

Our Symbiotic Life

An Exploration of Interspecies Relations

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ABSTRACT

We will explore four plausible futures and experiment on a speculative approach to investigate “wicked problems” [14]. Grounded in the field of design fiction, this work combines insights from the climate impact research community, technology meta trends, and plant science, all of which work as a basis for the exploration of relationships between humans, plants, and technology. Based on scenarios from the climate impact research community, we prototyped four plausible worlds and visualized exemplary scenes in the daily life of the plausible citizens. Sketching and low-fidelity prototyping supported the process of gaining knowledge and iterating on storytelling.

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AUTHORS KEYWORDS

Design fiction; prototyping; scenarios; design methods; research through design; visual storytelling

ACM CLASSIFICATION KEYWORDS

Human-centered computing → Interaction design theory, concepts and paradigms

INTRODUCTION

Design fiction enables us to experience future perspectives, to explore the unknown, and to make abstract scenarios tangible. In regard to design research, it can be a playful method to extend horizons and thus to “prototype the future” [1]. This pictorial introduces a design fiction based on recent narratives from the climate impact research community that deal with plausible future scenarios. The latter provide a socioeconomic framework for the fictional worlds that we (the authors) further combine with the influence of recent trends in technology on the relationship between humans and plants. The fiction offers a set of alternative futures for how we could live instead of predicting the most likely projections of how we will. It may inspire the general public to reflect critically on current developments.

DESIGN FICTION

Speculative approaches enable people to deal with “wicked problems” [14], which include challenges like climate change, disasters, or inequality. Such problems are not easy to describe. They are highly complex, contradictory, and hard to solve. (Some may even be unsolvable.) One way to approach them is to develop scenarios offering multiple entry points for actions and reactions. Such scenarios can work as tools for detecting actionable solutions within seemingly insuperable problems. Design fiction offers a narration to help people identify with a certain scenario. In one description, it “speculates about new ideas through prototyping and storytelling. The goal is to move away from the routine of lifeless scenarios-based thinking.” [7] Bringing a scenario to life moves us one step closer to reality. Artifacts can work as tangible metaphors and stimulate reflection and discussion about complex coherences. The fictional prototype is one “that exists within a story world” [6]. This story world enables designers to explore not yet existing technologies or systems and investigate their potential impacts on future users and societies. Design fiction is one way to create “experiential futures” [13]. It can be allocated to speculative and critical designs that look forward, by dealing with “what if ...” scenarios, with an emphasis on the unreal [5]. They provide a path that leads from today to the proposed scenario, while facilitating the “suspension of disbelief” [4]. A balance

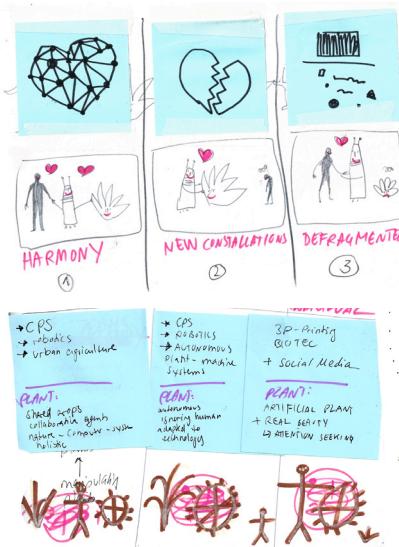


Figure 1 & 2: Exploration of relationships and constellations ©Katja Budinger

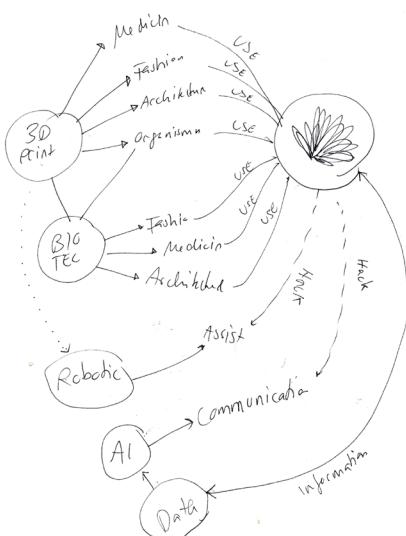


Figure 2: Sketches to organize thoughts and to shape the story for the scenarios On Demand and Invasion. ©Katja Budinger

should be struck between real-life probability and imaginary thoughts. Dunne and Raby's speculative project "the united micro kingdoms" [12] is related to our draft. This work imagines four micro kingdoms through the use of four scenarios based on political ideologies and trends in technology. Unlike this approach, we build on existing scenarios and utilize them as a framework for our fiction. Dunne and Raby's props stand for themselves as artifacts from the plausible world. By building narratives and scenes, we focused on plausible daily life to provide a broader context. Another similar project is Ståhl and Lindström's "Plastic Imaginaries," [33] which introduces a plausible future after the plastic era. It is designed as a conversation between two plausible citizens who adopt different strategies to deal with the challenges of their daily lives. Based on ethnographic research, the project consists of a text illustrated with documentary-style images. Unlike this example, we work with multiple plausible futures and emphasize the visual component of storytelling.

