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Frédéric Ducarme

► **To cite this version:**

Frédéric Ducarme. The Ecology of the "Terroir". *Environmental Ethics*, 2025, 47 (1), pp.65-88.
10.5840/enviroethics20252395 . hal-04933683

HAL Id: hal-04933683

<https://hal.science/hal-04933683v1>

Submitted on 10 Feb 2025

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The Ecology of the “Terroir”: What Can an Old French Concept Bring to Modern Relationships to the Land?

Frédéric Ducarme

Industrial agriculture led to a worldwide homogenization of crops and modes of cultures, but also of landscapes and relationships to the land, threatening at the same time biodiversity and cultural diversity. Developing alternatives to the agro-industrial system inherited from the twentieth century is therefore one of the greatest challenges facing humankind today. This article advocates for the promotion of the French concept of “terroir” as a foundational framework for preserving biocultural diversity, illustrating an ethical way of relating to the land. Already enshrined in European law for three decades and under study at the UNESCO and the FAO, it encourages farmers to adopt ecologically virtuous practices, while ensuring greater economic incomes. Moreover, it enhances the value of their work and their specific relationship with their environment in the long run. It also epitomizes broader worldwide initiatives, which propose basing agriculture not against the environment (both human and natural) but in symbiosis with it.

INTRODUCTION

The rise of environmental philosophy and eco-anthropology has allowed conservationists to become more and more aware about the diversity of relationships with nature throughout different cultures.¹ Moreover, it also has allowed US conservationists to understand how some of their key concepts such as “wilderness” were actually very US-centered cultural items, difficult to translate in other languages (Nelson and Callicott 2008) and with little if any existence in other countries, hence little legitimacy elsewhere² unless they get appropriated and cultur-

¹ Among many works on this topic, we can cite the ones of J. Baird Callicott, such as Callicott 1994. In a more anthropological approach, a famous reference is Descola 2013. A comparative linguistic approach can be found in Ducarme et al. 2021.

² This concern was particularly raised in the columns of the present journal by Guha 1989.

Frédéric Ducarme is an associate researcher in environmental philosophy at the Muséum National d’Histoire Naturelle, CESCO lab (UMR 7204), 43 rue Buffon, 75005 Paris. Acknowledgements go to Yasha Rohwer, who came up with the idea for this article during his stay in Paris before it was then presented at the ISEE annual conference. The paper was proof-read by Denis Couvet, Yves Bertheau, Patrick Blandin, Lola Cornaert, and Kalli Giannelos, as well as members of the IUCN French Committee’s “Ethics in Action” working group. Two anonymous reviewers for the journal also provided particularly useful comments. frederic.ducarme@gmail.com.

ally recontextualized. On the other hand, this cultural diversity in the relationships with nature should not entail a sort of total ecological relativism, as many traits and consequences of the ecological crisis are global, and many potential solutions are adaptable to a wide array of countries, if properly adapted to local cultural and natural landscapes.

Eco-anthropology also has taught ecologists that the great diversity of relationships between humans and nature is rich in lessons for the future of our agricultural systems, sometimes across oceans, far beyond vertical technology transfer from rich countries to poorer ones. In this scope, I seek to introduce to a broader audience the French concept of “*terroir*,” an idea as culturally rooted and untranslatable as wilderness (Prévost et al. 2014), but which may provide an interesting conception of ecosystem management and agro-ecology for conservationists far beyond Europe. “*Terroir*” is a word that carries powerful cultural, environmental, and sensory associations in France. Although difficult to translate, *terroir* can be understood as a dynamic engagement between people, land, and food (Lemasson and Trubek 2010). My aim is also to relate the notion of “*terroir*” to proximate and more scientific notions, such as biocultural diversity (Maffi 2007) and agroecology (a good definition can be found in Isbell [2015]), in the framework of the “transformative changes” called by IPBES.

CONTEXT: INDUSTRIAL AGRICULTURE AND STANDARDIZATION

To understand the challenges for the notion of *terroir*, one has to examine the historical sequence of industrialization and its consequences for biocultural landscapes. In this regard, the North American version of agricultural industrialization offers the advantage of clarity, being at the same time the fastest and the most dramatic—going directly in certain landscapes from very low human influence to highly industrial agriculture, a shift that took several centuries in the Old World, with many intermediate stages. The US industrial paradigm, as embodied by Taylor and Ford, was based on massification and standardization, two ways of reducing costs and prices, and hence to flood ever-growing markets while increasing profits (Taylor 1911). Such historical economic success gave some sacrality to this model, from the idea of “manifest destiny” to the Cold War. This industrial paradigm was also imported to agriculture (Worster 1994³): the progress made in agronomy throughout the nineteenth and twentieth centuries allowed to produce such large amounts of corn that the main agricultural issue in the US during the twentieth century was to find sufficient outlets for all these stocks (Foley 2013), mainly through the development of grain-fed cattle, new foods (such as kids’ cereals), and worldwide subsidiarized exports. After WWII, this agro-industrial model was exported to many countries, especially Europe (through the Marshall plan) but also India with the “Green Revolution,” leading to major growth in terms of amount of food produced, but also in reduction of products and crop diversity, along with pollution and social issues (Hubert and Couvet 2021).

³ See especially ch. 12: “Dust follows the plow.”

Food production has seen various advancements globally in developing countries, such as India. Notably, the World Bank applauded the introduction of the green revolution there as it reduced rural poverty for a certain time. Despite this success, the World Bank also reported health outcomes had not been improved, and during the post-green revolution period, several notable negative impacts arose (John and Babu 2021). However, the benefits and harms of the green revolution for local populations remained poorly studied, while it led to major impacts on ecosystem functioning and unsustainable practices (Baranski 2022). In this wake, a massive conversion soon allowed most of the world to share in the joys and sorrows of 1930 Oklahoma farmers (Glaeser 1987).

