D1.8 Report on Legal, Privacy, Ethical and Social Aspects (b)

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Executive summary

D1.8 Report on Legal, Privacy, Ethical and Social Aspects (b) due at M18 (February 2024) is the second deliverable dealing with the ethical issues expected to be addressed during the MUSAE project execution.

This second edition provides an analysis from an ethical perspective of the scenarios developed during the first art-tech experiment by the 10 participating artists.

Main ethical, legal, social and privacy-related implications are pointed out for each scenario to offer a general overview of the main risks, we may expect to encounter in the second art-tech experiment when the teams composed by a company and an artist will transform these scenarios into prototypes.

Table of Contents

1. Introduction 7
1.1. Purpose of the document 7
2. Ethical implications of MUSAE scenarios 8
2.1. The Cooking Ape Institute 8
2.1.1. Scenario summary 8
2.1.2. Social implications 8
2.1.3. Privacy-related implications 8
2.2. From Farm to Table in a Hyperconnected World: A Journey Through Macro to Micro Experiences 8
2.2.1. Scenario summary 8
2.2.2. Ethical implications 9
2.2.3. Legal implications 9
2.2.4. Social implications 9
2.2.5. Privacy-related implications 9
2.3. PATTERNS THAT PERSIST: Biodiversity As The Measure Of Healthy Human Food Systems Systems 9
2.3.1. Scenario summary 9
2.3.2. Ethical implications 10
2.3.3. Legal implications 10
2.3.4. Social implications 10
2.3.5. Privacy-related implications 10
2.4. What the World Eats. Agro-technologies in Earthly Futures 10
2.4.1. Scenario summary 10
2.4.2. Ethical implications 11
2.4.3. Legal implications 11
2.4.4. Social implications 11
2.4.5. Privacy-related implications 11
2.5. Holobiont Gardens 12

2.5.1. Scenario summary 12
2.5.2. Ethical implications 12
2.5.3. Legal implications 12
2.5.4. Social implications 12
2.5.5. Privacy-related implications 13
2.6. One Health Alliances 13
2.6.1. Scenario summary 13
2.6.2. Ethical implications 13
2.6.3. Legal implications 13
2.6.4. Social implications 14
2.6.5. Privacy related implications 14
2.7. Food Beyond Food: what is food without its origin? 14
2.7.1. Scenario summary 14
2.7.2. Ethical implications 14
2.7.3. Legal implications 14
2.7.4. Social implications 15
2.8. Bio-Intelligent Data 15
2.8.1. Scenario summary 15
2.8.2. Ethical implications 15
2.8.3. Legal implications 15
2.8.4. Social issues 15
2.8.5. Privacy-related issues 16
2.9. Soil Skinships: soil fertility and our reproductive futures 16
2.9.1. Scenario summary 16
2.9.2. Ethical implications 16
2.9.3. Legal implications 17
2.9.4. Privacy-related implications 17
2.10. The Microbial Renaissance: A Culinary Tech Revolution 17
2.10.1. Scenario summary 17
2.10.2. Ethical implications 17
2.10.3. Legal implications 18

2.10.4. Social implications 18
2.10.5. Privacy-related implications 18
3. Conclusions 19

1. Introduction

1.1. Purpose of the document

Purpose of the different editions of this document is to present and discuss the ethical implications of the research work carried out in the MUSAE project.

Ethical matters are managed within T1.4 Privacy and ethics management of the project, running from M4 (December 2022) to the end of the project (M36 - August 2025).

The different steps of the project, particularly the management of the two open calls, the running of the individual projects leading to MUSAE scenarios definition and the final prototyping of the identified solutions, are accurately planned and monitored to avoid any potential ethical or legal issue by means of an ethics by design approach.

The data collection and processing in MUSAE are designed and conducted in full respect to the fundamental ethical principles, including those reflected in the European Convention of Human Rights and the Charter of Fundamental Rights of the European Union, considering the opinions of European Group on Ethics in Science and New Technologies (EGE).

An Ethical Project Committee (EPC) has been setup in M4 (December 2022) to manage all ethical issues in the different phases of the MUSAE project. It has the responsibility of monitoring the conformity of the project to the ethical standards and address all the ethical issues of the project.