METHODS

We chose design fiction as a method to gain insights into the fields of plant science and climate impact research and to reduce the barriers to engaging with these complex topics. During the process, sketching supported synthesizing the desk research and shaping the basic ideas (Figures 1, 2). Furthermore, we built to think; hence, we approached the concept tangibly using low-fidelity prototyping. For each scenario, we created a world model and visualized representative scenes of future daily life there. By iterations of the prototypes, we defined the visual language and elaborated on the visual storytelling. To facilitate a "felt-life"[3] experience, we created a pastiche scenario for each world by defining a medium that people interact with – a contemporary document of the future. In the field of user experience, pastiche scenarios work beneath personae and scenario design as a method to take users' perspectives. This is done to explore their emotions and social backgrounds, as well as their cultural and political ones. The use of media and its tonality reveals cultural conventions, while providing hints for political and socioeconomic contexts.

SHAPING THE SCENARIOS

Instead of forecasting, the climate impact research community addresses "wicked" problems by developing an array of scenarios integrating future changes in life conditions and society regarding correlations with climate impacts. These scenarios offer maps of plausible futures that enable decision makers to navigate through

a "solution space" [8]. This process facilitates the definition of goals and the necessary tasks or micro steps to be undertaken. Fields like energy system analysis, climate impact research, and environmental assessments require long-term outlooks, even up to 100 years ahead. The scenarios help explore underlying socioeconomic developments and are suitable tools for shaping global narratives ("Limits to Growth", 2°C, etc.) as a basis for political discussion [8]. One component of these scenarios is a set of alternative futures of societal development known as shared socioeconomic pathways (SSPs). The SSP narratives are a set of five qualitative descriptions of plausible future changes in demographics, human development, economies, lifestyles, policies, institutions, technologies, environments, and natural resources [9]. We chose four of them as the basis for our design fiction: SSP1, the green road, is based on democracy, collaboration, and sustainability. SSP3, the rocky road, deals with nationalism and protectionism. SSP4, a road divided, represents inequality and stratification. SSP5, the highway, embodies consumerism and economic progress. These narratives aim to make data, calculations, and observations tangible. They provide contexts that should facilitate imagination and help in posing a plausible future. The form in which they are communicated is often rather uninspiring (i.e., texts with an optional representative image). In addition, they are not easily accessible to the public. Recent developments, including the public denial of a human factor in climate change by several conservative leaders and researchers in the Western world, illustrate the importance of addressing a broader audience in an understandable, engaging way.

Although it will not solve the problem of dealing with climate change, our design draft will introduce a way to approach this highly complex topic and to humanize it. The focus ranges from the global to the human scale, which enables an exploration of how circumstances in the plausible worlds influence society and the daily life of an individual. The SSPs work perfectly as a basis for our scenarios, which are less complex and focus on human-plant relationships. By combining one main issue from the SSPs, a human who lives in the alternative world, a plant he/she interacts with, plant skills, and a predominant technology, we created the following scenarios: Harmony, Invasion, On Demand, and Bottle Garden. The future plants have plausible skills that are inspired by recent research. The pastiche scenarios are presented through diverse media that represent peoples' perspectives and hint at their daily life experiences. To engender a familiar experience, we used recent instead of probable future media.



Figure 4: Different types of vehicles – contemplative unites focus on the experience, direct units take the shortest way ©Katja Budinger



Figure 5: Contemplative Unit U7 and augmented reality journey planner. Commuters can decide if they prefer to arrive quickly or to enjoy a longer ride, with the opportunity to take a walk and/or harvest crops. Materials: lasercut wood, soil, moss, and plants (Kokedama) ©Katja Budinger

SCENARIO 1: HARMONY

Shared goods and gardens have become common. Instead of self-driving cars, the streets are crowded with self-driving landscapes. There are different types for different speeds. The contemplative driving gardens (Figures 5 and 6) offer citizens the opportunity to take a walk while approaching a destination. The faster types of gardens are inhabited by shorter, more resistant plants that are not as affected by acceleration (Figure 4). The energy is gathered by sun, wind, and the plants' biological power. Some of the vehicles even carry urban crops for citizens who enjoy gardening. Plant and human needs are balanced. If a mobile crop unit is ready to be harvested, it informs the garden community (Figure 8). It is also possible to order certain fruits or vegetables in advance, and the garden sends a message when they are ready. Decisions within these communities are mostly made together, which often causes delay. But this factor is taken into account for the sake of democracy (Figure 10).