Nascent "global supply chain value" induced a need to standardize production to avoid any heterogeneity in the merchandise, and even more so with the globalization of the agricultural commodities trade (Price 1921). As with oil, standards emerged, and with them dominating varieties, breeds, and cultivars (ideotypes) that assured growers the bulk of their production could be integrated into this large, standardized, homogenized, and normalized market. This market standardization has led to a worldwide agricultural homogenization and, above all, specialization, a liberal request since Adam Smith. Whereas "traditional" farmers practiced mixed farming and livestock breeding to feed their community and live off the sale of surpluses, the modern industrial farmer tends to produce a single product, but *en masse*, thanks to the mechanization of farming practices and contracts with upstream and downstream multinationals. Autonomy thus gave way to a system in which the farmer becomes part of an integrated agro-industrial production system, a system in which a handful of multinational companies virtually control the entire sector. Hence, 99 percent of US corn production is now patented dent corn (Barnes et al. 2020), and 70 percent of it come from only 3 seed companies (as for soybeans), traded globally by 4 multinational companies ("ABCD" = ADM, Bunge, Cargill, Dreyfus). As a result, agricultural landscape became treated as a simple industrial asset, the usual "commodity," with little concern for environment, health, local culture, and well-being (Ortiz et al. 2021). While the United States is a gigantic country marked by extraordinary geological and climatic diversity (even inside the "corn belt"), farmers from the Dakotas to Alabama, Pennsylvania, and Kansas had to ensure they produced a similar corn, which was made possible by earth levelling, soil earthwork, heavy tillage, the use of fertilizers, acidity correctors, pesticides, and, of course, massive irrigation. This is how the dull cornfield became the default rural landscape across most of the country, even though it is only marginally used for human consumption, and is essentially a raw commodity for industrial use (Fardet et al. 2024), especially livestock farming and biofuels (more than one third of the corn production according to USDA⁴). This is also how farmers became the workers of large international agricultural production firms, and how the farm became an open-air factory.

⁴ USDA, "Global Demand for Fuel Ethanol Through 2030," <https://www.ers.usda.gov/publications/pub-details/?pubid=105761>.

This system led to significant growth in production, opening the way to internationalization of the market and diversification of outlets, as most US corn is no longer destined for human consumption. However, it also generated major environmental issues, especially in places where such a model was unsustainable in the short term. The first to gain fame was the great Dust Bowl of 1930, due to the mineralization of the Great Plains' soils as a result of agricultural mis- and overexploitation (Worster 1994). The widespread use of pesticides was a more silent issue, at least until Rachel Carson's *Silent Spring* (1962), raising the question of their effects on both human health and nature, therefore on human health twice. Finally, ultra-processed foods produced by the agro-industrial system from this reductionist approach to agriculture and alimentation are today considered one of the major public health issues in developed countries (Fardet et al. 2024).

In the shadow of these great battles, the issue of the disappearance of both agricultural and wild biodiversity through the homogenization of landscapes and agricultural practices took longer to penetrate people's consciousness (Tscharnitke et al. 2012), yet it poses a risk at least as great as the one posed by pesticides (Rigal et al. 2023). An industrial corn field landscape may look like "nature," but it actually shelters less biodiversity than a wasteland, and impoverishes the soils. It delivers mostly one ecosystem function, which is primary production as long as the soil can be kept fertile, with fertilizers and tilling compensating, for a while, the loss of natural soil fertility and microbiota (Ackerman et al. 2003, Godfray et al. 2010, Banerjee et al. 2019). But such a soil only can evolve towards mineralization (the agronomic term for desertification), and emits more carbon than it sequesters, absorbs little water, loses its organic matter and life, and does not even allow the survival of species that would be useful to the crops (Suman et al. 2022).⁵

Agriculture now occupies 37 percent of the terrestrial land area and uses over 70 percent of the world's freshwater withdrawals, with constantly rising figures (Polimeni et al. 2008, Pérez-Blanco et al. 2021). By 2050, 80 percent of agricultural land will face water scarcity, while the efficiency of water use has plateaued (Pérez-Blanco et al. 2021). Despite claims from GMO companies, industrial corn is actually more sensitive to water deficits, leading to water depletion and negative consequences (Lobell et al. 2020). In parallel, fertilizer inefficiency results in 80 percent being lost (Rosa and Gabrielli 2023), causing massive ecosystem disruptions in water streams and seas. No effective solution has been found for these negative externalities of intensive agriculture whose examples could be extended.

At a time when a new green revolution is called for to right the wrongs of the past,⁶ a critical examination of the various pre- and para-industrial traditions is called for, and this is what I propose here with the concept of terroir.

⁵ A good synthesis of current soil biodiversity science and its agronomic interest also can be found in Selloso 2021, although not translated into English yet.

⁶ Among many works advocating for such a shift, we can cite the 2018 report from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES 2018). In the scientific literature, syntheses can be found in Pingali 2012 or Renard and Tilman 2019.

THE VIRTUES OF TYPICALITY AND LOCALITY

DEFINING THE TERROIR

One of the main historical debates among conservationists is the "land sparing/land sharing" debate (Loconto et al. 2020). It asks whether the best way to conserve biodiversity is to concentrate the anthropic pressure on smaller areas (thanks to more intensive agriculture) to leave large areas protected from human enterprise, or whether conservation rather should be widespread across most human settlements and activities, reducing the ecological footprint everywhere (through agro-ecology, for example) at the price of smaller protected areas. For historical and geographical reasons, the US has mostly favored the first option, whereas Europe (as well as large parts of the Old World) rather chose the second, because agriculture and biodiversity have co-evolved over the long term there, and populations were often more evenly distributed.

