FERAL WOOL. Designing with a vibrant matter with care and cosmo-ecological perspective in times of troubled abundance

Secil Ugur Yavuz
https://orcid.org/0000-0002-1603-7700
Free University of Bozen-Bolzano (Bolzano, Italia)
Secil.UgurYavuz@unibz.it

Merve Bektas
https://orcid.org/0009-0003-9377-5904
Free University of Bozen-Bolzano (Bolzano, Italia)
Merve.Bektas@unibz.it

Camilo Ayala-Garcia
https://orcid.org/0000-0001-6679-0605
Free University of Bozen-Bolzano (Bolzano, Italia)
Camilo.AyalaGarcia@unibz.it

FERAL WOOL. Diseñar con una materia vibrante con cuidado y mediante una perspectiva cosmo-ecológica en tiempos de compleja abundancia

Resumen:

Feral Wool es un proyecto de investigación a través del diseño que se desarrolla en la región del Tirol del Sur, en Italia. Explora el concepto desbordante y desatendido de la lana local, que se convierte en una abundancia problemática debido a las dinámicas globales del «Capitaloceno». Al llamar a la lana «salvaje» como punto de partida, destacamos el abandono de una materia preciosa mientras regeneramos las narrativas de múltiples cosmo-ecologías. Por medio del diseño, el proyecto rastrea actores invisibles y olvidados para abrir espacios a nuevas alianzas e imaginar futuros alternativos de la lana local. Nuestro artículo plantea las siguientes preguntas: ¿Qué otras cosmologías deben considerarse para vincular las relaciones entre diferentes especies y promover el cuidado? ¿Qué otras nuevas estéticas de la lana se deben descubrir como «elementos de cuidado» y de relación entre especies? Abordamos estas preguntas proponiendo nuevas prácticas de investigación incluyendo procesos de cuidado, mientras presentamos una visualización de la cosmología de la lana que servirá como base para soñar con un futuro de la lana multiespecie.

Abstract:

Feral Wool is an ongoing research-through-design project that takes place in the South Tyrol region in Italy. It explores the concept of overflowing and overlooked local wool that becomes a troubled abundance due to the global dynamics of the "Capitalocene". By calling wool "feral" as an entry point, we highlight the abandonment of a precious matter while regenerating narratives of plural cosmo-ecologies. Through design, the project traces invisible and neglected stakeholders to open up space for new alliances to imagine alternative futures of local wool. Our article poses the following questions: What other cosmologies need to be considered to bind interspecies relations and foster care? What other new aesthetics of wool need to be discovered as a "matter of care" and relationality? We address these questions by unfolding research insights into new care practices and processes while also representing a visualisation of wool cosmology which will serve as a basis for multispecies dreaming for wool futures.

13

Inmaterial Vol. 9 núm. 17. Junio 2024
FERAL WOOL. Designing with a vibrant matter with care and cosmo-ecological perspective in times of troubled abundance. *Secil Ugur Yavuz,*
Merve Bektas, Camilo Ayala-Garcia

1. Introduction:

With its diverse characteristics, wool has always interacted intimately with humankind, embracing the body on many different levels and having many functions. Wool is one of the outcomes of the sheep-human relationship that began with domestication, which is often thought of as a unilaterally human-controlled activity. Today, domestication is not seen as a process that involves only humans as the main agents, but as a reciprocal interaction in which animals or plants also have a say (Sanchez-Villagra, 2023). Wool has been continuously shaped, crafted, and transformed into many different forms for human purposes. Market factors have recently put wool in a troubling situation.

Today, due to an extractive approach towards nature, the scaling of mass production and the introduction of synthetic materials, wool is suffering from depreciation and loss of value. Due to global economic dynamics, wool circulating worldwide is driven by monocultural selective animal breeding practices. Merino sheep have become a major breed globally thanks to their uniformity, resulting in the extinction or near extinction of many other breeds which were once valuable for their fleece (Eide *et al.*, 2023). This systemic colonisation and standardisation of natural resources threatens local diversity, provokes, among other serious problems, biodiversity loss together with economic instability and endangers small-scale farming and breeds of local regions. As China, India and Australia are the main global producers (IWTO, 2022), small local realities suffer for a chance to survive. Therefore, we are urged to find new sustainable solutions for appreciating wool processed, used, and re-valued locally. In Italy and the rest of Europe, the status of wool changed dramatically with the new guidelines of the European Environmental Regulations (2011). In these guidelines, raw wool is considered a by-product and must be sterilised for its treatment; otherwise, it must be sent to specialised centres for its disposal requiring additional space, energy, and cost. This is a critical issue that has various impacts on multiple stakeholders, such as small-scale farmers, shepherds, crafters, and manufacturers, as well as non-human stakeholders, like sheep, soil, grass, and beyond.

Our ongoing research-through-design project, Feral Wool, is situated in this context of troubled matter and explores the concept of overflowing and overlooked wool in the South Tyrol region in Italy. Although the region has a history rooted in sheep breeding, wool crafts, and production, today it is facing an unprocessed wool waste problem, resulting in multiple economic, ecological, and social problems. Small-scale farmers in South Tyrol, as in many other places in Europe, are constrained by European regulations and, therefore, try to find their own way to manage and dispose of

wool from their sheep flocks. The lack of accessible local infrastructures to wash, and process wool fibres cause huge amounts of wool to be wasted, disposed of, or become feral, which then circulates and flows in rivers, land, and air. This massive amount of waste has been troubling many "worlds" that are all entangled.

Feral Wool positions itself inside these fibrous entanglements and explores the traces of this abandoned matter to regenerate alternative narratives through the speculative practices of design. We use "feral" as a metaphorical tool to trace and regenerate the

Figure 1: Visualisation of Feral Wool concept, 2024.

plural narratives of alternative ecologies shifting from anthropocentric, productionist, extractivist and market-driven approaches to care-oriented and multi-species future(s). To achieve this, we argue that adapting new methods, practices and processes that involve diverse worldviews in design is urgent. Also considering the EU's new Nature Restoration Law (2023) aiming to rebuild agricultural ecosystems through pastures and the species they host, our project seeks to bring the *wool web networks*[1] together with farmers, shepherds, shearers, manufacturers, crafters, designers, artists, and scientists. de la Bellacasa (2017) questions one-sided relationalities and proposes care to embrace a many-sided web of relations involved in the "ecosystem services"[2] instead of only benefits to humans. In our preliminary research, we have

---

1. Inspired by the concept of "soil food web" from Dr. Elaine Ingham, we came up with the term wool web networks that are formed by human and non-human stakeholders around care for wool.

2. "The ecosystem services approach looks at the elements involved in an ecological setting or landscape from the perspective of what they offer humans beyond purely economic value and tries to calculate other sources of value – not necessarily to "price" them, a distinction important to many advocates of this approach" (de la Bellacasa, 2017, pp.101-102)

15

Inmaterial Vol. 9 núm. 17. Junio 2024
FERAL WOOL. Designing with a vibrant matter with care and cosmo-ecological perspective in times of troubled abundance. *Secil Ugur Yavuz, Merve Bektas, Camilo Ayala-Garcia*

explored these networks through conducting interviews and design ethnography in the field with diverse stakeholders to understand their perspectives and pose questions to map invisible and missing connections in between. This qualitative enquiry together with secondary research allowed us to bring all these diverse entities and their worldviews together to understand the serious problems behind feral wool; and what made it abandoned and unwanted. We use cosmology as a term hosting this interdependent web of entities that co-exist, interrelate, and at the same time trouble each other. The question is how these webs of relations and their intended or unintended effects forming wool cosmology could be seen as means to envision multispecies future(s). Where and how does wool flow in and around South Tyrol; how can wool be revalued through design; how can design mediate and speculate on alternative care practices and processes of wool; how can wool be an interspecies binder, linking human, sheep, and surroundings. Our article addresses these questions through unfolding insights into outlets of new care practices and processes, while also representing a visualisation of the wool cosmology scheme which we will use as a basis for speculating about alternative wool narratives.

Figure 2: Visualisation of Feral Wool concept, 2024.