Socioeconomic context: People are mindful of the social, cultural, and economic challenges arising from environmental degradation and inequality. Humanity increasingly advances in effective cooperation and collaboration, as the emphasis shifts from economic growth towards human well-being. Consumption is oriented toward sustainability, including lower use of material resources and energy. Biodiversity and ecosystems can recover, and climate conditions improve step by step [9].

Urban gardens play a prominent role in the cityscape. Sustainable technologies are increasingly common, enabling an ecological lifestyle. Data are used responsibly to optimize autonomous mobility and to avoid inefficient use of energy. Cyber-physical systems and augmented reality are employed reasonably and enable interaction and communication between humans, plants, and machines (Figures 5, 8).



Figure 6: Contemplative fleet – public transport can be enjoyable and recreational.
©Katja Budinger



Figure 7: Commuters are waiting for their delightful public transportation.
©Katja Budinger



Figure 8: Signaling crops – when crops are ready to be harvested, members of the garden community receive notifications and a map with the best spots. ©Katja Budinger



Figure 9: Commuters are checking their journey planner on augmented reality devices. ©Katja Budinger

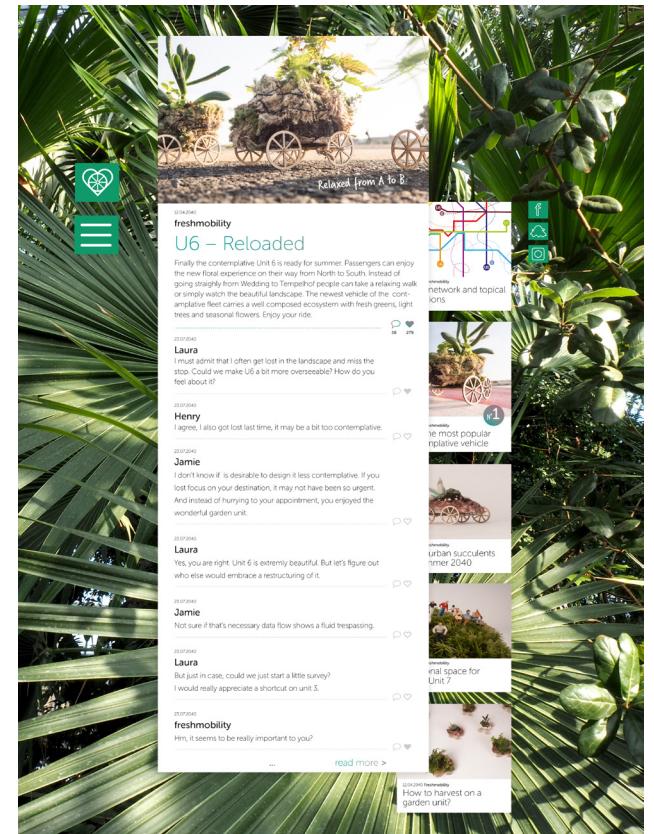


Figure 10: Pastiche scenario. The mobility provider introduces a new unit of the contemplative fleet. Users share their opinions and suggest optimizations, which causes a vivid discussion. In a participatory society, decision making takes a bit longer.
©Katja Budinger

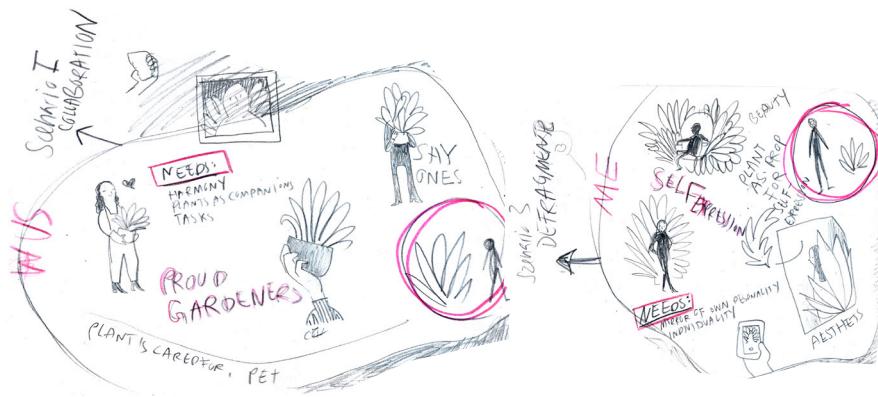


Figure 11: Shaping the core principles and differentiating of the scenarios harmony and on demand ©Katja Budinger

