that are more sensitive to photoperiodic effects are eliminated from the herds and slaughtered.[49] In addition, deseasonalizing buffaloes also require proper nutritional and post-partum management of the animals (e.g., hormonal treatments to reduce the seasonal anoestrous; Neglia, 2017). Artificial insemination is also used in some cases (only among 10% of the buffaloes enrolled in the Genealogical Book in the PDO area) in order to decrease seasonal reproduction. Its limited use (compared to cattle) is due to the seasonality of the buffaloes. Although fertility failure rate is lower in farms that apply the OBSM technique for several years because they select the buffaloes less sensitive to photoperiodic effects, fertility loss is still recorded (di Francesco, 2010). The introduction of the OBSM technique has created an opportunity to produce fresh buffalo milk 'just-in-time' and follow the seasonality of the market demand for mozzarella, but it has generated new risks by increasing fertility loss rate.

Overall, buffalo farmers in Campania have been successful in mitigating the effects of seasonality, and the whole farming industry has gravitated further toward the factory processes. As in other cases (Allen and Lueck, 2002), when the seasonal factors are mitigated, the larger factory farms tend to dominate the sector. Their data also show that changes in the seasonal dynamics usually generate changes or transformations in the farm organization as well. Allen and Lueck (2002) also add that the most radical reorganization in agriculture toward a factory–corporate type of farming has been done in the livestock sector. This reorganization has especially been prevalent in broiler chicken and intensive cattle farming, where large corporate firms have become predominant in the industry after

[49] Besides the animals' ability to produce a high milk yield, this is one of the most valued qualities in the selection of buffaloes.

World War II. Previously, the livestock farming sector was dominated by family farms with small numbers of livestock (Allen and Lueck, 2002).

Just as in buffalo farming in Campania, the general trend in livestock farming worldwide has been the removal of animals from the open environment and breed/rear them all year round inside the stalls. New technologies (in disease control, animal handling, nutrition and transportation) have reduced the seasonal patterns in the sector. In comparison with crop production, livestock farming is less affected by natural forces because animals are usually reared inside stalls.

Breeding animals out of season to get higher milk yield at the right time to satisfy consumer demand goes against the underlying logic of sustainable, local and seasonal food production. Mozzarella di Bufala Campana with the PDO label is one of the prime examples of traditional, local food production. Nevertheless, buffaloes are usually bred in industrial farms, they are fed with a mixed diet, and they are forced to reproduce out of season. Therefore, the 'traditional' seasonality of mozzarella consumption is not affected by the 'seasonality' of the buffaloes, and consumers can get fresh mozzarella whenever they like. On a side note, contrary to many other countries in the Global North, the consumption of 'sustainable' and 'locally sourced' food is not embedded in class (or race) privilege in Italy. The majority of the people in Campania region have access to fresh agricultural products. Even Pier Maria Saccani, the Director of the PDO Mozzarella Consortium, noted the *"differences between consumers"* when talking about the possibility of introducing frozen mozzarella as a PDO product (more about the frozen mozzarella in the next section). He pointed out that the market of the proposed frozen mozzarella would not be in Campania where *"people eat a lot of mozzarella and they want fresh one"*, regardless of their economic situation (interview with Pier Maria Saccani, 21 November 2018).

4.6. Deseasonalization and frozen mozzarella

Over the last 20 years, most of the buffalo farmers have managed to 'deseasonalize' their animals in order to meet the fresh milk demand in the market. Since the Protected Designation of Origin (PDO) system came into operation in 1996, frozen milk cannot be used for making the Mozzarella di Bufala Campana PDO. The strict PDO regulations and the emerging export volume has made buffalo farming and mozzarella production strongly dependent on a just-in-time production system. Therefore, animal bodies and animal reproduction have been forced to adapt to this economic model. In this case, capital has not only forced the female animal body to reproduce (Federici, 2004), but it has done it in a way that has followed the seasonal trends of market demand.

Although deseasonalization was introduced in the sector in the 1980s in order to meet the fluctuating milk demand in the market, the traceability system, biosecurity measures and – consequently – the increase of the milk price (especially during summer) has also made farmers more interested in managing animal reproduction activities over the past few years. Currently, over 90% of the farms in Campania keep their livestock deseasonalized (interview with Gianluca Neglia, 13 September 2018).[50]

The higher demand for buffalo milk and the higher milk prices incentivize the farmers to manage the reproduction of their buffaloes, so most of the buffalo calves are born between February and July. By managing the dates of birth of the calves this way, farmers can make the buffalo cows produce the highest milk yield in spring and summer when the demand for mozzarella cheese is the highest. Controlling the reproduction of the buffaloes is not a cheap and easy task for the farmers because it requires efficient management and control in the farms. Therefore, both the 'efforts' and the economic loss

[50] The reason behind some small-scale farmers' decision about not deseasonalizing their buffalo herds may be the additional cost of the deseasonalization process and the risk of losing money in case the animal does not get pregnant outside of the regular breeding season (personal communication with Gianluca Neglia, 13 September 2018).

of the farmers (declining fertility of the animals, therefore lower total annual milk yield; di Francesco, 2010) have to be compensated.

There has been an agreement between local dairies and farmers about stable summer and winter prices for buffalo milk since the 1970s [in autumn 2018, the milk price was 1.35 euros/kg between March and October and 1.10 euros/kg between November and February (interview with Nicola Cecere buffalo farm owner, 26 October 2018)]. The higher summer price operates as an incentive for farmers to keep their animals deseasonalized. The possibility of managing the reproductive capacities of animals has restored – at least partially – the farming sector, and it has given more powerful positions to farmers in the decision-making processes in the 'mozzarella landscape', especially after the introduction of the traceability system in 2014 (more about this in Chapter 5). After multiple socio-environmental crises in the region and the sector, and before the introduction of the traceability system, the average milk price was very low (at around 0.90 euros/kg; interview with Nicola Cecere buffalo farmer, 26 October 2018). Luigi Zicarelli, a veterinary professor from Naples who is considered the 'guru' of buffalo breeding in Italy, has argued in an interview that the average milk price was not sufficient to cover the economic loss and the efforts of the farmers in deseasonalizing their animals (Ruminantia, 2019b). A 2015 Parliamentary Commission Report on mozzarella production also confirmed that *"the seasonal adjustment involves higher production costs, which are in no way repaid by the price of milk, even with different summer and winter milk prices"* (Parliamentary Commission, 2015).

Nevertheless, over the past few years, deseasonalization has become a particularly useful tool for capital accumulation for buffalo farmers because of the higher milk prices and the strict regulations of the mozzarella production process. The strict rules and the higher milk prices, however, also increased the production costs for the mozzarella, in addition to the rather high cost of shipping this cheese to the international market. These issues have contributed to debates between the dairies and the farmers about the future of this PDO product.

On 4 May 2017, at the Assembly of the PDO Mozzarella Consortium in Caserta, there was a proposition requesting changes in the regulations in the production of the Mozzarella di Bufala Campana PDO (personal communication with Nicola Cecere buffalo farm owner, 26 October 2018). According to this proposal, the Mozzarella di Bufala Campana PDO could have multiple forms (different from the traditional ones, see in Chapter 1), the weight limit would be eliminated (currently, the maximum allowed weight of the Mozzarella di Bufala Campana PDO is 3 kg), and the final product could be frozen. The mozzarella that loses the characteristics of a fresh product could be used as an ingredient for other products in the food service industry (HoReCa, a syllabic abbreviation of the words Hotel/Restaurant/Café), and finally, not only boiling water (as the tradition indicates) but steam could also be used to process the paste. The new product specification would identify five different types of the Mozzarella di Bufala Campana PDO: 1. handmade, 2. smoked, 3. frozen, 4. exclusively for professional use, 5. lactose-free (Pignataro, 2017).

More than any of the other proposed changes, the possibility of freezing the mozzarella has sparked fierce debates.[51] Domenico Raimondo, the President of the PDO Mozzarella Consortium, pointed out on the pages of Il Mattino (a national newspaper based in Naples) that *"frozen mozzarella already exists outside the PDO system and that market is in the hands of multinationals"* (Pignataro, 2017). According to the Consortium, the re-configuration of the product specification is necessary for the producers of the Mozzarella di Bufala Campana PDO to maintain their competitiveness at the global level. Also, the introduction of frozen mozzarella would open new possibilities to reach the international market. In 2019, 34% of the total Mozzarella di Bufala Campana PDO produced was exported (**Figure 27**), but the changes in the regulation would allow further expansion. PDO cheese could be transported by ship and not only by plane, and the

[51] Freezing milk for mozzarella production is not uncommon in the history of this fresh cheese. In the past, milk surplus in winter – due to the seasonality of the buffaloes – was frozen, but it negatively affected the quality of the mozzarella. Therefore, the PDO Consortium tightened the regulation in 1996 and the production of the Mozzarella di Bufala Campana PDO required exclusively fresh milk. Domenico Raimondo, the President of the Consortium, noted that the introduction of the new category of frozen mozzarella would eliminate the illegal use of frozen milk for mozzarella production (Pignataro, 2017). This practice has caused some damage to the image of the product and the honest producers.

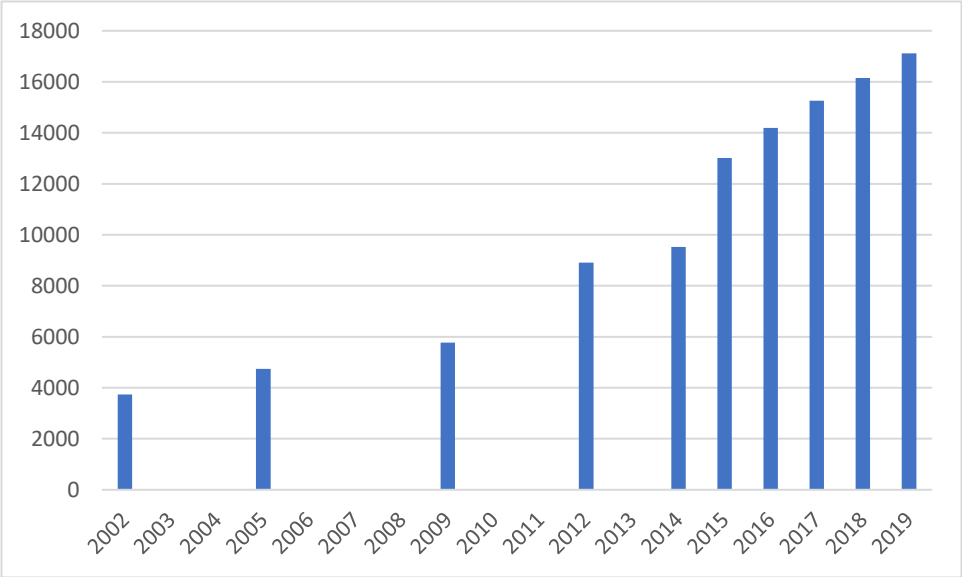

Figure 27. The export growth of the Mozzarella di Bufala Campana PDO between 2002 and 2019 (tonnes)
(Source: Consortium for the Protection of the Mozzarella di Bufala Campana)

transportation costs of the cheese would decrease from 10 euros/kg to 0.50 euros/kg (interview with Pier Maria Saccani, 21 November 2018; Bonardi, 2017). Currently, the final price of the product overseas, such as in New York, is at around 35 euros/kg. The extremely high transportation cost makes it difficult to significantly increase the export volume of the cheese (international expansion). According to the Consortium, freezing the finished product and therefore lowering transportation costs would allow the sector to cooperate with quality pizzerias abroad (De Luna, 2017). Pier Maria Saccani, the Director of the PDO Mozzarella Consortium also pointed out that the main buyers of the frozen mozzarella would be the representatives of the HoReCa sector:

You can imagine a pizzeria in Utah in the middle of the US. You have to send [the mozzarella] *from Naples to Rome, from Rome to the US – NY or Washington, the only two direct flights* [from Rome to the US]*, but you arrive in NY or Washington, customs, another flight to Utah, it takes about six/seven days. I have to manage, as a pizzeria, a shipment* [of buffalo mozzarella] *twice a week. It is a difficult job. You think that I am interested in buying*

mozzarella from Italy? No. It is too expensive because of the cost of the mozzarella and the cost of management, the flight. The transportation costs 4.20 euros per kg, and you spend double for the mozzarella because we send the mozzarella and the brine for the mozzarella. In the end, you spend 9 euros only for the shipping. You pay 7-8 euros for the mozzarella, and you spend more for the shipment than the price of the product (interview with Pier Maria Saccani, 21 November 2018).

With the introduction of the frozen mozzarella as an export product, the PDO Mozzarella Consortium would be able to sustain the formal and the real subsumption of nature in mozzarella production at the same time. Milk production is intensified in buffalo farms through deseasonalization and exogenous oxytocin injections (real subsumption), and the continuously growing export market could be significantly expanded if frozen mozzarella would be approved to get the PDO certificate (formal subsumption). As Hardt and Negri (2009) argue, the reciprocal movement from the real to the formal subsumption in the globalized economy does not mean that new 'outsides' to capital are created. Frozen mozzarella represents a subdivision that would provide mozzarella cheese supply to hotel and restaurant owners overseas. This plan, however, has generated debates between some of the buffalo farmers and the Consortium.

Some of the buffalo farmer associates **(Figure 28)** rejected the proposal of approving frozen mozzarella as a PDO product. Raffaele Puoti, the President of Confagricoltura Caserta (one of the leading farmers' trade unions in Italy) argued that

It is evident that with such modifications, the characteristics of the product protected by the PDO mark would be lost. PDO is a brand that preserves the tradition of a production process in the face of technological innovation that is useful and can be used for other products. It seems absurd that a product like the mozzarella has to be protected by farmers, the milk producers, and not by those who produce mozzarella themselves and by the PDO Mozzarella Consortium with specific authorization from the Ministry [of Agriculture] (Pignataro, 2017).

Figure 28. A farmer associate of the Consortium
(photograph by the author)

Confagricoltura has been particularly critical about the proposed changes.[52] The organization even sent letters to Maurizio Martina, the Minister of Agriculture and Forestry and to Vincenzo De Luca, the President of Campania Region, underlining that the changes would not serve *"the protection of* [milk] *producers, consumers and processors* [i.e., the mozzarella producers]*"*, but it would *"only be an attack on the PDO system"* and on everything that it represents for the territory/landscape, its tradition and quality farming

[52] Coldiretti, the other large agricultural organization (it is also the largest one in Europe) accepted the proposal. Salvatore Loffredo, its regional director, said that they approved that proposal because it is transparent, and it provides a guarantee to consumers (Pignataro, 2017).

(De Luna, 2017). Ernesto Buondonno, the President of the 'Federazione allevamenti bufalini' (Buffalo Breeding Federation, part of Confagricoltura), pointed out that the proposed changes were accepted by the mozzarella producers only and not by the buffalo breeders. According to Confagricoltura Caserta, the Mozzarella di Bufala Campana PDO should be produced in the same way as it always has been. They argued that selling frozen mozzarella would be like freezing a bottle of Chianti Classico wine (De Luna, 2017).

The Ministry of Agriculture has also expressed its opposition against the 'industrialization' of this traditional food product. Senators from the Five Star Movement voiced their concern that in case frozen mozzarella would become a PDO product, farmers would have to accept lower prices for the milk that their farms produce (Bernardelli, 2017). The Parliamentary Commission Report (2015) on the seasonal nature of the Mozzarella di Bufala Campana PDO noted that with the introduction of the frozen mozzarella as a PDO product *"the 60-hour limit for processing the buffalo milk would automatically disappear, because the milk would be processed and become part of the frozen product."* A buffalo farmer also pointed out that

the mozzarella producers argued that the [production of frozen mozzarella], without losing the characteristic of the PDO product, would have made possible for the producers to solve the problem related to the surplus buffalo milk in winter.[53] *Buffalo farmers, on the other hand, opposed the requested changes, claiming that no data showed the actual production surplus during the winter period.* [They argued] *that before considering the idea of modifying the product specifications, a* ***traceability system*** *should be set up to provide reliable data on the trends in the production of milk and buffalo mozzarella, so as to be able to make the necessary resolutions* [based on reliable data] (emphasis added; personal communication with Nicola Cecere, buffalo farmer, 25 October 2018).

[53] In addition, the introduction of the frozen mozzarella as PDO product would probably have helped mozzarella dairies (in the form of better export opportunities) to recover from the effects of the dioxin and waste emergencies.

Both the buffalo farmer's comment and the excerpt from the Parliamentary Commission Report (2015) suggest that there is a link between the seasonal variations of milk production and the proposal to label the frozen Mozzarella di Bufala Campana as a PDO product. Some of the stakeholders argue that it would be necessary to revise the 60-hour limitation as the maximum storage time of the milk if the sector would like to survive and grow in the face of global competition. It is too difficult to guarantee (in terms of food quality) for the mozzarella producers (Pignataro, 2015). However, farmers are concerned that if the 60-hour limitation is compromised in any way (even in the form of frozen mozzarella as the final product), the price of the buffalo milk will decrease again, after a steady rise over the past few years since the introduction of the traceability system in 2014.

As a final point of this chapter before the conclusion, I have to add that the 60-hour limitation as the maximum allowed storage time of the milk had never been officially suspended before March 2020, even though buffalo farmers and mozzarella producers have had to face several socio-environmental crises in the past. The COVID-19 health emergency, however, has already impacted the mozzarella producing sector by the end of March 2020: the sales of the Mozzarella di Bufala Campana PDO cheese have decreased by 50%. According to Domenico Raimondo, the President of the Consortium, the main reason of the sales drop was the closures of restaurants and pizzerias both in Italy and abroad and the drastic reduction of export opportunities (i.e., the massive cutback of flights has affected the export of mozzarella because this fresh cheese requires fast transportation). In addition, the lockdown in Italy has had a negative effect on the sales of the Mozzarella di Bufala Campana PDO in supermarkets. Italian families have been advised to make only one trip to the supermarket every seven to ten days, so they have generally purchased food products with longer shelf lives, and buying fresh buffalo mozzarella has not been a priority anymore (d'Antonio, 2020).

The critical economic situation in the mozzarella sector, following the COVID-19 health emergency, required the adoption of a temporary modification of the product

specification by a ministerial decree on March 18, 2020. According to the decree he 60-hour limitation as the maximum storage time of the buffalo milk is temporarily suspended, and frozen milk can be used now for the production of the Mozzarella di Bufala Campana PDO. This exemption aims to provide a remedy to farmers and mozzarella producers who are facing a radical and sudden drop in the consumer demand for this fresh cheese (Pelagalli, 2020).

4.7. Conclusion

This chapter has investigated the relationship between the intensification of buffalo farming in Campania and the market demand for the Mozzarella di Bufala Campana PDO. I have argued that buffaloes cannot be adapted to intensive farming conditions as easily as cows due to their seasonal reproductive cycles and their udder morphology. I have also pointed out how the market demand and laws regulating the production of the mozzarella have affected buffalo lives. The seasonal milk supply, the strict regulations of the Mozzarella di Bufala Campana PDO production, and the seasonal market demand for the mozzarella cheese have led to the intervention in the reproductive cycles of the buffaloes. Deseasonalisation was introduced in the 1980s to match milk production with the seasonality of consumer demand for mozzarella (with increased summer milk prices as incentives for farmers to keep their animals deseasonalized). Over the last decade, biosecurity measures, including traceability systems (see Chapter 5), and consequently, the general increase of the milk price have made farmers more interested in managing animal reproduction activities.

I have also considered that deseasonalization and the use of oxytocin injections on lactating buffaloes as environmental fixes, or accumulation strategies in which nature is increasingly subsumed by capital (Smith, 2007, 2010). These fixes have been developed not only for 'improving' the milk yield of the buffaloes but also for satisfying the seasonal consumer demand for the mozzarella cheese. Deseasonalization has supported the

intensification and globalization of the product in a way that the traditional elements from the consumer's perspective have been maintained. The animals' lives, however, are increasingly circumvented in order to provide the raw material for a growing, strictly regulated and consumer-driven market. Nevertheless, this type of securitization of the mozzarella market has come at a cost. Buffaloes that are regularly injected with exogenous oxytocin can progressively develop addiction to this hormone. Also, if buffaloes are forced to reproduce outside of their 'regular' breeding season, the animals might experience fertility loss in the long term. Although the role of the farmers was important in keeping the animals deseasonalized, in the past, the average milk price was not sufficient to cover the economic loss (due to the decreased fertility) and management costs of the farmers in deseasonalizing their animals (Ruminantia, 2019b).

This chapter has also pointed out the potential links between the seasonal reproduction of the buffaloes (i.e., the seasonal variations of milk production) and the proposal regarding the introduction of the frozen Mozzarella di Bufala Campana as a PDO product. This suggests that the reproductive politics of buffalo farming cannot be separated from the efforts to expand the global market of the buffalo mozzarella from Campania.

To conclude, this chapter has explored how and why buffalo bodies have been subject to interventions for subsuming their value production in the 'mozzarella landscape'. My empirical findings suggest that the real subsumption of nature in buffalo farming and mozzarella production is more complex than a technological initiative to increase the productivity of nature. Regulations, increasing control, and place-specific cultural–historical elements (that can influence the seasonality of consumer demand for a product) have been significant bases to increasingly subsume nature by capitalist money and science. In this chapter, I have also argued that the real and formal subsumption coexist in the globalizing agri-food sector.

Chapter 5. Immunizing the 'mozzarella landscape'

5.1. Introduction: The 'Calcutta of Europe'

Concerns about food security in Campania have been present since the early 1970s. The cholera outbreak in Naples in August and September 1973 resulted in the destruction of the mussel beds in the bay of Naples. Health authorities also warned Italians to be cautious about seafood, unpasteurized milk, sausages and ice cream of uncertain origin (The New York Times, 30 August 1973). Mussel breeders and their families who were blamed for the epidemic found themselves with their livelihoods destroyed (The New York Times, 7 September 1973). The outbreak impacted mozzarella production as well: every mozzarella dairy in the region was closed for about a month (Gravante, 2019). Ironically, some food products benefitted from this crisis: citrus fruits such as lemons (allegedly lemon helps to build immunity against intestinal infections) and bottled water quickly disappeared from the shelves of the supermarkets. During the epidemic, the city was given a derogatory and colonialist nickname the *'Calcutta of Europe'* (Hofmann, 1973) by some in order to emphasize the alleged unsanitary conditions in Naples. Ten years after the incident, researchers demonstrated that mussels imported from Tunisia caused the cholera outbreak in and around Naples, and not local food products or unsanitary conditions in Naples and Campania (Gravante, 2019).