We are now aware that the network of protected areas alone will not be enough to sustain the global biodiversity and ecological functions, and that nature should be cared for outside of them, too (Smil 2011). Enriched by the rise of new ideas of human-wildlife interaction such as reconciliation ecology (as defined in Rosenzweig [2003]), researchers are now looking for new ways to combine agricultural production with biodiversity protection and ecosystem services (such as carbon storage), and ecologists are increasingly interested in agricultural areas (Cozim-Melges et al. 2024).

In this context, the seemingly old-fashioned idea of *terroir* may constitute one example of a way to conciliate agricultural production and biodiversity conservation. Connected to the concept of socio-ecosystems, it may help to give some perspectives and to propose paths to transform globalized agricultural production towards localized and diverse agro-ecological productions.

The idea of *terroir* can be defined as follows:

A *terroir* is a delimited geographical area defined by a human community which, over the course of its history, has built up a set of distinctive cultural traits, knowledge and practices, based on a system of interactions between the natural environment and human factors. The *savoir-faire* brought into play reveals an originality, confers a typicality and enables recognition for products or services originating in this area, and therefore for the people who live there. *Terroirs* are living, innovative spaces that cannot be equated with tradition alone. (*Charte des terroirs*, UNESCO 2005)

Hence, more than simple geographical indications, *terroirs* can be understood as "a link between the diversity of environments, cultures, agricultures and foods," and extended to the idea of "an area developed by a rural community, what ancient geographers called the 'finage'" (Prévost et al. 2014), with roots in pedology, microclimates, and long-term agricultural history.⁷ The word is quite ancient in

⁷ A scientific approach corresponding to this type of object can be found in the works developed by Carol L. Crumley, who called her discipline "historical ecology": it is probably no coincidence that Burgundy was her main field of study. See, for example, Crumley 2017.

French (it emerged during the Middle Ages, maybe designating a way of working the land, “*terre*”⁸) and regarding the academic fields, is mostly present in geography, closely related to agricultural landscapes. This word offers the advantages to be spread over both human and physical geography, as it is the meeting point of physical particularities (reliefs, soil, climate, local species, or varieties) and human cultures (know-how, trade routes, traditions, customs). Of course, it is also present in agronomy where it is defined as “A set of lands in a region, considered from the point of view of its agricultural aptitude at providing one or more characteristic products,” sometimes also called “localized agrifood system” (Prévost et al. 2014). For further reading, the main English-speaking synthesis about this concept and its history (although mostly food-oriented) can be found in *Tasting French Terroir: The History of an Idea* (Parker 2015).

To sum up, a proper terroir approach relies on five pillars:

1. The use of locally sourced crops and breeds, adapted to local conditions (morphology, soil, climate, ecosystems, people);
2. cultivation of agricultural products that are particularly distinctive in terms of their nature, processing and/or taste qualities, and therefore offer high added value and originality;
3. products whose essential production cycle is carried out locally, often using environmentally sourced raw materials in a sustainable way;
4. the use of specific local know-how, based on a farming tradition that relies more on human ingenuity rather than industrial strength, developed in relation with local biodiversity rather than against it (as in the idea of “nature-based solutions”), and part of a local cultural tradition;
5. the maintenance, through agricultural practices, of a special landscape system, accommodating significant local biodiversity, from agricultural and semi-domestic species to wild ones, in so-called semi-natural habitats (e.g., Garibaldi et al. 2023).

The idea of terroirs has remained for centuries a popular notion without much academic work. It became controversial only when these terroirs got jeopardized by the agricultural modernization that followed the Second World War, often thought of as an “Americanization”—a synonym of modernization, industrialization, and globalization in most of the world during the second half of the twentieth century. The defense of terroir was then organized, gathering nostalgic regionalists (often traditionalists and conservatives), but also autonomist activists stemming from the leftist social movements of the 1960s, as well as local farmers attached to their products and way of life and fearing unfair competition from foreign industries or alienation by big multinational companies (Demeulenaere and Bonneuil 2010).

The main advocates of the notion were wine producers, as their whole production is terroir-based. In southern Europe, people do not actually buy wine accord-

⁸ In French, “*terre*” means at the same time earth, land, ground, and soil.

ing to a type of vine (Chardonnay, Sauvignon, etc.), but to a region: Bordeaux, Bourgogne, Beaujolais, etc. Inside of these regions, a good bottle will normally get its name from a distinct place (Côte de Nuits, Saint-Emilion, Crozes-hermitage, etc. see Trubek [2004]) and then a distinct property (Romanée-Conti), and usually even indicate the name of the wine-maker. It is as if every good bottle of European wine was geolocated and could be traced back to the postal address of the very person who made it, and is held responsible for its quality, the exact contrary of the opaque industrial superstructure. In exchange, as the value of the product comes from its first producers, a larger part of its price is expected to go to them, contrary to industrial products where the farmer's share is often extremely low. A first legislation erected quality labels in 1855, which was completed during the 1930s by "territorial" labels, which were passed in France to regulate and protect the use of locality names in wine, called "*appellation d'origine contrôlée*" (AOC, "restricted designation of origin"), a system that was progressively extended to incorporate many other products (cheese, meats, vegetables, etc.) and accommodate, alongside the geographical requirement, specifications for good practice based on local tradition. This system dwells on even older practices: for example, since the seventeenth century only ten small villages in the south-west of France are officially allowed to produce a famous local chili known as "piment d'Espelette," which is now exported worldwide, generating both market and tourism incomes. The first significant international treaty protecting such appellations was the "Lisbon Agreement for the Protection of Appellations of Origin and their International Registration" of October 31, 1958 (WIPO, 1958), although it protected only the geographical mentions on the basis of intellectual property and only inside 39 signatory states.