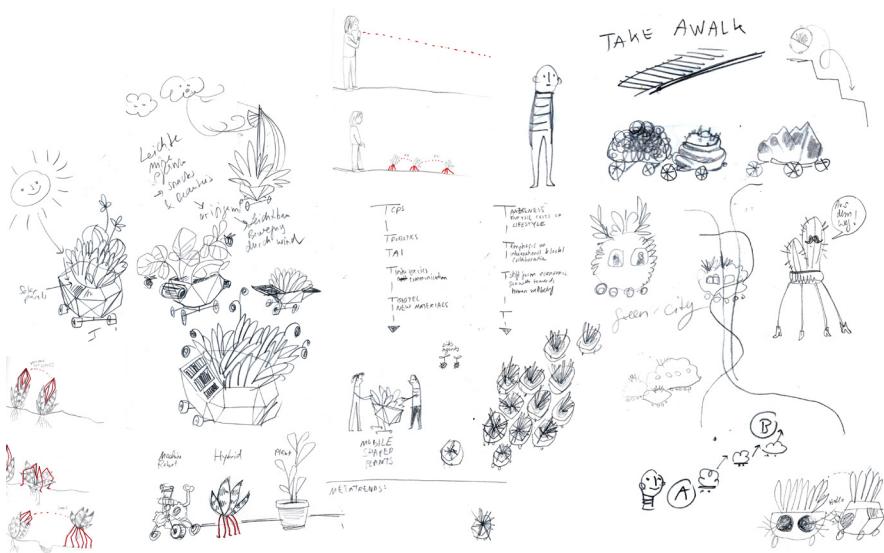


Figure 12: Sketches for the scenario Harmony: communication, swarm behavior and cooperation ©Katja Budinger

Background: Plants are capable of “non-reflexive actions” [15, 16], in triggering certain responses from humans or other beings. This phenomenon can be exemplified by their influence on humans’ recovery processes [17] or on their well-being in office environments [18]. Furthermore, plants process a huge amount of information, from light to air pollution, through their complex electromagnetic and chemical communication systems [10].

We combined these capabilities with autonomous driving and experimented with ways to communicate the values behind the scenario. The first sketches visualize individual mobile plants. During this process, we emphasized the community aspect of this scenario and decided to work with shared gardens instead. The visualization of relationships and dependencies enabled us to understand the core elements of the underlying narrative of SSP1 (“the green road”) [9], which is based on democracy, sustainability, and collaboration.

Several related projects deal with autonomously moving plants and ecosystems. Examples include Gilberto Esparza’s Plantas Nómadas [25], Shannon McMullen and Fabian Winkler’s Soybots [26], Stephen Verstraete’s Plant Host Drone [27], and Rutgers University’s IndaPlant [28]. Helene Steiner also explores plants’ communicative potential with Project Florence [29], an interface for interacting digitally with the plant via electrochemical signals. Rob Faludi, Kate Hartman, and Kati London’s Botanicals – The Twittering Plant [30] connects humans and plants via messaging on Twitter. Unlike utilitarian, “internet of things” approaches for connecting plants, these two projects play with the empathy humans develop towards responding objects and beings.



Figure 13: Prototyping – exploration mobile gardens ©Katja Budinger



Figure 14: Special forces apply a toxic herbicide on invasive species Equinops Cupidus – the greedy thistle.
©Katja Budinger



Figure 15: Prototyping – scenes for Invasion ©Katja Budinger

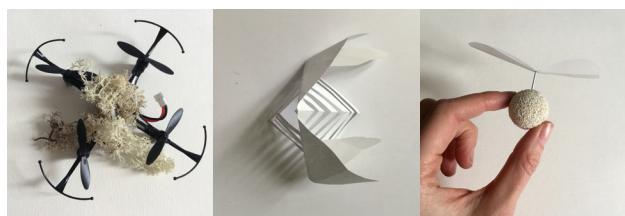


Figure 16: Prototyping – exploration pollinator drones
©Katja Budinger

SCENARIO 2: INVASION

Robots and drones (Figure 12) maintain huge monocultures that struggle with climate conditions. Invasive species have learned how to hack the agricultural cyber-physical systems, and they misuse them for their own dissemination. Pollinator drones become handy vehicles for their seeds (Figure 17), and machines that apply herbicides are tricked through mimicking of the crops' languages. The most effective invader is a thistle called Equinops Cupidus (Figures 18, 19). As this invasion is becoming overwhelming and is starting to endanger the national food supply, the government involves special forces to fight the plague (Figure 14). Strict rules and a code of conduct for agriculturists aim to contribute to the fight against the greedy thistle (Figure 21).

Socioeconomic context: Since 2016, more and more states have shifted toward protectionism and nationalism. Regional conflicts and concerns about security push people to focus on regional issues. Several states have moved toward more authoritarian forms of government, with highly regulated economies facing food insecurity. International cooperation becomes more and more difficult, and international conflicts are on the rise, which makes climate policy impossible. Deforestation due to humans' high need for fossil fuels accelerates a wave of mass extinctions. Most of the land is used for agriculture and resources. Wildfires are common, and in this rapidly changing climate only resistant, adaptive species survive. Because investment in education and technological progress is lacking, development stagnates [9]. Governments focus on armament and basic food supplies. Highly automated agriculture employs old-fashioned, maintenance technology.

