



Flanders  
State of  
the Art

# The Future of Soil and Land Stewardship



# The Future of Soil and Land Stewardship

- An exploration of stewardship in  
three scenarios

WE MAKE  
TOMORROW  
BEAUTIFUL  
**OVAM**

shift<sup>II</sup>  
clarity in complexity

aw<sub>b</sub>



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# Reading guide

## **Intro**

At OVAM, the Public Waste Agency of Flanders, we have initiated a program to explore new approaches to soil remediation policy and soil care. One of the key strategies is soil and land stewardship. To develop such a strategy, we need a sense of what the world may look like tomorrow. The practice of future scenarios can be of help here.

## **About the scenarios**

In this document, we present three distinct scenarios that explore possible contexts for the future of soil and land stewardship. Each one describes a state of affairs in the future, some milestones in the transition to that state, and what form soil and land stewardship could take in this context. Each scenario also contains two vignettes which describe some of the many roles soil stewards could take on in practice.

The point of future scenarios is neither to predict or to dream the future, nor to convince anyone about the rights and wrong or to argue for any specific decision. You don't even have to 'choose' a scenario. Instead, the aim of future scenarios is to suggest a space of possibilities.

## **Different ways the scenarios can be used:**

- 1.** At a basic level, future scenarios stimulate reflection, raise questions and make us aware of the fact that different futures are possible, depending on our choices today. They also improve our understanding of the long-term trends and of the key variables affecting soil and land stewardship.

**2.** Future scenarios can also be used as pacesetters to mobilise the community and boost an interdisciplinary debate on soil and land stewardship. Because nothing in scenarios is fixed or certain, they offer a free space to generate ideas or expose conflicting priorities. People are often eager to correct or adjust the scenarios to their view by adding 'missing' elements. Resistance, criticism, cooperation, or enthusiasm - any reaction is insightful, as this expresses how someone looks at the present and the future.

**3.** Scenarios do not only allow stakeholders to develop informed and plausible stories about the future, but also inspire them to reflect on the role they can take on as a soil steward, based on their talents and affinities. Future scenarios can also help to evaluate the robustness of current stewardship actions, either as affirmation, support and encouragement, or to inspire improvement.

**4.** For policy makers, future scenarios can provide a useful background to strategic reflection. Looking at the future can shed a new light on today's problems and solutions. Scenarios help us to see alternative paths into the future and the possibilities of smarter, more holistic strategies. What would happen, for example, if we chose soil and land stewardship as the guiding perspective across different policy domains? What would be the impact on the food chain, forest management, landscapes, watercourses and biodiversity? Could a focus upon soil and land stewardship even improve people's physical and mental health?

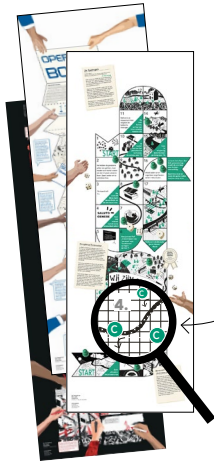
**About the illustrations**

Each scenario is accompanied by an illustration. You can find these behind the cover of this booklet. The illustrations add an extra narrative layer and unfold the storyline of each scenario in a different way. For Scenario 1 an activist pamphlet calls for action, for Scenario 2 a boardgame emphasizes the journey towards a bioregion and 15-minute-city and for Scenario 3 a map displays the top-down soil strategy of two continents. The soil stewards receive a different colour in each illustration - red, green and blue - to highlight their central role and achievements. The numbers in the illustrations refer to the corresponding paragraphs in the scenario texts, which adds another level of readability.

**Let's get started!**

And now, it's up to you. This booklet provides different ways of exploring the three future scenarios of soil and land stewardship. Through the means of text, of illustrations, or with a combination of both. Take your time, open your mind and let the scenario's wash over you.