2. Background

2.1. Wool, Human, Sheep Entanglements

By broadening the notion of wool, we relate to sheep and their entanglements in their socio-ecological and ethical-political spheres. The sheep (*Ovis aries*) is one of the oldest domesticated animals for its meat, milk and fleece and has been an important *companion*[3] *species* (Haraway, 2003) for humankind. In the last decade, livestock populations for all species, including sheep, have declined in Europe (Eurostat, 2023). In South Tyrol, sheep farming remains almost as a hobby. Due to the breeding, grazing animals, together with their guardians, are slowly disappearing on the high Alpine pastures (Tauber, 2022), also risking some sheep breeds becoming extinct.

Some important semi-nomadic events such as Transhumance[4] , which is the form of pastoralism of moving livestock from one grazing ground to another in a seasonal cycle (Spawforth, 2016), still exist. It is an ecosystem service that ensures ecological maintenance of landscape and human-animal relationality with care. The decline of sheep populations, together with endangered sheep breeds, also results in the decline of grazing practices which became a critical discourse since such practices are essential for grasslands to foster biodiversity and resilience. In South Tyrol, a considerable number of pastures suffer from the abandonment of grazing animals and subsequent shrub encroachment (EURAC, 2023).

Additionally, the culture of shepherding that ensures the coexistence of pastoral life through ecologies of relations, which involves animals, plants, and land, is also struggling to keep the figure of the shepherd alive today. The European Shepherds Network (ESN), which is a network of European shepherds and pastoral organisations, is striving to increase their political presence at European level. Through working with transnational institutions, such as the Food and Agriculture Organisation of the United Nations (FAO), the network demands measures and new policies that bridge ecological, economic, and cultural aspects and impact the pastoral system of maintenance (Cattin, 2016). These policies include promoting artisanal production;

---

3. The word "companion" emphasises a relationship based on mutual sharing and coexistence. It is a Latin word, and companion is made up of two words. Com- means "with" and panis means "bread", while "companion" literally means "one who eats bread with another". We discovered that sheep also love to eat bread when we started asking the question "what do sheep dream of?" A shepherdess we interviewed helped us to acknowledge this commonality. It made us realise that there is so much in common for both sides. It invites us to maintain reciprocity, to be able to share our bread with each other, to be companions.

4. Transhumance movement is an ancient tradition that is renewed every year covering about 45 km with sheep, shepherds, and guard dogs, following the tracks from Val Venosta and Val Senales to the Austrian summer pastures of Ötztal (Gambicorti, 2008).

improving local markets; respecting pastoralists' methods of breeding and animal identification; recognising intangible cultural heritage; including pastoralists in the making of decisions; recognition of grassroots pastoralist organisations across Europe as partners; and ending "land grabbing" and the restrictions on mobility (ibid). Witnessing the struggle of maintaining the figure of the shepherd in mountain pastures, we acknowledge that "we all might learn to craft new ways of being obligated and new ways of helping life to flourish" (Despret and Meuret, 2016, p.27) from shepherding practices.

In 2023, a new shepherding practice emerged in South Tyrol expanding to the urban context, making sheep, guard dogs, and the shepherd the agents of change also by bringing an alternative and contemporary perspective of urban coexistence in multispecies alignments. A flock of around 150-200 sheep, in collaboration with a pair of shepherds, 5 guard dogs and a donkey have started to graze the banks of the Adige River as an alternative to machinery use (Autonomous Province of Bolzano, 2024). The local municipality has agreed to carry out this pilot project for the first time together with the shepherds, who have approximately 10 years of experience in the matter. This practice represents a type of care and relationality that aims to trigger positive eco-social transformation in the local context.

Figure 3: Flock of sheep grazing on the banks of Adige River in Bozen-Bolzano, photo by Merve Bektaş, 2024.

18

Inmaterial Vol. 9 núm. 17. Junio 2024
FERAL WOOL. Designing with a vibrant matter with care and cosmo-ecological perspective in times of troubled abundance. *Secil Ugur Yavuz, Merve Bektas, Camilo Ayala-Garcia*

Considering wool as an extension of sheep and as an interspecies binder, we acknowledge that it brings with it feral effects. Wool as a *vibrant matter* (Bennett, 2010) not only relates to the sheep but also to other species. For instance, it becomes a habitat where birds can rest in a symbiotic way. A case study from an island in Hawaii demonstrates that sheep wool is being used by birds (of ten birds studied, six birds used wool) as nesting material because of its ready availability and binding quality (Van Riper, 1977). The study also included a bird species that traversed territories to procure wool because of their preference (Van Riper, 1977). Wool can also host a variety of species such as seeds, thorns, insects, and ticks that are carried from one place to another with the movement of sheep and cause feral effects by flourishing or harming other living beings and the environment.

Situated in a mountain environment in South Tyrol, which is an autonomous province in northern Italy covering an area of 7,400 square kilometres and with a total human population of about 534,000 inhabitants (Astat, 2020), there are 36,634 sheep populated within ten breeds, with the most common being the "*Alpina tirolese*" followed by "*Tirolese bruno-nera, Lamon, Lamon black, Jura, sheep from Val Senales, Schwarznasen, Suffolk, Dorper, and Steinschaf*" (Provincia Autonoma di Bolzano, 2022). Four of these ten breeds are threatened with extinction and further assistance is required for their protection (ibid). In order to preserve the *Alpine Steinschaf* breed and increase its population, a programme was created in Germany and Austria in 2004, by highlighting the breed's wool through designing different products, which had a success (Mendel *et al.*, 2009).

Wool production per sheep usually ranges from 1.2 to 3.5 kg depending on the breed (Vagnoni *et al.*, 2015). According to a study from 2015, every year in South Tyrol, out of 150 tonnes of wool, 50 tonnes are unused and must be disposed of, 30 tonnes are processed into traditional products, 60 tonnes are exported as insulation material, and 10-20 tonnes are processed into pellets and mulch mats (Ruber, 2015, cited in Bader, 2018). This mass of unused wool is thrown away every year and is not even noticed by those involved in the wool web network.

If we were to make a dystopian speculation, we could also imagine that wool could become endangered locally, as sheep farming declines with the decrease in the sheep population and as wolves return to the Alps. Due to the risk of predation, sheep need to be protected. Today, many small-scale farmers are abandoning sheep farming, and the number of sheep in the region is decreasing due to the lack of protective policies for pastoral life, to ensure coexistence. To be protected from the wolf, the sheep flock requires the constant presence of a shepherd, who, with the help of guard dogs, can

bring the sheep into special enclosures at night (Autonomous Province of Bolzano, 2022). Training and caring for the guard dogs used to keep herds safe from wolves also has a high economic cost that is not of interest to the local authorities. These scenarios also open up other questions on how to ensure coexistence when dynamic relations are involved.

According to The *Wolf Totem*, a story set in Mongolia, mentioned in the article by Despret and Meuret (2016), wolves are part of the lives of pastoralists, who are believed to be intermediaries between humans and gods. While wolves protect grasslands by chasing gazelles and killing some of them, humans use the dead gazelles to feed their livestock. Here we see that the relationship between humans and wolves is based on mutual trust, and it represents the importance of wolves in this culture for the survival of humans but also their respect towards conviviality. Despret and Meuret (2016, p.25) define this by stating that "humans and animals are tied together by non-innocent bonds of respect". In nature, wilderness can be destructive but at the same time maintains a sort of equilibrium that cares and coexists. Escobar (2018) also states that in many indigenous communities, there is a continuity between biophysical, human, and supernatural domains, and many anthropologists who work with indigenous groups have richly described the local models of nature that underlie ontologically vibrant relational worlds.

2.2. Transforming wool through craft

Another dimension of wool is the craft practices that transform it into artefacts embedding cultural, historical, and tacit knowledge through the production process. Wool crafting dates back to pprox. 6500 BC with the very first examples of non--woven fabrics made from animal fibres that were found at the site of Çatalhöyük in Turkey (Ryder, 1975). Felt making is the ancient method known in history, which was crafted among nomadic people rather than spinning and weaving. Ingold (2023) questions the tradition of felt making among pastoral nomads which have something to do with their way of perceiving the grounds they roam with their flocks and herds. In The Treatise on Nomadology, Guattari and Deleuze propose both felt and pasture as "smooth" without coherent lines and boundaries, exhibiting a heterogenous space that entangles in all directions like the fibres of the felt (Ingold, 2023).