This brief introduction has demonstrated that concerns about food security in Campania are not new.[54] Even decades ago, food safety scandals and misinformation had radical effects on local food systems (including the manufacturing of buffalo mozzarella).

[54] Of course, food safety concerns are not something specific in the agri-food sector in Campania. There have been similar or more severe cases in other regions in Italy (the methanol wine scandal in 1986) and abroad as well (mad cow disease, bird flu; Cembalo et al., 2019; interview with Antonio di Gennaro, 16 February 2018).

This chapter examines how food safety scandals and the immunitary reactions to safety and quality issues in the agri-food industry have transformed the 'mozzarella landscape' in Campania. First, I am going to provide a conceptual review of the securitization of the agri-food sector from a more-than-human perspective (5.2). Then, I am going to argue that biosecurity measures (5.3) and the traceability systems have been essential in immunizing the 'mozzarella landscape'. I am also going to pay specific attention to the various ways in which the lives and bodies of the animals are affected by the immunitary processes (5.4). Finally, I am going to look at how the potential responses to the conflicts between market demand, the strict regulations regarding the geographical origin of the Mozzarella di Bufala Campana PDO and environmental concerns about intensive farming might affect not only the future of mozzarella cheese production, but they would radically alter the lives of the milk-producing buffaloes as well (5.5).

5.2. Theorizing securitization in human–nonhuman agri-food co-production

In this chapter, I am going to consider a range of human and nonhuman elements in the process of securitization, and my objective is to move away from the traditional notions of security and develop a more flexible, broader understanding of the concept. In this process, I am going to examine how humans and nonhumans, organic and inorganic, are all parts of food security (Lougheed and Hird, 2017). Lougheed and Hird (2017:500) argue that

[s]ecuring the food system is a matter of trying (often failing) to control the conduct of humans and the exuberant and proliferate bacteria, viruses, prions, machines, and other things comprising that system. The inhuman – meat, plants, packaging, landfill leachate, microbes, and antimicrobials – are a critical component of security, safety, and threats thereto.

Biosecurity is often an essential element of the discussions on food safety. Hinchliffe et al. (2013:531) define biosecurity as a particular type of biopolitics attempting *"to separate diseased from healthy life, to contain infectious outbreaks and to police the flow and movement of anything potentially threatening to life"*. According to Lougheed and Hird (2017), biosecurity is a technique to separate healthy/clean from unhealthy/unclean. In my research, however, I find Dixon's (2015) broader definition of biosecurity the most productive one. Dixon's conceptualization of biosecurity includes *"technologies, governance mechanisms, institutions, and discourses that have emerged during the last couple of decades to manage and explain the knowns and unknowns (e.g., invasive species, zoonotic diseases, etc.) that are impacting and potentially threaten economy and society"*.

Biosecurity needs to ensure the free circulation of the 'good things and people' while it has to maintain the nation-state through the restriction of the movements of 'undesirable things and people' (Gray, 2016). Modern food safety regulations have to guarantee the safety of the industry, while any obstacles to the global circulations of food products have to be minimized (Lougheed and Hird, 2017). Food recalls, tests, biosecurity measures on livestock farms and farmed animals are all parts of the 'biopolitical security apparatus' (Dillon and Lobo-Guerrero, 2008; Lougheed and Hird, 2017).[55] Bruce Braun (2007:21) argues that *"surveillance networks are being extended to animal populations, including wildlife, as animals are reclassified as 'biohazards', both to each other and to humans"*.

In addition to biosecurity, traceability is also a crucial element in the process of securitization of the agri-food sector. Traceability can be operated as biosecurity dispositif by the agri-food industry to enforce food safety (*"as a tool of recall and reconstruction"*, Bingham and Lavau, 2012:1599; see also Popper, 2007), but it can also be used as a branding/labelling device in order to protect brands and detect frauds (Opio and Steinfeld,

[55] Riley (2011) argues that food safety and security requirements, such as traceability, individualize dairy cows (and buffaloes) more than other animals that are kept for their meat. Dairy animals need more control (breeding, milk yield) and individual attention than other animals that receive a 'flock' treatment (e.g., sheep; Riley, 2011).

2010). Traceability systems are fundamental for product differentiation (e.g., Smith, 2018). For example, they can help consumers to distinguish between imported and local products, or between PDO and non-PDO products. Traceability in agriculture *"refers to the capture of information at all points on the supply chain of a food item to allow each step – production, handling, and processing – to be identifiable"* (Smith, 2018:36). According to Whatmore (2002:139), *"[p]roduct traceability transacts the interval between production and consumption by tracing the bio-graphies of foodstuffs from field to shelf through networks of protocols, devices and personnel and rendering these journeys legible on the things they have become at point of sale by means of product labelling"*. The two definitions (Smith's and Whatmore's) of traceability are somewhat similar. However, Whatmore also emphasizes that traceability is not merely about following the 'things', the circulation of the products. Traceability involves various regulations, protocols, institutions, methods and staff members responsible for the certificates, control and other administrative tasks.

When the product is not handed over directly from the producer to the consumer anymore, the traceability system can provide a more formal, trust-based system between producer and consumer. The purpose of the system is to guarantee the quality and safety of the products. Lobb and Mazzocchi (2007) note that in intensive food production, we (the general public) are increasingly unable to assess the risks related to food by using traditional methods such as smell, taste and other physical qualities. This 'inability' has led to a growing demand for various measures to trace where and how food has been produced. Traceability is also linked to increased productivity, operational cost reduction, and improving consumer safety in industrial food systems (Regattieri et al., 2007).

Finally, I argue that the immunization of agri-food landscapes is linked to the notions of excess and waste. The search for profit maximization, the high operational costs of biosecurity and traceability systems and the increasing consumer demand for high-quality regional agri-food products (such as typical food products in Europe with PDO and CDO certificates) have led to a strong specialization of these productive landscapes. The objective of the specialization and intensification is to satisfy human diets and livelihoods. Productive landscapes are controlled by the political economies of power and capital

(Peluso, 1995; Zimmerer and Bassett, 2003), and the integration of local resources has contributed to climate change and the degradation of the environment (Robbins, 2001; Barua, 2019).

It has been recognized that the production of livestock can affect local and global landscapes in radical ways, and it is one of the significant contributors to climate change and environmental degradation (Dickson-Hoyle and Reenberg, 2009). The number of livestock animals has radically increased worldwide over the past few decades, and the extensive 'production system' has become more and more intensive and large-scale. The shift towards intensive pig, poultry, cattle and buffalo production has brought a range of new environmental problems. Although consumer concern supports organic and sustainable farming, most of the livestock animals are bred in concentrated animal feeding operations (CAFOs). Dickson-Hoyle and Reenberg (2009) also argue that the industrialization of animal breeding (in the dairy and meat production sectors) has caused the separation of food production and consumption, and the natural resource base. They note that *"this is dramatically transforming both the physical and social landscapes with which it was once so closely connected"* (Dickson-Hoyle and Reenberg, 2009:106). The increasing control over nonhuman lives by *"standardisation, acceleration and concentration"* can create additional problems, as Allen and Lavau (2015:2) emphasize in their analysis of factory-farmed chickens.

Policies and funding incentives also contribute to the transformation of agricultural animal landscapes from small-scale farms into large, industrialized complexes (Dickson-Hoyle and Reenberg, 2009). For example, the World Bank has financed the construction of megafarms and animal processing plants all around the world (McMichael, 2001). The avian influenza outbreak has also contributed to the shift in which small-scale, open-air poultry farms have slowly disappeared because it is more practicable (from the aspect of biosecurity) to keep animals in large, confined and indoor farms (Ellis, 2007). Biosecurity measures in productive landscapes are relevant examples of the anthropocentric ideas of creating *"rigorously ordered"*, planned and *"purely human biosocial worlds"* (Blanchette, 2015:645).

The strict control over regional agri-food systems and 'productive' nonhuman lives can also reinforce the waste–value dynamics. Increasing market demand, the limits of resources, space and regulations make the environmental impact of specialized, intensive food production for a global market more visible. In the case of livestock farming, these mechanisms force farmers to decide which lives and bodies are worth keeping, and which ones do not represent value. The 'optimum' between waste and value depends on the context (e.g., local traditions) and how the situation is framed (Hillier, 2017). This is directly linked to Gidwani's (2013) argument about waste, which is un-valuable excess and value-in waiting at the same time.

5.3. Securing mozzarella production and the animal–industrial complex in rural Campania

Local food producers, including mozzarella cheesemakers and buffalo breeders, eventually managed to overcome the cholera crisis (mentioned in the introduction) over the second half of the 1970s, but they realized that they needed to create alliances in order to prevent or face future crises if they emerge (Gravante, 2019). A few years after the cholera outbreak, a cooperative was created by a group of buffalo breeders and mozzarella producers near Cancello ed Arnone. This cooperative started on a small farm, and in 1980, it moved to a new and modern production facility (Coop Volturno; personal communication with Nicola Cecere, 7 October 2018). Another organization was established by four mozzarella dairies (three from Caserta and one from Salerno) after the cholera crisis, and this cooperative became the Consorzio Nazionale per la Tutela della Mozzarella di Bufala (National Consortium for the Protection of the Mozzarella di Bufala) in 1981 (Pirolo, 2017). In 1993, it changed its name to the Consorzio di Tutela della Mozzarella di Bufala Campana DOP (Consortium for the Protection of the Mozzarella di Bufala Campana; Spieler, 2018). The Consortium aims to protect buffalo mozzarella mainly from fraud and adulteration. The Mozzarella di Bufala Campana PDO (Mozzarella di bufala campana DOP) trademark can be used only by those cheesemakers who produce mozzarella exclusively from buffalo milk

in Campania, Southern Lazio and some parts of Puglia and Molise regions. The alliance between buffalo farmers and mozzarella producers proved to be even more important, also because over the past two decades, several waste and dioxin crises (2003, 2008 and the last one in 2013), brucellosis and tuberculosis outbreaks caused false or real emergencies, and had temporary but drastic negative impacts on the sales of local agricultural products.

5.3.1. Mozzarella as a 'boundary object'

The issue of illegal toxic waste dumping and burning has been present in Campania since the early 1980s (d'Alisa et al., 2017). Despite extensive debates and research on the possible impacts on human health conditions and human–animal relationships (Armiero and Fava, 2016), the Land of Fires and the Triangle of Death (Senior and Mazza, 2004) phenomena have profoundly affected the reliability of local agricultural products as well. The Mozzarella di Bufala Campana PDO **(Figure 29)** is one of the internationally best-known products of the region. Cheese producers, buffalo farmers and other representatives of the sector found themselves in the centre of the debates. After the declassification of the parliamentary committee documents on the waste crisis and the scandalous Carmine Schiavone (ex-camorrista) interview on a national television program in 2013 (in which Schiavone revealed some, previously unknown details of hazardous waste trafficking from Northern Italy to the agricultural areas of Campania region), several local and international newspapers speculated about the possibility of dioxin contamination in the mozzarella cheese (Birrel, 2016).

Forty years after the cholera outbreak, Campania and the local agriculture had to face dioxin and waste crises. Due to the heterogeneity of the resistance groups in the region (protesting against municipal and hazardous waste dumping and burning), the complexity of the topic, the lack of clarity about the socio-environmental conditions and the lack of interventions by the state resulted in often unjustified and unscientific claims, such as all

Figure 29. Mozzarella production in process in a dairy near Castel Volturno

(photograph by the author)

the lands are 'contaminated', and food produced in the area is 'all dangerous' by the media news (Cembalo et al., 2019). This issue initially resulted in harsh conflicts between farmers and activists in the region. Agricultural producers accused local activists that they contributed to the confusion and the destruction of their reputation. Also, sensationalist titles were published in the news media such as 'Italy's Trash Crisis Taints Reputation of a Prized Cheese' (Fisher and Pinto, 2008).

Several countries and Northern Italian regions banned the import of buffalo

mozzarella (and other agricultural products) from Campania in 2013. Allegedly, some Northern Italian shops even placed notes at the entrances of their shops, saying: *"We don't sell products from Campania"* (interview with Antonio di Gennaro, 16 February 2018). Later, on the New Year's Eve celebration in 2014 in Piazza Plebiscito, the main square of Naples, the well-known Neapolitan singer, Gigi d'Alessio publicly promoted the agricultural products of Campania as both safe and healthy by saying that the contaminated areas were less than 1% of the whole region. He reinforced this statement by consuming some mozzarella with his friends on stage. As a reaction, he (and local scholars, such as agronomists, claiming that the waste-related pollution was not extensive) was accused by the local grassroots movements fighting against toxic waste-related pollution that while supporting the economic regeneration of the area, he denied the existence (or the extent) of the problem (Il Foglio, 6 January 2015). These debates have contributed to the intensification of the post-truth phenomenon within the context of waste conflicts. Currently, the 'fake news' term is often used in various arguments regarding the agri-food sector and socio-environmental issues in Campania.

Over the past few years, *"things have changed, and activists have become more self-reflective about doing their work. They [have] realized the need to preserve farming activities in the region, and important alliances have been created between cooperatives, farmers and grassroots groups"* (personal communication with Salvatore Paolo De Rosa geographer, November 2018). The Mozzarella di Bufala Campana PDO has been mobilized as a 'boundary object' (Star, 2010; Lieto, 2017), and this flagship product has enabled *"collaboration without consensus"* (Clarke and Star, 2008: 222) within the context of the waste and dioxin crises in Campania. Besides the symbolic value of the buffalo mozzarella for the region, the Mozzarella di Bufala Campana PDO production chain is very significant in the economy of the PDO area (La Repubblica, 20 June 2019). According to the recent SVIMEZ report, the total revenues of the companies in the buffalo supply chain were at around 577 million euros in 2017, directly and indirectly generating an estimated production volume of approximately 1.218 billion euros. Based on the analysis of SVIMEZ, the entire Mozzarella di Bufala Campana PDO chain employs 11200 people that represents

1.5% of the total active workforce in the Provinces of Caserta and Salerno. The PDO chain created 1.4% of the GDP in the Provinces of Caserta and Salerno in 2017 (SVIMEZ, 2019).

Some representatives of the mozzarella-producing sector and farmers still think of activists like the ones who created or endorsed fake claims and therefore caused 'irreparable' damages to the local agri-food sector. Michele Buonomo, the former President of Legambiente Campania argued that still, there had been a mistrust between agricultural producers and activists. He has pointed out that *"the dialogues, sometimes even very harsh, have started from distant positions, but they have come closer over time".* Buonomo pointed out that finding a shared perspective required responsibility, mainly on the side of environmentalists. He noted that farmers have to bear the costs of the actions, because activists *"did not have their income from agricultural work, but farmers did. So, they tried to maintain their source of income, their jobs."* Buonomo suggests to activists that *"you should not raise a false alarm, and you have to be sure when you make a complaint. You need to have scientific evidence whenever possible"* (interview with Michele Buonomo, 14 November 2018).

There are a number of positive examples of cooperation between activists and farmers in Campania (such as 'Le Terre di Don Peppe Diana' – 'Libera Terra' Social Cooperative between Cancello ed Arnone and Castel Volturno, or the 'Fuori di Zucca' project in Aversa). One of my informants, the spokesperson of 'Rete di Cittadinanza e Comunità' (Citizenship and Community Network), also argues that there are strong links between the interests of activists and the farmers. In the committees of the Network, many farmer members have understood the importance of activism as a form of *"defending their own lands"* (interview with Vincenzo Tosti, 6 December 2018). According to De Rosa,

The potential risks of contamination in the food chain in Campania is scientifically untenable (other environmental matrices like water and air are different issues), but it is perceptively huge, because of the visible pollution by toxic fires, illegal dumping sites, legal landfills filled

with toxic waste, etc. The deep issue here is the contradiction between government institutions (at national and regional levels) that are busy covering up their wrongdoings by building up marketing campaigns aimed to reassure consumers that food is healthy, and activists' groups that are trying to protect and valorise the local food sectors, and at the same time to live in a clean and safe environment (personal communication with Salvatore Paolo De Rosa geographer, November 2018).

As part of the restoration of the territory and consumer trust in the local food products, the headquarters of the Mozzarella PDO Consortium was moved to the Cavallerizze Regie inside the prestigious Royal Castle of Caserta in 2016. At the inauguration of the new headquarters, Vincenzo De Luca, the President of Campania Region, argued that *"a few years ago, talking about the products of Campania seemed impossible, we were overwhelmed by the controversy on the Land of Fires, but we have taken giant steps. Here there is an extraordinary sector that makes great sacrifices, and we will never have to suffer again from an entirely unjustified commercial aggression,"* and *"**no [other] Italian territory is controlled like ours**"* (emphasis added; Iuliano, 2016).

As De Luca argued in his inauguration speech in 2016, local bodies and the regional and national governments developed sophisticated control systems to contain infectious diseases, to protect uncorrupted producers, and to guarantee food quality and safety. Over the past few years, biosecurity and traceability have become key concepts in the local/regional political-ecological debates.

5.3.2. Securing buffalo farms

2008 was a particularly difficult year for the buffalo farmers in Campania. First, the waste emergency, then the dioxin crisis, caused a temporary drop of sales for buffalo mozzarella producers. These socio-environmental events undermined the structural stability of the

whole production chain, including the buffalo farming sector in the Protected Designation of Origin (PDO) region (Rainieri, 2009). Besides, this area (affected by the waste and dioxin crises) has struggled with the consequences of the brucellosis epidemics. This infectious disease is caused by the genus Brucella, and it can be transmitted from animals to animals and from animals to humans (De Rosa and Trabalzi, 2016).[56] In general, water buffaloes are reported to be more resistant to various diseases and other illnesses (foot-and-mouth disease, mastitis, etc.) than cattle (Khan, 2011). However, by the time buffaloes show symptoms of diseases, farmers have more limited opportunities to treat buffaloes than cattle (interview with Domenico Vecchio, 4 December 2018).[57]

The multiple socio-environmental crises affecting the region and the 2008 economic recession had a radical economic impact on the dairy buffalo farms (and mozzarella dairies). Also, as Rainieri (2009) argued, the often occurring (winter) milk surplus and the pressure to keep the price of the raw milk lower had further adverse effects on the farming sector. The farmers who had to take the economic consequences of the multiple crises demanded a tighter control system and the active presence and support from relevant state authorities in order to provide financial security for them. As a result, biosecurity practices have emerged in buffalo farming in Campania. On the other hand, a sophisticated traceability system was introduced in 2014 to obtain *"information at all points on the supply chain of a food item to allow each step – production, handling, and processing – to be identifiable"* (Smith, 2018:36).

Infectious diseases such as brucellosis and tuberculosis have been present in the Province of Caserta, the homeland of buffalo farming for decades. "*This area has had*

[56] The relationships between buffalo farming and organized crime is not included in the scope of this research but De Rosa and Trabalzi (2016) provide a detailed analysis on how 'dishonest' farmers and criminal groups have participated in the 'brucellosis scheme' (obtaining financial compensation from the government for the elimination of infected animals but keeping the infected buffaloes alive and in production) that has also contributed to the severity of the brucellosis crisis in the region.

[57] Domenico Vecchio also told me that a number of dairy farmers in other Italian regions (such as Calabria) who switched from cattle to buffalo breeding, generally took very good care of their animals. They were used to dealing with dairy cows who were less resistant to illnesses and required more attention than buffaloes. When they switched to work with water buffaloes, they kept their old practice of looking after the animals regularly (interview with Domenico Vecchio, 4 December 2018).

problems with brucellosis for 40–50 years, at least. In the Caserta area, brucellosis was considered pandemic. And we were not able to eradicate it" (interview with Gianluca Neglia, 13 September 2018). The increase in the number of farms as well as the number of animals kept on each farm led to the more frequent incidence of these illnesses. *"In 1990, on average there were 84 buffaloes on each farm, and currently, there are 220 animals on each farm. The problem is that there is a direct relationship between the number of animals and the diffusion of infectious diseases"* (interview with Gianluca Neglia, 13 September 2018).

Allen and Lavau (2015) make a similar point in their analysis of the 'just-in-time' poultry sector: the risk of disease is not external, but a constitutive part of the modern factory farms. Also, the pressures to produce cheap and disease-free buffalo milk in large farms with well-designed biosecurity measures can *"contribute towards the incubation of disease within"* (Allen and Lavau, 2015:15.). They also argue that *"disease is a contingent outcome of the intra-actions among pathogens, animals, equipment, capital and people in commercial, regulatory, farming and food production practices",* and it *"is not simply a matter of bacterial or viral presence; it is a relational achievement, one that is generated through the entangled interplay of environments, hosts and pathogens"* (Allen and Lavau, 2015:16).

Biosecurity has become a fundamental approach to buffalo farming in Campania since 2009, when the EU Commission for Health of Consumers, Food and Veterinary Office assessed the implementation of a program in order to eradicate brucellosis in the Province of Caserta. Around Caserta, the problem was much more present than in the areas around Battipaglia and Salerno. According to Gianluca Neglia, the reason behind this difference is that

[I]n that area (Salerno), there are fewer animals. When there is a brucellosis case on a farm in Salerno, the veterinary service works very efficiently to slaughter the animals (in order) to eradicate the disease. Every 35-40 days, the vets are on the farm: blood samples are collected from all the animals, and those with positive results go to the slaughterhouse. In Salerno, the

problem of brucellosis is limited to a very restricted area (Albanella), in the mountains, not far from Paestum. That area is the only one where there are some cases of brucellosis sometimes.

In Caserta, the problem is that… if this is the Caserta area [sketches a map]*, we have about 200 farms in very close proximity to one another. In practice, in the field, this is probably 'one farm'* (interview with Gianluca Neglia, 13 September 2018).