4

De beschrijving van het scenario is verdeeld in twee delen. Het eerste deel is de beschrijving van het scenario zelf, het tweede deel is de beschrijving van de gevolgen van het scenario. De beschrijving van het scenario is verdeeld in twee delen. Het eerste deel is de beschrijving van het scenario zelf, het tweede deel is de beschrijving van de gevolgen van het scenario.

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**For your information**

*In the left margin of the scenario texts there are grey numbers. In the illustrations, the same grey numbers are scattered across the drawing. You can look for the representation of a certain paragraph in the scenario text by tracing the corresponding number on the drawing. This can also be done in reverse. The illustrations can be read and interpreted as a stand-alone format as well.*

*In 2050, short-supply chains  
reconnect urbanites with  
farmers, soils and seasons.  
Urban-rural partnerships thrive.*





**scenario 1**

# **Save Our Soils**



*People start to imagine pathways in becoming soil and land.*

# Save Our Soils

The bottom-up struggle

## 1. **AFTER THE PANDEMIC, BACK TO NORMAL**

During the pandemic of 2020, when the world went quiet, we had a second to think before we hit play again. The Covid-19 virus was a magnifying glass that sharpened inequalities and revealed system errors. Many hoped that the biophysical cause of the crisis would make us rethink our relation to the larger ecosystem, beginning with the soils on which we depend. But governments worldwide were too busy picking up the pieces of the economic turmoil. National budgets capsized, debts exploded. There weren't many strategies available to repair the damage: raise taxes, cut costs, increase productivity, accelerate economic growth.

One area which suffered: carbon cuts and the clean energy transition. Governments knew that postponing investments would only make it all more expensive, but with populist challengers breathing down the neck of centrist coalitions, there wasn't enough political capital or leadership to make it happen. We even had to argue the case anew for policies which were already widely accepted twenty years earlier. 'Back to normal' was the mantra, and that what was going to happen, come what may.

### **STUMBLING FORWARD (ON OLD CRUTCHES)**

2. Rock-bottom prices for fossil fuels were a critical factor. Covid-19 gave the fossil-fuel industry the biggest blow in its 100-year history. International travel and trade had slowed to the point that it made the demand for oil and gas crash. This permanently altered the energy industry and its geopolitics, further increasing the interest in fossil fuel divestments. More than ever, a global clean-energy transition seemed inevitable. The only question was 'when'. Lobbying for long-term technical solutions was a notorious strategy of oil companies to postpone climate action.
3. Further momentum was provided by a coalition of business leaders who urged governments to set strong targets to reach the 'carbon neutral by 2050' goal. However, their voluntary approach was too weak to green the global economy. The system showed little ability to adjust and kept on

rewarding influential, polluting companies with bonuses, while externalising the costs of environmental damage, extinction and global warming. Markets kept on ignoring human-induced natural disasters.

4. Committed CEOs remained stuck between their shareholders and the planet. Some were accused of greenwashing, even slowing down structural change. Can (green) growth and profit go hand in hand with people and planet? Can you deliver the same quality and quantity of goods and services, while drastically reducing emissions and raw materials on a global scale? Or is this a technological utopia?
5. The European Green Deal of the 2020s felt big and good but was insufficient to reach any climate goal. Although there were early signs of a paradigm shift tackling our obsession with endless growth, the deal didn't really question the rich world's (over)consumption and (over)production patterns, the EU's agricultural policy favouring animal production, free trade agreements, long production chains and transferring the costs of ecological damage to less influential countries. Who - in power - dared to challenge the dominant, extractive economic model?

### **FLOODS, DROUGHTS AND A POLARISED SOCIETY**

6. Unfortunately, global warming didn't wait. The consequences were known and expected. Temperate maritime climates like Belgium saw more erratic weather patterns. Heatwaves, droughts and freshwater shortages in summer, but also more torrential rainfall and floods throughout the year. Flanders was severely affected by both agricultural droughts (crops lacking water) and hydrological ones (aquifers running dry). Code orange was announced earlier each year, with low groundwater levels and declining water quality already in May. Flanders' Blue Deal of the 2020s was a last-minute attempt to make its soils more drought resilient.