Wool as a living organism consisting of a multispecies community, is an interdependent matter, and embraces multiple cosmologies that connect humans and nonhuman entities. It is a living, organic, vibrant matter that decomposes over time when left to nature. Wool can be felted through the entanglement of fibres; it can be spun

into threads that accompany humans, non-humans, or things; and can be woven by bringing threads together to form a fabric, allowing it to manifest itself in different ways with new aesthetics and meanings. Haraway (2016) defines weaving as a "cosmological performance" that interlaces the relations of "humans, plants, soils, water and sheep" (p.96). Westerlaken (2020), by referring to the Navajo weaving practice, says that the churro sheep's story is told by the hands of the weavers. In a community artwork by Maria Lai in Ulassai, Sardinia in 1981, a sky-blue ribbon binds villagers to the mountain, reconnecting old and new relationships between women, children, shepherds, and elders with nature and each other through relational art. Crafters can not only transform wool into various shapes but also embed stories into the making. It becomes a practice of knowledge preservation and tangible narration. Moreover, felting as a craft technique can be seen as an entanglement of the human and nonhuman, with this being in a continuous dialogue (Aktas and Noronha, 2021).

Craft, however, if seen only as a nostalgic practice, remains limited, and therefore does not really answer the contemporary needs and significant problems that come with industrialisation and globalisation. In recent decades, craft practices have been going through a transformation mainly driven by technological innovations, digitalisation, demographic change, and environmental crisis. Specifically, when they are situated in rural areas, such as mountains, these challenges become much more relevant and crucial to sustaining these practices while imagining preferable future(s) within their ongoing transformation. Mountains are peculiar rural areas for production and manufacturing characterised by "their altitude, terrain, roughness, slopes, low population density and access difficulties" (SIMRA, 2018). These aspects, on the one hand, bring uniqueness to materials and techniques that are used in the craft and, on the other hand, require these practices to revive and develop further. Moreover, craft practices can also be seen as an alternative sustainable livelihood (SL) for people who "mitigate the effects of climate change" in rural areas shifting from their practices like farming to alternative ones (Nzama, 2021). Garcy-Dory (2020) also highlights the positive potentiality of rural areas that might trigger "slow living, reconnecting with nature, responsible consumption and production, close connections and spontaneous communication, a revival of craftsmanship as opposed to unified mass production".

Highlighting the importance of collective practices, Manzini's (2010) SLOC (small, local, open, connected) concept proposes a distributed production and "a mesh of connected local systems" that can exchange knowledge, collaborate on local produc-

21

Inmaterial Vol. 9 núm. 17. Junio 2024
FERAL WOOL. Designing with a vibrant matter with care and cosmo-ecological perspective in times of troubled abundance. *Secil Ugur Yavuz, Merve Bektas, Camilo Ayala-Garcia*

tion, and therefore create resilient communities. We can imagine that this connectedness can also expand to a more-than-human level, including land and other life forms into dialogue while reforming craft practices.

Moreover, craft skills are mostly based on embodied and tacit knowledge that is transferred through practice-based learning activities and exercises. To sustain craft practices and attract the interest of other demographic groups, it is crucial to imagine new educational systems to bring craft knowledge to new participants. Therefore, different forms of mountain craft schools are emerging in rural areas not only as an alternative tourist attraction but also for educating young people to continue practising these craft skills to further develop craft future(s). In the South Tyrol region, there are also some schools for craftsmanship, such as the Winterschule (2022), which offer professional training for traditional handicrafts with innovative techniques and ideas, working with natural raw materials, one of which is wool. Moreover, the "Tiny FOP MOB" project by EURAC is an example of a movable learning space for developing innovative ideas and solutions for craft, science, and new materials (Habicher *et al.*, 2022).

2.3 Care in times of troubled abundance

Fisher and Tronto (1990, cited in Tronto, 1998, p.16) define care as: "a species activity that involves everything we do to maintain, continue, and repair our 'world'… [that] includes our bodies, ourselves, and our environment, all of which we seek to interweave in a complex, life-sustaining web". The vicious buy-use-discard cycle resulting from planned obsolescence has been damaging our multispecies world, which needs a care-oriented approach. There is an urgent call to interrupt the cradle-to-grave perspective of our current industrial era in which everything that we extract as a primary source, after being processed, marketed, and used, becomes waste discharged in landfills without the chance to be recovered for a second life. The cradle-to-cradle perspective, proposed by Braungart and McDonough (2002), invites us to rethink the biological and technological cycles separately, creating a virtuous cycle of abundance with responsibility towards the ecosystem.

Wool is one of the materials that can be considered as subject to troubled abundance and facing the problem of being wasted. In Europe, "wool is unnecessarily stored, buried or burned" since the production process seems to be a costly burden for farmers, rather than an opportunity (Kicińska-Jakubowska *et al.*, 2024). In Europe around 160 thousand metric tonnes (Løvbak Berg *et al.*, 2022) of wool is discarded annually, meaning, there is an apparent need to act by understanding the simple

principle that nothing is wasted in nature. If we consider something wasteful, we must figure out what to do with it (Ashby, 2013). Today, a considerable amount of raw wool is wasted even without being processed after collection due to inflexible regulations which impose standards on a natural material, paralleling it to an industrial counterpart from a factory or manufacturing facility.

In Italy, it is estimated that annual production of raw wool is 14,000 tonnes, of which 95 percent is unsuitable for the current textile industry (Vagnani *et al.*, 2016). This places local wool on a niche level and even turns it into a matter of disturbance. Since mountain economies mostly focus on dairy products and meat, wool becomes a "troublesome by-product of sheep breeding" (Kicińska-Jakubowska *et al.*, 2024) and needs to be treated to be utilised. When the specified treatments or technologies are unavailable, it must be sent to specialist centres for disposal requiring additional space, energy, and cost for small farmers.

In addition, the diversity of fibres derived from multiple sheep breeds in relation to their climates, geographies, and cultures offers a rich variety of wool types far from what can be considered as standard. Therefore, we need to seek a broader understanding of what this kind of fibre can do and what transformations are needed to give it new meanings, forms, aesthetics, and narratives. We can imagine the possibilities that can emerge when we have a natural material that has the same respect and value of territory as food. Prestige and cultural values are treasured by the market when fruits and vegetables come from a particular region under labels of protected designation of origin (PDO). The designation was created to protect products processed and developed in a specific geographical area, using the recognised know-how of local producers and ingredients from the region concerned (EU Commission, 2023). If natural fibres such as wool could enjoy such protection, the sheep, soil, grass, the way of shredding the sheep fleece and the region would be valued and treasured as belonging to the culture where it comes from and not because of the standards it needs to follow. This is just an example of how a change of perspective could give wool that goes feral another pathway for the future. The diverse worldviews that can encompass a research project on natural materials such as ours, around the notion of the pluriverse, challenges of conventional views of design, advocating for a more inclusive approach that recognises the multiplicity of knowledge, practices, and ontologies across cultures and societies (Escobar, 2018).

2.4 Multispecies Perspectives and Cosmologies

Escobar (2020) defines "modern cosmovision" as a worldview that is based on human-centredness, creating many binaries, one of which is nature-culture. This cosmovision is the main cause of the multiple crises that we live in and the current epoch – Anthropocene that we are all entangled with. To make a shift towards a better future or "a better ending" (Antonelli, 2019), Tsing (2015) highlights the urge for a new perspective to find "latent commons" (p.135) and to "notice" overlooked relationalities, actors, and processes. These invisible connections that form our ecosystem are often neglected when Capitalist forces drive continuous growth resulting in massive production and consumption. Haraway (2016) calls our interdependencies with the more-than-human world "kinship", that goes beyond the ancestral or genetic ties, and brings an alternative concept, speculative thinking on how we relate to other critters. This speculative way of seeing our interconnections can help us to go beyond the ill-functioning systems and imagine alternatives such as multispecies worlds that "arise from becoming attentive to the things that exist around us" (Westerlaken, 2020, p.140). Akama *et al*. (2020) address the importance of interweaving multiple worldviews -so-called *ontological braiding*- when expanding design processes to more-than-human perspectives. As an alternative to Anthropocene, Fuad-Luke (2023) proposes "Plurocene" in which many world views can exist together and form "relational-futures". In this context, Ávila (2022) coins the term "designing for interdependence" as a practice that is based on the "poetics of relating" and "attune[s] to other-than-human ways of knowing and feeling, to create patterns and forms that have the possibility to become life-affirming" (p.19). Designing for life-affirming systems embraces a holistic understanding of life that goes beyond the wellbeing of human beings, and takes other life forms into consideration.
Having a multispecies perspective, we see wool as part of a complex network of stakeholders, being transformed not only by industrialised machines or crafters' hands but also by the relationalities on which it hangs.