It is when French (but also Greek) cheese got threatened by European legal homogenization directly inspired by the agro-industrial paradigm⁹ at the end of the 1980s, that a grueling legal battle finally led to the recognition of the concept by the whole European Union in 1992. This was the birth act of AOP (*appellation d'origine protégée*, protected designation of origin), and incorporating geographical mentions as well as a set of best practice specifications. The idea of terroir then gained its first international definition in the early 2000s thanks to a report from the FAO (2003, 2018) and two years later the UNESCO "*Planète terroir*" international meeting, which led to the establishment of an international "terroir charter" (UNESCO 2005). However, its development did not exceed Europe and its neighboring countries so far, partly because of a strong US opposition at the WTO (see Josling 2006 and Huysmans 2022). To date, the only similar legislation accepted in North America only applies to wine and does not act yet as a meaningful label for consumers. Some small groups are currently advocating for similar labels on their products in the US, such as for artisanal cheese (Paxson 2010), along with many scattered projects around traditional ecological knowledges or reclamation, but with limited success so far. However, similarities can be found in geographical

⁹ For more historical background, see Bérard and Marchenay 1995 and Demeulenaere and Bonneuil 2010.

indications in trade agreements (Huysmans 2022), or fair trade or organic labels, which are increasingly common in many industrial countries; the differences and resemblances will be discussed below.

SOCIAL VIRTUES

There are multiple virtues to the terroir framework once it is supported by a specification sheet and protected by the law. First, these virtues can be social. For example, the terroir approach **values the producer**, both symbolically and financially, rather than market intermediaries, helping reducing the wealth gap between cities and countryside but also valuing the diversity of local cultures and empowering rural communities, in a way similar to fairtrade labels. The use of traditional methods based on manual know-how also guarantees the employment of more workers, with a higher level of qualification and more secure jobs. An AOP also acts as a **certificate of quality** for the consumer who is certain the product will meet certain standards regarding health, nutrition, and taste. It also helps **relocating, reducing, and tracking down the supply chain** for a better control of consumers over the quality, content, and production norms of the products, while nobody knows where on Earth their ketchup tomatoes grow, and under what pesticide legislation. This can be compared to community-supported agriculture initiatives that have recently flourished in the US. Last but not least, these shortened supply chains also can **lower the prices** for the consumers, as fewer intermediaries take their cut along the supply chain. Hence a product with far higher quality may eventually not cost much more than its industrial counterpart once the logistics are set up. However, the most iconic products can become more expensive with wider recognition.

While for industrial products, the more standardized and massified they are the better they are considered, terroir products become more valuable as they distinguish themselves from the bulk of similar products, and sometimes scarcity makes the profit. For example, Romanée-Conti only produces 5500 bottles a year over 25 hectares (61 acres, 13 percent of an average US farm), but each of them can cost more than 30 000 € and they are sold all over the world. The whole production of Champagne is spread over only 34,000 hectares (half of New York City) but is worth 4 billion euros, employing 30,000 direct jobs. In a striking opposition to the tendency of gigantism in industrial agriculture, Champagne is the most fragmented vineyard in the world, with almost 300,000 parcels averaging less than two hectares in size, and more than half of all winegrowers cultivate less than one hectare—something unthinkable in industrial farming. Indeed not everybody can afford a bottle of Romanée-Conti at every meal, but in many European regions people can enjoy good local products at an affordable price as they buy it directly from the primary producer. Furthermore, people also can concede an economic effort as long as these products make sense to them, embody their land, value their local landscapes and culture, guarantee a responsible production, and make good ambassadors of their culture. For these reasons, it is now estimated the French

agricultural and food trade balance is positive mainly thanks to exports of "terroir products: cheeses, AOC wines, spirits, foie gras."¹⁰

Terroir is not just about agricultural products; it is also about the landscapes that produce them. So it is vital for these farmers to maintain these landscapes, ensuring their beauty, vitality, and sustainability, and making the region where their food is produced a pleasant place to visit, with tourism adding another economic interest to a fairer sharing of resources between agricultural production and the salvation of ecosystems, as illustrated by the famous example of the "wine route." Culinary tourism, which is already highly developed in southern European countries (Bata 2021) but also south-east Asia, also makes it possible to shorten the logistics chain even further, making some luxurious products more affordable, but also more directly profitable for producers.

Outside of Europe, we can find some systems close to terroir, with more or less similar uses. The word itself also has gained visibility and attracted interest, and is now getting applied in the academic literature to productions as varied as coffee in Costa Rica (Smith 2018), whiskey in Ireland (Kyrleou et al. 2021), durian in Malaysia (Airriess 2020) or kava in Vanuatu (Siméoni and Lebot 2014) as well as many other regional products in China (Tracy 2013), proving an important potential for development worldwide, which may eventually include North America (Lemasson and Trubek 2010). The FAO also has coined the similar concept of "Globally Important Agricultural Heritage Systems" (GIAHS, FAO 2018), identifying fifty sites throughout twenty countries, which is another argument in favor of the global potential of such approach.