Meanwhile the rush to maintain growth and food security fuelled the wasteful use of water and land. Humans kept on moving more rocks and

7. sediments than all the world's rivers combined. Deforestation, urban sprawl, land grabbing, ploughing, artificial fertilizers and climate change ruined our soils at breakneck speed. They killed almost all organic life, increased the rate of soil erosion sixtyfold over the past century and wiped-out Europe's wild pollinators along the way. In 2030, Europe missed almost all of its biodiversity goals. Half of its native trees and more than 1,500 of its animal species were threatened with extinction.
8. And it showed: crop yields and their nutritional quality went down, soils degraded. In just four decades, between 1970 and 2010, the surface area of drylands worldwide doubled. Then in half the time, between 2010 and 2030, it doubled again. In Spain, Sicily, the French Provence and the Greek Peloponnesus, farmers had to abandon large areas of degraded farmland that had lost all ability to hold carbon.
8. In Flanders, harvesting became more expensive than the dried-out crops' value, so they were left unharvested. Its agroindustry put pressure on Europe to get the same subsidies for irrigation that Spain had received decades earlier. In 2026, following the US, European stock markets turned water into a speculative commodity. Water and food prices were raised artificially and benefited investment bankers, but left crops thirsty. Investors had always adored the apocalyptic vibe.
9. The string of calamities and the visible impact on our landscapes further polarised society. At one side of the divide, people were determined to tackle the challenges ahead. They couldn't tear themselves away from a planet in decline. At the other end, fatalism and wilful ignorance thrived. Yet another thing to worry about! Pleasure trips by plane, private swimming pools and plasticized bananas were comforting to some, horror to others. Never have we been so free, never have we felt so powerless, a famous sociologist once said.

Society became ever more divided, with gaps widening not only between the hopeful and the bewildered, but also between the rich and the poor,

the technologically minded ‘wizards’ and the planetary limits embracing ‘prophets’. And, between different ways of relating to the land: one seeing soil as an outside object, to be dominated and consumed; the other recognizing the interdependence of all living beings, making soils, in effect, part of ourselves.

### **THE GREATEST SOCIAL SILENCE OF ALL**

10. Despite all warning signals, the industrial agri-food regime and its supermarket chain model didn’t change course. They held to the dogmas of monoculture, economies of scale, perfect-looking plastic-wrapped food, year-round availability, a focus on import-export, and a functional view of land. Resilience was mainly sought in genetic modification and large-scale, robotized artificial food production.

The new European Soil Strategy was blocked by six member states and agribusiness lobbies for a second time in 2026. This left soil scientists and farmers frustrated as this would have been the best legal framework to halt soil-erosion and improve soil biodiversity. An underlying cause was that Europe’s mammoth subsidy program for agriculture had only recently started to graft ecological thinking onto its foundation.

11. Another long-overlooked problem was soil blindness, or the lack of awareness that a healthy soil is the key to all life. No one seemed to grasp that if you want to protect animals, plants and humans, you should start with soil. Lose soil, and everything goes with it. Instead, soil was treated as an isolated, marginal element, so irrelevant that you could go for months without seeing it in any newspaper. And if soil was mentioned, it was only valued for a narrow range of ecosystem services: food, fibres and energy. Other benefits were ignored, like soils regulating climate change by storing carbon, filtering and holding water, protecting us from floods, being a resource for pharmaceuticals, the stock of our archaeological heritage and a living system - home to one fourth of all species on Earth.

Maybe it was soil being interwoven with so many aspects of life that made it invisible. Soil was everywhere, and therefore nowhere. Hidden under our feet and hard to grasp. Not talking about soil was perhaps the greatest social silence of all times.