Next Chapter 2 briefly presents the main ethical, legal, social, and privacy-related implications of the 10 scenarios developed within the first art-tech experiment of the project run in Autumn and Winter 2023. Indeed, before moving to the second call, it is important for the consortium to have a clear view of the potential risks associable with each scenario. Main messages to be considered are summarised in Chapter 3.

2. Ethical implications of MUSAE scenarios

2.1. The Cooking Ape Institute

2.1.1. Scenario summary

The preparation of food can have an important role in our society in the context of the umbrella term „Food as medicine“. It can have mental, physical, and ecological benefits. How is it possible to support and revolutionize the process of cooking, baking, and food preparation? Cooking can take on a whole new role in our society through a holistic approach, with the cornerstones being personalized and environmentally friendly nutrition (such as the Planetary Health Diet) as well as mental health through multi-sensory perception during the preparation process. This concept, leading to improved mental and physical health, is by no means the romanticization of grandma cooking.

In an increasingly digitalized society, the physical and psychological needs of sensory activities are often neglected. Our senses provide us with orientation and mental balance. It is always an interplay of several senses that allows us to perceive the world. In psychology, this is known as multi-sensory experience and is particularly prominent in the culinary world, where haptics, acoustics, olfactory, gustatory, and visual senses create a shared experience. Looking at the preparation of food in evolutionary terms, we could argue that our fine motor skills, the development of various technologies and the handling of new materials are strongly linked to the preparation of food.

In addition to the multi-sensory aspects of preparing food, especially when working with sourdough or other fermented products, there is a microbial exchange that can benefit both the product and the person cooking it. The current discourse on inter-species relationships in the context of the ecological crisis shows that there can be no debate on human well-being without including other life forms.
Could we reinvent the way how we prepare food, and create a multi-sensorial and inter-species experience, for a physically, mentally, and ecologically healthier life?

2.1.2. Social implications

- Equity and Access: Addressing the potential exclusion of lower socioeconomic groups due to the possible move specialized diets and preparation methods.

2.1.3. Privacy-related implications

- Health Data Security: Protecting the privacy of individuals’ health and dietary information in the use of smart kitchen technologies or health tracking apps.

2.2. From Farm to Table in a Hyperconnected World: A Journey Through Macro to Micro Experiences

2.2.1. Scenario summary

From Farm to Table in a Hyperconnected World explores a dynamic journey through three interconnected scenarios that traverse the realms of macro to micro experiences within the

contemporary food landscape. Rooted in a complete food chain, the narrative unfolds against the backdrop of AI technologies, robotics, and immersive technologies. These innovations enable real-time monitoring and adaptive processes throughout the entire agricultural and culinary continuum. The overarching scenario envisions an innovative hybrid encompassing traditional agriculture, agroforestry, and lab-grown food products. This symbiosis is powered by a diverse array of cutting-edge technologies, including AI, IoT, robotics, and remote sensing. The integration of these technologies is humanized through communal experiences enriched by immersive art and gamification, ensuring data transparency and compliance with AI ethical standards. As the scenarios transition from macro to mezzo and micro levels, novel features emerge, such as edible electronics and soft robotics. A distinctive highlight is the introduction of personalized augmented sensory dining experiences, intricately woven with personal data. This approach not only allows for the incorporation of the individual into the culinary process but also addresses the complexities of data ownership in a hyperconnected, post-globalized world characterized by both centralized and decentralized influences, impacting every facet of our in-real-life (IRL) and online (URL) existence. In this narrative, the coexistence of natural and digital ecologies is paramount, presenting a holistic vision where technology and nature seamlessly intertwine to shape the future of our food experiences.

2.2.2. Ethical implications

- Displacement of Human Labor: possibility to replace traditional farming and food service jobs with AI and robotics.

2.2.3. Legal implications

- Regulation and Safety: The need of developing regulations that ensure the safe use of advanced technologies in food production.

2.2.4. Social implications

- Access and Inequality: The potential for advanced food technologies to widen socioeconomic disparities by limiting access to those who can afford them.

2.2.5. Privacy-related implications

- Personal Data Security: Safeguarding the privacy and security of personal information used to personalize food experiences, especially against unauthorized access or breaches.