ECOLOGICAL VIRTUES

Other virtues of the terroir are more ecological. The terroir approach then can be seen as an ecocentric vision of socio-ecosystems based on healthy, varied, functional, and respected environments, benefiting humans and non-humans alike, in a highly inclusive (if not holistic) approach that completely contradicts the simplifying (if not reductionist) approach of industrial agriculture. Hence, it is no surprise so many great wine producers have easily converted to organic (or similar) protocols, as in many cases their practices were already quite virtuous, and above all their ideals naturally led them in this path. In 2023, more than one quarter of the Bordeaux "grands crus" were sold under the European organic label (Niederorn, 2022); many others operate under similar labels and protocols (sometimes even more demanding, such as "Nature et Progrès" or "Bio Cohérence"¹¹), and a large proportion of the remainder are in the process of converting.

Once legally recognized and organized, terroir can act as a certification of "**good practices**," as the process of cultivation, curation, and cooking (or vinification) are all monitored under strict specifications. This is especially true regarding the respect

¹⁰ Quoted from a press article by French agronomer Dufumier, M., « L'avenir ne sera assuré qu'avec une agriculture paysanne relevant de l'agroécologie », *Le Monde*, 20 February 2024.

¹¹ The specifications are available on the website: <https://www.biocoherence.fr/>.

of the soil (Brevik et al. 2019) and the use of chemicals or heavy machines: the local nature is seen as an ally to glorify rather than a defect to be smoothed out, in a way that can be analyzed in terms of “nature-based solutions” as coined by the IUCN (Cohen-Shacham et al. 2016).

Secondly, terroir products use **local crops and animal breeds**, which are better fitted to the local conditions and then need less water, pesticides, fertilizers, and drugs than standard varieties (Lamichhane et al. 2018). They also work on smaller parcels with a more diverse land use, hence maintain a more complex landscape and **more sustainable relationships with local biodiversity**, to such extent it has been shown in some parts of Europe that age-old terroirs are home to more biodiversity than “wild” areas (such as the “*bocage normand*,” see Tourneur and Marchandeu 1996).

Thirdly, these shortened manufacture channels and supply chains also allow to **reduce the carbon footprint** of the products and then act as a climate-friendly label, hence with a global positive effect adding up to the local one. This aspect was already highlighted in the local food (“locavore”) movement since the early 2000s, which already connected local community solidarity with lower carbon footprint.

There has been extensive research on the effect of the terroir soils on the particular taste and quality of wines (e.g., White et al. 2009, Knight et al. 2015) and sometimes cheese (Chemidlin Prévost-Bouré et al. 2021), dominating the biological research about terroirs. However, some research in conservation biology also has focused on the relationship with broader biodiversity, including reviews of best practices for “pairing wine with nature” (Viers et al. 2013), or linking farmland biodiversity to the field size and type of culture (Clough et al. 2020) or cultural and biological diversities (Bérard and Marchenay 2006). Studies led around the Mediterranean basin (a major biodiversity hot spot) showed a terroir approach of agriculture “is well-related with species richness and herbaceous diversity” (Cohen et al. 2015) and this biodiversity appears “related to historical land use” (Cohen et al. 2023). Research also has focused on crop diversity, showing increasing crop heterogeneity enhances soil health (Yang et al. 2024) and biodiversity across agricultural regions (Sirami et al. 2019). Finally, it is well established that agricultural intensification and the homogenization of landscapes it entails was one of the most decisive factors in the crisis of biodiversity and ecosystem functionality (see Mc Kinney and Lockwood 1999, Clavel et al. 2011, Deguines et al. 2014, and Sánchez-Bayo and Wyckhuys 2019). On top of that, intensification, homogenization, and the decrease of ecosystem functionalities also favor crop pests and pathogens (Paredes et al. 2020), making industrial, standardized agriculture all the more unsustainable, while the use of diversified interspersed local crops shows good results in preventing diseases (Zhu et al. 2000). This is also why terroir farmers (often revindicating the name of “peasants”) are particularly worried about climate change, which may jeopardize their working traditions (Clark and Kerr 2017), asking them to develop a great capacity for adaptation and resilience, where the diversity of wild as well as domesticated species will constitute major assets.

More broadly, there is a wide consensus on the positive environmental effect of regulated alternatives to industrial agriculture that easily can be paired with the terroir approach, such as organic agriculture of course, but also applied agroecology: the relationships with these approaches will be discussed further.

TERROIR AMONG SIMILAR APPROACHES

Denunciation of the effects of industrial agriculture on ecosystems as well as on producers and consumers is almost as old as industrial agriculture itself, and the German *lebensreform* was one of its earliest avatars at the end of the nineteenth century.¹² As a result, many alternative farming systems¹³ have been mapped out since, some based on science, others on tradition, and some even on spiritualism, such as biodynamics invented by Rudolf Steiner in the 1920s.¹⁴ Many of these approaches are already closely related to the notion of terroir, but they also differ in their underlying philosophy. The aim of this section is to provide a short overview of this taxonomy (a more detailed overview is readable in Kumar et al. [2022]).

Perhaps the most famous approach is that of **organic farming**, a direct heir of European *lebensreform* and resistances to industrialization, which is now the subject of an internationally recognized label and represents a small but significant and growing share of agricultural consumption in developed countries, especially in western Europe. Organic farming is based on the prohibition of certain techniques and inputs in cultivation (especially most pesticides), and the granting of a certification label for good practices. Its success has sometimes led to excesses and criticism, to the extent some premium distributors have added further constraints or even more demanding alternative labels, such as Bio Coherence. The positive effects of organic agriculture on ecosystem, producer, and consumer health are now consensual, and the main obstacle to greater development remains the associated costs, as well as gaps in knowledge concerning certain crops or regions—gaps that could be filled precisely by the systematic study of local traditional knowledge (or from ecologically similar regions). As mentioned above, the compatibility between the terroir approach and organic farming is such that a high degree of overlap already exists.