Figure 30. A buffalo at the perimeter of one of the paddocks
(photograph by the author)

Although the farms in the Caserta area can be found in very close proximity to one another, a study has shown that many of the farmers have not been aware of the level of closeness between their and other farms (personal communication with Domenico Vecchio, 4 December 2018). In order to 'protect life' in buffalo farms, various strategies have been developed. Some of the farms affected by the epidemics have been relocated to areas far from other farms and without any previous buffalo farming activities. Over the past few years, various biosecurity principles have been developed in the buffalo farming sector in Campania.[58] This means, for example, that new animals introduced to the farms should go through a period of quarantine, after being identified and registered. The movement of people and vehicles on the farms should be minimized, and visitors need to be informed about biosecurity requirements. Both farmworkers and visitors have to be provided with protective clothes. In addition, there should be a method to identify sick animals early on, and they would have to be isolated. Storage sites for dead animals and farm waste have to be allocated correctly in order to prevent disease spreading and access by farmed animals, pets and wildlife (interview with Domenico Vecchio, 4 December 2018). Reinforcing the perimeters of the farms **(Figure 30)** has also become a vital element of the securitization of the farming sector, so the movement of the farmed animals between farms, and the entering of stray and wild animals (e.g., stray dogs, nutria) into the farm areas can be prevented. During my internship on the farm, my colleagues and I had to regularly monitor and fix various sections of the fence around the pasture.

The potential risk of the farms is increasingly assessed by ClassyFarm, which is an integrated system with its main objective to categorize farms according to risk assessment methodology. This local innovation allows cooperation between buffalo farmers and relevant authorities to improve food (of animal origin) quality and safety. This system focuses on various categories, such as biosecurity, animal welfare, health and production parameters, animal nutrition, antimicrobial usage and injuries detected at the

[58] These principles are bio-exclusion (limiting the risk of introducing pathogens), bio-compartmentation (isolating excreting animals), bio-containment (limiting the risk of spreading the disease agents outside the farm) and preventing the human and environmental bio-contamination and the persistence of pathogens (Vecchio et al., 2018).

slaughterhouse (Domenico et al., 2019). In order to measure animal welfare on the farms, the Italian National Animal Welfare Reference Centre (CReNBA) and the National Reference Centre on Water Buffalo Farming and Productions Hygiene and Technologies (CReNBuf) developed a survey-type checklist with 80 elements. This checklist was tested in 353 farms. According to Vecchio et al. (2019:51), the checklist represents *"a functional and smart instrument to assign an animal welfare index to each farm, and to provide veterinarians and breeders with a tool to improve farm management and conditions"*.

Besides the emergence of various surveillance systems and strict controls, the veterinary profession also deserves a few words regarding the securitization of the 'mozzarella landscape'. Neo and Emel (2017) note that the professionalization of veterinary medicine was established in Europe and North America during the second half of the nineteenth century. Veterinary conferences were held from the 1860s, and the Office International des Epizooties (OIE) was set up to fight against foot-and-mouth disease (Neo and Emel, 2017). In Naples, the School of Veterinary Medicine was established in 1795 during the rule of Ferdinand IV of Bourbon. Initially, the focus of the School was the hospitalization of sick horses of the Royal Cavalry Regiments. However, from the mid-nineteenth century, the curriculum was expanded to include 'all animals useful to humans', and not only horses. After 1848, the School went under the authority of the Ministry of Agriculture, and in 1935, it became one of the faculties of the University of Naples 'Federico II', the leading university of Naples and Southern Italy. More recently, two new graduate courses, Animal Production Technology and Animal Production Science and Technology were added to the traditional course (Veterinary Medicine) of the Faculty. Even the name of the Department (Veterinary Medicine and Animal Production) suggests that the emphasis of the research and teaching is not only on veterinary medicine but on animal production and food safety as well. The objective of the department is to improve animal health and the quality of animal lives, the breeding systems and supply chain processes with a particular focus on food safety (Dipartimento di Medicina Veterinaria..., n.d.). Returning to Section 2.4, the primary concern of the industry and the veterinary science specialized on farmed animals is human health, the wellbeing of the animals is secondary

(Gray, 2016). In addition, the concept of 'animal production' signals that the professionals involved in the industry (farmers, workers, researchers, veterinarians, animal technicians, etc.) see the animals mainly as resources or 'matter' and treat them accordingly (Porcher, 2011). Donald (2019) suggests that a more holistic understanding of empathy could ease the tensions between the concepts of human and animal, science and emotion both in veterinary science and human geography.

During my fieldwork, I conducted interviews with veterinarians, and I attended seminars with a focus on veterinary medicine. I have investigated mainly the role of biosecurity as an approach and as a set of practices that has transformed the 'mozzarella landscape'. At the end of my fieldwork, one of my informants pointed out that the veterinarian had become a crucial figure in the sector due to the growing importance of biosecurity measures (interview with Maurizio, buffalo trader, 29 November 2018). Over the next few years, with the emergence of more complex farm welfare assessments, the significance of the veterinarians might increase further in the 'mozzarella landscape'.

5.4. Traceability

Traceability, as a concept, refers both to a more impersonal/bureaucratic system of traceability, and a more informal, trust-based arrangement that links producers, sellers and consumers (Smith, 2018). In this chapter, I focus mainly on the first one, but I also argue that the second connotation of the concept helps to reframe the understanding of the 'terroir'[59] and the value of traditional, local knowledge and nature. Julia Smith (2018:1) defines traceability in the agri-food sector as a process of capturing "*information at all points on the supply chain of a food item to allow each step – production, handling, and processing – to be identifiable".* For instance, a relatively new, trendy pizzeria chain called Berberè, which has restaurants in gentrified neighbourhoods in Central and North Italian cities and London, promotes the buffalo mozzarella on their pizzas as the cheese *"from the*

[59] More details about the concept of the 'terroir' in Sections 2.5.1 and 6.2.

happy buffaloes of Ponterè" (Berberè, 2019). They operate a more informal, trust-based traceability system to assure their customers that Berberè uses organic and traditional ingredients for making their pizzas.[60] Berberè is one of the finest examples of the globalization of sustainable food consumption. The restaurants that are located in affluent and gentrifying neighbourhoods of Northern Italian cities and London offer *"the new 'art' in the urban cultural experience"* (Zukin, 2010:29; Rossi, 2017).

A more formal (and impersonal) traceability system was established in 2014 to provide better control on buffalo breeding, as well as milk and cheese production. This system was initially proposed in the 'Resolution' of the Chamber of Commerce, Agricultural Committee in 2009 to counter the multiple socio-environmental crises affecting the sector at that time (Rainieri, 2009; see more details about this process in Section 4.6). Currently, agricultural products that comply with the standards set by the European Union can have a Quick Response (QR) Code affixed, that ensures the traceability of the product. This code that has been developed by the Experimental Zooprophylactic Institute of Southern Italy (IZSM) provides access for consumers to the results of analyses completed at the various stages of the production. Overall, the system aims to provide safety and transparency for consumers. Agricultural products can be marketed only if they are certified, and the QR code can provide detailed information about the product (producer, geographic location of production, and a report of the tests carried out on the products of that specific chain). Products that do not conform to the required standards are prevented from being marketed (Esposito et al., 2015).

The next level in the traceability system involves the stakeholders of the buffalo

[60] On the website of Berberè, the consumers are provided with a detailed description of the area, the farm and the living conditions of the animals *("300 buffaloes graze freely in 65 hectares of land not chemically fertilized"; "where they can immerse themselves in natural pools and become covered with mud that, drying in the sun, protects them from diseases"*; Berberè, 2019). Berberè emphasizes that their buffalo mozzarella supplier is not a dairy ('caseificio'), but a buffalo breeder – the origin of the cheese and the milk can be traced back to the farm and the animals themselves –, and the milk is unpasteurized to preserve the organoleptic characteristics of the milk. One of the posts on the Facebook page of Berberè specifically mentions Ponterè, where the post author explains why Berberè puts the buffalo mozzarella on the pizza only when the pizza is already baked. Berberè answers that *"because the one from Ponterè is so good, it would be a shame to change its taste by cooking it"* (Berberè Facebook thread, 7 October 2019).

mozzarella chain, and it focuses less on the 'safety' of the product and more on its 'quality'. The system – that is called 'tracciabilitabufala' ('buffalo traceability') – is managed by the National Reference Centre on Water Buffalo Farming and Production, Hygiene and Technologies (CReNBuf) at the IZSM in Salerno and by the National Agricultural Information System (SIAN) of the Ministry of Agriculture. This element of the traceability system is different from the previous two examples. 'Tracciabilitabufala' is not a 'labelling tool' (Opio and Steinfeld, 2010) that helps consumers *"often far removed from the producer, to identify precisely where a particular batch of food or similar commodity came from"* (Smith, 2018:5). The primary aim of this system has been to 'immunize' the mozzarella sector and to provide equal opportunities to the stakeholders. To put it differently, the traceability system developed by IZSM is supposed to ensure that only fresh buffalo milk is used for the production of the Mozzarella di Bufala Campana PDO, and to exclude unauthorized or dishonest farmers and mozzarella makers from the PDO network.

Buffalo farmers have to provide the data on the daily quantities of milk produced and the names of the dairies or milk transporters (intermediaries) to whom the milk is supplied. Dairies that work with buffalo milk are required to provide the following information on the platform: the amount of buffalo milk and other buffalo products (also in frozen form) purchased and the names of individual suppliers; the quantity of the final products: Mozzarella di Bufala Campana PDO, non-PDO buffalo mozzarella, other products made from buffalo milk (e.g., ricotta, yogurt, provola, butter, ice cream) and the quantity of buffalo milk and semi-finished products stored. These data have to be uploaded onto the platform daily. Intermediaries are obliged to provide the following data: daily quantities of buffalo milk and other products purchased (also in frozen form), with the indication of each supplier; the daily amount of buffalo milk and other products sold, even in frozen form, with the indication of each recipient. These data are also to be uploaded to the platform on a daily basis. Every month, breeders must submit data on individual animals acquired to the central platform (Vecchio and De Carlo, 2017).

During the interview [with Domenico Vecchio at the IZSM in Salerno], *while we talked about the traceability system, suddenly, Domenico asked me: "Do you want to see where the operators work?" Without waiting for my answer, he took me to the end of the corridor, and we entered a tiny office, where three extremely friendly employees sat at the computers. All the operations of the traceability system are conducted from that tiny office in Salerno* (fieldnotes, 4 December 2018).

According to the Ministerial Decree (9 September 2014), every stakeholder involved in the production, handling and processing of buffalo milk is obliged to use the system for data declaration. The data provided can be consulted in real-time by the officials of the Ministry of Agriculture and the Ministry of Health. Although the participation in and data provision to the traceability system is compulsory for every stakeholder, there was some initial resistance from the dairies. Also, several PDO mozzarella producers (around 10%; Gallinella, n.d.) lost their right to use the 'PDO' label on their products after the introduction of the traceability system (i.e., separate production lines must be kept for buffalo mozzarella and cow mozzarella production, and some of the smaller producers were not able to finance the required new technologies).[61] Also, many small-scale producers were unable to survive in the market due to the harsh economic effects of the brucellosis, dioxin and waste crises, and the additional costs of the food quality and safety requirements (di Gennaro, 2018b). Di Gennaro (2018b) has pointed out that the effects of the Land of Fires phenomenon unequally affected small-scale agricultural producers: they lacked the capital to deal with the temporary loss of sales and the new food safety requirements, and they did not have large distribution networks. Larger producers with resources to afford the necessary certificates even managed to increase their export, while small companies had to sell their products anonymously at a discounted price. Many farmers got bankrupt, and this process has also generated land speculations (di Gennaro, 2018; interview with

[61] Rossi (2012b) points out that small-scale dairy producers have suffered from the 'structural crisis' of the agricultural sector in other parts of Italy as well (e.g. Sardinian shepherds who produce the well-known Pecorino Romano cheese).

Antonio di Gennaro, 16 February 2018). Generally, food quality and safety requirements and food systems are less feasible for small-scale operations in the agri-food sector due to the high coordination costs of these systems (Narrod et al., 2010).

Contrary to the mozzarella dairies, most buffalo farmers in the area have considered the introduction of the traceability system as a positive change. *"In these two years since the project was first implemented, no winter milk surplus has arisen, as was the case in previous years. Also, the farmers' revenues have increased, and the gap between winter and summer milk prices has narrowed"* (Vecchio and De Carlo, 2017). However, Confagricoltura, one of the trade unions of the farmers, argues that the results of the traceability system are still partial and not yet entirely satisfactory. Despite the 'imperfections' of the system, it is noted that the traceability system has allowed the cooperation between the Region (of Campania), the relevant ministries and health authorities and the private companies (the buffalo farms and the mozzarella dairies; Confagricoltura, 2019).

Some of the criticism of the traceability system has been about the requirement to provide unnecessarily detailed data: farmers have to upload the quantity of the produced milk every day and the number of milked animals, but also the milk yield of each animal. Another problem is that companies not participating in the traceability system are not sanctioned appropriately, but participants who make formal errors during the data provisions are fined (Confagricoltura, 2019).

5.4.1. Tracing buffalo calves

The traceability system has had a particular side effect on the conditions of the male buffalo calves. In Campania, buffalo farming focuses almost exclusively on milk production. Therefore, only the female animals are needed (and some male buffaloes that are necessary for reproduction), and male animals generally represent 'surplus' animals and by-products of the mozzarella sector.

The 'gendered commodification'[62] in the buffalo farming sector is not surprising. It is prevalent in dairy and egg farms all around the world. Kathryn Gillespie (2014b) effectively demonstrates how bovine animals are subject to sexualized violence and gendered commodification processes. Male animals that are not used for reproduction have rather short and intensified lives in the veal industry. Gillespie (2018) also notes that the veal sector is not immediately visible within the dairy industry. However, most of the male animals are slaughtered after living only for 4 to 6 months. In the dairy sector, cows can be either dairy or beef, but they cannot be both. Also, intensive pork production has nearly eliminated local animal breeds (Porcher and Schmitt, 2012).

In buffalo farming, the visibility and invisibility of certain animals, the different life cycles in the gendered commodification process, is similar to the dairy cow industry. Nevertheless, the differences in how the dairy buffalo industry uses male and female buffaloes in Italy is even more severe. Currently, the market for buffalo meat is almost non-existent in Campania. According to my informants, the problem is above all cultural. In the past, the meat of young and good quality animals was sold as beef[63], while the one marketed – correctly – as buffalo meat, came from animals at the end of their 'careers'/lives, raised in marshy areas, with unbalanced diets (interview with Gianluca Neglia, 13 September, 2018; Cicerone, 2018a). Consumers still associate buffalo meat with inferior quality. Looking at the current situation from the perspective of the buffalo farmers, Gianluca Neglia, a veterinary professor, argued that

the dry matter (DM) in energy that is needed to increase the body weight [of a buffalo] by 1 kg is higher than in beef production. So, I need to produce something that consumers do not like, and I have to put it on the market at a high price because it costs more to reach the

[62] Gillespie (2014b) argues that the commodification of male and female animal bodies is essential for the functioning of the dairy sector.
[63] Interestingly, the Indian state claims that beef produced in India is sourced from buffalo (and this buffalo beef is called carabeef). However, Narayanan (2019) points out that there is some evidence that suggests that a significant proportion of the Indian beef is actually cow beef.

slaughtering weight. So, these are the main reasons why the males are not marketed at the moment" (interview with Gianluca Neglia, 13 September 2018).

Buffalo farmers and traders also confirmed that buffalo meat **(Figure 31)** is not only not required by the market, but it also costs more to produce than beef. Therefore, male buffaloes do not represent any 'productive value' in the mozzarella sector, except for very few male animals that are selected to maintain reproduction in the herd. Previously, male

Figure 31. Carne di buffalo (buffalo meat) – butcher shop sign on the road between Cancello ed Arnone and Mondragone

(photograph by the author)

buffalo calves often were killed/slaughtered in the farms shortly after their birth because they only represented expenses for the industry. In popular culture, a documentary film/beast fable called Lost and Beautiful, written by Maurizio Braucci and Pietro Marcello, shows the destiny of male buffaloes in Campania in a very compelling way.[64]

Nevertheless, things have changed over the past few years (Cicerone, 2018b). "*Such behaviours* [killing male calves] *are not tolerable, and today we have the tools to counter them,"* argues Domenico Vecchio from the IZSM. In the national database of the zootechnical registry (BDN) that allows real-time control, buffaloes, as well as cattle, are enrolled with a registration number that helps to track the calves from birth. 'Tracciabilitabufala', the portal created in 2014 to guarantee the traceability of the buffalo milk supply chain, records milk production on each farm. Companies are obliged to declare how much milk they produce and how many animals they have obtained. Control and transparency *"should make the irregularities a real exception, avoiding damage caused to companies that follow the rules",* argued Domenico Vecchio. Undoubtedly, there are margins of illegality. In 2018, Carabinieri Command for the Protection of Health found a buffalo farm during its inspection with an unacceptable level of hygiene and buffaloes without ear tags (that are necessary for the identification and the traceability of the animals; Ruminantia, 2019a). Some of the farmers and other representatives of the sector argue that those 'margins of illegality' still affect their work and reputation: a recent report about the maltreatment of buffaloes in Campania by Fanpage.it (a Naples-based online news website) has caused controversies among the buffalo farmers. In a buffalo farmers' Facebook group ('Bufalando'), one of the members argued that the video report published by Fanpage.it only served to create 'fake news' about the sector. The group member noted

[64] The original protagonist of the film, Tommaso Cestrone, who was a shepherd, finds a male buffalo abandoned in the countryside with his legs tied. Don Tommaso saves the animal and calls him Sarchiapone. However, Tommaso Cestrone dies soon after that. He summons Pulcinella, a popular character from the 17th century Neapolitan commedia dell'arte (an early form of the professional theatre), to rescue the buffalo calf that he has saved. Pulcinella takes Sarchiapone with him, and on their way, they spend the night in a farmhouse. The owner of the house immediately asks Pulcinella: *"What are you doing with that worthless male calf? You could have gotten a female. At least it produces milk."* Pulcinella responds apologetically: *"I know, but… I'm doing a favour for a friend."* The owner argues that *"they worth nothing,"* and that is why male buffalo calves are usually killed after their birth.

that the 15-minute-long video had suggested that *"buffalo mozzarella equals with male calves starving to death and their bodies secretly disposed of in the fields, buffaloes living in horrendous conditions, and farmers dumping animal manure everywhere except for the concrete storage sites"* ('Bufalando' Facebook group; accessed 11 November 2019). One of the commenters in the group (perhaps a buffalo farmer) also referred to a 2017 TV report about the buffalo farming sector in Campania ('Reportage: Animali come noi'; in English: 'Report: Animals like us') created by journalist Giulia Innocenzi. The group member mentioned that Innocenzi was a vegan, and she created an 'extreme' report by negatively depicting the whole sector. At the same time, there was only one specific case of animal mistreatment, the commenter argued. During my fieldwork, one of the farmers (Paolo) that I talked with also pointed out that the negative media attention and the widescale

Figure 32. A newborn male calf and his mother are returning from the pasture
(photograph by the author)

generalization caused some of the biggest problems for the sector from an economic perspective (fieldnotes, 11 May 2018).

Returning to the main argument of this section (the value of male calves in the buffalo mozzarella sector), Maurizio Braucci, the scriptwriter of the film Lost and Beautiful, wanted to raise awareness on how the male animals had the destiny to die after a rather short life: *"How is it possible that you are born just to die, because the food industry says that you have no value?!* [...] *and the only way to save the water buffalo now is to let them become food. If they become food, they can live more."* When the male calves are born, *"the farmer looks at them, and they are already dead"* (interview with Maurizio Braucci, 17 November 2018). Related to this conversation is one of my work experiences on the buffalo farm. One

Figure 33. A male buffalo calf with the eartags
(photograph by the author)

afternoon, we found a newborn male calf on the pasture **(Figure 32)**. After we walked back to the barns and separated the mother and the calf from the herd, my colleague said promptly: *"Un altro morto" ("one more dead",* fieldnotes, 5 October 2018).[65] At most farms, the separation of calves from their mothers is almost immediate. In Ponterè, the male and female calves spent a few days with their mothers while they got registered to the health authorities (Asl), and my colleague pierced their ears and attached the two ear tags for each animal **(Figure 33)**.[66]

The practice of keeping the mothers and the calves together for a few days is quite unique in this sector. In the case of primiparous buffalo cows, it can take some time until a visible bond develops between them and their calves. Anyway, they seem to enjoy their time together, especially when there are more calves in this 'nursery section'. In case the lactating buffalo was younger (i.e., primiparous), we also brought the mothers and calves together inside the milking parlour for one or two days before they got separated. When the buffalo cow was milked, the calf stayed next to her. Although in some cases the bond between them develops slowly, separating the mother and the calf can be uncomfortable to watch and listen to. When the mother is taken from her calf, she keeps calling her calf agitatedly from the milking parlour and then, from the other side of the farm (fieldnotes, 5 October 2018).

Equipping newborn male calves **(Figure 34)** with microchips is not obligatory if they are slaughtered shortly (within a few days) after being born. Not placing the microchip inside the body of the buffalo (which must be a very uncomfortable process[67]) means slightly less suffering for male calves and cost-saving for the farmers. Then, every few days, once a week, a truck comes to pick the male calves up and takes them to the slaughterhouse.

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[65] *"Un altro morto"*: A newborn male buffalo calf and his mother returning from the pasture: https://ln2.sync.com/dl/5569f3690/3qnub5vt-76fxddi4-tji2mr7d-r646i3s5

[66] Eartagging a buffalo calf: https://ln2.sync.com/dl/7853aef10/mwwb2c36-pxcsbcbc-pv8irb83-gc9d423r

[67] A female buffalo calf is eartagged, and then, a microchip is placed inside her body: https://ln2.sync.com/dl/09922f3d0/tqvsdvbj-gneqn634-p2fp4k7e-fnx4ajss

Figure 34. A buffalo calf at an intensive farm near Battipaglia
(photograph by the author)

It is important to emphasize that getting rid of male calves in the mozzarella sector at the lowest possible cost is not unique at all. It is not my aim here to present the buffalo farming sector in Campania as a cruel and exceptional case in which male animals are slaughtered after their birth, and to suggest that this does not happen in the dairy sector elsewhere. Recent news reports have shown that the practice of slaughtering male buffaloes straight after birth is on the rise again in the dairy industry worldwide because it is too expensive for farmers to raise the male calves for the veal or beef industry. A Guardian analysis has demonstrated that farmers in the UK are under extreme pressure to keep production costs low. Ironically, public protest against the international and intercontinental transportation of animals has also affected the lives of male calves in the British dairy industry (BBC, 11 September 2018). Male animals were previously transported from England, Northern

Ireland and Scotland to continental Europe, but the public and industry pressures have reduced the export of animals via ferries. Transporting animals is less and less a viable option, and an increasing number of calves are killed at birth instead (Lewitt, 2018).