## **DOWN TO EARTH**

12. Soil stewardship emerged at the fringes at first. While in the 2020s authorities kept on supporting industrial agriculture, rebel groups of students set up parallel experimentation tracks together with farms of all sorts and sizes. Underground seed exchanges assisted farmers to bypass the highly regulated, industry-dominated seed market. Experiments focused on time-tested regenerative practices such as agroforestry, crop rotation and permaculture, on working with natural systems rather than against them. Another breeze of change came from companies, with innovations ranging from peat-free potting soil and breweries switching to soil-friendly crops, to 'urban mining' which turned excavated soil from construction sites into local building materials.
13. A third node of resistance was community-supported agriculture (CSA), an alliance between farmers and citizens. To improve local resilience and food sovereignty, this farm-to-fork model relied on the science of agroecology and risk-sharing with customers. CSA farming meant professionalism and advanced technology - but no supermarkets, no fertilizers, no use of harmful products and no monocultures. It was the antithesis of the global distribution chains of modern industrial food production.
14. CSA grew, although slowly. Initially their main bottleneck was not demand, but access to land. Every acre was speculated on by traders of frozen food, potatoes and even horses. CSA initiatives were buzzing, but young farms couldn't expand their area due to outdated soil management and land valuation policies, which seemed designed to frustrate them. Many conventional farmers, on the other hand, were trapped in an economic power structure where they had to lease land from the agroindustry,



while trying to get as much out of the soil as possible. Farmers had little interest in caring for the soil because they didn't reap the long term benefits themselves.

### **SAVE OUR SOILS**

15. The movement 'Save Our Soils' gained momentum in the late 2030s, when people found it harder to ignore the dust bowls spreading across the land, and the low quality and high prices of the fresh produce in their supermarkets. Citizens who were lucky enough to own a backyard became motivated to turn theirs into vegetable gardens. They formed growing networks of trade and knowledge exchange. 'Keep our soil on the land!' became a widespread battle cry, seen on social media, stickers, posters and pins everywhere. Governments saw a substantial rise in soil lawsuits filed against them. Climate cases in the past had shown that countries which fail to justify their environmental policy, can be severely challenged in court.
16. Supported by activist experts, many new data on soil health were generated, such as new microorganisms, the amount of organic carbon, and possible pollutants. Small patches of urban soil, it appeared, contained a third more organic carbon than agricultural soil. Citizen science flourished. Soil was no longer a black box, although we had only scratched the surface of soil complexity.

### **A LEADING ROLE FOR FARMERS AND CITIES**

17. Things started to move faster when cities decided to manage their regional metabolisms more assertively. They experienced the impact of climate change first-hand and wanted to increase food security for the ever-growing group of economically vulnerable citizens. In the absence of (inter)national support, local policymakers developed partnerships in their countryside with farmers-stewards who already sustainably managed their soils. Together with agricultural associations, they reinforced existing soil care programs.
18. Wherever possible, cities bought traditional farms gone bankrupt, turned

them over to sustainable cooperatives, and embedded them in a network of local sales points. Instead of labelling and opposing different types of farming, they wanted to get as many farmers as possible on board. Agricultural and dietary diversity were crucial to tackle the looming soil crisis. We couldn't afford a perfect solution - but needed one good enough to avert environmental disaster while we still had the chance.

19. Over time, more land became available for organic food production. The cooperatives developed more clout, and their regional networks became the foundation of a more resilient land-use system. They aligned the interests of producers, consumers, and often also retailers and urban policy makers. The Save Our Soils movement expanded internationally because of its positive, hands-on approach, taking many households on board. It received support and visibility from the Food and Agriculture Organisation (FAO) which launched the yearly SOS Soil Steward Prize, the most prestigious and engaging environment prize in history.

All these initiatives reinforced a sense of urgency, but also provided insight into the empowering success of good soil stewardship practices. We saw the world changing in front of our eyes.

## VIGNETTE 1

### 20. **Sous les pavés, la terre! (2035)**

Against the background buzz of cars, activist soil stewards scour the city and its suburbs for every patch of available (or hidden) soil: abandoned plots, dumps, brownfields and under-used backyards. Soils are a neglected resource in cities, and that needs to change. We can't afford to bury our livelihood under asphalt.