Background: Plants live in symbiotic relationships with diverse species and are “active recruiters of friends” [19]. To adapt to new circumstances, some plants even actively change their social networks. Their “strategy to please other species” [21] describes different methods to attract and manipulate pollinators in order to disseminate. On the other hand, “overharvested species” [20], especially monocultures, are suffering from more stress than their wild relatives and demand more maintenance and caretaking effort. One reason is their lower resistance to diseases and invasive species.

To ask the following question, we applied a use-versus-misuse approach [4] to the meta trend of automatization and cyber physical systems: What if plants and machines make a better match and expel humans from their social networks? The scenario is based on SSP3 (“the rocky road”) [9], which deals with protectionism, regional conflicts, and security concerns. We decided to visualize the early signals of this scenario to create a weirdly familiar yet not completely dystopian atmosphere.



Figure 17: Pollinator drones are supposed to substitute rare insects and manage the dissemination of crops. Materials: Acrylic, paper, copper wire, spray paint
©Katja Budinger



Figure 18: The invasive pest Equinops Cupidus is highly resistant. Its sticky seeds and strong air roots are weapons to conquer monocultures. Materials: Modeling clay, toothpicks, filament, flower tissue paper, spray paint. ©Katja Budinger



Figure 19: Blooming specimens are capable of hacking the drones' communication system and attracting them. ©Katja Budinger



Figure 20: Infested drone, which pollinated the greedy thistle instead of crops. It carries the sticky seeds of the invader. ©Katja Budinger

THE DAILY NEWS

Issue #1567

Tuesday, 23.07.2047

XXIX Annual

BATTLEFIELD AGRICULTURE

Invasive species on the rise



WHAT TO DO IN CASE OF INVASION



1. Shut down your pollinator drones
2. Identify place, number and status of the hostile pest
3. Contact Ministry of Agriculture

0900 729 989 00

Mo, Di, Do 8am - 10pm
Mi, Fr 9am - 15pm
EC-Tatfors@MAGe.com



Official Ad
Ministry
of Agriculture

O *nce when Farmer Schmüller regarded his land, he used to see golden fields of grain that reached up to the sky. But everything has changed in two years. One morning in June he made an unsettling discovery. When he went to his field, he stumbled upon a huge amount of strange, black plants, the *Echinops Cupido*, currently infesting grain fields. "My first thought was, that the farm must have been hacked by a competitor to get rid of some of the competition, you know. We've had some hard times lately, we're not the only ones here. I'm selling a lot of our as well, seems that I am their main competitor..." But Kevin, the owner of the farm, who was not the only agriculturist with this problem. "I was surprised to find the others struggling with the black*

plant too. Never seen them in this amount before. Creepy development." This plant seems to have sped up dissemination within the last two years and could become an overgrowth of the field. "It's not just grain fields that are especially affected by this invasive species. While checking his land Schmüller made another troubling discovery. One of his fields contained a large amount of grain that contains with such black, glossy, sticky seeds that usually spread via natural pollinators like bees or other endangered insects. The seeds are extremely sticky and can stick to anything. After examining it the farmer realized it was full of black, glossy particles. Was it possible that it accidentally spread via a drone? "It's not the first time that a drone contains with such black, glossy, sticky seeds that usually spread via natural pollinators like bees or other endangered insects. The seeds are extremely sticky and can stick to anything. After examining it the farmer realized it was full of black, glossy particles. Was it possible that it accidentally spread via a drone? "It's not the first time that a drone

*Food Security states: "It seems like *Echinops Cupido* hacks the communication system between crops and the automated management and care technology. We suspect it to be a highly intelligent species that can communicate with drones and it seems like they are steadily getting better at it." The Ministry of Agriculture demands farmers to carefully monitor their fields and to take action if they suspect something is wrong. "We suggest not relying on the maintenance robots and drones during blooming period. Arguments that accuse the mono culture of being the cause of the invasion should not be taken seriously, but at the moment there is no alternative."*

The state has released their agenda by rectifying the alarming situation. Furthermore they have issued strict guidelines for the treatment of any outbreaks and infestations. The Ministry of Agriculture has issued strict guidelines for the treatment of any outbreaks and infestations. The Ministry of Agriculture has issued strict guidelines for the treatment of any outbreaks and infestations. The Ministry of Agriculture has issued strict guidelines for the treatment of any outbreaks and infestations.