In order to assess the wellbeing of farmed animals, including buffaloes in Italy, the 'Ruminant Welfare' project has been developed by the National Reference Centre for Animal Welfare (CReNBA) of the Experimental Zooprophylactic Institute of Lombardy and Emilia Romagna (IZSLER). Among the parameters taken into consideration for the assessment, the mortality rate of the male buffaloes is also included (Cicerone, 2018b).

Besides the compulsory registration of newborn calves to the health authorities (Asl) with a 'smart card', the traceability system provides an additional level of control, therefore it has become more difficult to make male buffalo calves 'disappear'. Vecchio noted that the effects of the traceability system and more robust control in the sector are already visible. According to the statistics of ISTAT, the registered number of slaughtered buffaloes increased from 4621 animals in 2006 to 94660 animals in 2016. Vecchio added that the registered number of buffaloes slaughtered in 2016, based on the fertility rate of the buffaloes, should roughly cover the number of male animals born and not kept for reproduction (Cicerone, 2018b; interview with Domenico Vecchio, 6 December 2018).

"Another trick that could contribute to reducing the problem is the use of sexed semen in assisted insemination operations", argues Domenico Vecchio, therefore the sex of the animal could be determined at an early phase, and only a few male buffaloes would be born that are necessary for reproductive purposes (Cicerone, 2018b). However, one of my informants questioned the viability of the sexed semen in the buffalo farming sector: *"The problem is that sexed semen costs 45 euros per straw. The [price of the] conventional semen is 5-7 euros per straw"* (interview with Gianluca Neglia, 13 September 2018). Not only the use of sexed semen but artificial insemination is less common in dairy buffaloes than in dairy cows (Gillespie, 2014a) due to the low efficiency of artificial insemination in buffaloes (Napolitano et al., 2013). Even in the dairy cow sector in the UK, sexed semen is used only in 13% of the cases, and the use of sexed semen has not reduced male Holstein calf

production in the long-term. Many farmers use sexed semen only on heifers and not on lactating cows because the sexed semen can reduce the 'expectation of fertility' (Calf Forum Progress Report, 2013).

Stronger control, legislation and the fear of diseases have transformed the lives and commodified the bodies of male buffalo calves. The market for buffalo meat is still struggling to expand. The bodies of male buffalo calves are transformed mainly into canned meat for the pet food market (Cicerone, 2018a). Currently, there are a few butcheries in Terra dei Mazzoni where buffalo meat is sold, but it does not have a visible market that could be compared to the buffalo mozzarella cheese. Moreover, the lack of available space makes it challenging to increase the number of buffaloes in the PDO area, in case the buffalo meat market takes off.

5.5. Managing overflow

Terra dei Mazzoni and the Province of Caserta, in general, have received widespread and sometimes unjustified media attention due to their multiple environmental problems. The crises have had profound impact on the local agri-food sector. However, increasing food production and the intensification of the industry have also affected the socio-environmental conditions in the PDO area.

Recent reports have noted that the exponential growth of production of the Mozzarella di Bufala Campana PDO **(Figure 35)** and some other PDO 'Made in Italy' products, due to the popularity of these flagship products, has negatively impacted the landscape where they have been produced. One of the well-known examples is the production of the prosecco, a traditional Italian sparkling wine produced in the north-eastern part of the country. Recent studies have shown that the vineyard monoculture has been causing soil loss to an unsustainable extent. The story of the prosecco DOCG is similar to the Mozzarella di Bufala Campana PDO. The expansion of prosecco production has resulted in the loss of traditional knowledge in favour of modern agricultural practices (De

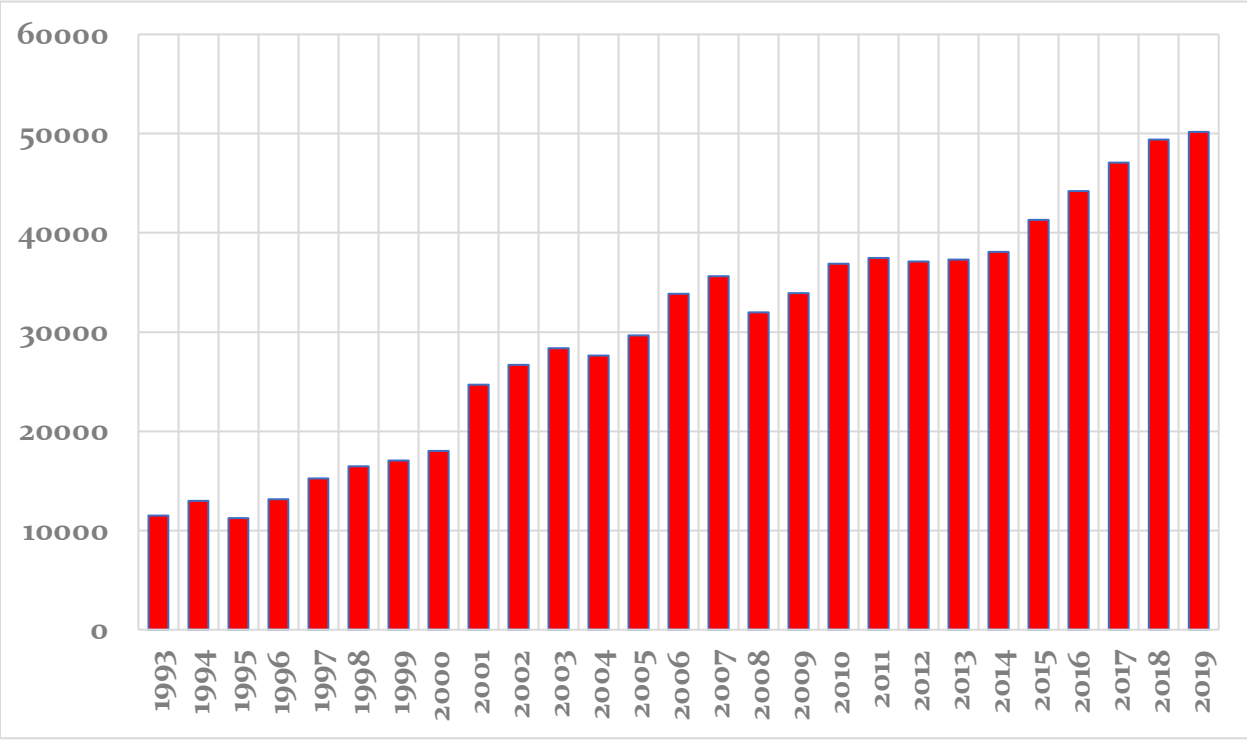

Figure 35. The production of the Mozzarella di Bufala Campana PDO between 1993 and 2019 (tonnes)

(Source of the data: Consortium for the Protection of the Mozzarella di Bufala Campana)

Nardi, 2016). Pappalardo et al. (2019) argue that the recent and sudden increase of prosecco DOCG production has been the result of a combination of global market demand and significant investments in the region to increase crop production and land use change into the creation of vineyards. Recently, international newspapers have also covered the debates on the environmental sustainability of the increasing prosecco wine production with alarming titles such as *"Should you stop drinking prosecco for ethical reasons?"* (Vaughan, 2019).

The story of the Italian prosecco is not unique. The growth in the number of buffaloes and the buffalo farms after World War II was exponential in Southern Italy. In addition to the radical increase in the number of farmed animals in the region, the soil consumption due to urban expansion in Campania has been extensive. Di Gennaro and Innamorato (2005) called the rapid urbanization of rural Campania after 1960 the great

transformation of the region ('la grande trasformazione', De Rosa, 2017). The decrease of available lands for buffalo farming in the region has resulted in the intensification of farming methods and a considerable environmental impact on the landscape. Besides the growing national and international demand for buffalo mozzarella cheese, the European Union quotas that aim to prevent cow milk overproduction have also led to a rapid change, especially in the PDO region (Liotta et al., 2015). The density of the animals has further increased, and recently, the management of buffalo manure and other farm waste has become a contested issue.

The growing number and the increasing size of the farms, the intensification of the sector impact the environment and pollute the air, the water and the soil in various ways. It is recognized by existing research that intensive livestock farming is a significant contributor to global environmental change. Breeding and slaughtering farmed animals, producing feed, waste storage and disposal, water use in the farms, electricity consumption and transportation of animals and feed all contribute significantly to the greenhouse gas emissions (Stoddard and Hovorka, 2019). Inside buffalo farms in Campania, cooling milk requires electricity, cleaning the milking parlour requires water, potentially harmful substances are used for keeping rodents and flies away from food production, medicines for animals, the management of animal manure, etc. I worked on an organic farm where the animals spend most of their time grazing outside and the stalls did not have to be cleaned as frequently as in an intensive farm, but cleaning the milking parlour every day required a considerable amount of water.

Waste originating from intensive livestock farms is becoming one of the leading causes of water pollution in many parts of the world (e.g., the Yangtze Delta in China; Dickson-Hoyle and Reenberg, 2009). In addition, countries within the European Union such as Denmark and the Netherlands where a high number of pigs is produced, ammonia deposition originating from farm animal manure has contributed to the radical increase (and exceed of the official limit) of nitrogen level in many sensitive areas (Dickson-Hoyle and Reenberg, 2009; Duyzer et al., 2001).

Neglia and Campanile (2016) argue that animal manure contributes significantly to air, soil and water pollution in Campania. Among others, the causes of pollution are the change in feeding animals ('single dish' instead of seasonal feed, in order to intensify 'animal production' and maximize milk yield, meat and egg production[68]), high concentration of animals compared to the available lands, and the changes in breeding techniques [the production of liquid manure (slurry) instead of traditional farmyard manure, without proper management]. Various European, national and regional laws aim to regulate the nitrate pollution of agricultural origins. Of all those regulations, the European Union Nitrate Directive (91/676/CEE) is going to be the focus of this subsection.[69]

The Nitrate Directive and the increase (to double) of vulnerable areas to nitrate might have a significant impact on the agri-food sector, especially on the buffalo farming and the mozzarella production in Campania.[70] According to the new proposal of the (Campania) Region, the majority of the buffalo farming areas (in total, over 316 thousand hectares, 23% of the whole region) in the coastal areas would precisely fall into the new zones vulnerable to nitrate. Franco Alfieri, an advisor to Vincenzo De Luca (the President of Campania Region) for agricultural policies, has argued that *"after a substantial expansion recorded in the last two decades by the buffalo farming sector, wastewater originating from farms has increased considerably"* (Pelagalli, 2019).

The Region has developed an 'Extraordinary Program for the adaptation of the buffalo farming sector in Campania'. According to the action plan, buffalo farms would be obliged to find the most suitable solutions to deal with their farm waste and reduce their nitrate pollution. The Region also offers financial help and support to the sector to make this 'transition' possible and to equip themselves with new wastewater treatment plants.

[68] Leibler et al. (2009) note that the feed supplied to animals in intensive farms are significantly different from the forage traditionally provided to the same species.
[69] The European Union Nitrate Directive focuses on the protection of surface and underground water, the classification of areas vulnerable to nitrate, the definition of the Code of Good Agricultural Practice, the descriptions of measures to be implemented (max. 170 kg of nitrate per hectare).
[70] The Campania Regional Council Resolution No. 762 of 5 December 2017, redefined the areas to be protected from excess nitrogen fertilization, in compliance with Directive 91/676 /EEC, aimed at avoiding contamination of surface and underground freshwater (agricolae.eu, 2018).

Alfieri adds that the treatment plants *"have to be technologically advanced, highly efficient and eco-friendly. Also, they have to be able to produce energy and quality compost to improve soil fertility. In short, the threat of nitrate should become a resource for the farming sector of Campania and its lands"* (Pelagalli, 2019).

Confagricoltura (agricolae.eu, 2018) has proposed an emergency plan, which calls for the declaration of a state of crisis for livestock farms, the creation of coordination centres for the spreading of farm waste, technical insights on the use of 'denitrificators' directly on animal manure and the provision of loans to biogas plants. They have argued that

[t]he protection of water from pollution caused by nitrates is the right choice, but it is necessary to put farms in a position to adapt. At the same time, it is essential to identify all sources of pollution, without blaming only the farms. The cause of pollution is often the lack of proper water treatment facilities (anthropic origins). We request a one-year extension of the regional resolution (agricolae.eu, 2018).

However, the regional Director of Coldiretti (a large, nationwide farmers' association), Salvatore Loffreda, took a position different from Confagricoltura, and he did not oppose the implementation of the new regulation. Loffreda said that *"implementing what is necessary to protect surface water from nitrate pollution of agricultural origin is not opposed by our organization."* The new delimitation must come into force as soon as possible, and Coldiretti is convinced that surface waters, as a resource of considerable interest, have to be adequately protected (Pelagalli, 2018). However, these parties have realized that if the new measures are introduced without giving farmers the chance to adapt to the new conditions, the number of buffaloes would have to be halved in the region. In order to comply with European environmental regulations and sustain the sector in Campania, the farmers would have to slaughter as many as 50% of the buffalo population in the region (or move them to non-PDO areas), or they would need to rapidly develop technological fixes

Figure 36. Biogas plant at a large, modern buffalo farm near Battipaglia, Province of Salerno
(photograph by the author)

(such as biogas plants; **Figure 36**) to utilize farm waste. Slaughtering a large percentage of the herds would have a drastic impact on the buffalo mozzarella sector and the regional economy.

The growth of the buffalo farming sector, the increasing national and international demand for buffalo mozzarella, and the strict regulations in the production of the Mozzarella di Bufala Campana PDO have resulted in the 'overproduction' of animals in the PDO area. This overproduction (just as the increasing production of prosecco in Northern Italy), the popularity of the 'Made in Italy' products can result in land erosion, pollution, a further transformation and degradation of the 'original landscape'.

5.6. Conclusion

This chapter has investigated how the process of immunization of the 'mozzarella controls animal bodies and lives. I have also analysed two parallel mechanisms, the increasing global demand for the Mozzarella di Bufala Campana PDO and the immunization efforts, and their effect on productive landscape of the mozzarella cheese.

First, I have provided a detailed analysis of the dioxin and waste crises on the agri-food sector in Campania. The contested claims, the lack of clarity about the socio-environmental conditions of the area and the heterogeneity of the resistance and interest groups initially resulted in harsh conflicts between farmers and activists in the region. Agricultural producers accused local activists of contributing to the confusion in the area and the economic crisis of the agri-food sector. These debates have also led to the intensification of the post-truth phenomenon within the context of socio-environmental struggles in Campania. However, buffalo mozzarella has become a 'boundary object' (Star, 2010; Lieto, 2017), and various interest groups have started to work together ('collaboration without consensus') to restore the reputation of the cheese and the productive landscape. Within this collaboration, complex control systems have been developed and introduced in the buffalo farming and mozzarella producing sectors in order to contain infectious diseases, protect uncorrupted producers, and guarantee food quality and safety. Recently, the concepts of biosecurity and traceability have become buzzwords in the local and regional political debates. A formal traceability system was established in 2014 to provide a more reliable control on buffalo breeding, as well as milk and mozzarella production. The main objective of this system was to immunize the 'mozzarella landscape' (e.g., only buffalo milk from certified farmers; controlled transformation of the milk into mozzarella). The traceability system also operates as a form of branding in an indirect way (Opio and Steinfeld, 2010). This system protects brands (the PDO label), it detects fraudulent activities, and it also helps customers differentiate between PDO and non-PDO products.

The stronger control over the circulation of buffalo milk through the traceability system has had profound effects on the political debates and the conditions of animals in the 'mozzarella landscape'. The effect of the introduction of the traceability system has also had a side effect on the conditions of male buffaloes. Nowadays, this system provides an additional level of control over the more 'ordered' slaughtering of the surplus animals.

Finally, I have investigated the controversy between increasing food production (and increasing demand for the mozzarella) and the immunization efforts in the PDO area. The rapid growth of production and the export of the Mozzarella di Bufala Campana PDO and other 'Made in Italy' PDO products have negatively impacted the landscape where they have been produced. The growth of the buffalo farming sector, the increasing national and international demand for buffalo mozzarella, and the strict regulations in the production of the Mozzarella di Bufala Campana PDO have resulted in the 'overproduction' of animals in the PDO area. This overproduction (partly due to the popularity of the 'Made in Italy' agri-food products) results in land erosion, pollution and a further transformation of the 'original landscape'.

In conclusion, I argue that the immunitary reactions to food quality and safety issues have secured the 'mozzarella landscape' via biosecurity and traceability mechanisms. These measures have also enhanced the real subsumption over the biological processes of the value-producing animals (deseasonalisation), and they have contributed to the further subsumption of the productive landscape, with the potential of various autoimmunitary reactions. Animals are critical parts of the securitization efforts, but the measures are anthropocentric, and the wellbeing of the animals is rarely a matter of concern (with the exception of some elements of the ClassyFarm initiative, for example). In many cases, these efforts miss to understand the productive landscape in a more holistic way, and they reinforce human–animal divides.

Chapter 6. Securing Mozzarella Land by branding the product through the landscape and the animal body

6.1. Introduction

The water buffalo has been part of the historical landscape of Campania and Southern Lazio for centuries. However, the grazing animal is not a common sight any more on the pasture nowadays. Most of the buffaloes do not graze in the fields and do not bathe in ponds or mud as they did in the past before the land reclamations. The farmers usually keep the buffaloes inside the stalls within industrial farm complexes.[71] Evans and Yarwood (1995) argue that the 'technological treadmill' (the industrialization and intensification of animal farming) has made it possible for humans to remove various animal breeds from 'their' original landscape without any major difficulties. Formerly, the topographic variations and the diverse agricultural practices have created an extraordinary diversity of animal breeds. However, the globalization of the sector has contributed to the homogenization of 'cattlescapes' (Evans and Yarwood, 1995) or, in this case, 'buffaloscapes'. The process in which animal breeds have been 'engineered' to become more homogenous has affected the unique characteristics of the landscapes as well.

Campania and Southern Lazio regions produce the best buffalo mozzarella cheese, most if not all Italians agree on that. Nevertheless, we might want to ask what makes this landscape so unique if the marshlands where buffaloes used to take mud baths were dried nearly a century ago. Nowadays, humans can breed buffaloes and produce mozzarella

[71] In some larger farms, the animals might have the possibility to use 'showers' or artificial pools (**Figure 37**). Research has shown that the availability of pools in the farms contributes to the welfare of the buffaloes and it can decrease the calving conception intervals as well (Neglia et al., 2009).

Figure 37. Artificial pool on a buffalo farm near Battipaglia, Province of Salerno
(photograph by the author)

almost anywhere. For example, several new buffalo farms have been established in Hungary in recent years to penetrate the local market (Montagnoli, 2019) and to provide additional supply for the increasing mozzarella demand of the Italian 'pizzaioli' (pizza makers; Sokszínű Vidék, 1 July 2019). While I was a visiting researcher in Vancouver, Canada in 2019, I found local buffalo farmers and mozzarella producers at the Riley Park Farmers Market on my very first weekend there (Anderson, 2018). These examples suggest that buffalo farming does not depend on the environmental conditions of particular landscapes anymore, and mozzarella producers around the world have successfully adopted the traditional know-how of mozzarella production.

Over the past few decades, branding the Mozzarella di Bufala Campana PDO has become one of the principal ways to reconnect the product with the landscape and the value-producing animals, the water buffaloes. The main objective of the branding processes is to make the product unique in the global market. It has also been an essential element of the securitization of the mozzarella sector in Campania, as a response to multiple socio-environmental crises and to the challenges of the globalization of the agri-food sector. In this case, branding has reconnected the product and the place (Pike, 2009), and it has served *"the purpose of reassuring consumers that what they buy will not surprise them"* (Ermann and Hermanik, 2018:3), as part of the broader securitization efforts in the agri-food sector in Campania.

I use the concept of the landscape in this chapter not as a synonym for the area but *„as the character of a region, a unity of cultural and physical phenomena in their broadest terms, something understood by multi-sensual engagement with place over time"* (Crary, 1959 quoted in Pries, 2018:2). One of my objectives is to 'reanimate' (Barua, 2014) this landscape. We know very little about how animals have co-produced this landscape and how they have cohabitated it. Although environmental historians and political ecologists have explored Fascist views on nature and the radical transformation of the landscape during the interwar period in Italy (more about this in Caprotti, 2007; Caprotti and Kaika, 2008; Armiero and Graf von Hardenberg, 2013), the 'ecological' aspects in these investigations have been rendered in the background (Walker, 2005; Barua, 2013). My objective is to demonstrate that buffaloes are not static objects but co-producers of this landscape [as Whatmore (2006) argues, there is a bodily involvement in the world, and landscapes are co-produced between nonhuman animal bodies and a lively earth], and their shifting relations with humans have had an impact on Terra dei Mazzoni. It might seem that the 'mozzarella landscape' has abandoned nature/matter/animals, but this is not the case. Through the bodily involvement of the animals, the materiality and the cultural/historical/branding aspects of the landscape are strongly connected.

In this chapter, I am going to investigate the role of branding in the 'mozzarella landscape', and I am going to explore how this concept is linked to securitization and value

production. First, I am going to provide a brief review of the geographies of branding (6.2) and more-than-human landscapes (6.3). Then, I am going to unravel how this landscape (that has been co-produced by buffaloes) has been 'reordered' over the past century. I am also going to make the case why branding the product and historical–cultural elements of the landscape, and the role of the value-producing animal are linked. In the second part of the chapter, I am going to examine how branding the Mozzarella di Bufala Campana PDO has been an effective tool to 'fix' and secure the 'mozzarella landscape', and how the historical and cultural elements (that includes animals as well) have been utilized to promote the product, the mozzarella cheese.