3. What if wool becomes feral?

Feral represents separation, abandonment, and alienation, and to be away from the familiar, but it may also refer to beautiful isolation, like a 'beautiful strangeness' (Fuad-Luke, 2009, p.188)[5] . Being an ambiguous term, feral represents the troubling situation of local wool and, at the same time, reminds us of its wilderness, vitality and agency that go beyond being a mere material towards being an active agent in relation to many other life forms. Carr & Zhou (2022) define that the word feral has different meanings in different contexts, which does not have to be necessarily negative or positive. In the project Feral Atlas, the word feral refers to a more-than-human entity that is free from human control. Feral effects can be the result of human control and domination, but it then goes beyond humans. As noted by Carr and Zhou (2022, p.27): "Feral effects are all around us and the flora and the fauna adapt to and transform ecologies in tune with their own cycles and rhythms beyond the anticipation and control of human activities all the time". Tan (2023) notes that building feral alliances involves an organic and inorganic vitality in which vulnerabilities are strengthened through commonality, diverse caring practices are generated, and multiple ecological cosmologies are interrelated. In our context, the word "feral" derives from an abandoned state of a precious and highly vibrant matter (Bennett, 2010), shifting from a domestic state to a feral state, which is overflowing in the South Tyrol region and beyond. Our enquiry questions how we can bring back what has been forgotten, by reconnecting wool and people in diverse spaces, for unusual and "re-enchanting" (Federici, 2018) encounters so that new alliances can emerge, to reassemble relations and stories through speculating on alternative care practices of our contemporary time. By "embracing disturbance as opportunity" (Fuad-Luke, 2022. P.50), our aim is to collectively redefine the notion of feral that helps us to imagine new narratives for local wool.

---

5. According to Fuad Luke (2009, p.188):
Our current notion of beauty in everyday design therefore needs contesting. This beauty will not sustain us in the future. We need new visions of beauty – we could call this beauty, 'beautiful strangeness', a beauty that is not quite familiar, tinged with newness, ambiguity and intrigue, which appeals to our innate sense of curiosity ... beauty that is more than skin deep, beauty that is envisioned by society, because the current version of beauty is largely ordained by big business and governments.
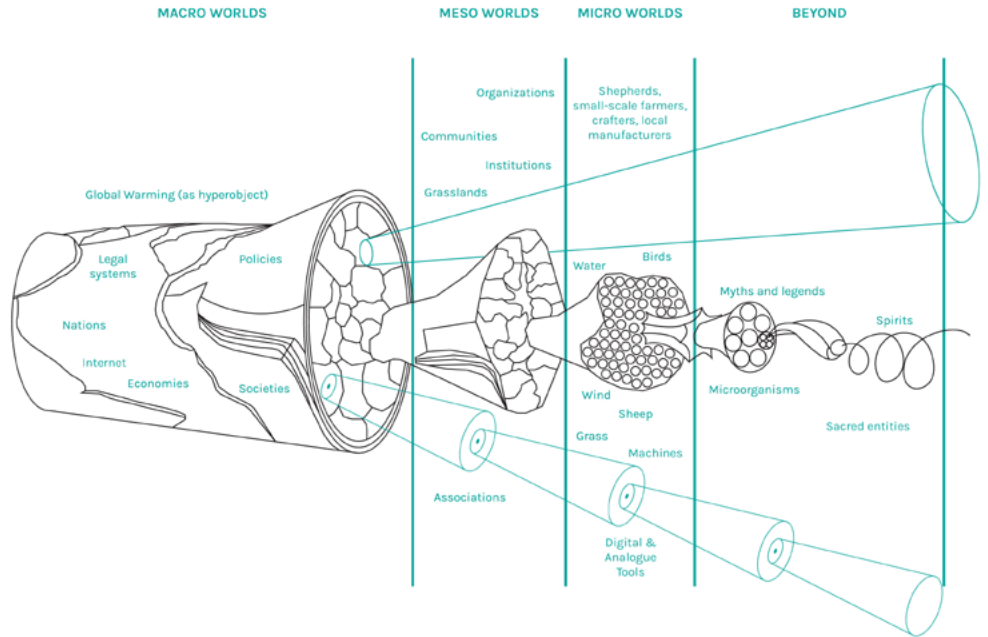
4. Wool Cosmologies

In our project, the aim is not to find one-way solutions to wool waste and to create another product application that can turn the waste into new production possibilities. This would only be a partial intervention that neglects the bigger picture and the complexity of interrelations involved in this serious problem. Our vision is to open space for imagination and speculation by bringing facts, figures, and fiction together. Through unweaving and reweaving the local wool web networks, the Feral Wool project aims to stimulate local wool production and processes to highlight the vulnerability and the difficulties that are involved in the background. Kimmerer (2013, p.9) notes that without "re-story-ation", which brings scientific knowledge together with indigenous wisdom, we cannot meaningfully heal and restore broken relationships. For this reason, we believe that collectively composing new narrations and stories would be an important basis for intervening in the future and creating a collective echoing.

Wool as a material coming from a living entity, namely sheep, is highly connected to many other life forms, ranging from microorganisms living in the fleece of the animal, to grasslands, from soil to atmospheric molecules. When disassembling wool fibre, we observe that a fibre holds many other strains and micro-worlds within its own structure. Sheep wool as a natural fibre holds mainly keratin protein fibres (60%), followed by 15% moisture, 10% fat, 10% sheep sweat and 5% impurities (Parlato *et al.*, 2022). Given information, through a microscopic look, wool fibre embraces "a world of many worlds" (Escobar, 2018). Westerlaken (2020) highlights the power of non-verbal communication means such as illustrations in explaining "multispecies worlds". Therefore, in our research we have used illustrations to represent wool cosmologies, which can also be seen in our figures, which emerged based on our preliminary research.

One of our contributions in this article is our multispecies design approach that starts with framing a cosmological representation of eco-social relationalities of a troubled matter. According to Kimmerer (2013), cosmologies are a source of identity and an orientation to the world. Kimmerer (ibid) highlights the importance of original instructions that function as a compass rather than a map to provide an orientation, which could be an important factor when considering ontological design. In our project, we are shifting from a mere mapping activity to creating a dynamic conceptual tool that can orient us towards plural worldviews as the basis for speculating multiple design scenarios. This adds a higher complexity to the design process, while also enriching the possibilities of inclusion of overlooked stakeholders and invisible entities.

The insights generated through the dialogues with diverse stakeholders during our field research brought up controversies around wool and wool production in South Tyrol and revealed untold and hidden narratives around the biological cycle of wool growth. This helped us disassemble and later "assemble neglected 'things' (de la Bella-casa, 2017). We examined the importance of illustrating and making controversies visible to show already existing connections, the preferred ones, and non-existing ones. In order to help our interlocutors to talk about issues that are even invisible to them, we asked them to list existing stakeholders in wool web networks, but also add desired stakeholders that they think are lacking.