IDENTIFICATION OF ECHINOPS CUPIDUS

At first sight the small black, spherical sprouts look quite harmless but they have a high potential to destroy your harvest. As soon as you detect them you should start intervening immediately. The sprouts are extremely sticky and it is nearly impossible to get rid of the plague. The most persistent exemplary is a plant that survived its first year. It consists of a single stem with several long, thin leaves and a huge black blossoms that attracts pollinator drones. Perfectly adapted to its environment it can only be combatable with the help of a drone. If you suspect that your field is infested with the greedy thistle call 0900 729 989 00. The case will be evaluated and measures will be adopted. Do not try to remove the plants by hand as they contain highly allergic substances. Touching it without protection can lead to injuries and highly allergic reactions.

ECHINOPS CUPIDUS States of development

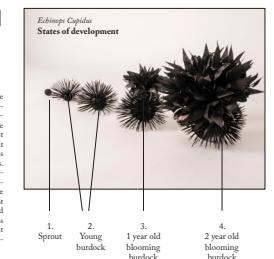


Figure 21: Pastiche scenario. A newspaper article embodies a totalitarian tone of voice and instructions on how to behave in the current state of emergency. ©Katja Budinger



Figure 22: Product shot of ready-mixed base to grow flower accessories at home. Materials: Paper and watercolor. ©Katja Budinger

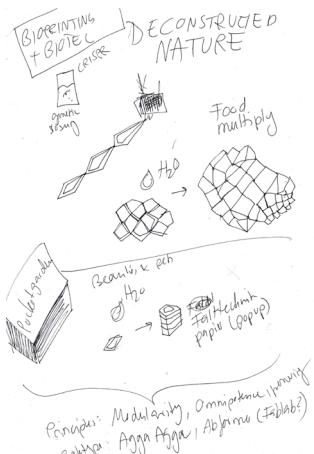


Figure 23: Shaping the core principles of the scenario
©Katja Budinger



Figure 24: Prototyping – DIY gene editing machine ©Katja Budinger

Figure 25: Prototyping – exploration modular plants
©Katja Budinger

SCENARIO 3: ON DEMAND

New plants can be printed or put together. They embody plant principles like modularity, symmetry, and cells but can look completely different. Humans can easily customize them according to their needs and tastes. Fashion and style are central elements of daily life. One trend is to grow fashion accessories (Figures 26). Flower crowns and diadems are especially in vogue (Figures 22, 29, 30). Even if these phenomena mirror young people's longing for nature in a world shaped by technology, plants are mostly treated as lifeless material.

Socioeconomic context: Individualism and the joy of consumerism accelerate markets and product development. Society enables all population groups to participate, and living standards improve worldwide. Optimism and a belief in limitless technological progress shape lifestyles and attitudes. People are confident that climate change will be addressed by geoengineering, and that biodiversity can be regained by bioengineering. Highly competitive markets, participatory societies, and a strong focus on innovation facilitate rapid technological progress [9]. Decentralized manufacturing, 3-D printing, and biotechnology are the most popular developments. In the rush of gene editing, plant principles are applied to surfaces and textiles. Step by step, tissue cultures are substituted for classic crops. Indoor and garden plants are modified and adapted to consumers' tastes and styles (Figures 27, 28).

Background: As the scenario is based on an optimistic and carefree mindset derived from SSP4 ("the highway") [9], we chose fashion and social media as a theme. The economy-focused worldview pushes plants into an even more passive role. We examined the meta trends of decentralized manufacturing and bioengineering. After experimenting on Do-it-yourself (DIY) machines and processes (Figure 24), we decided to adopt a more consumer-centered artifact, which embodies the laissez-faire attitude of the future citizens (Figure 26). We created a ready-mixed product that is easy to use and suitable for a fast-moving market.

Carole Collet's Biolace [31] could be related to this draft. She imagines modified plants as multitasking fabrics that produce food and textiles at the same time. Although a sustainable solution for food and material supply is presented, plants are exploited as production factories and genetic material is edited extensively.



Figure 26: Ready mixed grow kit ©Katja Budinger

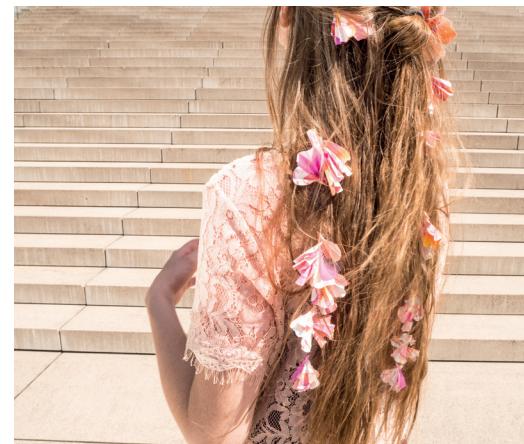


Figure 27: Influencer presents a new product that can be applied directly on human hair. ©Katja Budinger