2.3. PATTERNS THAT PERSIST: Biodiversity As the Measure of Healthy Human Food Systems

2.3.1. Scenario summary

What if… Biodiversity became the main measure of healthy human food systems? This scenario imagines that in 2033 the buzzword in every part of the food system is biodiversity. Attempts earlier in the 21st century for food systems to be chemical-free or carbon-neutral had limited uptake and impact. The scenario suggests that in 2028 the European Commission approved quite radical legislation called Maximizing Biodiversity. Since then, the increase in agricultural and wild biodiversity has had a big

impact on the food system, with tangible and measurable changes and impacts, both good and bad. The story follows a journalist named Max, who travels through Europe in 2033 where he meets various stakeholders affected by this European focus on maximizing biodiversity. From radical fringe groups in remote areas, to the largest ag-tech corporations, everyone is looking for ways to make kitchens, farms, and rural landscapes more biodiverse. Max is particularly interested in talking to the farmers and citizens that feel left behind by the new focus, and the network of regenerative farmers and food producers who work to heal agricultural landscapes. For example, in Poland he speaks with a traditional farmer who struggles to adapt. As the farm adapts to new requirements the less the farmer is sure what he is even farming. However, in Portugal he meets a technician who designs monitoring tech for food forests, a pioneer in optimizing community-based emerging technologies for biodiversity and environmental healing. She has developed open-source DIY technologies that monitor the health and biodiversity of food forests, such as an AI enabled audio ecology device and software, and an online platform that connects producers with eaters. He also attends the filming of a talk show in Serbia about the future of food, where he observes that Food is a playground for new possibilities and hybridity, but also a battleground of polarized identity politics. Who do you think Max should visit?

2.3.2. Ethical implications

- Responsibility to Future Generations: The ethical imperative to maintain biodiversity for the benefit of future human and non-human life, balancing present needs with future sustainability.

2.3.3. Legal implications

- Regulatory Compliance and Enforcement: The challenge of developing, implementing, and enforcing legislation, ensuring laws are effective, fair, and adaptable to emerging technologies and practices.

2.3.4. Social implications

- Social Inclusion and Cohesion: Addressing the potential for social fragmentation as a result of shifting food system priorities, ensuring that all stakeholders, from farmers to consumers, are included in the transition towards more biodiverse systems.

2.3.5. Privacy-related implications

Data Privacy and Security: With the development and use of monitoring technologies, ensuring the privacy and security of data collected.

2.4. What the World Eats. Agro-technologies in Earthly Futures

2.4.1. Scenario summary

The scenario includes past and contemporary patterns to envision a future transformative paradigm in the convergence of technology, agriculture, and the environment. Should we broaden our consideration of who benefits from our food choices, placing emphasis on the concept of gratitude for the gifts the world provides us, and recognizing our obligation to ensure the care of more-than-human lives and the overall wellbeing of our planet? In recent decades, the world is quite literally eating the waste chambers of packaging, plastics, and electronic waste, etc. At the same time, our reliance on agricultural and ecosystem knowledge, to a larger extent, will rely on digital and technological apparatuses. Nothing

nutritious will grow in the digital rubbish, nor will anything pollinate in a digital twin; few earthbound intimacies can rummage in the excess work of software and hardware maintenance. Do these elements take the appearance of the Talmudic myth: the Golem, an automated-being gone on a killing frenzy, until returning to dust? We need machines, just as present rock- based machines one day will turn to dust and become soil again. The Rooiboit Nutritura Antessorem takes this life span of technological apparatuses seriously and explores the ancestral dimension of imagining agro-technological machines. It includes past and contemporary patterns to envision a future transformative paradigm in the convergence of technology, agriculture, and the environment. Not only should it nurture and express gratitude to its predecessor—the Earth, its minerals, and soils—but also to the future generations of life and the potential for differentiation. If opening for symbiosis across intergenerational time-space, then what is the agri-technological machinery of the future? Can technology itself become compostable for the earth? Should the conception of tech be expanded to include traditional ecological knowledges (tek)? Can we incorporate non-human sensibility, bio-machines, in food systems, as well as affirmatively towards difference?