On a more academic level, “**agro-ecology**” has been defined as the development, through theory and evidence-based science, of new, less ecologically damaging agricultural models. It is defined by the OECD as “the study of the relation of agricultural crops and environment,” (OECD, 2003) aiming at a more sustainable agriculture. It is now a vivid field of research at the intersection of agronomy and functional ecology (Altieri 1995, Dufumier 2012), nurturing the FAO as well as various alternative movements and associations. Its applied version advocates, among other concerns, for more diversity in crops and an ecosystemic approach of agriculture (Isbell 2015, Prieto et al. 2015). Here, the concern for sustainability and

¹² One of the major theoretical works of this very complex and influential anti-industrial movement is Just 1903.

¹³ I here use the formula coined by the United States Department of Agriculture.

¹⁴ An introduction to Steiner’s place in the agronomic field of his time can be found in Lejano et al. 2013.

respect for landscapes and ecosystems is largely in line with the terroir approach, but remains essentially biological and rarely addresses the issue of cultural diversity and the epistemic alliance between practices and place. However, the conversion of terroir practices to agro-ecological recommendations would seem to be both an essential and accessible horizon for further enhancing their sustainability and ecological benefits. Many other approaches derive from the agro-ecological matrix, such as **synecoculture** (Funabashi 2016).

Regenerative agriculture can be considered as a United States sub-category of applied agro-ecology, particularly dedicated to the question of soil health (and productivity), an obsession that arose in the United States in the wake of the Dust Bowl. It aims at restoring healthier ecological functions in exploited farmland thanks to particular techniques such as bio-sourced fertilizers, no tillage, permanent crops, or crop rotations and cover crops (see Uphoff and Thies 2023). More recently, a connection has been made between regenerative agriculture and carbon sequestration in agricultural soils and cattle-grazed pastures, paving the way for new perspectives on this approach (Jordon et al. 2022).

The idea of **community-supported agriculture** (as defined in DeMuth 1993) has been quite successful in the United States since the 1980s, and since has been popularized with varying degrees of success in other developed countries. This approach, which is in fact directly inspired by certain European terroir practices as well as ideas from the *lebensreform*, easily can be compared to the terroir approach, although it is more focused on the proximity relationship between producer and consumer, and is not subject to any particular regulation or consideration for product typicity.

In a similar vein, **fair trade** (as defined by the World Fair Trade Organization) is a system for certifying good practices, primarily social and secondarily ecological (“10th principle,” then possibly in association with another label), here targeting the relationship between a producer and a consumer who are geographically distant. It also has gained some international recognition since the 1980s and is now a significant (albeit still minority) player in the trade of certain commodities such as coffee and chocolate towards developed countries.

The idea of “**appropriate technologies**” (or “intermediate technology”) has been theorized by the economist Ernst Friedrich Schumacher (Schumacher 1973, see also Jequier and Blanc 1983), arguing appropriateness (on both social and environmental grounds) should be the cardinal virtue of any technology rather than productivity or “modernity.” It is very close to the “design for the other 90 percent” movement coined by a 2007 exhibit at the Smithsonian’s Cooper-Hewitt, National Design Museum, with a strong focus on autonomy and empowerment, but little discourse about market valuation of the production.

The use of **local crops** is still dominating in many countries, but vanished from highly industrialized ones, especially the United States. However, some institutions, such as the University of Kentucky, support projects like the “Center for crop diversification,” which advocate for the use of “heirloom crops,” that can be

considered as a very light version of terroir breeds. They also advocated at USDA the recognition of "ethnic crops," where the breeds are more explicitly linked to particular human communities.

On the other hand, the idea of **ecological intensification** aims at designing a more ecologically friendly agriculture yielding as much as industrial agriculture but using more sustainable methods (MacLaren et al. 2022). This approach is clearly profit-oriented, and aims for massification that can compare to, or even replace, industrial agriculture.

There exist many more examples of less famous but nonetheless interesting approaches in the vast world of alternative farming systems, such as permaculture, but these are less related to our subject and will not be treated here.

The terroir approach, arguably the oldest of these agricultural systems, maintains a symbiotic relationship with this highly diverse ecosystem of alternative farming methods. Combining the ideals of several of them, it may be regarded as a fairly original synthesis of them, and is also distinguished by the high level of profitability and notoriety it can achieve, which is not always the case with alternative farming systems, which constitutes a classical criticism to such approaches. On the other hand, for people who are struggling to support alternative projects around the world, it can be inspiring to see similar approaches are achieving significant success both economically and symbolically in developed countries, and are generating a profitable and successful economy.

In addition to alternative farming systems, the terroir approach can be linked to two other important paradigms. The first is the system of geographical indications, which is backed by property law (Paris Convention of 1883, enforced by the World Intellectual Property Organization), and which essentially concerns the regulation of misleading references to a product's origin, without directly addressing questions of quality or manufacturing methods.

Another approach that has been in vogue since the 2010s, and even more so since the COVID-19 pandemic, is the "one health" concept, which proposes to reunite ecosystem and human health. It is defined by the One Health High-Level Expert Panel as "an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals, and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent" (Adisasmito et al. 2022). Even if this approach is not characterized by considerations of geographical units or agricultural production, the combination of the health of ecosystem and inhabitants can make the terroir a relevant operational unit. Terroirs can even use the health of their inhabitants to promote their products, as in the case of the famous "Cretan diet," which has done much to popularize olive oil (Wahrburg et al. 2002). Recent studies suggest such Mediterranean diets (inscribed in 2013 on the Representative List of the Intangible Cultural Heritage of Humanity) also would provide ecological benefits (Tilman and Clark 2014).