6.2. Branding the product

Ermann and Hermanik (2018) note that brands are related to the geographical origins of the products. These geographical origins are generally associated with positive qualities. Ermann and Hermanik (2018) list some of the examples: Swiss watches, knives from Solingen, Germany, clothes and shoes made in Italy, and Belgian beer are all perceived as good quality because of the origin of production. Attaching the name of the place, region or country to the product carries an added value (to the product), and this element is particularly strong when the product is place-specific, and there is no alternative site for cost-effective production (Pike, 2015). Ermann and Hermanik (2018:4) note that branding can be seen as *„a performative process whose effect is to make a commodity authentic"*. Ibert et al. (2019:45) remind us that in an oversupplied market, producers and sellers make an effort to **secure their value production** by linking the product to *"trusted agents of certification and assurance"*, so their products become more visible in the crowd. From a (neo-)Marxist perspective, branding as sign value can obtain symbolic rents *"by means of exercising reputational monopoly to appropriate (temporary) super-profits"* (Pike, 2015:30).[72]

[72] This surplus is what David Harvey calls monopoly rent (Pike, 2015).

The recognition of brands and the increase of the symbolic value of products do not happen spontaneously. It is supported by campaigns and other types of strategic work (Ibert et al., 2019). It also includes contradictions because branding a product or a group of products makes a distinction between similar products. This distinction supports the price premium that consumers are willing to pay for the branded product in comparison with other comparable goods (Pike, 2015). Ermann and Hermanik (2018) emphasize another key point. In order to circulate certain branded commodities in the market and to turn consumers into loyal customers, the branding process singularizes and standardizes the products. In other words, branding ensures that products are unique and recognizable, and the standardization helps to build consumer trust in the quality of the brands (Ermann and Hermanik, 2018).

Branding can be understood as a tool in two ways: it enhances abstraction and simplification, but it also makes associations and connections. Brands are created with logos and slogans that help the process of abstraction. Ermann and Hermanik (2018:6) argue that branding can be seen as *"a form of decontextualization and dissociation as a precondition for commodification".* Dissociation is a strategic process: efforts are made to obscure and weaken negative associations between the branded product and other entities, so the positive links can annul or counterbalance the negative ones (Ibert et al., 2019). For example, Amazon presents itself as a reliable online store with plenty of goods. However, the company effectively hides the working conditions in the Amazon warehouses and how Amazon orders are delivered to us (Ermann and Hermanik, 2018). The Mozzarella di Bufala Campana PDO has been marketed similarly, with some differences: the traditional elements of the production process have been emphasized, but the industrial farming system in which buffalo milk is produced has generally been hidden.[73] Ibert et al. (2019:46) also note the value building includes not only positive associations but *"omission, obfuscation, and hiding potentially 'unholy grounds'"*, too.

[73] In other cases, the buffalo farms are branded as secured, clean and controlled systems in order to assure consumers about the safety of the food products (fieldnotes, Battipaglia, 23 June 2018).

Ermann and Hermanik (2018) note that not only products are branded but places and nations as well. Place branding involves creating particular connections and disconnections. This includes selective narratives and images about places, and all these narratives and images are summarized in logos, slogans and 'sanitized' pictures. The presentation of cities, regions and nations is built on simple, uncomplicated descriptions about cultural, natural, artistic and historical heritages:

[B]rands shape geographical and historical imaginations as they replace complicated or unpleasant associations with other, simpler, more positive associations, which, in turn, emphasise specific items, actors and/or events in space and time (Ermann and Hermanik, 2018:8).

According to Bonetti (2004:747), consumers choose typical food products not only because of "*their links with the territory (as the expression of food quality and tradition)",* but because *"the area of origin, the ingredients used, the processing methods and the individual sensory features of the product"* are guaranteed. The European Union supports three different types of agricultural food product labelling. These labels are Protected Designation of Origin (PDO), Protected Geographical Indication (PGI) and Traditional Speciality Guaranteed (TSG) (European Commission, 2013; Dias and Mendes, 2018). PDO is applied to agricultural and other food products that are produced, processed and prepared in a specific geographical area. PGI denotes agricultural and food products where the production, processing or preparation are closely linked to a particular geographical area. However, the raw material can be produced elsewhere. TSG provides protection for food products that are produced from traditional raw materials and with traditional methods, but the geographical area of origin is not restricted in this case. By drawing on Callon (1999), we can argue that these labels (along with qualifications and brands) function as 'market devices' (Buller and Roe, 2014).

As Dias and Mendes (2018) point out, **control** over food production was one of the main objectives of the European Union with the introduction of quality food labelling. In addition, these labels allow the differentiation between quality European food products in the international market. The first two labels (PDO and PGI) were created in 1992, and these certification systems were based on two already existing national systems: the French AOC (Appellation d'Origine Contrôlée) and the Italian DOC (Denominazione d'Origine Controllata, or CDO: Controlled Designation of Origin). The French AOC system is based on the idea of terroir (Hajdukiewicz, 2014; Dias and Mendes, 2018).

Over the past few decades, the PDO trademark has been assigned to various agricultural and food products, based on their area of origin. The product that is granted with the PDO label has to be produced by using a prescribed method that may be unique to that area. In Europe, a variety of well-known cheeses have been linked to their area of production for several centuries. Barron et al. (2017:101) argue that in the case of PDO cheeses, the *"characteristics of that cheese are 'essentially or exclusively due to a particular geographical environment with its inherent natural and human factors'. These characteristics are not reproducible outside this area."* Italy has the highest number of cheeses that are granted with the PDO status (49) in Europe, and it is followed by France (45) and Spain (26). Italy alone produces around 1225 million tonnes of cheeses, and 41% of them are PDO certified products (Licitra, 2017). The PDO cheeses with the highest quantity of production are the following in order: Grana Padano, Parmigiano Reggiano, Gorgonzola, Mozzarella di Bufala and Pecorino Romano. The rest of the cheeses are produced in relatively limited quantities. However, all of them have strong cultural and social roles in the regions where they are produced, beyond their economic values. Licitra (2017) notes that many of the Italian PDO cheeses (excluding Grana Padano, Parmigiano Reggiano and Mozzarella di Bufala) are produced in mountainous and hilly areas of the country that are not suitable for intensive farming. Therefore, the extensive animal farming in those areas has essential roles in the conservation of the natural landscape as well (e.g., protecting natural resources; reducing soil erosion, deforestation and desertification; preserving biodiversity, including indigenous breeds and native pasture; Licitra, 2017).

Although the landscape where the Mozzarella di Bufala Campana PDO is produced has transformed radically over the past century, the buffalo mozzarella cheese and buffalo farming are still important elements of the identity in the rural landscapes of Campania. Sassatelli (2019) argues that food is particularly important in marking the national (and I would add, regional and local) identities of Italians, and their positions in a global context. Sassatelli (2019:2) cites Roland Barthes' work (Rhetoric of the Image) in which he effectively demonstrates how a pasta brand (Panzani) can summarise everything that is Italian "*in a mythological fashion building imagined but powerful reference points for practice*".

Buffalo mozzarella has become part of people's identity in Campania. However, in order to produce buffalo mozzarella as a distinct element of the identity there, various other factors, such as marshlands and (later) industrial farming systems, nonhuman animals, such as buffaloes, the history and geography of the landscape and human knowledge had to come together. Although branding uses all these elements (their positive aspects) in promoting the mozzarella cheese, they also create a 'purified', depoliticized context. My aim in this chapter is to investigate how the body of the buffalo and the more-than-human landscape are mobilized in branding in order to provide (economic) security for the product and the 'mozzarella landscape'. I also argue that branding processes reconfigure animal bodies and lives, the landscape as well as the broader context and practices of buffalo farming and mozzarella production.

6.3. More-than-human landscapes: Foregrounding the role of the animal in landscape studies

Julie Urbanik (2012) notes that the 'second wave' of animal geographers from the middle of the 20th century began to focus more on human–animal relations from a spatial perspective. Animal geography showed an increasing interest in human impact on wildlife and human–livestock relations. The 'second wave' of animal geography has also turned to the Berkeley School led by Carl Sauer. Sauer (1969) aimed to understand how human

cultures shape and are shaped by the environment. He argued that animals contributed to the transformation of 'natural landscapes' into 'cultural landscapes' (Wolch, 2002). In *Seeds, Spades, Hearths and Herds* (1969), Sauer investigated how the domestication of animals supported the development of cultural landscapes. He argued that the domestication of animals needed a significant alteration of the landscape by creating grazing areas, building holding pens, and producing feed for the animals. His work, as Urbanik argues, was substantial in indicating the effect of human culture on human–animal relations. Nevertheless, Sauer still maintained the human separation and dominance over animals (Urbanik, 2012). The work of Sauer and others following his tradition stimulated Charles Bennett (1960) to propose cultural animal geography as a new field of research (Wolch, 2002). In the conclusion of the short essay, however, he calls animals *„an element in the landscape"* (Bennett, 1960:14).

Sarah Whatmore (2006) argues that both classical (Carl Sauer and the Berkeley school) and 'new' cultural geography (for example, the work of Denis Cosgrove) define the process of making the landscape an exclusively human achievement.[74] More recently, posthuman theorists such as Anna Tsing (2015:304) argued that landscapes could be understood as *"patchy assemblages"* with both human and nonhuman participants. Human geographers engaging with new materialism/more-than-human perspectives advocate the reanimation of *'"the missing 'matter' of landscape"* (Whatmore, 2006:603) for a more in-depth *"examination of the political ramifications of landscapes via the lens of political ecology"* (Pries, 2018:5). Political ecologists claim that the recognition of nonhumans and their agency in political processes can change our understanding of 'who' matters. A posthumanist perspective can strengthen and renew landscape studies by decentring human interests (Sundberg, 2011, 2014; Pries, 2018) and recognizing the role of nonhumans

[74] Materiality and Actor-Network Theory at the end of the 20th century contributed to the emergence of the 'third wave' of animal geography. One of the seminal books in the early period of the third wave of animal geography was Animal Spaces, Beastly Spaces edited by Chris Philo and Chris Wilbert. Philo and Wilbert (2000:4) defined animal geography as a subfield that *"focus[es] squarely on the complex entanglings of human-animal relations with space, place, location, environment and landscape"*.

in the production of spaces and the knowledge of particular places (Tănăsescu, 2019; Barua, 2014; Johnston, 2008; Philo and Wilbert, 2000; Whatmore and Thorne, 1998).

Elizabeth Johnson (2017:281) reminds us that *""our" capacity for transformation has always been more than human"*. I argue, however, that we have to carefully consider how we engage with these more-than-human *"patchy assemblages"* (Tsing, 2015:304) without downplaying the effect of human domination and structural forces over the environment. In the next section, I am going to investigate how the buffalo landscape has been made, as the co-production of humans, buffaloes, and other living and non-living nonhuman elements.

6.4. Making the buffalo landscape

"[L]andscapes can be seen as transformations of social and political ideologies into physical form."
(Duncan and Duncan, 1988:125)

The concept of the landscape provides an effective tool to examine human–buffalo relationships in Terra dei Mazzoni. Focusing on the landscape from a more-than-human perspective in this section also helps to understand the role the landscape plays in branding the product. The leading buffalo farming and mozzarella producer regions such as Southern Lazio, the coastal areas of the Province of Caserta and the Sele Plain were all marshlands or frequently flooded areas. *'La mortifera palude*' (in English: death-inducing swamps; Caprotti and Kaika, 2008) was considered unproductive for agricultural purposes, but the environmental conditions were perfect for water buffaloes (Thurmond and Thurmond, 2017). Buffaloes are not only highly adaptive to the wetland (Sweers et al., 2014), but they depend on the availability of ponds and mud for wallowing in hot and humid climates. They have a reduced number of sweat glands in their bodies, and they rely on wallowing to lose body heat and to regulate their body temperature efficiently (De Rosa et

al., 2009).[75] In that environment, water buffaloes were not used only as dairy animals, but their labour was necessary to maintain infrastructure created by humans in the marshlands.

Gruppuso (2016) notes that buffaloes had crucial roles in water 'management'. On the one hand, their presence was considered dangerous for the local hydraulic systems in the marshes. They destroyed the canal banks and prevented the water from flowing. On the other hand, buffaloes had a vital role in managing relations between land and water in the coastal plains of Southern Lazio and Campania. For example, the Regi Lagni canal (that was built between 1610 and 1616 during the Spanish rule of Southern Italy) was cleared using water buffaloes every three years to avoid damages caused by the increased water flow during the spring season (ANASB, n.d.). Gruppuso (2016) cites Barra-Caracciolo di Basciano (1902) engineer who documented the process in detail how buffaloes cleared canals from aquatic plants in the Pontine Marshes. This activity was particularly important to prevent the overgrowth of this vegetation, which could obstruct the water flow in the canals.

Gruppuso (2016) notes that at the beginning of the 20th century, the 'Consorzio di Bonifica' (Land Reclamation Authority) owned 230 buffaloes, and most of those animals were kept for the task of clearing canals. Two hundred animals were divided into three groups, and each one of the groups was managed by four workers who led the animals to the canals, so the movement of the buffaloes eradicated the aquatic plants. This activity was carried out for forty days every year from March/April until October November (Gruppuso, 2016).

Currently, buffaloes in Campania are bred almost exclusively to produce milk for the mozzarella economy. However, there are several European experimental research projects in Germany and Italy in which water buffaloes are kept on wetland areas as 'biodiversity managers' (and in other parts of the world, buffaloes traditionally have been

[75] Even the trendy pizzeria chain Berberè suggests that buffaloes grazing freely and covering themselves with mud is beneficial for the health of the animal and the product itself *"(mud that, drying in the sun, protects them from diseases"*; Berberè, 2019).

raised in wetlands for their meat; Sweers et al., 2014). Buffaloes are adapted to semi-open landscapes, consisting of water bodies, marginal vegetation and wetland meadows. Buffaloes go wallowing, and they can digest marshland vegetation as well (cattle and horses cannot). In 2010, more than 2100 water buffaloes were kept in Germany by 90 breeders, and they were monitored by researchers from the Brandenburg University of Technology. Wiegleb and Krawczynski (2010) argue that grazing in wetlands in Western Europe (their study focuses on Germany) has generally been avoided. However, recent research projects have shown the beneficial effects of moderate wetland grazing for birds, amphibians, insects and vegetation. Pasturing traditional herbivores (cattle, goats, horses or sheep) has been dangerous in a wet environment. However, over the past few decades, several projects have experimented with buffaloes in wetland areas in Central and Eastern Europe (Wiegleb and Krawczynski, 2010). In Italy, buffaloes have been employed in managing coastal wetland areas in Puglia as part of a research project. Currently, about 400 buffaloes graze in the coastal wetlands of Puglia (Magazzini and Perrino, n.d.). These projects are linked to large-scale, European-level rewilding initiatives. Lorimer (2015) argues that the concept of rewilding has become a significant approach to nature conservation. The primary aim of rewilding is to (re)introduce absent species and functions in order to restore degraded and inhabited environments. In Europe in particular, the focus has been mainly on reintroducing larger herbivores, such as cattle, horse, bison, deer, beaver and wild boar. These animals are considered as 'ecological engineers', and their particular type of grazing and browsing has the potential to recreate forest-pasture landscapes that dominated a large part of pre-agricultural Holocene Europe (Lorimer, 2015:42).

In Campania, given that the environmental conditions were optimal for buffalo grazing, it is not surprising that buffalo mozzarella has become one of the leading products of the region. Historians indicate that during the 18th century, a large and almost continuous 'belt' of swamps surrounded Naples. There were no proper roads or bridges. The reclamation projects carried out by the Bourbon kings (1734–1860) partially transformed the coastal landscapes, and they also generated new sources of wealth in urban

areas. However, they were not enough to improve the living conditions of those who lived and worked in the marshlands (Pirozzi, 2007).

"The 'sterile' nature of the marshes" was turned *"into a fertile landscape"* by the Fascist administration (Caprotti and Kaika, 2008:614; also in Thurmond and Thurmond, 2017). On 11 June 1925, Benito Mussolini launched the 'Battle for the Corn'. This campaign was also known as the 'Battle on the Swamps'. The Land Reclamation Authority built canals, constructed electric pumping stations and dams. One of the largest infrastructure projects linked to the Fascist land reclamations in Campania was a dam on the Sele river near Persano (Province of Salerno). The dam was built in the 1930s, and it withheld the freshwater of the Sele and created an artificial lake. From this lake, irrigation pipes brought the water to the new arable lands of Battipaglia and Capaccio (Thurmond and Thurmond, 2017).

Although the reclamation works created space for intensive agriculture and improved the lives of those who lived in the marshlands, they destroyed the earlier natural environment of the buffaloes. These interventions contributed to the temporary but radical decrease in the number of buffaloes as well. At the end of World War II, their number decreased to 12000 heads (1947), and most of the buffaloes were found around Salerno because the retreating German soldiers killed many of the animals in the Caserta area. At the beginning of the 1950s, the buffalo was nearly extinct in the region because the marshlands, the natural habitat of the buffaloes, were not available anymore for their survival (Pirozzi, 2007). However, over the past three to four decades, the number of buffaloes increased significantly in the region because the intensive farming techniques, developed initially for cattle farming, have been applied to the buffalo farming sector as well (Napolitano et al., 2013) but these changes have had negative effects on the behaviour and life of buffaloes (De Rosa et al., 2009).

The transformation of small-scale and rural livestock farming into industrial farming and specialization (a trend towards a single dominant activity in agri-food production) was typical in the buffalo farming sector in Campania. Urbanik (2012) shows

that this shift was also introduced in other countries such as in Australia, where the government and multinational corporations supported the restructuring of the animal farming sector. Other scholars such as Dickson-Hoyle and Reenberg (2009) point out that even though the landscape has changed due to the intensification of the farming methods in many parts of the world (e.g., Iowa in the US), the small family farms characterize those places and landscapes in popular representations.

Nowadays, as Pirozzi (2007) notes, the buffaloes (and mozzarella production) are the only reminders of the earlier, pastoral landscape, even though they are present in the landscape only as 'food animals'. Still, over the past few years, buffaloes and the historical landscape have become crucial elements in the branding of the buffalo mozzarella. Branding and promoting the mozzarella cheese has also been very significant in restoring the image of the landscape that has struggled with waste and dioxin crises and unauthorized urban development. Gailing and Leibenath (2015) investigate a similar case in Germany, where despite the radical transformation of the rural landscape, the 'old' landscape remains alive in the forms of symbols and traditions. They note that the Spreewald, the inland delta of the Spree river in Germany, does not exist anymore as a traditional small-scale farming landscape, but the symbols and traditional images of this landscape are vital to promote rural tourism and to establish a regional brand for products from the Spreewald.

Besides the value of buffaloes inside the animal–industrial complex, their symbolic value to people, as relatively rare breeds and the co-producers of the landscape, is also significant (Holloway, 2007). Livestock breeds are often utilized for creating a localized and unique landscape. In similar ways as water buffaloes in Campania, particular types of cattle are associated with specific landscapes in Great Britain. For example, the highland cattle are originally from the Scottish Highlands and the Welsh blacks are from northern Wales (Evans and Yarwood, 1995; Urbanik, 2012).

6.5. „Fixing"/securing Mozzarella Land by branding through the landscape and the buffalo

Branding is a profoundly geographical type of commodification process.

(Ermann and Hermanik, 2018)

This is not the land of fires, but the land of hearts.

(Gigi d'Alessio, 2015)

At the events organized by the PDO Mozzarella Consortium that I attended during my fieldwork in 2018, there was a strong emphasis on the relationship between the Mozzarella di Bufala Campana PDO and the landscape as a heritage. This emphasis was not surprising: as I have already demonstrated in the previous sections of this chapter, the landscape and the mozzarella are connected in various historical, cultural, economic and environmental aspects. The historical landscape of Campania has become an effective tool to restore the reputation of the mozzarella cheese, and the international recognition of the 'White Gold of Campania' has helped to 'fix' the landscape after multiple socio-environmental crises in the region.

Biosecurity measures and traceability systems have been two of the critical elements in the restoration of the landscape and the product in Campania. In addition, a robust branding and marketing process was introduced with the involvement of various stakeholders, including researchers and celebrities. Branding, in this case, was a *"process of adding value to goods and services by providing meaning"* (Pike, 2009:623). In addition, branding can secure the trust of consumers by guaranteeing the quality and (safety) of the product, and it connects the brand to an 'origin' (e.g., the PDO system in Europe). This last point is linked to Opio's and Steinfeld's (2010) claim about traceability systems as branding/labelling devices for protecting brands and detecting frauds. In Campania, the

'positive' living and non-living elements of the landscape have been mobilized to brand the product. In return, the buffalo mozzarella, the 'White Gold of Campania', has been used in the restoration of the landscape.

6.5.1. Gigi d'Alessio's mozzarella

Barua (2019:14) notes that celebrity reinforcement is currently an integral part of the rendition of (the product of) more-than-human labour. For example, in Campania, after the most recent dioxin crisis in 2013, Gigi d'Alessio, the famous Neapolitan singer, promoted the agricultural products of Campania, especially the buffalo mozzarella. At the New Year's Eve celebration in 2014 in Piazza Plebiscito, the main square of Naples, he argued that the contaminated areas are less than 1% of the whole region of Campania. Research has shown, despite the negative media campaign, that the local agricultural products are safe and healthy for human consumption. He reinforced this statement by consuming some mozzarella together with the comedian Biagio Izzo on the stage.[76] Later, he was accused by the local grassroots movements fighting against toxic waste-related pollution that, while supporting the economic regeneration of the area, he denied the existence (or the extent) of the problem (Il Foglio, 6 January 2015). Some of my informants, including an agronomist also 'warned me' during the early phase of my fieldwork that the local movements fighting against illegal toxic waste dumping and the expansion of waste infrastructure around Naples and Caserta would consider the scientific arguments and findings of those agronomists, who argued that the agricultural food products of Campania were safe to consume, as negationism or denialism (interview with Antonio di Gennaro, 16 February 2018). Nevertheless, Gigi d'Alessio did not try to hide the existence of the problem because he also noted in his New Year's Eve performance that *"I wish you a good life for 2015, let's take note of the environmental emergency and let's face it. We must all work*

[76] Gigi d'Alessio – "Capodanno piazza Plebiscito Napoli" – "Noi Siamo D'Alessiani Official Group" (available at: *https://www.youtube.com/watch?v=OjqFhtlwGDs*, starting from 14:35; accessed 27 July 2019)

together and not make war with one another." What was probably even more important in his speech is a mention about the scalar politics of this problem: *"With the concert at the end of the year we focused on the revival of Campania products, let's not forget that waste is a* ***national*** *problem"* (emphasis added; Esposito, 2015).