Based on the insights gathered in these encounters, we came up with the wool cosmologies model which works as a dynamic tool embracing human and non-human stakeholders, and their worldviews, and gives space for other speculative worldviews that do not exist yet. The wool cosmologies scheme is divided into four levels. The first three levels are based on Frank W. Geels' 'multi-level perspective' (2006), consisting of macro, meso, and micro levels that are expanding towards futures through the representation of Future Cone by Hancock and Bezold (1994). For each level, we added a multispecies perspective by including stakeholders, for instance sheep, water, land, soil, etc. In addition to these three levels, we also considered a fourth level, which we call "beyond", which involves invisible entities and forces, that go beyond human perception, such as microorganisms, sacred entities, and forces. Like wool fibres, diverse worldviews also become entangled, creating winding or meshes of unknown futures. We envision the use of the wool cosmologies scheme as a tool to give directions to the participants of co-creative workshops to generate future narratives for local wool (see Figure 4). By taking inspiration from the wool craft techniques, spinning and felting, we illustrate fibrous thinking processes (see Figure 5), representing this collective creation that can merge diverse worlds to form multispecies stories. While the spinning process offers a more controlled way of binding worlds, felting randomly brings different worlds together.
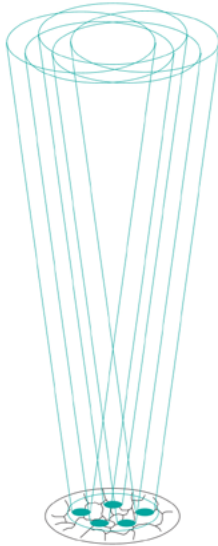
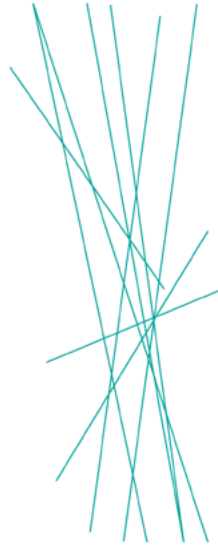Figure 4: Wool Cosmologies – Macro, Meso, Micro, and Beyond Worlds

FIBROUS THINKING PROCESSES

A World Constraining other worlds

A world of many worlds

Worldviews are entangled unintentionally in unlimited and disordered way

Worldviews are brought together intentionally

Figure 5: Fibrous Thinking Processes

29

Inmaterial Vol. 9 núm. 17. Junio 2024
FERAL WOOL. Designing with a vibrant matter with care and cosmo-ecological perspective in times of troubled abundance. *Secil Ugur Yavuz, Merve Bektas, Camilo Ayala-Garcia*

5. New care practices and processes for feral wool

Seeing practices and processes as a means to foster care, we can imagine alternative forms of engaging with wool. Having the lens of care helps us look closely at the cyclical rhythms of wool with a more-than-human angle. Especially in times of ever--changing climate conditions, and global warming as a worldly phenomenon which creates vulnerability in multiple systems, in our project we emphasise the need for phenology, which is the study of phenomena or happenings that are applied to the recording of natural events in relation to seasonal climatic changes, combining ecology with climatology (Britannica, n. d.).

Wool as a matter that is in relation to this constant change in a rural context, requires us to consider shifted phenologies, disturbed multispecies entities, and other rhythms as "arts of noticing and attentiveness" which Tsing (2015) suggests are included in our design process. Through wool processing and production, we enter into a virtuous cycle such as sheep breeding, grazing, wool harvesting, washing, drying, carding, and crafting. Through this acknowledgement, we form questions that emerged from the insights gathered in our research as sources for speculations in this section.

5.1. Who cares?

Looking at the entire wool production process, there are many practices involved in its transformation, from shearing to spinning, weaving to wearing, and shepherding to farming. In our enquiry, we observed that farmers' initial attitude when relating to wool was troubling. Often, farmers mix the freshly harvested wool without considering the division of colours and parts of the sheep wool due to the fact that this takes time and costs money. Today, sheep shearing in South Tyrol is only done twice a year (in spring and autumn) by shearers who are paid around 3 euros per sheep and complete the shearing in around 2-3 minutes. As shearing causes humans back pain, this work needs to be done very quickly, which doesn't leave time for adequate preparation for either the person or the animal. This work is also poorly appreciated, and it is seen as a burden. Therefore, this first interaction with wool (and sheep) is careless and already becomes problematic. Apart from being a mechanised process, it is also a stress factor for sheep, and it results in additional costs and management problems for farmers. Before the invention of shearing, around 1000 B.C., plucking sheep manually was the only way to harvest wool during the shedding season (Ryder, 1987). Sheep knew how to lose their fleece and created their shedding seasons, waiting to be plucked by humans, which demonstrates how sheep are also open to learning and thus to evolving. However, most sheep breeds have lost this knowledge

over time. New technological developments often did not take sheep into account in the design process. Through selective breeding, sheep fibres were adapting themselves not only as a response to human domination, but also as a necessity for their transformation. As a result of selective breeding, shedding practices were eliminated with the invention of shearing and became a precondition for biological alteration for sheep (Ryder, 1987). The processes that are slow, attuned to the environment and climate, and inclusive are removed because they are not adequate for the market and therefore not adopted. This is where we believe that change must be brought about through a care-centred approach. But who needs to show care when care is not being found? Can care practices be carried out in a collaborative way that does not put pressure on individuals and becomes a collective action?

An Insight emerged in our research around the complexity and the insufficiency of wool processing and production infrastructures. Farmers, shepherds, crafters, and manufacturers need to carry their raw wool to diverse facilities, depending on necessity, either for washing, carding, spinning, or dyeing, etc. However, not all of them have the possibility to do so, due to being in remote valleys. We discovered an old practice (concept) from South Tyrol called *Krumer* that connects those valleys by providing various services to people. The Krumers, also known as itinerant workers, were significant storytellers and types of messengers who would travel from farm to farm on foot during winter – some with looms to weave fabrics and clothes, others with knife sharpeners or tools to shred cabbage for kraut (Francheschini, 2022). By walking from one valley to another, the Krumer bridged remote places and became a figure taking care of needs. Looking at this practice from today's contemporary world perspective, we can ask new questions: *how do we imagine and reinterpret such a role today dealing with the lack of infrastructure for wool processes? What tools, methods, and processes would this figure need? Can this figure become a new crafter of today, transforming materials and supporting this highly fragile production system through care and relationality?*

5.2. Attuning with cosmo-ecological rhythms

In ancient times, soil, water, wind, and sunlight worked together to transform wool, and brought about a different type of rhythm that is much slower than toda"'s pace aligned with the fast, industrial growth that places care both for wool and sheep as a secondary concern. These ancient practices, which are attuned with a multispecies world, are struggling to survive today and need special attention for their continuation and existence. In Tsing's (2015) practice of "noticing differently", the author proposes a more attentive way of perceiving the world while being aware of invisible

31

Inmaterial Vol. 9 núm. 17. Junio 2024
FERAL WOOL. Designing with a vibrant matter with care and cosmo-ecological perspective in times of troubled abundance. *Secil Ugur Yavuz, Merve Bektas, Camilo Ayala-Garcia*

relationalities and neglected forces through diverse ways of knowing. In the context of feral wool, one of the reasons that wool is left abandoned is the overlooking of non-human involvement, such as sun, wind, and water in production processes, and not being in tune with climate and its ever-changing effects on land. Starting from "noticing" as a careful practice, we ask another set of questions: *can we attune to the natural rhythms and cycles of sheep and land when thinking of wool? What would such processes look like in a posthuman world considering the shifted seasons due to climate change?* Ajda Pratika, created as a handbook by the Robida Collective (2022), is an example of a design tool for the enhancement of an embodied relationship in which seasonality, slowness and circularity are intertwined. The project is dedicated to the cultivation and production of buckwheat and serves as a tool to foster human relationships with plant-food. It makes us think about how we can be inclusive in our design processes and outcomes in terms of non-human beings and values, giving space to neglected and invisible voices.

5.3. Encounters for new alliances for multispecies dreaming

In the creative processes, for more-than-human participation, Noorani and Brigstocke (2018, p.26) highlight the importance of intentionally built "stages and spaces for the intermingling of human and non-human agencies". Giving space to more-than-human entities in design processes is not an easy task. Their direct involvement can even be impossible, considering that we do not share a common language. Due to the difficulty of including sheep as a participant in our enquiry, we asked human stakeholders to imagine what a sheep's perspective could be when talking about wool. A way to make them go beyond human-centredness is to ask them, "*What do sheep dream of*". Their results are being gathered in an illustrative journal, registering, and reflecting on insights during the field visits.