2.4.2. Ethical implications

- Environmental Stewardship: The ethical obligation to care for more-than-human lives and the planet, recognizing the impact of our food choices and technological practices on the environment.
- Sustainability of Technology: The responsibility to ensure that technological apparatuses used in agriculture and food systems do not harm the environment, considering the lifecycle of these technologies from production to disposal.
- Intergenerational Equity: The duty to not only express gratitude to the Earth and its resources but also to consider the wellbeing of future generations in the development and implementation of agri-technological solutions.

2.4.3. Legal implications

- Regulation of Agri-Technological Innovations: Developing legal frameworks that support the sustainable and ethical use of technology in agriculture, including the regulation of bio-machines and compostable technologies.
- Intellectual Property and Traditional Knowledge: Legal considerations around the protection of traditional ecological knowledge and the intellectual property rights related to agri-technological inventions that are inspired by or derived from such knowledge.

2.4.4. Social implications

- Digital Divide and Access: The reliance on digital and technological tools in agriculture could exacerbate social inequalities, limiting access to those who can afford such technologies or who have the knowledge to use them.

2.4.5. Privacy-related implications

- Data Privacy in Agri-Tech: As agricultural systems increasingly rely on digital technologies, ensuring the privacy and security of data collected from these systems becomes crucial. This includes concerns about who has access to this information and how it is used, especially in the context of monitoring environmental health and crop productivity.

2.5. Holobiont Gardens

2.5.1. Scenario summary

Holobiont Gardens explores a future where healthcare is shaped by environmental microbial justice, and emerging technologies converge with Traditional Ecological Knowledge (TEK). Public access to beneficial microorganisms is recognized as a human health right, and as such, accessible microbiome testing is widely available, along with community-embedded science to develop care plans, alongside prescriptions for pre- and probiotics, soil contact time plans, and medicinal foods. Pharmacies open connected Holobiont Gardens, that facilitate access to these prescriptions, as well as being a space for mapping information on holobiont connections. Public awareness of microbial equity is more prevalent, following protests against the 'Silent Microbiome Crisis' – the unseen depletion of global microbial diversity, and the effect this has on individual, collective and planetary health. In addition, scandals surrounding extractive methods of biobanks, as well as their targetability for biohacking has resulted in more legislation around the protection of microbial species. Government-funding training in microbiome stewardship has created new occupations and jobs in ecological restoration, regeneration and care work. Traditional ecological knowledge guides urban dietary choices, incorporating a rich tapestry of locally sourced, plant-based, and fermented foods that support a resilient and balanced gut ecosystem. Additionally, increasing urban biodiversity influences the diversity of available food sources, creating a more complex and dynamic landscape for the gut microbiome. Community-driven initiatives promote sustainable agriculture, local food production, and waste reduction, further enhancing the diversity of nutrients available. Nourishing growth, transformation, mapping, mystery and healing, the Holobiont Gardens are a space for people and microorganisms to come together with the aim to nurture multispecies and collective health.

2.5.2. Ethical implications

- Biobanking and Biohacking: Ethical concerns regarding the collection, use, and protection of microbial data and samples, particularly in preventing misuse and ensuring that biobanking practices are conducted with consent and for the public good.

2.5.3. Legal implications

- Access to Microbiome Healthcare: Legal frameworks ensuring public access to microbiome testing, pre- and probiotics, and medicinal foods as part of a right to health.

2.5.4. Social implications

- Public Awareness and Education: The importance of raising public awareness about microbial equity and the impacts of microbial diversity on health, leading to informed communities actively participating in microbial stewardship.
- Community Engagement and Job Creation: The role of community-driven initiatives in promoting sustainable practices and the creation of new jobs in ecological restoration and microbiome stewardship, emphasizing the social benefits of integrating health and environmental care.

2.5.5. Privacy-related implications

- Microbiome Data Privacy: Privacy concerns related to the collection, analysis, and sharing of microbiome data, particularly in ensuring that individuals' health information is protected and used ethically, with consent, and in ways that benefit collective health without compromising personal privacy.