Antonio di Gennaro, whose articles frequently appear in the local edition of La Repubblica, a centre-left national newspaper, argued after the controversies following d'Alessio's New Year's Eve speech that *"I'm with d'Alessio*". He noted that the term Land of Fires (Terra dei fuochi) coined by Legambiente is now included in the Treccani Dictionary, which is regarded as one of the most prestigious and authoritative Italian-language encyclopaedias. Di Gennaro points out that (according to some of the activists and grassroots groups) d'Alessio's statement about the absolute quality and safety of the agricultural products of Campania undermines the activist struggle against the existing socio-environmental problems in the Land of Fires.[77] He notes that the notion of the Land of Fires has become commonplace, and by some, it can only be accepted as a *"whole",* without the possibility to emphasize the complexity of the socio-environmental problems in the area. Di Gennaro indicates that carefully analysing ecological data on the potential contamination of the agri-food sector, and highlighting the complexity of the problem does not mean that the existence of socio-environmental issues is denied. He underlines that the correct presentation of the data regarding the 'health' of the local agricultural sector – *"the only thing that works, in the shapeless chaos of the hinterland"* – does not mean that other, pressing socio-environmental issues are diminished or relativized (di Gennaro, 2015).

Other commenters argued that D'Alessio's New Year's Eve speech was incorrect because he did not talk only about the safety of local agricultural products, mentioning that vegetables produced in Caivano (a small town situated north from Naples) are served on the table of Queen Elizabeth II, but he also said that only 1% of the lands in the region were

[77] Di Gennaro (2015) argues that the 'extremist' description of the Land of Fires can be summarized as follows: *"The plain between Naples and Caserta has been massively characterized over the course of thirty years by practices of spill and illegal burial of waste, which have caused the general pollution of soils and waters. The agricultural products grown on these soils are irretrievably poisoned, and their consumption is one of the causes of the high rate of tumour diseases in this area."*

polluted [according to Musella (2015), 2% was stated in the March 2014 government report, that was incomplete], and reclamation works already started in the countryside (Musella, 2015). These debates have also contributed to the emergence of the post-truth phenomenon within the contexts of the waste conflicts and food production in Campania, and several local stakeholders have used the terms 'fake news' and 'denialism' in various arguments. Even while doing research, 'selective ignorance' was something perceptible.[78]

In the next subsections, I am going to examine how various efforts have been made to rebrand the 'mozzarella landscape'. I am going to uncover how the product, the Mozzarella di Bufala Campana PDO has been branded by focusing on the cultural and historical heritage of the landscape, by addressing the post-truth phenomenon (the 'bufala') and via the value-producing animals, the water buffaloes.

6.5.2. The 'mozzarella landscape' in art and literature

Movies and theatre plays have had active roles both in forming the public perception of the socio-ecological problems of the region and in branding the buffalo mozzarella and other agricultural products of Campania. Besides Roberto Saviano's well-known book called Gomorrah and its film adaptation, several other works have focused on various socio-ecological problems of the region. Some of those are light-hearted comedies, such as Mozzarella Stories, a criminal comedy about mozzarella, directed by Edoardo De Angelis and produced by Emir Kusturica. Biagio Izzo, the comedian who has an almost permanent role in Neapolitan comedies and festivals, produced a movie and a theatre play on the buffalo mozzarella. His film titled 'Effetti indesiderati' (Side effects) is a story of three brothers, Giuseppe, Ciro and Mimmo, who own a mozzarella dairy together. Their

[78] Selective ignorance in environmental research refers to a condition in which individuals or groups produce or disseminate specific information about a topic or phenomenon without disclosing/disseminating other significant information (Elliot, 2015).

company is near bankruptcy due to the adverse economic effects of the Land of Fires phenomenon. However, somehow they accidentally manage to discover and produce an aphrodisiac 'supermozzarella' that becomes very popular among consumers, and it helps them restart their business.

Mimmo La Vecchia, the owner of the famous 'Il Casolare' caseificio in Alvignano (Province of Caserta) where many of the scenes were filmed, noted that

I enthusiastically joined this initiative aimed at enhancing the flagship product of our land, the Mozzarella di Bufala Campana PDO, a cheese that I have always made with the same passion for over twenty-five years, thanks to the teaching and guidance of my father, Benito. I am delighted because the film also promotes the beauty of this landscape, which is relatively unknown, and to acknowledge the companies involved (d'Avanzano, 2015).

Biagio Izzo has recently produced a theatre play (in which he was one of the protagonists) called 'I fiori di latte' that explicitly focuses on the relationship between the Land of Fires phenomenon and the mozzarella production. The title also refers to the mozzarella cheese made from cow milk, which is called 'fior di latte'. The story is placed somewhere in Campania in the fictional town of Casal Di Sotto Scalo where two cousins are one step away from opening the 'Fiori di latte' dairy. They plan to produce organic mozzarella cheese in a traditional way. The idea of the cousins is excellent: it is a mixture of technical innovation, attractive design (the bitten mozzarella is similar to the famous Apple logo) and the traditional flavours and production methods.[79] The cousins would like to sell the most famous product of this seemingly bucolic landscape when they discover that the land where

[79] Organic livestock farming is claimed as 'a non-abolitionist response' to intensive farming. It is also argued that organic farming has the advantage of restoring the connection between rural agricultural landscapes, local communities and animals that have become separated by industrial farming (Neo and Emel, 2017).

Figure 38. Paola Paesano's painting exhibited in the town hall of Cancello ed Arnone during the Mozzarella Festival in 2018
(photograph by the author)

their buffaloes graze hides bins containing suspicious substances that might have caused the death of some of their animals, and there are some worrying cases of poisoning human consumers, too. The two cousins find themselves in a difficult situation: report the problem before they even start their business or keep working? Although this play deals with a current and 'burning' issue, the mix of comedy and social reflection was generally well-received by the local community and the mozzarella producing sector. However, some other comedy films and plays dealing with the Land of Fires phenomenon did not have such a positive reception.

Just after completing my fieldwork in Campania and moving to Canada to start my

research visit in January 2019, I read about the controversies of a new comedy called 'Non ci resta che il crimine' (We Have Nothing Left but Crime). The brief conflict between the film producers and the representatives of the mozzarella industry has been well-documented in Italian newspapers. The particular issue that has upset the mozzarella producers was about a joke of a character played by Marco Giallini. In one of the scenes in the movie, Giallini said that *"we are ruined. We need to sell the contaminated mozzarella from Caserta."* In response to this joke, Domenico Raimondo, the current President of the PDO Mozzarella Consortium and the owner of a mozzarella dairy (Caseificio Mail) in Battipaglia in the Province of Salerno argued that

[n]o Mozzarella di Bufala Campana PDO cheese has ever been contaminated, not even in the most challenging periods, which fortunately are behind us. Nowadays, consumers love buffalo mozzarella as in 2018 we reached a historical production record with over 50 million kg of mozzarella produced. This offense is intolerable, and our appeal goes to the institutions of Campania for a collective mobilization against any attempt to cast shadows on this land. We are tired of such behaviour and will not tolerate them anymore. We will put forward our dignity and our pride in every instance. We demand respect from all (Corriere del Mezzogiorno, 14 January 2019).

This series of events took an interesting turn. Raffaele Ambrosca, the Mayor of Cancello ed Arnone (the buffalo capital in Terra dei Mazzoni), invited the director and the cast of Non ci resta che il crimine to the 42nd 'Festa della Mozzarella' (Mozzarella Festival; **Figure 38**) after the controversial phrase in the movie upset many mozzarella producers and the local population in mid-January 2019 **(Figure 39)**. The director, Massimiliano Bruno, has agreed to participate in one of the most important events of the mozzarella sector in the region to have his say and to prove that he is sensitive to the issue. A few days before the festival at the end of July, a town council meeting was attended by the mayor, the local buffalo

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«Chi offende la mozzarella, venga a mangiarla»

▸L'invito del sindaco Ambrosca agli attori protagonisti del film «Non ci resta che il crimine» finito nel mirino

CANCELLO ED ARNONE

Fabio Mencocco

«Venite alla festa della mozzarella, potrete assaggiare voi stessi la bontà del prodotto» con queste parole il sindaco di Cancello ed Arnone, Raffaele Ambrosca ha lanciato la «sfida» a produttori, regista e cast del film «Non ci resta che il crimine», di Massimiliano Bruno, che sta facendo parlare di sé non solo per il pienone nelle sale, ma anche per le polemiche che si registrano nell'area del casertano. Il tutto nasce da una frase citata nelle pellicola, in cui si viene detto «Siamo rovinati. Non ci resta che vendere la mozzarella contaminata di Caserta».

L'INIZIATIVA

Ed è proprio da questo spunto che Ambrosca, sindaco di uno dei paesi dell'area dei Mazzoni, zona fulcro dell'allevamento e produzione di mozzarella di bufala, ha voluto prendere carta e penna per invitare attori come Marco Giallini, Alessandro Gassman, Edoardo Leo e Gianmarco Tognazzi. «Voglio invitarvi alla 42sima edizione della festa della Mozzarella di bufala, cosicché possiate gustare la delicatezza, la bontà, la genuinità e la tracciabilità del nostro alimento simbolo, che ci rende orgogliosi e positivamente apprezzati in Italia e all'estero».

LA PELLICOLA

Parole di apprezzamento vengono spese sia per la qualità del film, ma anche per attori e produzioni, che vengono definiti come «sapienti maestri della comunicazione» a cui è lo stesso Ambrosca a rivolgersi però con rammarico: «Voi conoscete bene il danno che, a un comparto, può arrecare simile infondata e infelice battuta seppur proferita in un contesta artefatto quale quello cinematografico». Sono i deputati di M5s Marianna Iorio e Nicola Grimaldi a sottolineare come basti navigare sul sito del consorzio di tutela per «vedere come ci sia un impegno a 360 gradi per assicurare ai consumatori un prodotto genuino» il tutto accompagnato da una «normativa specifica in termini di sicurezza, che serve anche a garantire il prodotto Dop». «Magari - ipotizzano Grimaldi e Iorio - gli autori avranno provato un prodotto finto, magari uno non casertano, non italiano».

«SAREMO FELICI DI OSPITARVI ALLA 42SIMA EDIZIONE DELLA FESTA DEL PRODOTTO DOP»

IL PUNGOLO

Una sorta di provocazione rivolta a produzione e cast che «magari non hanno mai provato in vita loro una mozzarella degna di tale nome. Speriamo - concludono - che chi si occupa di arte, non incorra più in errori grossolani». Al coro di disappunto si unisce anche Antonio Papa sindaco di Santa Maria la Fossa, altro paese che con Grazzanise che fa parte della zona dei Mazzoni: «È sotto gli occhi di tutti che la produzione di mozzarella sia il fiore all'occhiello delle nostre terre, un vanto per le centinaia di produttori».

S. MARIA LA FOSSA

Anche Papa prende le difese dell'oro bianco, sottolineando come il comparto «sia apprezzato e riconosciuto a livello globale e non può essere sminuito in questo modo». «Il settore non è mai stato controllato come in questo momento», fa sapere Enrico Petrella, esponente del gruppo Senso Civico di Grazzanise che aggiunge: «La produzione di mozzarella di bufala è una delle grandi realtà. Le aziende continuano ad esportare il prodotto in tutto il mondo, nonostante non siano sempre supportati da un'adeguata politica». Un invito alla cautela nelle parole, viene riferito anche da Federico Conte a capo del gruppo Novi Orizzonti sempre di Grazzanise: «Prima di parlare a sproposito venissero ad assaggiare un alimento che è apprezzato da tutti e che inoltre rappresenta la cultura e l'identità di un intero popolo».

LO SCONTRO

Per una frase pronunciata nel film è scoppiata la «lite» fra la produzione e i sindaci dei Comuni noti per la mozzarella

Figure 39. An article published about the Mayor of Cancello ed Arnone inviting the actors and the director of 'We Have Nothing Left but Crime' to the annual Mozzarella Festival. The translation of the article title is 'Those who offend the mozzarella, come and taste it!'

breeders and mozzarella producers and the film director Bruno. The mozzarella producers offered Bruno to taste the local buffalo mozzarella and other local dishes (L'Espresso napoletano, 26 July 2019).

It might seem that the representatives of the 'mozzarella landscape' tried to avoid another economic crisis when they spoke up against the joke/accusation about the mozzarella from Caserta as 'contaminated.' However, I argue that the measures to protect local products go beyond the protection of local economies. Making jokes about local traditions, dishes and symbols of Campania (and of Southern Italy in general) is generally considered inappropriate, to say the least. In June 2019, RAI (the national broadcasting

service) made a documentary about the Neapolitan coffee, and some of the experts participating in the broadcast noted that the coffee in Naples had a 'rancid' aftertaste. Many Neapolitans have rejected the findings of the report. They have argued that the producers did not respect traditions, and the objective of the documentary must have been just developing a negative marketing campaign about the coffee of Naples. Not only coffee makers but the residents also claimed that Neapolitan coffee *"has always been done this way", "what you like has no flaws",* and *"we will nominate Neapolitan coffee for UNESCO protection"* (Clemente, 2019).

Securing local food products, such as the Mozzarella di Bufala Campana PDO, has been only one part of the story. Other products of the local agri-food sector, such as the San Marzano tomato, Neapolitan pizza or the wine products of Campania have also been mobilized to restore the reputation of *"the shapeless chaos of the hinterland"* (di Gennaro, 2015), referring to the area between Caserta and Naples. This part of the region was called 'Terra dei fuochi' (Land of Fires) in 2003 for the first time by Peppe Ruggiero (the co-author of 'Biutiful Cauntri', a 2007 documentary film on the waste crisis in Campania) in the Rapporto Ecomafie periodical of the Legambiente organization.[80] Although the expression has been instrumental in catching the attention of political decision-makers and in emphasizing the gravity of the problem, it has also created negative and sometimes superficial media attention that has temporarily hit the sales of local agricultural products. As I have mentioned above in this section, the Treccani Dictionary now includes Land of Fires as one of its entries (di Gennaro, 2015). The entry starts with the following sentence to explain what Land of Fires is:

A vast area of rural origin, but now widely urbanized, between Naples and Caserta, characterized by the frequent presence of bonfires set by the Camorra clans to the heaps of

[80] Other movies have also dealt with the issue of Land of Fires. Most recently, Diego Olivares directed a movie called 'Veleno' (Poison; 2017). The story is about two brothers who try to keep their farming activities (including buffalo breeding) away from the poisoned lands, but local crime groups need their lands to expand their waste trafficking business.

illegally spilled toxic waste, with consequent dispersion in the air of highly harmful and polluting substances (di Gennaro, 2015).

To demonstrate that this part of Campania has a lot more to offer than some apocalyptic pictures in the newspapers about the waste crisis, Legambiente Campania also published a book titled 'Terra dei cuochi' (Land of Cooks) in Italian and English in 2015. Rosella Muroni, the National Director of Legambiente and Michele Buonomo, then President of Legambiente Campania wrote an introduction to the book:

The Land of Fires of the Campania Region produces, indeed, many high-quality products appreciated and requested all over the world. But Campania goes beyond just the Land of Fires, and it is the country of origin of the healthy and tasty Mediterranean diet based on high-quality products. It is the so-called Terra Felix (Happy Land) characterized by traditional products. […] For years rising columns of smoke have poisoned this land with deadly effects on the local environment and agriculture industry, source of traditional and regional delicacies; but in this region torn apart by blazing fires, live many honest farmers, both men and women, who struggle with gritted teeth against a crisis, that has casted (sic!) *a shadow on their land, by proudly supporting the production of well known "made in Italy" products* (Legambiente Campania, 2015:5).

Muroni and Buonomo continue that the various recipes collected in the Land of Cooks *"sow the seeds of a new healthy uncontaminated future"* (Legambiente Campania, 2015:5). The quotation at the beginning of the book unambiguously proposed food as a mediator between humans and the land [*"La più profonda relazione dell'uomo con la terra è rappresentata dal cibo"* (in English: *"Food represents humans' most profound relationship with the land"*); Legambiente, 2015:0].

6.5.3. Branding via the architectural heritage

Probably the two most iconic architectural sites of the area are the Royal Palace of Caserta (Reggia di Caserta) and the Royal Palace of Carditello (Reale tenuta di Carditello). The former is one of the largest royal residences in the world, and it is a UNESCO World Heritage Site since 1997. As part of the restoration of the territory and the consumer trust in its products, the headquarters of the PDO Mozzarella Consortium was moved to the Cavallerizze Regie, inside the prestigious Royal Castle of Caserta, and it was opened by

Figure 40. The Palace of Carditello
(photograph by the author)

Vincenzo De Luca, the President of Campania Region in 2016. Previously, the offices were in San Nicola La Strada, a southern suburb of Caserta.

The other site, the Royal Palace of Carditello (**Figure 40**), is a crucial reference point in the history of the mozzarella. Ferdinand IV of Bourbon built the palace as a hunting lodge in 1787, and when mozzarella became a widely consumed cheese product at the end of the 18th century, the Bourbon kings established an experimental cheese laboratory in Carditello (Thurmond and Thurmond, 2017). Even Goethe was impressed by the palace and its surroundings during his travel, and he recommended the readers to visit

to have a true idea of what vegetation is and why man tills the fields. The flax here is near to blossoming, and the wheat a span and a-half high. Around Caserta the land is perfectly level, the fields worked as clean and as fine as the beds of a garden. All of them are planted with poplars, and from tree to tree the vine spreads; and yet, notwithstanding this shade, the soil below produces the finest and most abundant crops possible. What will they be when the spring shall come in power! (Goethe, 16 March 1787)

After World War II, however, Carditello was abandoned. The palace and the surrounding area became symbolic because they represented socio-environmental struggles, criminal infiltration and the absence of the state authorities. Pietro Marcello's and Maurizio Braucci's movie (part documentary, part beast fable) titled 'Lost and Beautiful' ('Bella e Perduta' in Italian) was filmed partly in and around the Palace of Carditello. At the beginning of the movie, Marcello and Braucci focused on the life and work of Tommaso Cestrone, the 'Angel of Carditello' **(Figure 41)**. Tommaso dedicated his life to protect and preserve the palace on his own as a volunteer.

Tommaso Cestrone was an ordinary man fighting against losing the past that was

represented by the royal palace. And it is interesting that very often these fights for life and against pollution are fought by ordinary people. Women, shepherds, who are not ecologists or intellectuals, but they think about the future. They just defend life because they live in nature (interview with Maurizio Braucci, 17 November 2018).

Initially, Tommaso was the protagonist of the film, but unexpectedly, he died on Christmas Day in 2013. The next year, at the beginning of 2014, the state purchased the palace, and they started the restoration works, and now the restored palace in the Land of Fires represents the essence of the landscape (with its culture, history and economy). Carditello

Figure 41. A drawing of Tommaso Cestrone, the Angel of Carditello, on the wall of the Palace of Carditello
(photograph by the author)

is open once a week, and a not-for-profit group called Visiterre organizes guided tours in the area. Although the palace is a central element of the restoration of this landscape and the branding of local agricultural products, especially buffalo mozzarella cheese, this project is still at an early phase.

6.5.4. Branding the 'bufala'

We have seen that the landscape has been used to promote food, and local food products have been employed to recover the reputation of the landscape (from Land of Fires to Happy Land[81]). The PDO Mozzarella Consortium, however, claims that in the post-truth era, the notion of 'fake news' has a massive impact on (the sales and reputation of) the agri-food sector, including buffalo mozzarella production in Campania. In order to deal with this phenomenon, the Consortium launched its own magazine in 2018. The name of the magazine (Bufala News; **Figure 42**) reflects both the sector that it represents ('bufala' is the Italian equivalent of the female buffalo) and the struggle of the agri-food sector with 'fake news' (the other meaning of 'bufala' is lie, fake, untrue, hoax). The editor of the magazine, Lorenzo Iuliano, argues that their objective was to change the meaning of the term 'bufala'. According to the Consortium, the expression should no longer be the synonym of fake (news). According to Iuliano (2018), the purpose of 'Bufala News'[82] is to provide accurate and quality information on the Mozzarella di Bufala Campana PDO supply chain that is not merely a 'folkloristic' element but an economic driver of the Campania and Southern Italy and a part of its cultural heritage. This objective of the sector was emphasized by Pier Maria Saccani, the Director of the PDO Mozzarella Consortium, too. He argued that sometimes buffalo mozzarella might be perceived as "*small, typical [product], connected to*

[81] In Roman times, Campania was often called 'Terra Felix' (Happy Land).
[82] Over the past year, 12 issues of the Bufala News have been published. The articles of the magazine focus mainly on educational programs offered by the Consortium, international relations, recipes, the nutritional values of the mozzarella, the traceability system, food journalism and the emergence of fake news.