*"In my village in the outskirts of Brussels, out of pure necessity, we had to overrule the zoning plans and turn parking lots and golf courts into farmland. To earn some additional income besides their regular office jobs, many locals go picking harvests in these new farms. Although the work is physically demanding, it feels right to serve our families self-picked produce."*

The mission of the soil stewards is to restore soils covered by redundant asphalt, take over parking spaces, boost water storage capacity, create community gardens, urban wetlands and tiny forests, both in private and public spaces. Whatever spot they find - from school playgrounds to parks and building façades - it is made available to grow food and greenery.

Stewards also inspire the 'heavier' users of soil to take a different turn, for example by showing contractors how to recycle excavated soil materials from building projects. **Sous les pavés, la terre!**

*"Building often requires the extraction of earth on-site. Because it's hard to stock and transport, more than 70% is being dumped or landfilled as waste. To avoid this, we transform excavated soil into on-site building materials such as clay plasters, blocks and earth for walls and floors. They are circular, carbon neutral, healthy, and possess minimal grey energy. In this way, we want to help architects, contractors and clients to achieve their climate targets, and improve the indoor living quality of their projects."*

*“At the construction site around the corner, the groundwater is pumped up and then lost in the sewerage. To save the water, together with some friends we decided to hire a tanker. With a little help from the construction manager, we directed the water into the water cisterns of our neighbours. This simple idea made the sweltering summer a bit more bearable, both for people and plants. The enthusiasm of our mayor is promising. He wants to extend our action to other districts in town.”*

The guerrilla gardens that emerge are the triumphant outcome of a vibrant soil care network, bringing together activists, scientists and citizens. They empower both locals and newcomers, who add new flavours, knowledge and stories to the self-gardening palette.

*“Through hands-on campaigns, we call on citizens to grow food in whatever spaces they can. We give free advice and soil-test-kits to monitor soil quality, contamination, acidification and compaction. But above all, we want to empower and encourage people to become self-sufficient. Nothing is more valuable than working a little land, no matter how small, and harvesting your own food.”*

By growing food, promoting community-led trade, and winning citizens’ hearts and minds, stewards are able to challenge – little by little - the agribusiness and supermarket dominance. We can prevent the agribusiness from using our bodies to store surpluses from monocultures, if we want to.

*“More than 100 years ago, there was a similar movement in the US called ‘Victory Gardens’. School and community gardeners – soil stewards par excellence - were able to produce no less than 40 percent of the nation’s fresh vegetables. Gardening had become a civic duty. As soil stewards, we always hope that people will pick up our work and take things further.”*

## VIGNETTE 2

### 21. **Urban by nature (2050)**

In 2050, more than two third of the world population lives in urban areas. In Europe, soil stewards play a pivotal role in connecting cities and the countryside. They bring urbanites to the doorsteps of local farmers and farmers to consumers and retailers. The challenge for stewards is to break the rural-urban divide by finetuning circular flows of materials, energy, water, fresh air, biomass and organic waste between both areas.

Soil stewards are supported by a high-performing, growing network of cooperatives, farmers markets and community-supported agriculture initiatives (CSA). The latter allow small-scale farmers to sell “shares” of their crops during seasons when expenses are high but incomes low – like winter and early spring (in Europe). Farms also provide the option of working on their fields, co-op style, in exchange for produce. Individuals are important, but community is king.

*“I swapped my regular desk job for 5 am harvests that come with running my own farm just outside Brussels. I work the rich, loamy soil with no-tillage tools and without fertilizers (nor subsidies). My father, a retired farmer, is sceptical: “You have an engineering PhD, and now you are farming like they did it in the Middle Ages?”. I am not against conventional farming but mindsets - and markets – have changed. Customers want us to take care of the environment.”*

In the beginning, only medium- to high-earners can afford to pay CSA farmers in advance, and to free-up time to work on the farm. But over time, the growing solidarity between producers and consumers is facilitated by an integrated policy for urban-rural development. This includes social subscription fees, cycling highways, a free cargo bike rental service, efficient public transport and green corridors shaping a pleasant urban-rural nexus.