2.6. One Health Alliances

2.6.1. Scenario summary

In 2033, a profound shift in governance models is underway, challenging traditional notions of authority. Fueled by a lack of trust in human leadership's ability to address the environmental crisis, breakthroughs in AI development have given rise to unprecedented collaborations between humans and nonhumans. The EcoMind Alliance, led by the Artificial Intelligence - GAIA, emerges as a pioneering political party, uniting scientists, farmers, indigenous communities, activists, and technologists. In this envisioned future, the planet undergoes unprecedented monitoring through an intricate network of satellites and sensors, gathering data from diverse ecosystems—forests, oceans, insects, and plants. GAIA-AI interprets this wealth of information in collaboration with local communities, fostering a synergistic relationship between artificial intelligence and human insights. This dynamic interaction gives rise to new policies, the implementation of regenerative farming practices, and the establishment of Earth Rights — recognizing the Earth as a community of interconnected subjects. The EcoMind Alliance operates under the guiding principle of 'One Health,' embracing a holistic perspective that acknowledges the intricate interdependence of all earthly beings. The alliance's endeavors, such as the "seed currency" mark a crucial step toward harmonizing the human economy with the delicate balance of the Earth's ecology. Through collaborative efforts, they navigate the complexities of environmental challenges and seem to be a step towards a future where humans and nonhumans coexist in a mutually beneficial and sustainable equilibrium. However, amidst the promise of the EcoMind Alliance, the RealNature group emerges as a formidable opposition. Comprising tech sceptics echoing the historical Luddite movement, they adamantly resist the integration of advanced technologies. Fearing the perceived threats of AI, this group actively sabotages the AI-driven pilot farms established by the EcoMind Alliance. Messages exchanged within this group reveal a deep-seated fear of losing the authenticity of nature to the encroachment of artificial entities. In light of these tensions between technological progress and natural preservation, a crucial question arises: To what extent should AI be entrusted with decision-making in areas crucial to environmental sustainability, and what safeguards should be in place?

2.6.2. Ethical implications

- AI Governance and Moral Responsibility: The ethics of entrusting an AI, like GAIA, with significant decision-making power, particularly regarding environmental sustainability and governance. This includes concerns about AI's ability to make value-based decisions affecting all forms of life.
- Human-AI Collaboration: The ethical considerations of how humans and AI systems work together, ensuring that AI complements rather than replaces human judgment, especially in understanding complex ecological systems.
- Biodiversity and Natural Integrity: The ethics of using AI and technology to intervene in natural processes, potentially altering ecosystems in unforeseen ways.

2.6.3. Legal implications

- AI Rights and Legal Status: The legal implications of AI-led initiatives, including the need for new laws that recognize the role of AI in governance and its accountability in decision-making processes.

2.6.4. Social implications

- Digital Divide and Inclusivity: Ensuring equitable access to the benefits of AI and technology-driven environmental solutions, preventing a digital divide that could marginalize communities lacking technological access or skills.

2.6.5. Privacy related implications

- Data Privacy and Surveillance: The collection and analysis of environmental and possibly personal data through the network of satellites and sensors, raising concerns about surveillance, data ownership, and the privacy of communities involved in these initiatives.
- Consent and Data Use: Ensuring that data collected for environmental monitoring and policy-making is used ethically, with informed consent from all stakeholders, particularly local communities whose lands and knowledge might be central to these efforts.

2.7. Food Beyond Food: what is food without its origin?

2.7.1. Scenario summary

The assessment of food and its quality has traditionally hinged on its geographical origin. Within the food industry, scrutiny and investigations into a product's origin have played a crucial role in determining its quality. Prestigious products from various corners of the globe have been manufactured and exported as premium offerings, undergoing rigorous testing and certification as "protected and certified origin," thereby elevating them to a status of luxury on our dining tables. It is now the year 2044. The increasing global population and the environmental impact of climate change on conventional food production have compelled us to explore alternative resources for the food industry. Many staples that have long defined our cultural cuisine are now produced through lab-grown, hydroponic, and genetically modified methods. However, this approach standardizes food quality and characteristics globally, transcending geographical origins and traditions. In a world where the best can be found anywhere, the concept of "authentic" is redefined. As food remains an anchor to traditions and community belonging, what is a national cuisine without the geographical ties we once knew? This transformation prompts contemplation on the essence of food, its identity and cultural significance in a world where origin becomes a malleable concept.