In short, the terroir approach could be an excellent path towards more virtuous agriculture and consumption, in both environmental and human terms, bringing together the merits of many existing, tried-and-tested approaches. By “virtuous” I mean a reliable, viable, and profitable method that brings together five essential constituents in the preservation of nature and the humans who inhabit it, summarized in the following figure: biodiversity conservation, sustainable resources management and use, carbon efficiency, natural and cultural heritage protection, and environmental health.

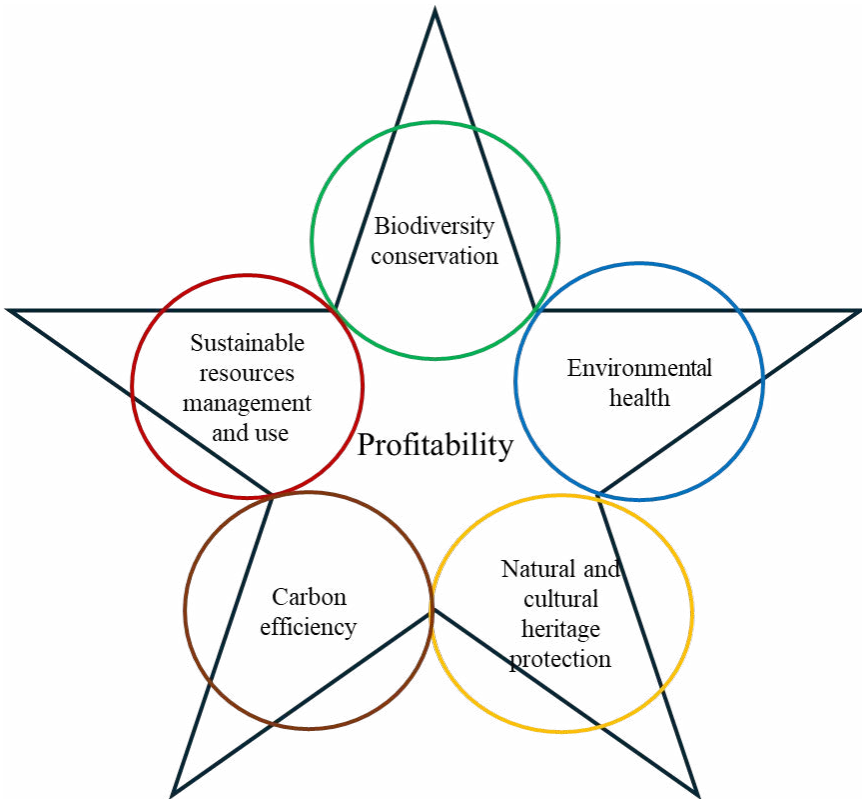


Figure 1. The five constituents of a virtuous model for agriculture and consumption.

TERROIR ETHICS: IS THERE A NEED FOR A NEW, AGRICULTURAL ENVIRONMENTAL ETHICS?

The “Great Wilderness debate”¹⁵ has highlighted that nature was not to be limited to remote, pristine wildernesses, and protecting nature at the global scale also meant taking special care of human settlements, too, especially farmland, as it covers most

¹⁵ The substance of this debate has been synthesized in the two books edited by J. Baird Callicott and Michael P. Nelson (1998, 2008).

of the continents (and one third of the United States according to USDA 2022). The godfather of US conservationism, Aldo Leopold, always included humans and their agricultural practices of the land in his eco-centric "land ethics" (Callicott 1989): his philosophy was less misanthropic than anti-industrial, and "thinking like a mountain" explicitly included the viewpoint of the cowman and even the hunter as legitimate ones (Leopold 1949, in particular the "Thinking Like a Mountain" essay), hence sounds more like terroir management than wilderness areas preservation. Moreover, the geographical unit of Leopold's mountain, defined from the influence of the wolf, can act as a model to define the terroir unit, a piece of land where humans act in a specific way, and imprint on the landscape a certain way of inhabiting the land. In this land, humans have *obligations* towards the land, and not only property rights: ideally, it "changes the role of *Homo sapiens* from conqueror of the land-community to plain member and citizen of it. It implies respect for his fellow-members, and also respect for the community as such" (ibid., "The Land Ethic" essay). In contrast to the industrial mining of ecosystems inherited from colonization, where the aim was to consume the soil's potential as quickly as possible before replanting further afield,¹⁶ terroir is a long-term, sustainable approach that intimately links the health of inhabitants with that of crops and ecosystems, which form an organic whole that is very close to the Leopoldian "community of life," where the smallest gesture on the environment has to be weighed in all its long-term consequences. Terroir is then an ecological unit that fits very well inside not only the Leopoldian land ethics, but also in current trends at the IUCN (e.g., Blandin et al. 2021) and the UNESCO Man and Biosphere program—the Dordogne river basin is both a UNESCO biosphere reserve and a famous wine terroir. Profit then is no longer only based on quantity, but also on quality, and on the ability to maintain this quality over time, anchoring an inimitable tradition in the intimate specificity of a place.

Terroir also teaches a certain humility towards the land,¹⁷ for the craftsman knows, despite all his skill and know-how, his product depends on many other human and non-human factors, associated in a subtle combination of earth, climate, and local biodiversity, and this combination requires constant study and care, hence a particular relationship of respect and identification to the environment, including wild biodiversity and ecosystem functions. Here, people are not owners of the land but owned by it, and parts of a greater whole, whose humble agents they must be. Once its legal existence is recognized, the terroir may then even be considered a social entity, in much the same way as certain areas are granted special rights or even legal personality in some countries. Take, for example, the famous Whanganui River in New Zealand, which shares its name with that of the tribe that inhabits its banks and is now its legal representative in the eyes of the law (Charpley 2017)—again, with a relationship of identity between the human collective and its land,

¹⁶ This aspect of pioneering colonial agriculture has many figures, from the "moving itch" of pioneering tenant farmers in the great plains (see Worster 1994), to the great system of slaves-based plantations that entailed the idea of "plantationocene" (coined in Haraway et al. 2016).