*"It is not only about the food, but also about being outside. Harvesting days at the local farm are our favourite family cycling trip. My children's weekly hobbies are swimming, Chinese class and learning what it takes to grow fruit, grains and vegetables."*

The effects are wonderful. Short-supply chains reconnect urbanites to soils and seasons. Urban lives are enriched by the values farmers bring to their plates. CSA makes citizens realize how dependent they are upon farmers, and farmers upon them. There is a dawning awareness that eating is an agricultural act. Our everyday food choices are political: we can either choose to strengthen the global industrial food system, or to participate in an entirely different local economy that gives farmers a bigger share.

*"My city has made fifteen plots of land available for agricultural initiatives which increase the proportion of local, short chain produce. Anyone can submit a project if it's sustainable and economically feasible. This gives me and my friends the opportunity we have been waiting for: to grow a suburban food forest with an educational treehouse in its heart."*

## SUMMARY OF SCENARIO 1

### **SAVE OUR SOILS**

Climate change and environmental degradation have hit hard across Europe: droughts and floods, thinning topsoils, biodiversity decline, abandoned farms, and poor ecosystem resilience. The post-pandemic rush to maintain growth and food security fuels the wasteful use of water and land. Soil is reduced to an object we can consume and exhaust. There is a lack of awareness that healthy soils are the key to all life. We are soil blind. (Inter)national governance is weak, non-binding and insufficient. No one in power dares to challenge the dominant economic model. While society gets more polarised, soil stewardship emerges at the fringes. Resistance comes from bottom-up citizen collectives, fuelled by protests and citizen science. Urban-rural partnerships become nodes of change and are endorsed by local policy makers. Agroecological practices, soil friendly innovations and community supported agriculture remain islands in an agribusiness sea, but they are growing. The Save our Soils movement gains momentum; 'Keep our soil on the land!' becomes a widespread battle cry. As more people realise that their everyday food choices are political, governments face a rise in soil lawsuits filed against them. Guerrilla gardens emerge, cities are 'depaved' and farm-to-fork chains reconnect urbanites with farmers, soils and seasons. We see the world changing in front of our eyes.



**Welcome to  
the 15-minute-city,  
your new home!**

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Time for cha  
stress! More





scenario 2

# We Are Soil

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# We Are Soil

Joining forces regionally for soil and human health

## FROM SALUTOGENESIS TO SOIL STEWARDSHIP

1. Eventually it took us until 2023 to leave the Covid-19 crisis behind. Along the way, we realised that viruses were here to stay with us. Rather than hiding from them, we had to adapt ourselves to their presence. The best way to do this, was to boost our immune system and treat it as a precious asset. After all, it was impossible to ignore the strong correlations between Covid-19 patients, their environment and lifestyle. For example, 80% of the people who died, lived in the most polluted areas; a similar number suffered from overweight-related diseases.
2. The 'war' shifted from fighting the virus to fighting the stressors that reduced our chances to survive an infection: pollution, stress, overweight, processed food, a lack of exercise and of contact with nature - also called the 'nature-deficit disorder'. And underlying this, worsening inequality had a big impact on the health of people with less privileges. Studies found that almost everything associated with health and the environment gets worse when inequality is higher.
3. Over time, public health strategies evolved from cure to prevention, and embraced a much broader, ecological concept of health. 'Salutogenesis' was the name of the new game. This approach focused on supporting health and well-being. Its three pillars were: a healthier environment, healthier lifestyles, and a higher level of health literacy.
4. The focus on human-ecological health created unexpected opportunities  
5. for soil stewardship to take root. Salutogenesis was a driver for a renewed  
6. sense of soil in two ways: it made people rediscover their surroundings by exercising more, and it further stimulated gardening. These two seemingly ordinary shifts made people care more about nature around them, and ultimately about healthy soils too - the foundation of environmental and human well-being.