2.7.2. Ethical implications

- Cultural Integrity and Authenticity: The ethical implications of detaching food from its geographical and cultural origins, potentially diluting the cultural heritage and traditions that are often embodied in food.
- Environmental vs. Cultural Trade-offs: Balancing the need for sustainable food production methods against the desire to preserve traditional agricultural practices and their associated cultural values.

2.7.3. Legal implications

- Regulation of New Food Technologies: Ensuring that lab-grown, hydroponic, and

genetically modified foods meet safety standards and regulations, and determining how these foods are labeled and marketed to consumers.

2.7.4. Social implications

- Access and Equity: The social implications of new food production technologies, including questions of access, affordability, and the potential for creating new divides between those who can access "authentic" traditional foods versus those who consume lab-grown or genetically modified alternatives.

2.8. Bio-Intelligent Data

2.8.1. Scenario summary

The future is embodied by divergent food systems, and complex food value chains, each giving rise to a vast repository of data. The food system, struggling to respond to changing climate, resource, distribution, and increased population related demands, has evolved along a set of opposed pathways. Consequently, these pathways represent distinct value systems and exert long-term impacts on the landscape and environment. Vertically integrated industrial agriculture, including organic practices, has taken over even more of the food system market. The lab grown food sector, particularly lab grown meat, has developed substantially. Meanwhile, smallholder farming persists, albeit to varying extents. In this unfolding landscape, data economies are not merely an emerging force but stand as the dominant economic sector, fundamentally reshaping the foundations of commerce. At the heart of this transformation lies big data, a ubiquitous force seamlessly integrated into the food value chain. The symbiotic relationship between big data and the food value chain has become so pronounced that they are virtually synonymous. Across the globe, electronically stored chronological lifespans document every nuance of food production. The visual representation of this data, and the built and natural environment, have changed accordingly and represent a more flexible and responsive visualization and the transects between data and reality are now blurred.

2.8.2. Ethical implications

- Data Equity and Accessibility: Ethical concerns about who has access to the vast amounts of data generated by the food value chain and how this data is used to influence food production, distribution, and consumption. This includes worries about data monopolies and the potential for such control to exacerbate inequalities in the food system.
- Transparency and Accountability: The ethical imperative for transparency in how data about food production and consumption is collected, analyzed, and utilized, particularly in decision-making processes that affect public health and environmental sustainability.

2.8.3. Legal implications

- Regulation of Data Use in Agriculture: The need for legal frameworks that regulate the use and sharing of big data in agriculture and food production, addressing concerns about competition, intellectual property rights, and the ethical use of data.

2.8.4. Social issues

- Digital Divide: Social implications of unequal access to the technologies and data that

underpin modern food systems, which could leave smallholder farmers and certain communities at a disadvantage.

2.8.5. Privacy-related issues

- Consent and Data Ownership: Issues surrounding the consent of individuals and communities whose data is collected as part of the food production process, including questions about who owns this data and how it can be used or sold.

2.9. Soil Skinships: soil fertility and our reproductive futures

2.9.1. Scenario summary

In the year 2034, a transformative shift in human consciousness has reshaped the way we interact with our planet and envision our future. The narrative of human existence, deeply intertwined with the soil, has taken center stage.

In this new reality, 'skinship' symbolizes the intimate bond between human skin and the Earth's skin, the soil. It marks a departure from the Anthropocene era towards a more harmonious coexistence. This shift was catalyzed by crises that forced us to reevaluate our priorities, moving away from short-term thinking and nationalism. Instead, inclusivity, diverse perspectives, and technology as a connector with nature guided our path.

Advanced technological augmentation devices, seamlessly integrated with human skin, allow people to connect intimately with the land. These devices collect real-time data about soil health and fertility, translating it into physical sensations that wearers can feel. Communities adopt rituals that harmonize with the rhythms of the land, empowering individuals to understand their own personal fertility in sync with the Earth. The rise of In Vitro Gametogenesis (IVG) technology, allowing the creation of human reproductive cells from human skin cells, further deepens this bond. Some pioneers even start to explore the idea of 'genetic babies' with the Earth, envisioning offspring inextricably linked to the soil.

This transformative narrative extends beyond human reproduction; it revolutionizes food production, shifting from conventional to regenerative practices. Augmentation devices contribute to a global network of soil health monitoring, creating a harmonious cycle where the Earth's skin's well-being sustains humanity.