¹⁷ An "environmental ethics of humility" has been developed by some authors, such as Frasz (1993).

although not defined from particular food products here. While an approach based on the notion of indigenous peoples always may not be relevant in countries like France, the terroir approach, i.e., a community sharing a common project for a shared territory with the conviction that the land and its community of life is the entity that takes precedence, may represent an excellent equivalent for many other countries and particularly for agricultural regions. It points a way to inhabiting differently the land, and “living better together” with nature (Blandin et al. 2021).

From a critical point of view, terroirs also may be regarded from a modernist perspective as refractory isolates of conservative populations fossilized in their endogamous traditions, resistant to change and making use of a more or less artificial folkloric imaginary, a “nostalgic, reactionary neo-ruralism” (as coined by Bérard and Marchenay [1995]). And indeed, they can happen to end that way. But as mentioned in the UNESCO *Charte des terroirs*, “Terroirs are living, innovative spaces that cannot be equated with tradition alone” (UNESCO 2005). The idea here is not to artificially freeze a more or less immemorial folk tradition, but rather to nurture relationships not only of sustainability but also of meaning between farmers and their land. To live and work in a terroir, one does not necessarily have to be the descendant of an ancient indigenous people and a fussy guardian of its traditions: Bourgogne wines today are very different from those produced by previous generations. Terroirs need heirs of long family traditions as much as young, fashionable, and provocative innovators. But in any case, one does need to know and respect the land, its environment, its climate, its biodiversity, and the people who inhabit it or have inhabited it, to determine how to reconcile all these elements to produce a quality product over the long term while preserving or even invigorating the environment and local culture. Terroir is a state of mind, and innovation is a crucial part of the terroir. Most current grape varieties in France actually grow on US rootstocks, just like Italian tomatoes, Swiss chocolate, or Madagascar vanilla all use plants originating from the Americas. Hence, new terroirs can sprout up anywhere, occasionally using non-local products and people as long as they acclimatize well and forge friendly relationships with the local environment, and without over-exploiting either side, in a way of inhabiting the land differently, that can be called “conviviality” (Blandin et al. 2021, Blandin et al. 2023).¹⁸

CONCLUSION

The shared knowledge and system of relationships that forms the basis of terroirs is an example of the collective development of practices aimed at economically enhancing the ecological functioning of a territory while maintaining its sustainability and authenticity (Prévost et al. 2014, about the quest for authenticity, see Katerinopoulou et al. [2020] and Wu et al. [2021]). At a time where biotic and cultural homogenization is among the main threats to our planet, a *terroir* approach may provide a good conceptual basis for conserving biocultural diversity along

¹⁸ The idea of “coexistence” is also being theorized as a keystone concept for conservation: see Aguilar and Webb 2024.

with sustainable development and employment, articulating local heritage to trade along with a win-win ecology. Highlighting traditional and low-tech agricultural practices, locally produced and adapted crops, verified high quality standards, high-value production, and respect of local heritage, landscapes, and knowledges, *terroir* agrosystems may achieve a satisfactory conservation of biodiversity, local outcomes, sustainability, and commercial success, at the opposite of industrialized mass production devastating socio-ecosystems worldwide by overproducing low-quality food and feed for export, market speculation, and waste.

The main compass of economy and agronomy in the industrial society always had been the amount of production (the main battlefield of the Cold War), to such extend that overproduction became a concern in US farming as soon as the 1920s. At the same time, the environment, local cultures, farmers' living standards, health, and food quality have all deteriorated in relative indifference, becoming major causes of death in most developed countries with industrial ultra-processed food being now widely considered as a major threat on both public health (Pagliai et al. 2021) and biodiversity (Seferidi et al. 2020). A *terroir* approach may now constitute a way to reconcile environmental, social, and economic stakes by concentrating on the quality rather than quantity, and nurturing people instead of feeding them. The industrial paradigm has thought of the optimal agriculture as an abstract, absolute optimum that ought to be spread all over the planet. The *terroir* approach suggests the optimal agriculture is the one best suited to the local land and people, an idea that could meet the demands of a wide variety of indigenous peoples, but also of humble rural communities who no longer find any meaning in their activity when the countryside is nothing more than an open-air factory for the global oil industry.

I do not claim here to present a panacea, the ultimate go-to method for saving the world's agriculture and solving the climate crisis and cardiovascular diseases at the same time. *Terroir* also suffers from limitations, flaws, and criticisms: *terroir* products can become so successful that local people cannot afford them anymore, and many expensive bottles only serve speculation. Some AOP remain mostly marketing arguments, with insufficient environmental regulations. No model is perfect, but perfectibility does not hamper the interest of an approach. Nevertheless, I believe the notion of "terroir," when properly used and reinforced in its virtuous dimensions, can be one more string to our bow in the transition towards more sustainable agricultural and food systems that respect the socio-ecosystems supporting them,¹⁹ and an avenue towards a different valuation of the land and its living communities.

History is never linear, and always full of surprises. One of them may be the fact that an old French term may constitute the missing link between major contemporary stakes and their related ultra-modern buzzwords, such as nature-based solutions, agro-ecology, community-supported fair trade, regenerative agriculture, organic food, and even the still mysterious idea of "one health," which may also constitute a decent translation of *terroir*.

¹⁹ This is the spirit of the Earth Charter pillar n°II-7, which encourages to "Adopt patterns of production, consumption and reproduction that safeguard Earth's regenerative capacities, human rights and community well-being."

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