Moreover, in our project, we will conduct collaborative speculative workshops to bring various stakeholders together and help them to shift, imagine and embody different worldviews to carry out "multispecies dreaming"[6] by using the wool cosmologies scheme. The questions proposed in this stream are: *How can we provoke multispecies thinking in collaborative design processes to generate multiple, preferable, and "response-able" (Haraway, 2016) futures? How can an enquiry beyond the human change*

---

6. We coin this term for defining collaborative speculative processes that involve multispecies perspectives, based on "social dreaming" (Dunne and Raby, 2013) that refers to speculative design that calls technological developments entangled within socio-cultural contexts into question.

perspectives in design and in perceiving the relationships and materiality that matter? How can we design spaces, experiences, and props for the facilitation of forming new alliances to generate multispecies wool futures?
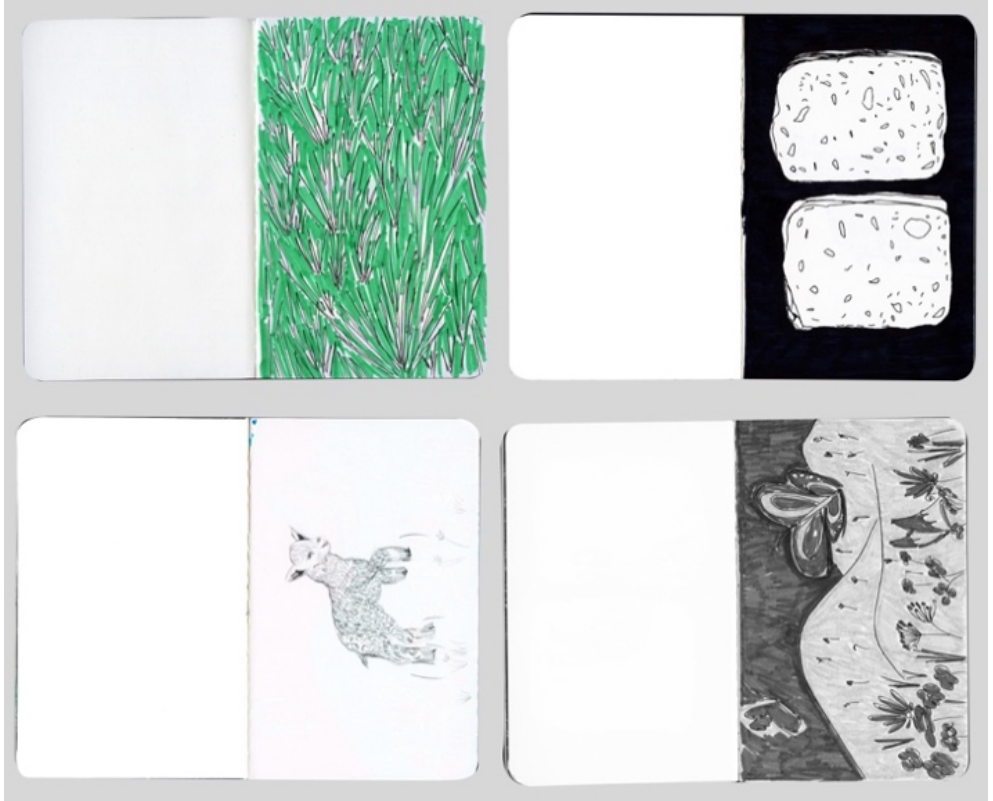

Figure 6: Illustrative journal of "What do sheep dream of", by Merve Bektaş, 2024.

33

Inmaterial Vol. 9 núm. 17. Junio 2024
FERAL WOOL. Designing with a vibrant matter with care and cosmo-ecological perspective in times of troubled abundance. *Secil Ugur Yavuz,*
Merve Bektas, Camilo Ayala-Garcia

5.4. More-than-human Relational Aesthetics:

Aesthetics is considered to relate to ethics, which takes it well beyond "pretty" and into the realm of justice and fairness, which are essential to sustainability (Allen, 2019). The American ecologist Aldo Leopold linked aesthetics and ethics in a context of biology that would be known as sustainability (ibid). According to his concept of "land ethic", he expands the boundaries of entities by including soils, waters, animals, and plants, which he refers to collectively as land (Leopold, 1989). Looking at aesthetics through the lenses of ethics, we can critically question the current state of wool's abandonment due to the constraints of mass production that demand a type of wool that is finer, softer, and attuned to the market and production system. Here we ask: *Can we think of different aesthetics that put relationality in the centre, rather than adapting systemic preferences? Can we decolonise the aesthetic language of wool that is set by mass production and industrialisation?*

Ancestral sheep fleeces consist of kemps, which are longer fibres considered as coarse and unwanted, since the new fleece known as fine wool became the major source of wool for the clothing industry (Ryder, 1987). Moreover, the colour and quality of the wool also changes based on the breeds, and based on what kind of vegetation their diet consists of. Sheep began to show a range of colours such as brown, black, white, and grey which then resulted in the introduction of new fleece colours, especially in white, as a result of the advent of dyeing (Ryder, 1987). And continuous growth of wool resulted in the invention of sheep shearing (ibid). In mountain regions, due to the weather and land conditions, their fleece can have particular features, having different aesthetic qualities, ranging from their colour to tactile properties. Since they do not match the high-quality standards for textile production, they often end up in different industries, such as the construction industry and agriculture, or become waste (Kicińska-Jakubowska *et al.*, 2024). Instead of finding alternative applications in which wool is downcycled and its value is diminished, we can revalue its properties by exploring its new aesthetics that are relational. Bourriaud (2002) defines "relational aesthetics" as experiences in art pieces formed by human relations, interactions, and encounters. Taking this concept to a more-than-human dimension, we can imagine new aesthetics that involve "poetics of relating" (Ávila, 2022) expanding to ethical and ecological dimensions. This type of aesthetics also requires a change in human attitude and preferences and finding other ways of relating to the world (Rognoli *et al.*, 2011). Here we ask: *Can we imagine new aesthetics that derive from more-than-human relationalities? Can aesthetics be challenged with ferality to have new ways of appreciation beyond the standardised definitions?*

6. Conclusions

In this article, we present the early findings of our ongoing research project, Feral Wool, that brings an alternative, speculative and preferable gaze on the troubling abundance of local wool in South Tyrol. Starting from a situated context, our article opens to bigger questions regarding design processes involving multispecies world-views. It proposes a conceptual scheme – Wool Cosmologies as a medium for merging diverse worlds of stakeholders to find desirable futures for an emergent problem. Drawing on the problems of local wool, the article sheds light on departure points for thinking differently about how to re-enchant its story and how to de-assemble and re-assemble its meaning based on care and relationality. In the final section, we propose hints for new care practices and processes for local wool with open questions as sources for speculations. As a next step, through workshops, we will foster collective dialogues to bring diverse opinions and voices together and carry out multispecies dreaming by using our wool cosmologies scheme as a basis. By creating these new alliances, our aim is to start to pay attention to the "unspoken needs" (Fisher and Tronto, 1990, cited in Tronto, 1998, p.16) of both human and nonhuman entities. Therefore, through our design-based research, we first provoke a shift in seeing wool as a mere resource for humans, to open a space to reveal its vulnerability and its state of abandonment as an *itchy matter*[7]. Haraway (2016) reminds us of the stirring power of trouble and seeing vulnerability to nurture, to become capable with each other in the present with response-ability. With this in mind, we enquire about how design can be an agent to intervene and provoke diverse cosmo-ecologies of feral wool, to show "the unreal, parallel, impossible, unknown and the yet-to-exist" (Dunne and Raby, 2013, p.101).

---

7. We use "itchy matter" as a term that refers to immaterial disturbance that triggers curiosity, sets one apart but also creates a strange intimacy. We use this term to illustrate two sides of ferality, which opens up different realms to be explored by thinking and doing in the field of design.

Acknowledgement of the roles of the authors

The authors confirm their contribution to the article as follows: Seçil Uğur Yavuz (PI of the project): writing and original manuscript preparation, theoretical and conceptual framing, study conception, conceptualisation, writing review and editing. Merve Bektaş: writing and original manuscript preparation, theoretical and conceptual framing, conceptualisation, study conception, collection, analysis and interpretation of results, writing review and editing, illustration, photography. Camilo Ayala-Garcia: writing and original manuscript preparation, conceptualisation, writing review and editing. All authors have read and agreed to the published version of the manuscript.

Acknowledgements

Bibliography

Allen, A. S. (2019) Aesthetics and Sustainability. *Encyclopedia of Sustainability in Higher Education*, pp.25-33. https://doi.org/10.1007/978-3-030-11352-0_403

Akama, Y., Light, A., and Kamihira, T. (2020) 'Expanding Participation to Design with More-Than-Human Concerns', *Proceedings of the 16th Participatory Design Conference 2020 - Participation(s) Otherwise (PDC 2020)*. pp.1-11. https://doi.org/10.1145/3385010.3385016

Aktaş, B.M., and Valle Noronha, J. (2021) Tangled becomings in materialities of felt practice(s). In: Brandt, E., Markussen, T., Berglund, E., Julier, G., Linde, P.(eds.), *Nordes 2021: Matters of Scale*, pp.15-18 August. Denmark: Kolding.