In this possible future, survival is a collaborative effort, a testament to the resilience of communities navigating the delicate balance between human and soil fertility. 'Skinship' emerges as a symbol of unity, emphasizing the physical bonds between human life and the living, breathing skin of the Earth.

2.9.2. Ethical implications

- Human-Technology Integration: The ethics of integrating technology with the human body, especially devices that alter or enhance human perception of the environment, raise questions about the nature of human experience and our relationship with the Earth.

- Environmental Stewardship: The ethical responsibility to maintain and enhance soil health, and the broader implications of human actions on the planet, emphasizing a symbiotic relationship with the Earth.

2.9.3. Legal implications

- Regulation of Augmentation Devices: Developing legal frameworks to govern the use, safety, and distribution of technological augmentation devices that enable deeper connections with the environment.

2.9.4. Privacy-related implications

- Data Privacy: Concerns related to the collection and use of personal and environmental data by augmentation devices, including issues of consent, data security, and the potential for surveillance.

2.10. The Microbial Renaissance: A Culinary Tech Revolution

2.10.1. Scenario summary

The Microbial Renaissance marks a transformative era in culinary practices and sustainable food innovation, with the culinary arts seamlessly transitioning to cutting-edge technology. The use of animal-based ingredients and the depletion of our natural resources have become outdated practices. What if we replace animal-based products with biologically identical ingredients synthesized directly by microorganisms, paving the way for a more sustainable world? Microbes, including bacteria, yeasts, fungi and micro-algae, can be used as 'cell factories'. Scientists can 'program' these organisms to produce a specific protein, carbohydrate, fat, vitamin or aroma in a growth tank. This is called precision fermentation. After harvesting the ingredients, they can take on any shape, flavor and texture we want using digital production techniques. However, imagining interesting novel food products that do not resemble existing products but still look edible, is very difficult. By making smart use of artificial intelligence tools, we can go beyond the limitations of our own imagination and revolutionize the products we consume. But just adjusting our diet is not enough for this culinary transformation. A cultural revolution is needed - one that involves the entire community and generates enthusiasm for an alternative approach to food production, cooking, eating and social interactions around food. In the age of the Microbial Renaissance, each moment becomes an exploration, every dish a creation, and every encounter a celebration of the boundless possibilities unlocked by the wondrous world of microbial-based foods.

2.10.2. Ethical implications

- Biotechnological Ethical Concerns: The ethical considerations surrounding the manipulation of microorganisms to produce food, including concerns about the naturalness of food, the welfare of microorganisms, and potential unintended consequences on ecosystems.
- Cultural and Dietary Changes: Ethical questions related to imposing a new dietary paradigm on communities, respecting cultural food traditions while promoting sustainable alternatives.

2.10.3. Legal implications

- Regulation and Safety: Establishing legal frameworks to ensure the safety, labeling, and marketing of foods produced through precision fermentation, addressing both consumer protection and innovation encouragement.
- Intellectual Property: Managing intellectual property rights associated with novel food technologies, including the programming of microorganisms and the digital production techniques used to shape, flavor, and texture foods.

2.10.4. Social implications

- Cultural Identity and Food: The impact on cultural identities that have evolved around traditional food practices, and how these identities can adapt to or integrate new food innovations without loss of heritage.

2.10.5. Privacy-related implications

- Consumer Data Protection: Ensuring that any personal data collected for the purpose of enhancing culinary experiences is protected against unauthorized access and used ethically.

3. Conclusions

As expected, when dealing with new technologies collecting and processing a large amount of data main concerns raise about data privacy and data protection. In the second art-tech experiment it is foreseen, when relevant, also wide data processing by means of AI-based algorithms. Compliance with GDPR will play a key role.

Another important issue, related with the designed scenarios and well known when dealing with new technology is the risk of digital divide mainly because of personal economic status allowing or not the access to new technologies.

Other identified risks are more related to the specific scenarios.

Overall, no major risks are expecting to coming from the next art-tech experiment. However, the participants will be bind to ethical constraints by contract as for the first art-tech experiment. Also, during the prototyping phase a privacy by design approach will be implemented in development as well as an ethics by design approach when relevant, mainly in AI related matter.