BUFALA news

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L'EDITORIALE

Più vero di una bufala

di Lorenzo Iuliano

Cari lettori, fare corretta informazione nel mondo dell'agroalimentare (specie se di qualità) è compito arduo e complesso. Nel food, più che in altri settori, il sensazionalismo del titolo a effetto prevale quasi sempre sulla riflessione. E poi la velocità imposta da internet e social alle notizie fa il resto, rendendo le doverose verifiche un esercizio d'altri tempi. Ma questa rivista, edita da un Consorzio di Tutela, il più grande e importante del Centro Sud Italia, nasce con un obiettivo chiaro: separare

Giovani, export e innovazione la "Road Map" verso il futuro della Mozzarella di Bufala Campana Dop

Il Presidente del Consorzio, Domenico Raimondo: "Le nostre sfide per rendere sempre più competitivo un comparto di eccellenza"

Nel 2018 il comparto della Mozzarella di Bufala Campana Dop spinge ese per impatto economico dei prodotti a indicazione di origine. Di fronte a questo scenario, gli obiettivi prioritari del Consorzio sono quattro, come spiega il presidente: "Innanzitutto interveniamo lavorare sulla formazione e sui giovani, che sono la nostra grande risorsa e scommessa, implementando le attività della Scuola nazionale di formazione, unica in Italia gestita da un Consorzio di Tutela; poi vogliamo far

Inoltre – prosegue Raimondo – bisogna incentivare l'uso della Mozzarella di Bufala Campana Dop in gastronomia, anche al fine di destagionalizzare i consumi, ancor oggi troppo sbilanciati verso i mesi più caldi. E ancora supportare l'internazionalizzazione delle nostre imprese, la cui dimensione è spesso troppo piccola per affrontare il mercato globale, e migliorare la logistica abbattendo i costi di trasporto

L'INTERVENTO

Un'occasione per costruire nuovi modelli di giornalismo

di Carlo Verna*

Una tumultuosa trasformazione investe ormai da tempo il mondo dell'informazione. La crescita delle piattaforme e l'esponenziale nascita di nuove iniziative determina opportunità e crea al contempo nuovi problemi. L'Ordine dei giornalisti sta provando a dare alcune risposte anche impegnandosi a disegnare una diversa modalità di accesso alla professione. E intanto valuta con

Figure 42. The first issue of Bufala News
(Source: Consorzio di Tutela Mozzarella di Bufala Campana DOP)

the territory, [that] represents small [economic] realities". Their objective is to change this perception and to demonstrate that they are not only 'folkloristic' elements of the region, but buffalo mozzarella production is *"typical and connected to the territory but with a strong economic value"* (interview with Pier Maria Saccani, 21 November 2018).

The Consortium also organized workshops for journalists in 2018 and 2019 on 'The economic impact of fake news on the agri-food sector' and 'Food and information, the challenge of quality'. It was a strong incentive initiated by the Consortium to spread knowledge on what Protected Designation of Origin means and to *" increase the value of our PDO and our trademark"* (interview with Pier Maria Saccani, 21 November 2018). The Consortium has highlighted that the Mozzarella di Bufala Campana PDO is connected not

only to a specific production area and **environmental conditions**, but it also involves traditional production methods and organoleptic characteristics. The Consortium guarantees consumers that PDO dairies *"are constantly monitored and analysed to ensure compliance with the specification and the high-quality standards of the product"* (Consortium, n.d.).

The package of the Mozzarella di Bufala Campana PDO is one of the key elements of the product branding **(Figure 43)**. The cheese has to be pre-packaged at the origin. It has to include the following indications: the trademark of the PDO Mozzarella Consortium, the PDO trademarks, the Mozzarella di Bufala Campana denomination, references to the

Figure 43. Freshly packed Mozzarella di Bufala Campana PDO at one of the dairies.
When the photo was taken the warranty seals were not placed over the knot yet.
(photograph by the author)

national (D.P.C.M. 10/5/93) and local regulations (Reg. CE n.1107/96) and the authorization number of the dairy (AUT. CONSORZIO TUTELA N. 000/00/0000). If the plastic package has the form of a knotted envelope, a warranty seal must be placed over the knot because mozzarella packaged without the seal could easily be replaced with a non-PDO mozzarella.

The Consortium also maintains a 'vigilant' campaign to find and report producers who use the PDO denominations and the logo of the Consortium on their cheese products without authorization, both in Italy and abroad. Recently, fake Mozzarella di Bufala Campana PDO has been found in Belgium and Japan. In the Japanese case, mozzarella cheese with the name of 'Mu Mozzarella Tokyo Dop' was withdrawn from the supermarket shelves. The Consortium discovered this fraudulent activity during a food fair in Tokyo. *"This safeguarding action is a first positive effect of the agreement*[83] *between Europe and Japan, confirms its value and testifies once again that our control system is at the forefront in the international field, thanks also to the supervisory action of the Consortium",* commented Luigi Polizzi, the manager of the Certified Quality and Protected Geographical Indications sector of the Ministry of Agricultural Policies (Consortium, 8 March 2019).

6.5.5. Branding the farm

The buffalo farms and the buffaloes themselves are at the core of the branding process. Buffalo farms are becoming more open and more accessible to the public. In the Province of Salerno, near the archaeological site of Paestum, Tenuta Vannulo has become a compulsory tourist stop between the Amalfi Coast and Paestum. The farm and the dairy gained international fame in 2008 when Vannulo's buffalo mozzarella was served at Barack Obama's (then United States Senator from Illinois) presidential nomination party (Cuomo, 2008). The buffalo farm has its own dairy, coffee shop and museum. The stalls where the animals are kept can also be visited as part of a self-guided tour. It is widely regarded as the

[83] The Economic Partnership Agreement between Japan and the European Union.

Figure 44. A buffalo using the massaging drum
(photograph by the author)

only buffalo farm in Campania where the movement of the buffaloes and their milking are automatically controlled with minimal human interactions. The farm looks like a very efficient factory.

If the buffaloes want to go from the resting area to the feeding area, they have to pass through the milking station. Unless they complete the required tasks, they cannot move to the other side of the stall where the fodder is served to the animals. Their movements are controlled from a 'tower' which is a first-floor office at the centre of the farm where you can easily observe each section in the stall. While the buffaloes are at the milking station, the system

also checks the health of the lactating animals. If there is anything out of ordinary, the buffalo is not let back to the herd. Instead, another door opens that leads to the 'sickbay'. The animals have to wait there until a farmworker or the veterinarian checks them. The animals seem well-fed, clean and healthy and some of them use the massaging drums.[84] *I was told that sometimes they even listen to classical music in the stall. However, I wonder how much the buffaloes appreciate this artificial environment, surrounded by concrete floor that is automatically washed, metal barriers, rubber beds and massaging drums (or brush rollers;* **Figure 44)**. *From an anthropocentric perspective, their lives are great – especially, compared to buffaloes living in less high-tech intensive farms. From the perspective of the buffalo, there is no pasture available where they could graze and there are no lakes or waterways where they could wallow. The original buffalo landscape has been replaced with high-tech solutions, and the buffaloes, as semi-anthropomorphized creatures, are to produce milk and live in an intensive farm, but at the same time, they get an upgrade to 'enjoy' some elements of human lives such as showers, massages and soft 'beds'* (fieldnotes, 5 February 2018).

After multiple socio-environmental crises (waste, dioxin and brucellosis) that had a substantial economic impact on the buffalo farming sector a decade ago, some of the farms had to decide either to close down or to diversify their activities. Some of them became more open to the general public. Michele Buonomo, the former President of Legambiente Campania, has noted that while previously, many of the buffalo farms were closed to the general public, nowadays, farmers *"offer possibilities for the citizens to visit the farms"* (interview with Michele Buonomo, 14 November 2018). Buonomo added that best control/transparency is done by *"the citizens"* themselves. Also, several educational farms ('fattoria didattica') started to operate in the region where school groups and tourists can even learn about farm life. One of the educational buffalo farms in the Province of Caserta is the one where I completed my internship (Ponterè). Besides Ponterè, four other buffalo

[84] A buffalo using the massaging drums: *https://ln2.sync.com/dl/c0e48ffd0/sv5z5a6w-b5af4xne-9k8xcyui-x4z6za6b*

farms function as educational farms in the PDO area, according to the Consortium.

6.5.6. The animal as a branding factor of the product

Animals living in farms are vital in the branding process. The involvement of the buffaloes in branding is not surprising, since they have been crucial in making this landscape, and the physical characteristics of the animals add to the uniqueness of the buffalo mozzarella cheese. Animals, especially charismatic animals or the ones that are 'closer' to humans, are

Figure 45. Morphological assessment of the buffaloes based on the ANASB guideline
(photograph by the author)

more likely to be used by marketers in branding (Brown, 2010). Branding with the animal is also linked to the concept of 'rendering' (Shukin, 2009), bringing them into a new form (Barua, 2019).

Within the buffalo farming sector in Campania, one of the main actors in the branding process is the National Association of Buffalo Species Breeders (ANASB) that was created in 1979, and it gained recognition from the Ministry of Agricultural and Forest Policies (MiPAAF) in 1993. The Ministry recognized both the Genealogical Book of the buffalo species and the Mediterranean Italian Buffalo breed in 2000. The aim of ANASB is the genetic improvement of the Mediterranean Italian buffalo with the use of the Genealogical Book, research, morphological evaluation **(Figure 45)** and dissemination. The Genealogical Book is becoming crucial in the production of the Mozzarella di Bufala Campana PDO cheese. According to a new regulation, farmers will have to register each buffalo on their farm in the Genealogical Book by 30 June 2020 to sell their milk as raw material to dairies that are involved in the production of the Mozzarella di Bufala Campana PDO. In addition, it has been proposed that the Mozzarella di Bufala Campana PDO should be made only from milk produced by water buffaloes that are not only part of the Italian Mediterranean Buffalo breed and included in the Genealogical Book, but also, they have been born inside the PDO area. Some of the stakeholders, including ANASB, have argued that regulating the origins of the buffaloes within the PDO area would be necessary because, over the past few decades, a large number of animals were imported from Eastern Europe. According to ANASB, this move has negatively affected the 'quality' of the animals in the area where the Mozzarella di Bufala Campana PDO is produced (fieldnotes, 4 December 2019).

ANASB and veterinary researchers have also created a sophisticated evaluation method for buffalo farmers to select the best buffaloes for reproduction (IBMI: 'Indice di Selezione aggregato per la Bufala Mediterranea Italiana' or Aggregate Selection Index for the Italian Mediterranean Buffalo).[85] This included the estimation of the annual milk yield

[85] ANASB morphological assessment video: *https://ln2.sync.com/dl/98a2cafco/wd2gwraq-fydcb8pc-w5xvd283-y5ijju95c*

of the animals and their various physical characteristics such as heel and chest height, the shape of teats and the direction of teats (field observation, 29 November 2018). Biffani et al. (2018) note that ANASB already had a system for the evaluation of the animals, but this index was based only on the estimated kg of mozzarella produced (PKM), more specifically the fat and protein in the milk and the milk yield. The new selection index (IBMI), however, considers not only the productivity of the buffaloes (high milk yield) but their ability to tolerate the intensive farming environments long-term (fieldnotes, ANASB meeting in Priverno, 4 December 2019).

When I started visiting buffalo farms in Campania, I noticed that some of the animals had white patches on their heads and their tails (**Figure 46**; fieldnotes, 5 February

Figure 46. Gaetano (one of the staff members of the Consortium) and a buffalo cow (with white patch) on a farm near Paestum
(photograph by the author)

2018). The unusual patterns made those animals more visible among the completely black buffaloes in the stalls. A few months later, while I was doing my internship on a buffalo farm, my co-workers told me that the buffaloes with white patches on their heads ['à capa ianca' (=white head) in Neapolitan dialect] were considered unique in the past, and better than the average black buffaloes in terms of milk yield (personal communication with Vincenzo V. buffalo farmer, October 2018). According to ANASB, the Italian Mediterranean buffalo may have white hair on the front, and the tail flake and the white areas may expand onto one or more limbs (ANASB, n.d.). Although the morphological description of ANASB does not 'forbid' the breeding of 'à capa ianca', farmers do not keep male buffaloes with white patches for reproduction anymore (personal communication with Nicola Cecere buffalo farmer, October 2018). As I have mentioned in the previous chapters, buffalo meat is rarely consumed in Campania, and only a few male buffalo calves are kept on the farms for reproduction. A newborn male buffalo with white patches does not have the chance to live longer than a couple of days. Of course, the exclusion of buffaloes with white spots on their heads will be slow, but the aim (of the stakeholders) is to create the image of a more homogenous, 'charismatic' animal (the black buffalo) that represents the landscape. For example, some types of bodily mutilations, such as tail docking and dehorning, are less common in the buffalo farming sector in Campania than in livestock farming in general. Buffaloes with large horns are valued from an aesthetic perspective among buffalo farmers.

During the first week of my internship [at the end of September]*, the weather was rather warm and dry. In the morning, when the first group of lactating buffaloes entered the milking parlour, they also brought a lot of flies with them* **(Figure 47)**. *Then, with each turn, more and more flies were inside the milking parlour. When the situation became almost unbearable, Vincenzo switched on the old ceiling fan, and then it felt that slow movement of the air slightly reduced the attacks of the flies. I thought about the buffaloes: luckily, their tails are not docked in Campania, and they can use them to slap flying insects away while grazing on the pasture* (fieldnotes, 2 October 2018).

Figure 47. Flies on the nose of a buffalo at Ponterè
(photograph by the author)

The concept of animal charisma has rarely been addressed within the context of industrial livestock farming. Human geography scholarship on animal charisma mainly focuses on wildlife (Lorimer, 2007; Dempsey, 2010; Barua, 2016). Lorimer (2007) argues that human relationships to animals are influenced by the qualities of the animals (their cuteness, media representations, etc.). Pandas, lions, elephants often represent regions and countries, and they mobilize fundraising for conservation agencies. More recently, however, farmed animals have also become parts of the branding processes. Piedmontese cattle in Northern Italy (Colombino and Giaccaria, 2016), mangalitsa pig in Hungary or the Italian water buffalo in Campania are some of the finest examples of linking 'characteristic'

farmed animals to specific landscapes in branding processes. Water buffaloes have historically been considered very 'charismatic' in this landscape. Artists and writers participating in the Grand Tour in the 17th and 18th century noted the presence of buffaloes. In 1787 Johann Wolfgang Goethe travelled across Campania, along the *"rough and muddy roads toward some beautifully formed mountains",* and he noted that *"we crossed brooks and flooded places and came upon buffalo that looked like hippopotami"* (Williams, 2003).

As Bruckner et al. (2019) note in their investigation on 'happy meat', the concept of animal charisma helps to analyse relationships between humans and farmed animals, but the nonhuman charisma has its limitations. When animals can graze on the pastures most of the time (like in Ponterè), or they are kept in a high-tech and spotless environment (like at Vannulo) where the public can encounter these animals, the 'charisma' of these animals is perceived stronger. However, there are other moments in the lives of these animals (e.g., artificial insemination; female buffaloes being separated from their newborn calves; ear tagging animals and placing chips inside their bodies) where humans, or more specifically consumers, connect to them in a very different way.

6.6. Conclusion

In this chapter, I have analysed how branding contributes to the securitization of the 'mozzarella landscape', and how the landscape and the buffalo are incorporated in branding processes. I have explored how humans and nonhumans, including water buffaloes, have co-created the productive landscape of the mozzarella in Campania. The environmental conditions of the earlier, pre-reclamation landscape and buffalo farming activities are strongly linked. The marshlands provided perfect conditions for the water buffaloes in the coastal areas of Campania. Although the bucolic marshland environment does not exist anymore, buffalo mozzarella producers still (and increasingly) use the image of the traditional landscape and the local cultural-historical heritage to brand the product. Also, buffalo mozzarella and the international fame of the cheese have been mobilized to

re-brand the landscape: to move away from the apocalyptic images of the Terra dei fuochi (in English: Land of Fires) to the tourist alluring Terra dei cuochi (in English: Land of Cooks; Legambiente Campania, 2015).

In this process of strengthening and extending the market of the Mozzarella di Bufala Campana PDO, multiple processes and practices are involved in its branding. Although buffalo mozzarella can be produced in many other places, local traditions, know-how and connections to "*trusted agents of certification and assurance"* (Ibert et al., 2019:45) are emphasized to secure value production and make this product more visible in the crowd. Food product labelling is an important element of branding. At the same time, these quality food labels allow control over the food production processes as well (Dias and Mendes, 2018). The branding of the mozzarella and the landscape have involved various, less formal practices, including the involvement of celebrities, scientific journalism and art and literature. The renovation and the use of historical buildings of the area, such as the Royal Palace of Caserta and the Royal Palace of Carditello have been significant in reconnecting the Mozzarella di Bufala Campana PDO and the landscape. The reappropriation of these symbolic buildings has been essential in emphasizing the connection between the mozzarella and the historical–cultural landscape.

Branding has been mobilized not only in its discursive and symbolic forms, but it has involved various material practices. For example, buffalo farms have been at the core of the branding process. Many farms have opened their doors to the public over the past few years. To some extent, this has been part of the demonstration of the sector as being transparent and reliable in the food chain. In addition, high-quality agri-food production and (extensive) animal farming embedded in particular landscapes can potentially have key roles in the 'material' conservation of those landscapes as well (e.g., protecting natural resources; reducing soil erosion, deforestation and desertification; preserving biodiversity, including indigenous breeds and native pasture; Licitra, 2017).

The value-producing animal, the water buffalo, is an essential part of the branding process. Regulations, research (on the nutritional qualities of the buffalo mozzarella cheese

and buffalo meat) and marketing campaigns have made efforts to distinguish dairy water buffaloes and their products from dairy cows and their products (see **Figure 9** on page 68). Recently, stricter regulations have brought the issues of the origin and the genetic features of the animal to the forefront. For example, farmers have to certify that their buffaloes are Italian Mediterranean Buffalo breed (razza di bufalo 'Mediterranea Italiana') if they would like to sell buffalo milk to PDO-certified mozzarella dairies. Also, buffaloes are increasingly selected based on their genetic features (e.g., the use of the IBMI selection index).

To conclude, these findings have demonstrated that branding is a key element of the securitization of value production in the 'mozzarella landscape', and as sign value, branding can also obtain symbolic rents. The examples summarized above have shown that branding includes symbolic elements, discourses and material practices as well. It has had profound (direct and indirect) material consequences on animal lives and the landscape. Branding is not only *„a performative process whose effect is to make a commodity authentic"* (Ermann and Hermanik, 2018:4), but it can alter nonhuman lives and the non-living environment associated with the product.

Chapter 7. Conclusion

7.1. Introduction

This PhD thesis has investigated how and to what extent do the processes of securitization and subsumption in the dairy farming sector contribute to more rigorous control over animal bodies, and interfere in their bodies and lives for more efficient value production in the 'mozzarella landscape' in Italy. My objective has been to connect the notions of securitization and value production at theoretical and empirical levels as well. In order to examine and to explain why these notions are linked, I have focused on how regulatory mechanisms, cultural and historical issues as well as physical characteristics and physical limitations of the landscape, contribute to the transformation of animal lives and bodies. In order to argue that value production and securitization are linked, I have engaged with a number of concepts, such as animal labour, the real subsumption of nature, biosecurity, branding and the landscape. However, the body of the buffalo has remained the main focus of my analysis. Keeping the body of the buffalo as the central theme of my research has been a suitable perspective to analyse how large-scale political–economic processes affect individual bodies. Also, it has provided me with the possibility to investigate how bodily processes affect various macro-level processes, such as the expansion of the export market of the mozzarella cheese.

The project was based on empirical research conducted in Campania region between 2017 and 2019. The methods used have included detailed analysis of text sources, such as local, national and international newspapers, magazines, government and industry reports, in-depth and expert interviews, photography and video methods. I also conducted participant and direct observation during my internship on a buffalo farm in September and October 2018.

Throughout the previous six chapters of this thesis, I have uncovered the processes of securitization and value production in the 'mozzarella landscape', with a particular focus

on the body of the buffalo. In the three empirical chapters (Chapters 4,5 and 6), I have demonstrated how the various measures to secure and subsume more-than-human value production use and modify animal bodies and lives and affect human–animal relations. I have investigated both the material and discursive/symbolic aspects of the securitization of the 'mozzarella landscape'.

In this chapter, I re-emphasize some of the key arguments of the thesis (7.2). Then, I review the contribution of this research to theory (7.3). In the subsequent section (7.4), I discuss the limitations of this project and the questions that my research has raised. These questions will also direct my future research plans. In the concluding remarks (7.5), I consider the future of the 'mozzarella landscape'.

7.2. Summary of main arguments, key contributions and theoretical implications

While investigating the securitization and subsumption of value production in the 'mozzarella landscape' through making connections between the abstract concepts and the day to day relations between humans and farmed animals (and how the lives of the animals and their bodies are used within intensive farming conditions), I have made three key arguments:

7.2.1. Subsuming more-than-human value production

I have uncovered how the seasonal milk supply, the strict regulations of the Mozzarella di Bufala Campana PDO production, and the seasonal market demand for the mozzarella cheese made necessary the intervention in the seasonal reproductive cycles of the buffaloes through deseasonalization. Over the last decade, the traceability system, biosecurity

measures (discussed in Chapter 5), and consequently, the general increase of the milk price have made farmers more interested in managing animal reproduction activities.

In addition to the seasonal patterns of buffalo reproduction, my research has emphasized the consequences of the udder morphology of the buffaloes on the milking process and the intensification of buffalo farming. In the past, the pre-milking stimulation of the lactating buffaloes was attained through the presence of calves. Nowadays, however, using calves during the milking process in industrial farms is not possible anymore, and some of the animals have to be injected with exogenous oxytocin.

I have pointed out that the seasonal reproduction of the buffaloes and the udder morphology of the animals have meant significant impediments for the industrialization of the buffalo mozzarella production. Circumventing the reproductive and milk ejection processes of the buffaloes have been crucial for intensifying and optimizing milk production for the just-in-time and seasonal mozzarella market.

I have argued that deseasonalization and the use of oxytocin injections on lactating buffaloes function as environmental fixes or accumulation strategies in which nature is increasingly subsumed by capital. These efforts have been made not only to 'improve' the value production of the buffalo cows and to conform regulations but also to satisfy the seasonal consumer demand for mozzarella. I have argued that the deseasonalization of water buffaloes in Southern Italy is a particular mode of the real subsumption of nature. Deseasonalizing buffaloes was a response to a variety of issues: 1. Meeting consumer demand and providing more fresh milk when mozzarella consumption is higher; 2. Indirectly fulfilling regulatory requirements and consumer expectations related traditional and fresh products; 3. Stricter control after various socio-environmental crises in the sector. In addition, the use of oxytocin injections in intensive farms meant a faster milking process and higher milk yield. Deseasonalization and the use of exogenous oxytocin are not without negative consequences. Buffaloes repeatedly injected with oxytocin might become 'dependent' on this hormone, and their fertility rate might also be reduced.