Figure 28: Pastiche scenario – A video blogger introduces a clever and easy fashion hack.
©Katja Budinger



Figure 29: The grow kit is available in different styles and can be customized to any taste.
©Katja Budinger



Figure 30: Biobrick based flower crowns are a popular fashion statement.
©Katja Budinger



Figure 31: Improvised DIY batteries and powerpet mascots are common for young people of poorer population groups. Materials: Iron filings, magnets, water, oil, watercolor, hard drive, polystyrene, model making moss, spray paint, wires. ©Katja Budinger



Figure 32: Sketches to explore plausible daily life ©Katja Budinger

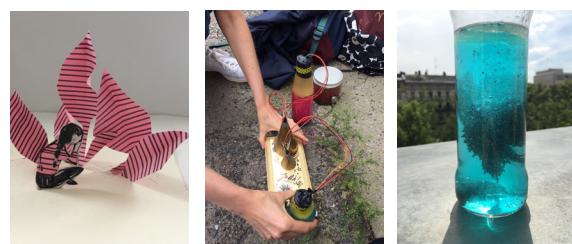


Figure 33: Prototyping of scenes and props
©Katja Budinger

SCENARIO 4: BOTTLE GARDEN

Amongst all of the pollution and waste, a special species has developed. This highly eutrophic algae (Figure 36) accumulates contaminants, especially lead. As nutrition is rare, it rigorously defends its territory – with electricity. Meanwhile, this algae has become a treasured, unconventional resource for the poorer population. It is especially popular among teenagers, as it enables them to join online communities. They call the algae “powerpets” and use them as a kind of battery (Figures 31, 34, 35). If kept in the right surroundings and given the right conditions, they produce energy when triggered by a concurring conspecific. People have started to use do-it-yourself circuits and accumulators to generate energy for their mobile devices, a not entirely harmless practice. Accidents often occur, and harvests as well as markets are controlled by gangs that profit from the popular demand.

Socioeconomic context: Internationally and within countries, inequality and stratification extend to extremes. Conflict and unrest become increasingly common [9]. Teenagers retreat to a digital sanctuary, where the gap does not feel as vast. In addition to the challenging conditions of their daily lives, children with more difficult social backgrounds struggle to join the online self-projection (Figures 37). Technological development is advanced in the high-income sectors, whereas low-income areas lag behind and often have to improvise in supplying energy and food [9]. Old-fashioned devices are used, repaired, and up-cycled. Ecosystems continue to struggle with climate challenges, and plants need to adapt to the rapid changes in their environment.

Background: A study on *mimosa pudica* (“the sensitive plant”) shows an immediate and visible reaction to different stimuli, indicating its learning and memory capabilities. During the experiment, the plants adapted their behavior to recurring stimuli [11]. Furthermore, nature is constantly adapting to human impact [23, 26]. We combined these phenomena with do-it-yourself and upcycling cultures. The scenario is based on SSP4 (“a road divided”)[9], which deals with stratification and inequality. It provides the perfect environment for a story about “collaborative survival” [22].

Plant fiction by Troika [32] is a related speculative project that deals with imaginary plants to address the relationship between Western civilization and nature. The plants are visually probable but have abilities and habits that seem fantastic.



Figure 34: Teenager charging his device. As the batteries are improvised, this process takes a lot of time and is not very reliable. ©Katja Budinger