Antonelli, P. (2019) Broken Nature. XXII Triennale di Milano. Milano: Electa.
Ashby, M.F. (2013) *Materials and the Environment. 2nd Edition*. Oxford, UK: Butterworth Heinemann.

Autonomous Province of Bolzano (2024) *Manutenzione degli argini dell'Adige: al "lavoro" anche le pecore.* News - Autonomous Province of Bolzano - Alto Adige [online]. Available at: https://news.provincia.bz.it/it/news/manutenzione-degli-argini-dell--adige-al-lavoro-anche-le-pecore (Accessed: 21 March 2024).

Ávila, M. (2022) *Designing for Interdependence: A Poetics of Relating*. New York: Bloomsbury.

Bennett, J. (2010) *Vibrant Matter: A Political Ecology of Things*. Durham & London: Duke University Press.

Bourriaud, N. (2002) *Relational Aesthetics*. Dijon: Les Presses du Réel.

Carr, L. and Zhou, F. (2022) 'Feral', Wesseling, J. and Cramer, F. (ed.) *Making Matters*. Amsterdam: Valiz, pp.269-274.

Cattin, S. (2019) *Staying with the Shepherd*. NERO Editions [online]. Available at: https://www.neroeditions.com/staying-with-the-shepherd/ (Accessed: 21 March 2024).

de la Bellacasa, M. P. (2017) *Matters of Care. Speculative ethics in more than human worlds.* Minneapolis: University of Minnesota Press.

Despret, V., and Meuret, M. (2016) 'Cosmoecological sheep and the arts of living on a damaged planet'. *Environmental Humanities*, 8(1), pp.24-36. https://doi.org/10.1215/22011919-3527704

Dunne, A. and Raby, F. (2013) *Speculative everything: design, fiction, and social dreaming.* Cambridge, Massachusetts: The MIT Press.

Encyclopedia Britannica (n. d.). *Phenology* [online]. Available at: https://www.britannica.com/science/phenology (Accessed: 21 March 2024).

EU Commission. (n. d.). *Geographical Indications and quality schemes explained. Agriculture and Rural Development* [online]. Available at: https://agriculture.ec.europa.eu/farming/geographical-indications-and-quality-schemes/geographical-indications-and-quality-schemes-explained_en#documents (Accessed: 20 March 2024).

European Environmental Regulations. (2011) 'Commission Regulation (EU) No 142/2011' [online]. Available at: https://eur-lex.europa.eu/eli/reg/2011/142/oj (Accessed 20 March 2024).

Eurostat (2023) *EU livestock population continued to decline in 2022* [online]. Available at: https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20230322-1 (Accessed: 21 March 2024).

EURAC (2023) *Pastures and Meadows* [online]. Available at: https://biodiversity.eurac.edu/research-sites/agricultural/
(Accessed: 22 March 2024).

Eide, H., Wiese, K. W., Celli, A., Farresin, S., Gonella, G., and Trimarchi, A. (2023) *Formafantasma: Oltre Terra.* Oslo: The National Museum of Art, Architecture and Design.

Escobar, A. (2018) *Designs for the pluriverse: Radical interdependence, autonomy, and the making of worlds.* Durham; London: Duke University Press.

Escobar, A. (2020) *Pluriversal politics: The real and the possible.* Durham, N.C.: Duke University Press. Translation by David Frye.

Federici, S. (2019) *Re-enchanting the World: Feminism and the Politics of the Commons.* Oakland: PM Press.

Francheschini, A. (2022) 'The Shepherd and the Weaver: A Conversation Between Futurefarmers' Founder, Amy Francheschini and Fernando Garcia Dory of Inland'. In: Fuad-Luke (ed.), *Field explorations: Design- and Arts- Based Practices Towards Viable Agri-cultures.* Berlin: Agents of Alternatives.

Fuad-Luke, A. (2009) *Design activism: Beautiful strangeness for a sustainable world.* London: Earthscan.

Fuad-Luke, A. (2022) *Field explorations: Design- and Arts- Based Practices Towards Viable Agricultures.* Berlin: Agents of Alternatives.

Fuad-Luke, A. (2022) *Post—Normal Design: Emergent approaches towards plural worlds.* Matosinhos: esad—idea.

Gambicorti, M. (2008) *Transhumanz.* Pontedera: Bandecchi & Vivaldi.

García-Dory, F. Michałowski, P., and Drane, L. H. (2020, March) *Arts in Rural Areas,* IETM [online]. Available at: https://cultureactioneurope.org/files/2020/03/IETM_Art-in-Rural.pdf (Accessed: 21 March 2024).

Geels, F. W. (2006) 'Multi-level perspective on system innovation: relevance for industrial transformation'. In: Olsthoorn, X. and Wieczorek A. J. (ed.), *Understanding industrial transformation: views from different disciplines* (pp.163-186). (Environment & policy; Vol. 44). Springer. https://doi.org/10.1007/1-4020-4418-6_9

Habicher D. et al. (2022) 'Report di progetto Tiny FOP MOB: unreal world laboratory in legno e canapa in viaggio attravero la Val Venosta; l'impegno comune di scienza e società per sviluppare soluzioni sostenibili'. E*urac Research* [online]. Available at: https://bia.unibz.it/esploro/outputs/report/Report-di-progetto-Tiny-FOP--MOB/991006376891101241#file-0 (Accessed: 21 March 2024).

Hancock, T., and Bezold, C. (1994) Possible futures, preferable futures. *Healthc.* Forum J. 37 (2), pp.23-29.

Haraway, D. J. (2003) *The companion species manifesto: dogs, people, and significant otherness.* Chicago: University Presses Marketing.

Haraway, D. J. (2016) *Staying with the Trouble: Making kin in the Chthulucene.* Durham: Duke University Press.

Ingold, T. (2023) 'History in Wool'. In: Eide, H., Wiese, K. W., Celli, A., Farresin, S., Gonella, G., and Trimarchi, A. (ed.), *Formafantasma: Oltre Terra.* Oslo: The National Museum of Art, Architecture and Design.

IWTO - International Wool Textile Organization. (2022) *World Sheep Numbers & Wool Production* [online]. Available at: https://iwto.org/wp-content/uploads/2022/04/IWTO-Market-Information-Sample-Edition-17.pdf (Accessed: 21 March 2024).

Kicińska-Jakubowska, A., Broda, J., Zimniewska, M. and Przybylska, P. (2024) 'Characteristics of Wool of Selected Polish Local Sheep Breeds with Mixed Type Fleece', *Journal of Natural Fibers*, 21(1). https://doi.org/10.1080/15440478.2023.2290855

Kimmerer, R. W. (2013) *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants*. Minneapolis: Milkweed Edition.

Leopold, A. (1989) cited in Allen, S. A. (2019) *A sand county almanac, and sketches here and there*. New York: Oxford University Press.

Løvbak Berg, L., I. Grimstad Klepp, A. Schytte Sigaard, J. Broda, M. Rom, and K. Kobiela-Mendrek. (2022) Reducing Plastic in Consumer Goods: Opportunities for Coarser Wool. *Fibers* 11(2), p.15. https://doi.org/10.3390/fib11020015

Manzini, E. (2010) 'Small, Local, Open and Connected: Design Research Topics in the Age of Networks and Sustainability', *Journal of Design Strategies,* 4(1). Spring.

McDonough, W., and Braungart, M. (2002) *Remaking the way we make things: Cradle to cradle.* New York: North Point Press.

Mendel, C., Feldmann, A., and Ketterle, N. (2009) 'Conservation of the alpines steinschaf', *Animal Genetic Resources Information*, 45, pp.61-64. https://doi.org/10.1017/s1014233909990332

Noorani, T., and Brigstocke, J. (2018) More-than-human participatory research. In: Facer, K. and Dunleavy, K. (ed.), *Connected Communities Foundation Series*. Bristol: University of Bristol.

Nzama, A.T. (2021) Tackling climate change through craft development: The case of rural women in Phongolo Local Municipality. Jàmbá': *Journal of Disaster Risk Studies*, 13(1), a1140. https://doi.org/10.4102/jamba.v13i1.1140

Parlato, C. M. M., Porto, M. C. S., and Valenti, F. (2022) Assessment of sheep wool waste as new resource for green building elements. *Building and Environment*, 225, 109596. https://doi.org/10.1016/j.buildenv.2022.109596

Provincia Autonoma di Bolzano. (2022) *Relazione Agraria & Forestale 2022.*

Robida Collective. (2022) *Ajda Pratika: Buckwheat – from landscape to table*. Topolove: Robida.