Breeding animals outside of their regular breeding season to get higher milk yield at the right time to satisfy consumer demand goes against the underlying logic of sustainable, local and seasonal food production. Mozzarella di Bufala Campana with the PDO label is one of the prime examples of traditional, local food products in Europe. Nevertheless, buffaloes are usually bred in industrial farms, they are fed with a mixed diet, and they are forced to reproduce outside of their breeding season. Thus, consumers are not affected by the 'traditional' seasonal variations of the buffalo milk supply, and they can get fresh mozzarella whenever they like.

Nevertheless, the importance of managing the reproductive capacities of animals has restored (at least partially) the farming sector. It has also given more powerful positions to farmers in decision-making processes in the 'mozzarella landscape', especially after the introduction of the traceability system in 2014. The strict rules and the higher milk prices, however, also increased the production costs for the mozzarella, in addition to the rather high price tag of shipping this cheese to the international market. These issues have contributed to debates between the dairies and the farmers concerning the future of the Mozzarella di Bufala Campana PDO.

I have also uncovered why frozen mozzarella was proposed to be labelled as a PDO product at the Assembly of the PDO Mozzarella Consortium in 2017. According to the Consortium, the frozen mozzarella would significantly lower the transportation costs of the cheese, and this would keep the Mozzarella di Bufala Campana PDO competitive in the international market. Many of the farmers did not support this initiative because the introduction of frozen mozzarella as a PDO product would probably negatively affect their revenues, and it would compromise the value of the mozzarella as a traditional product.

Finally, my findings have also confirmed the link between the seasonal reproduction of the buffaloes (i.e., the seasonal variations of milk production) and the proposal regarding the introduction of the frozen Mozzarella di Bufala Campana as a PDO product. Some of the stakeholders have also argued that it would be necessary to lift the 60-hour limitation as the maximum storage time of the milk, because it is too difficult to guarantee (in terms

of food quality) for buffalo breeders and mozzarella producers (Pignataro, 2015). However, farmers are concerned that if the 60-hour limitation is compromised in any way (even in the form of frozen mozzarella as the final product), the price of the buffalo milk will decrease again, after a steady rise over the past few years since the introduction of the traceability system in 2014.

7.2.2. Immunizing quality agricultural food production

In Chapter 5, I have investigated how food safety concerns and scares as well as immunitary reactions to safety and quality issues in the agri-food sector have transformed the 'mozzarella landscape' in Campania. My objective has been to examine how the lives of the animals have been affected by various securitization processes. In addition, I have made efforts to theorize the securitization of agri-food co-production from a less anthropocentric perspective.

I have argued that biosecurity measures, including the introduction of the traceability systems, have been crucial in the immunization of the 'mozzarella landscape'. I have paid specific attention to the various ways in which the lives and bodies of the animals are affected by the applied immunitary interventions. I have also analysed how the potential responses to the conflicts between market demand, the strict regulations regarding the geographical origin of the Mozzarella di Bufala Campana PDO and environmental concerns about intensive farming might affect not only the future of mozzarella cheese production, but the lives of the milk-producing buffaloes as well.

I have examined in detail the effects of the dioxin and waste crises on agri-food production in Campania. I have pointed out that the high level of heterogeneity of the resistance groups in the region, the complexity of the problem, the lack of clarity about the socio-environmental conditions and the lack of interventions by state actors have resulted in often unjustified and unscientific claims, such as all the lands are 'contaminated', and food produced in the area is 'all dangerous' by the news media (Cembalo et al., 2019).

Agricultural producers accused local activists for causing confusion in the area and damaging farmers' reputation. These debates have also contributed to the intensification of the post-truth phenomenon within the context of socio-environmental struggles in Campania.

Nevertheless, as I have noted, the Mozzarella di Bufala Campana PDO has been mobilized as a 'boundary object' (Star, 2010; Lieto, 2017), and defending the 'White Gold of Campania' has facilitated *"collaboration without consensus"* (Clarke and Star, 2008:222) between different interest groups. As a crucial part of this collaboration, the regional and national governments, trade unions and research institutes have developed sophisticated control systems to contain infectious diseases, to protect uncorrupted producers, and to guarantee food quality and safety. I have also pointed out that over the past few years, biosecurity and traceability have become key elements in the local/regional political-ecological debates and in the immunization of the 'mozzarella landscape'. The veterinary profession has been crucial in the processes of 'securing' factory farms and the agri-food sector, and these processes have also raised the profile of the veterinarians in the 'mozzarella landscape'.

I have discussed in detail how various biosecurity measures have been deployed in the buffalo farming sector in Campania. Apart from immunizing the dairy farms, scholars in biosciences, buffalo farmers and societies representing the interests of the stakeholders in the mozzarella sector are working towards *"producing new ways of harnessing non-human capacities"* (Johnson, 2017:285) of the buffaloes to improve their efficiency and reliability (e.g., the ANASB selection index).

A formal traceability system was established in 2014 to provide better control over buffalo breeding, as well as milk and cheese production. I have pointed out that traceability systems can function as branding/labelling devices as well, to protect brands and detect frauds. I have pointed out that this helps customers choose between imported and local, and PDO and non-PDO products. The primary aim of this system has been to immunize the mozzarella sector and to provide equal opportunities to the stakeholders. In addition,

the securitization of the circulation of buffalo milk through the traceability system has had profound effects on the political debates and the conditions of animals in the 'mozzarella landscape'. To put it differently, the traceability system developed by IZSM is supposed to ensure that only fresh buffalo milk is used for the production of the Mozzarella di Bufala Campana PDO, and to exclude unauthorized or 'dishonest' farmers and mozzarella makers from the PDO network. Although the participation in and data provision to the traceability system is compulsory for every stakeholder, there was some initial resistance from the dairies. Still, most buffalo farmers in the area have considered the introduction of these measures as positive changes.

I have pointed out that the introduction of the traceability system has had a notable side effect on the conditions of male buffaloes. In general, male animals have very low or no value in the specialized dairy and egg industries. In the mozzarella sector in Campania, male buffaloes do not represent productive value, except for some that are selected for reproductive purposes. In the past, surplus male animals were usually killed after their birth. Nowadays, the newborn calves have to be registered to the health authorities (Asl) with a 'smart card'. Some argue that the traceability system provides an additional level of control over the lives of the buffaloes. For example, the slaughtering of the male calves, as surplus animals, have become more regulated. Still, most of them are slaughtered at a very young age because the buffalo meat market is struggling to expand.

Finally, I have focused on how increasing food production and the intensification of the industry have affected the socio-environmental conditions in the PDO area. Recent reports have shown that the exponential growth of production of the Mozzarella di Bufala Campana PDO and some other PDO 'Made in Italy' products, due to the popularity of these flagship products has negatively impacted the landscape where they have been produced. The growing number and the increasing size of the farms, the intensification of the sector impact the environment and pollute the air, the water and the soil in various ways. The growth of the buffalo farming sector, the increasing national and international demand for buffalo mozzarella, and the strict regulations in the production of the Mozzarella di Bufala Campana PDO have resulted in the 'overproduction' of animals in the PDO area. This

overproduction can cause land erosion, pollution and a further transformation of the 'original landscape'.

7.2.3. Branding

I have analysed the branding of the Mozzarella di Bufala Campana PDO as a product of the landscape and the animal. I have pointed out that despite the radical transformation of the original landscape over the last century, buffalo mozzarella producers still (and increasingly) use the image of the traditional landscape and the local cultural-historical heritage to brand the product. In addition, the product and its international fame have been mobilized to re-brand the landscape: to move away from the apocalyptic images of the Terra dei fuochi (in English: Land of Fires) to the Terra dei cuochi (in English: Land of Cooks; Legambiente Campania, 2015). Nowadays, branding the Mozzarella di Bufala Campana PDO has become one of the principal ways to reconnect the product with the landscape and the water buffaloes. In addition, I have argued that branding functions as a particular way to secure the productive landscape of the mozzarella cheese. In this case, it has reconnected the product and the place (the productive landscape of the mozzarella), and it has served *"the purpose of reassuring consumers that what they buy will not surprise them"* (Ermann and Hermanik 2018:3), as part of the broader securitization efforts in the agri-food sector in Campania.

Although the original landscape that was co-produced by humans and animals does not exist anymore, the branding of the Mozzarella di Bufala Campana PDO cheese works as *"a performative process whose effect is to make a commodity authentic"* (Ermann and Hermanik, 2018:4). On the one hand, branding focused on abstraction and simplification. Instead of the socio-ecological conflicts in the Province of Caserta and the environmental costs of intensive animal farming, the traditional elements of the product were emphasized in the branding process. On the other hand, branding created connections between the final product, the historical-cultural landscape and the value-producing animals. In

Campania, branding functions as a way to (re)produce (the image of) the more-than-human landscape. This idealized 'mozzarella landscape', however, is rather anthropocentric. The water buffalo is only *"an element in the landscape"* (Bennett, 1960:14) that is used in the branding of the product, but the co-producer status of the animal is not recognized.

I have demonstrated that water buffaloes are also part of the branding processes. Both regulations, research (on the nutritional qualities of the buffalo mozzarella cheese and buffalo meat) and marketing campaigns aim to distinguish dairy water buffaloes and their products from dairy cows and their products. In addition, historical sources and current projects are used to make buffaloes more distinct in Campania. Branding via the animal body is not solely a marketing technique, but regulations and scientific research also support it. Recently, stricter requirements for the production of buffalo milk and buffalo mozzarella have brought the issues of the origin and the genetic features of the animal to the forefront. From July 2020, milk for the production of the Mozzarella di Bufala Campana PDO has to be produced by water buffaloes that have been born in the PDO area. Farmers also have to certify that their buffaloes are the Italian Mediterranean Buffalo breed.

I have argued that branding partially recreated the connection between the product, the landscape and the value-producing animal. Despite developing a connection between the product, the landscape and the value-producing animal, branding the Mozzarella di Bufala Campana PDO did not reveal properly the role that the water buffalo had played in co-producing the 'mozzarella landscape'. Linking the product and the landscape also hides the fact that the traditional landscape does not exist anymore. I have pointed out that modern food production has radically transformed *"both the physical and social landscapes with which it was once so closely connected"* (Dickson-Hoyle and Reenberg, 2009:106).

7.3. Contribution to theory

The empirical findings of this research provide a number of valuable theoretical insights. First, the empirics explored in Chapter 4 have illustrated how deseasonalization and exogenous oxytocin injections have functioned as real subsumption of nature in the mozzarella economy. My research has explored why and how animal bodies and lives are subjected to various interventions in order to maximize their capacity to produce value. Early literature on the real subsumption of nature (e.g., Boyd, 2001; Boyd et al., 2001, Prudham, 2003) suggested that under the conditions of the real subsumption, the transformation of natural production is used *"as source of productivity increase"* (Boyd et al., 2001:557). More recently, scholars have focused on extending the scope of the real subsumption of nature and include the absolute and relative surplus value (Banoub, 2018), or a regulatory framework (Cooper, 2017). My empirical findings of the deseasonalization of buffalo reproduction suggest that the real subsumption of nature in buffalo farming and mozzarella production cannot be described simply as a technological initiative to increase the productivity of nature. Regulations, increasing control, and place-specific cultural–historical elements (that can influence the seasonality of consumer demand for a product) have been crucial bases to increasingly subsume nature by capitalist money and science. These findings have also illustrated how the real and formal subsumption coexist in the globalizing agri-food sector. Hardt and Negri (2009) argue that the reciprocal movement from the real to the formal subsumption of nature does not mean that new 'outsides' of the capital are produced (e.g., frozen mozzarella as a PDO product would only represent a subdivision, not a new 'outside' in the mozzarella economy, that would provide an affordable supply of mozzarella to the hospitality sector overseas).

Controversially, in the long-term, these interventions could negatively affect the productivity of nature, but from the perspective of human producers and owners, optimizing value production according to market demand is crucial to improve and maintain the economic security of the agri-food landscapes. In the case of traditional food products (e.g., PDO), regulations (e.g., the product has to be fresh, milk cannot be stored

in a frozen form) also play key roles in decisions. These insights highlight that more research is needed to understand how regulations, consumer choices and cultural–historical issues influence the real subsumption of nature.

Second, my research findings about the immunization of the 'mozzarella landscape' have revealed how human and nonhuman actors, living and non-living elements have been caught between market forces and security tensions. Drawing on Roberto Esposito's concept of immunitary mechanism, I have uncovered how the immunitary reactions to food quality and safety issues have secured the 'mozzarella landscape' via biosecurity and traceability mechanisms. The securitization of the agri-food sector in Campania shows that this instrument can be successful in separating the *"other from the self"* (Grove, 2014:251) through regulations and strict control. Although nonhumans, including animals (under coercion, in many cases) are critical elements of the securitization of the agri-food sector, the measures are anthropocentric, the wellbeing of the animals (beyond food safety requirements and not properly enforced animal welfare laws) is rarely a matter of concern. Instead, the securitization of the 'mozzarella landscape' aims to maintain *"rigorously ordered"* and *"purely human biosocial worlds"* (Blanchette, 2015:645). In addition, I have pointed out that while the securitization of agri-food landscapes involves various mechanisms, institutions and discourses (Dixon, 2015), it is concerned about securing only the productive elements of the landscape, and not the landscape as a whole.

I have also demonstrated that securitization in livestock farming can lead to further subsumption in the sector. First, the strict control enhances the real subsumption over the biological processes of the value-producing animals. Second, the securitization of the agri-food sector results in the added optimization of the productive landscape (e.g., increase of the farm size and animals being kept in close confinement inside the stalls), that can generate various autoimmunitary reactions (e.g., infectious diseases; higher environmental impact of larger farms). To conclude, the empirics presented here have shown the connection between securitization and value production (traceability and deseasonalization).

Third, the empirical findings presented in Chapter 6 have demonstrated that the branding of the Mozzarella di Bufala Campana PDO includes humans, animals and other nonhuman lives and the non-living elements. Branding can operate as a form of securitization of value production. Branding can make certain products more visible in the crowd, and it can create a surplus (the price premium) as monopoly rent. For instance, quality labels allow control over the food production process (Dias and Mendes, 2018). I have also pointed out that branding is not only a discursive/symbolic, but a socio-material process, too. It also has material consequences that affect animal lives in unequal ways (e.g., strict regulations about the genetic features of the Italian Mediterranean Buffalo). Branding as a form of securitization can also alter nonhuman lives and the non-living environment that are associated with the product.

To conclude this section, I argue that the main contribution of this thesis to theory is providing a number of connections between the concepts of securitization and value production in animal geography and political ecology through the investigation of the transformation of the 'mozzarella landscape' by focusing on the notions of biosecurity, traceability, branding and the real subsumption of nature while keeping the body of the buffalo the central theme of the analysis. The securitization of buffalo farming and mozzarella production has indirectly made the cyclic reproductive activities of buffaloes a critical element of the political debates that can limit or enhance the globalization of the 'White Gold of Campania'.

7.4. Limitations and future perspectives for research

My research on securing and subsuming more-than-human value production in the 'mozzarella landscape' in Campania is inevitably partial. There are a number of relevant issues that I could not explore and include in this thesis. However, the amount of data that I have collected, recent development of events in the sector, and the diversity of issues that I have tackled in this research open up several potential future avenues of research.

At the practical level, it will be essential to monitor how the introduction of a stable, annual price for the milk (instead of the different winter and summer prices) might affect the management of the reproduction of the buffaloes. Although the market demand for the mozzarella cheese is still higher in the summer than in winter, the product has become very popular both in Italy and abroad so that the high demand has eliminated the winter milk surplus. As I discussed in Chapter 4, keeping the buffaloes deseasonalized requires more management, and in the long-term, it can decrease the productivity of the animals. Therefore, deseasonalization costs money for farmers. In the long-term, the control of the buffalo reproduction might change due to the increasing annual demand for the mozzarella cheese.

As I have demonstrated, the linked economies of buffalo farming and mozzarella production are 'just-in-time' systems. Under proper management and ideal external conditions, they provide increasing profits for the farmers and dairy owners. However, the stringent regulations for the production of the Mozzarella di Bufala Campana PDO make the whole system vulnerable to any unexpected events that might decrease the demand for the mozzarella or slow down transportation to the export markets. The recent COVID-19 health emergency has had this effect: pizzerias and restaurants have closed, and the radical reduction of international flights has diminished the export opportunities for the cheese producers. The decision of the PDO Mozzarella Consortium of suspending the 60-hour limitation for storing milk due to the low demand for the mozzarella cheese is unprecedented. The next few months will be critical for this strictly regulated production and market.

Nevertheless, the current situation shows the vulnerability of the agricultural and agri-food systems that depend on fast transportation [e.g., the Kenyan flower business is dying due to the effects of the current (May 2020) lockdown in Europe and the radical reduction of flights between Europe and Kenya]. Also, the European Union Nitrate Directive and the increase of vulnerable areas to nitrate in Campania can potentially impact buffalo farming and mozzarella production in the region (Chapter 5). From a more general perspective, more analysis is needed on how the rapidly increasing global demand for high-

quality or 'elite' agricultural products is putting environmental pressure on traditional productive landscapes and creates tensions among local groups, global and local interests, and to understand, in order to address those problems, at what level we should design various policies (local, national, European Union or even global levels).

Although my research has included human participants and 'stakeholders' in the 'mozzarella landscape', the main focus has been the animals. The farmers, veterinarians and farmworkers and their relationships with the animals have also been discussed in detail. The majority of the farmworkers on the buffalo farms in Campania, however, are immigrants from South Asia, but they are not part of this research. In the end, I decided not to focus on these perspectives in the thesis in order to maintain the coherence of my main arguments.

The relationships between animals and farmworkers, animals and veterinarians/animal technicians can be problematic, but human geographers interested in human–animal relations can still learn useful research skills from animal technicians and veterinarians by studying their everyday relationships and stories with animals (Greenhough and Roe, 2019). Even though I also struggled with the *"rolling blame and shifting empathy"* (Emel and Neo, 2015b:354) while I conducted my research in Campania, it was necessary for me to talk with human participants (farmers, farmworkers, veterinarians) as well and to understand their perspectives, too. I believe that maintaining and improving the dialogue between animal/more-than-human geographers and veterinarians would be mutually beneficial.

Finally, there has been increasing academic and public interest in the global environmental (and public health) impact of intensive farming methods (Gunderson, 2011). We understand the consequences of intensive agriculture, more specifically livestock farming on climate change, including deforestation and global warming (Rosin and Cooper, 2015; Stoddard and Hovorka, 2019; Clay et al., 2020). It is less clear, what kinds of human–animal relations we imagine, and what kinds of roles and agencies would (currently) farmed animals have in these relations. Over the past few years, many research projects

have tackled the potential of introducing (not necessarily autochthonous) ruminant animals (including water buffaloes) as biodiversity managers. Besides managing biodiversity, some studies suggest that these animals could potentially contribute to the reduction of global warming (Zicarelli, 2018; Macias-Fauria et al., 2019).

7.5. Conclusion

Since November 2017, I have had the chance to spend almost two years (21 months) in Campania region, doing my empirical research and the last part of the thesis writing. I believe that it was necessary to spend an extended period in the region in order to have a more nuanced understanding of the local cultural–historical and political contexts, including food politics, socio-ecological struggles and human–animal–landscape relationships.

In the previous chapters, I have demonstrated that water buffaloes and the buffalo mozzarella have strong cultural, historical and environmental ties to the Campanian landscape. Buffalo mozzarella is a highly valued product in Campania, in other parts of Italy and abroad as well. The visibility of the buffaloes has increased in the 'mozzarella landscape', thanks to branding and other regulatory requirements. Also, various projects focus on making the milk production of the buffaloes more efficient, 'less wasteful', and improving the tolerance of the buffaloes towards intensive farming methods (e.g., the ANASB morphological criteria). I believe that instead of looking for (technological) solutions to breed an ever-increasing number of animals in intensive farms, we should focus on the particularities of the buffaloes and other regional breeds (to promote 'agricultural biodiversity' as Slow Food does, for example; interview with Giuseppe Orefice, the former President of Slow Food Campania, 31 October 2018), and to make efforts to transform farms according to their needs. Moving towards these directions would not only improve the wellbeing of the animals, but less dense and more pasture-based farms would mean lower veterinary expenses. In addition, keeping regional breeds that belong to

particular landscapes would make the animal farming sector much less vulnerable to zoonotic diseases.

The role of the buffalo (and other mammals) in particular landscapes should not only be in history books, food marketing campaigns, or as part of scientific rewilding projects. Farmers and other representatives should investigate the roles that specific farmed animal breeds have played in the maintenance of particular landscapes. It should also be examined how the removal of specific animal breeds have affected the ecosystems/equilibrium of those landscapes. Mozzarella is undoubtedly an essential part of the landscape of Campania. People in Campania deserve credit for still using traditional methods to produce mozzarella, and for maintaining an almost cult-like food culture.

Figure 48. Pasture at Ponterè at the end of October 2018
(photograph by the author)

However, the buffaloes are missing from this landscape, besides their recent, rather symbolic surge of visibility. Their 'territory' has been used for urban expansion, infrastructure projects and intensive agricultural production. Rediscovering and facilitating a closer relationship between the landscape and the water buffaloes would not serve only the wellbeing of the animal. These measures would also help to restore the landscape and decrease the environmental impact of the sector. Also, shifting towards a more pasture-based and smaller-scale farming **(Figure 48)** would be a mode to move away from the current impasse in which mozzarella production tries to maintain the image of a traditional, small-scale and sustainable food production, and at the same time, it attempts to compete with global players for the overseas markets. Le Heron (1993) suggests that the globalization of agriculture is a political choice, not an imminent direction. I believe that alternative economic approaches are necessary in the case of traditional food products with strong links to their productive landscapes, such as the production of the Mozzarella di Bufala Campana PDO. This would mean a more harmonious relationship with the animals and the landscape (environmental protection and the preservation of the countryside; EU Common Agricultural Policy; Grasseni, 2007), and a higher level of resilience in the case of external socio-environmental crises.

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