Figure 35: DIY battery with algae ©Katja Budinger



Figure 36: Powerpets need special care
©Katja Budinger

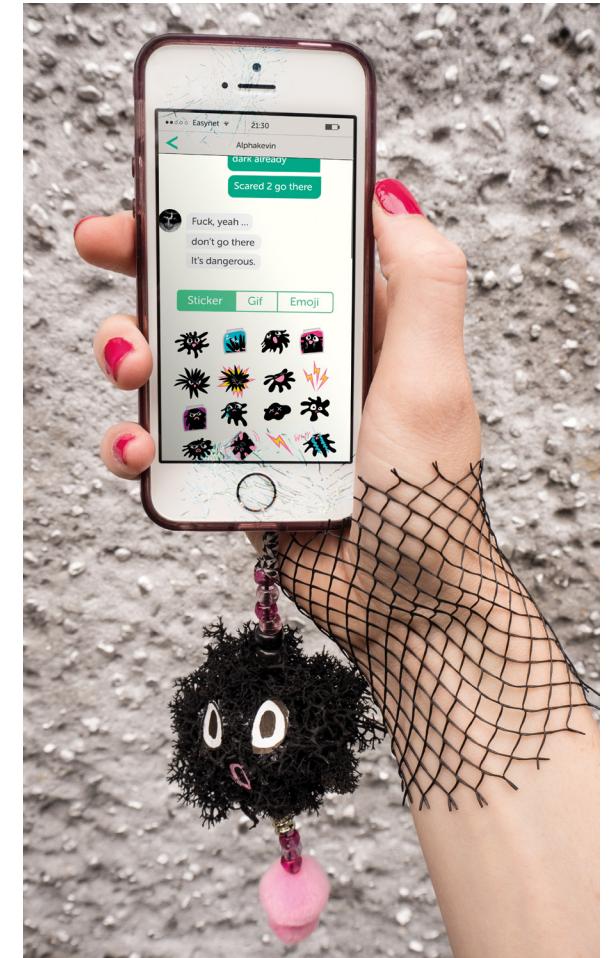


Figure 37: Pastiche scenario. Two teenagers are chatting about their recent problems with their powerpets. They use emojis and slang to address their fears and thoughts.
©Katja Budinger

FINDINGS

We introduced a way to bring abstract scenarios to life. The SSP narratives worked perfectly as frameworks to define a story world, in which the actors were placed. Design fiction facilitated a deep immersion into the probable future worlds and a playful exploration of the scientific research behind them. By prototyping, we uncovered complex interdependencies, became passionate about plants, and explored ways to combine the different research topics within an appealing story. We were able to match different theories about relationships between plants, humans, and technology with the value systems provided by the SSPs. Therefore we could make a connection between how human values and behaviors impact our relationships with plants (or nature in general). “Harmony” shows an example of collaboration between humans and plants, facilitated by technology. “Invasion” introduces a hostile environment that is shaped by humans losing control and by a new alliance between plants and technology. “On demand” exemplifies humans being dominant yet ignorant in their technology-driven role. “Bottle garden” shows how struggling humans and struggling plants team up for “collaborative survival” [22]. The use of daily-life materials and the principle of low fidelity prototyping empowered our experimental process.

A “right focus in between” [2] was not only important for the positioning between unreal and real but also for how open or directed the narration was, in order to leave enough space for multiple viewpoints and viewers’ interpretations.

DISCUSSION

In order to create a unique story world and visual language, we applied design fiction individually. Applied collaboratively, it could be an instrument for going beyond recent needs and finding unexpected facets for future communal life. Regarding ecological interdependencies, it could encourage radical thinking beyond classic environmental topics such as carbon footprint and resources. Furthermore, it makes participants experience the scenarios and offers them the space to identify with a plausible future self. It may even hint at ways to achieve or to avoid a certain scenario.

Factors that may deter people from applying this method in a business or organizational context are the open outcome and the time it takes. Accepting these factors, it could be a playful tool for working collaboratively on strategic realignment and perspectives. It would be interesting to investigate the role of facilitators in this environment, such as how they can encourage radical thinking and deep immersion within a group. This co-creation approach would focus on the process itself rather than on its results.

The entire practice of applying this method supported learning, exploring research, and gaining knowledge. In particular, approaching the research through prototyping, rather than by thinking about it, enabled a deeper understanding. A further step could be the investigation of its potential as an unconventional, playful learning method. As the visual quality of the artifact plays a significant role in enabling immersion and a “suspension of disbelief” [4] on the part of third parties, the collaborative application within a non-expert team might be a challenge. There is a need to explore how facilitation, improvisation, and technical advice in crafting the artifacts can encourage such teams.

CONCLUSION

Design fiction works in the intersection of science and fiction [7] to make abstract concepts tangible. The artifacts empower imagination and work as concrete metaphors for discussion. Our draft enables immersion in four plausible futures and hints at the daily life of future citizens therein. By offering the opportunity to compare the scenarios, each representing a societal value system, we invite viewers to reflect on recent values and developments. As the draft balances daily life and a vision of the future, it is approachable. Its familiarity distinguishes the work from futuristic concepts and allows viewers to relate to it. We would encourage working with multiple futures, as such an approach opens a space for different perspectives and emphasizes plausibility instead of forecasting. The future is not yet determined: it will be influenced by the decisions we make today.

When speaking about preferable futures [13], we might also consider the plant’s point of view, including how it might perceive the world and what intentions it may have. In the plant’s world, it is a subject, and humans and animals are external objects that are useful, useless, or dangerous [21, 24]. Inspired by Lui and Bardzell, we would like to encourage emphasizing the interdependencies between humans and plants. We all are part of ecosystems: we are actors in a network who depend on each other [23]. We might benefit from “working with nature” [23], instead of trying to control it, which means taking its point of view into account. This process can only be speculative, as we are not yet able to speak to plants. In our scenarios, the plants mirror the attitudes and behaviors of humans towards them. As design fiction offers multiple perspectives, it is an interesting tool for exploring this constellation even further. Although our draft does not present a solution for facilitating this approach, it can inspire further research on this topic.

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