Rognoli, V., and Levi, M. (2011) *Il senso dei materiali per il design [The sense of materials for design]*. Milano: Franco Angeli.

Runer, E. (2015) cited in thesis Bader, T. (2018) '*In the store instead of in the trash*'. Dolomiten Wirtschaftskurier.

Ryder, M. L. (1987) The evolution of the Fleece. *Scientific American,* 256(1), pp.112-119. https://doi.org/10.1038/scientificamerican0187-112

Sanchez-Villagra R. M. (2023) 'On Domestication: Interview with Marcelo R. Sanchez-Villagra'. In: Eide, H., Wiese, K. W., Celli, A., Farresin, S., Gonella, G., and Trimarchi, A. (eds.). *Formafantasma: Oltre Terra.* Oslo: The National Museum of Art, Architecture and Design.

SIMRA (2018, September). Collection of examples of social innovation in Mountain Areas [online]. Available at: http://www.simra-h2020.eu/wp-content/uploads/2016/11/2018-Mountain-Brochure.pdf (Accessed: 20 March 2024).

Spawforth, A. (2016, March 7). *Transhumance*. Oxford Classical Dictionary [online]. Available at: https://oxfordre.com/classics/display/10.1093/acrefore/9780199381135.001.0001/acrefore-9780199381135-e-6527#acrefore--9780199381135-e-6527(Accessed: 21 March 2024)

Tan, P. (2023) 'Yabanıl İttifaklara Doğru: Dolanık Sürgünler', Misi`nin Florası - Sergi Kitapçığı.

Tauber, E. (2022) The return of the wolf to the Alps: coexistence in pastoral landscapes. *Architectural Review* [online]. Available at: https://www.architectural-review.com/essays/the-return-of-the-wolf-to-the-alps-co-existence-in-pastoral-landscapes (Accessed: 20 March 2024).

Tronto, J. (1998) 'An Ethic of Care´, *Generations: Journal of the American Society on Aging*, 22(3), pp.15-20. Available at: http://www.jstor.org/stable/44875693

Tsing, A. L. (2015) *The mushroom at the end of the world: On the possibility of life in capitalist ruins*. Princeton: Princeton University Press.

Vagnoni, E., Carrino, C., Dibenedetto, N., Pieragostini, E., and Consenti, B. (2016) The enhancement of native sheep's wool: Three case studies from some Italian regions. *Small Ruminant Research*, 135, pp.85-89. https://doi.org/10.1016/j.smallrumres.2015.12.011

Westerlaken, M. (2020) *Imagining Multispecies Worlds* (Ph.D. dissertation, Malmö Universitet). https://doi.org/10.24834/isbn.9789178771059

Winterschule (2022). *Winterschule Ulten* [online]. Available at: https://www.winterschule-ulten.it/ (Accessed: 20 March 2024).

Secil Ugur Yavuz
Free University of Bozen-Bolzano (Bolzano, Italy)

She is an associate professor at Free University of Bozen-Bolzano, Faculty of Design and Art. She is currently the study course director of Eco-Social Design Master. She had her PhD degree in Design, from Politecnico di Milano, in 2012. Through participatory design and co-design methods, her research aims at opening debate and stimulating new visions of interaction within the entanglement of our socio and technological spheres towards sustainable and desirable future(s). She is a member of Social Design Network, New European Bauhaus of Mountains and Competence Center for Mountain Innovation Ecosystems (unibz).

Merve Bektaş
Free University of Bozen-Bolzano (Bolzano, Italy)

Istanbul-born Merve Bektaş, is a designer, artist, and researcher at the Free University of Bozen-Bolzano, Italy, working on the intersection of practice-based research and eco-social transformation. Trained in Industrial Product Design, she completed her master's degree with her thesis research project Glocal Worm-ing at unibz with honour. In this project, earthworms are active agents to transform human-soil relations for multispecies flourishing. The project was exhibited in various exhibitions, such as the Museum of Nature South Tyrol for six months, followed by the Long Night of Research. Since 2021, she has been organizing co-creative workshops exploring soil, dirt, and compost as a space for artistic and design research and as ecologies of relations. Merve was a guest speaker at MUSEION - Museum of Contemporary Art, as part of the exhibition Neo Soil, by Asad Raza. She is a member of Lungomare

Bozen-Bolzano, which is a platform for design, art, and cultural production and Competence Center for Mountain Innovation Ecosystems (unibz).

Camilo Ayala-Garcia
Free University of Bozen-Bolzano (Bolzano, Italy)

Camilo Ayala-Garcia is a Colombian designer, professor and researcher.
He obtained his PhD on the topic of Do-It-Yourself Materials as triggers of change at Politecnico di Milano. Before this PhD research, Camilo received a Master of Arts in Design degree from Domus Academy in Milan, awarded with Distinction. He is trained as an Industrial Designer and a Textile Designer at the Los Andes University in Bogotá. Camilo work as a researcher in the Design Friction Lab at the Free University of Bozen-Bolzano, bridging emerging technologies and materialities towards a transitional circularity. He devoted his research to local materials and product development together with his teaching activities, with several patents granted and different academic contributions published. He is a member of the Materials Experience Lab and Competence Center for Mountain Innovation Ecosystems (unibz).

Secil Ugur Yavuz
Free University of Bozen-Bolzano (Bolzano, Italia)

Es profesora asociada en la Facultad de Diseño y Arte de la Free University of Bozen-Bolzano. Actualmente es directora del Máster en Diseño Ecosocial. Obtuvo su doctorado en Diseño del Politecnico di Milano en 2012. A través de métodos de diseño participativo y codiseño, su investigación tiene como objetivo abrir el debate y estimular nuevas visiones de interacción dentro del entrelazamiento de nuestras esferas socio y tecnológicas hacia futuros sostenibles y deseables. Es miembro de Social Design Network, New European Bauhaus of Mountains y de Competence Center for Mountain Innovation Ecosystems (unibz).

Merve Bektaş
Free University of Bozen-Bolzano (Bolzano, Italia)

Merve Bektaş, nacida en Estambul, es diseñadora, artista e investigadora de la Free University of Bozen-Bolzano, Italia, y trabaja en la intersección de la investigación basada en la práctica y la transformación ecosocial. Formada en Diseño de Producto Industrial, completó su máster con honores en su proyecto de investigación de tesis Glocal Worm-ing en la unibz. En este proyecto, las lombrices de tierra son agentes activos para transformar las relaciones entre humanos y suelo para el florecimiento de múltiples especies. El proyecto se exhibió en varias exposiciones, como en el Museum of Nature South Tyrol durante seis meses y después en la Long Night of Research. Desde 2021 organiza talleres co-creativos que exploran el suelo, la tierra y el compost como espacio de investigación artística y de diseño y como ecologías de relaciones. Merve fue oradora invitada en MUSEION - Museum of Contemporary Art, como parte de la exposición Neo Soil, de Asad Raza. Es miembro de Lungomare Bozen-Bolzano, una plataforma de diseño, arte y producción cultural y de Competence Center for Mountain Innovation Ecosystems (unibz).

Camilo Ayala-Garcia
Free University of Bozen-Bolzano (Bolzano, Italia)

Camilo Ayala-Garcia es un diseñador, profesor e investigador colombiano.
Obtuvo su doctorado sobre el tema de los materiales de bricolaje como desencadenantes del cambio en el Politecnico di Milano. Antes de esta investigación de doctorado, Camilo recibió una Maestría en Diseño de la Academia Domus de Milán, con distinción. Se forma como Diseñador Industrial y Diseñador Textil en la Universidad de los Andes en Bogotá. Trabaja como investigador en el Design Friction Lab de la Free University of Bozen-Bolzano, uniendo tecnologías y materialidades emergentes hacia una circularidad de transición. Dedicó su investigación al desarrollo de materiales y productos locales junto con su actividad docente, con varias patentes concedidas y diferentes contribuciones académicas publicadas. Es miembro del Materials Experience Lab y del Competence Center for Mountain Innovation Ecosystems (unibz).