## **REDISCOVERY OF THE NEIGHBOURHOOD**

5. By 2025, putting hundreds of people to work in a building had become a thing of the past. During the lockdowns of the 2020s, we had learned to (love to) work from home. Walking and cycling had become popular, both for recreation and occasional commuting. People rediscovered their neighbourhoods and became more attached to them. What a difference not to see the world through the window of a car! The desire grew to take better care of our local 'habitat'.
6. The deeper connection to place was facilitated by a drastic reduction of global tourism during and after the pandemic. The 400 million arrivals registered in 2030 were much less than predicted a decade earlier, and looked more like the travel patterns of the late 1980s. Even if passenger densities were significantly reduced, people didn't trust being crammed into mass transport containers for hours. A long period of post-Covid austerity had also thinned our wallets, while airplane tickets had become more expensive due to a stiff European carbon tax.

## **THE RISE OF GARDENING AND FIFTEEN-MINUTE CITIES**

7. Progressive cities in Europe saw the disruption of working and travelling patterns as a chance to reposition themselves as post-car places. And in the same move, they aimed to tackle the social disparity which had become blindingly obvious during the various lockdowns. Urban planners turned road space into greener and wider walkways, terraces and bike lanes. Deprived areas and brownfields were refurbished to give people in cramped apartments better access to green spaces. A network of porous, socially mixed neighbourhoods emerged where all essentials - shopping, work, schools, farms and parks - were within walking or cycling distance. These 'fifteen-minute' cities improved the quality of urban life and reconnected people with their community. They became the engines of both ecological and economic recovery.

4. More and more people also started gardening because it enhanced their health in so many ways. Gardening reduces stress, reconnects us to nature, contributes to a sense of agency and brings fresh food to the table. In the countryside, monotonous lawns were turned (back) into vegetable gardens and wildflower tapestries. In cities, urban agriculture took off and was adopted on a large-scale. In Brussels for example, the cultivated public surface area doubled every two years. As a result, around 1,000 hectares were devoted to urban gardening by 2030, with no less than 8,000 residents on the waiting list for an allotment garden.

#### **GROWING MENTAL, SOCIAL AND SOIL CAPITAL**

8. Another positive outcome of gardening was the revival of local community life, stimulated by the roll-out of a basic income which freed energy, resources and time. Through gardening, people rebuilt their citizenship skills. They learned from each other, swapped seeds, shared recipes and enjoyed the blessings of a good harvest together. Citizens rediscovered how simple daily actions have the power to change things. This regained sense of purpose made people happier, more grateful and fulfilled. In contrast to the 'vaporous' debate around climate change, soil stewardship gave people a practical tool to enhance socio-economic and ecological resilience locally.
9. Of course, our attitudes didn't change overnight. Interventions by advisors was often needed as amateur gardeners still had access to a toxic cocktail of herbicides and still used climate-destructive peat as a soil enhancer. Salutogenesis too had a darker side. Being able to grow healthy food became a status symbol, earning you serious career-points but also exposing you to a lot of pressure. People also equipped themselves with an army of health gadgets spitting out data on command. An overload of heart rates, calories, energy levels, mineral intakes and blood pressures created a culture of health anxiety. It made us feel controlled and guilty, instead of happy and healthy.
9. It took two generations to make soil stewardship culturally acceptable and come to terms with our health in a healthy way. But once settled, the party

was going with a swing. We got rid of our health 'weapons' and listened to internal cues again. Eat mostly plants, not too much, grow your own food and enjoy it - that was all we really needed. It was a close thing, and totally unexpected, but the rollout of a basic income and the soil stewardship movement helped to mitigate the mental health crisis that had been building up due to the dark prospects of ecological breakdown.

### **AWAY WITH SOIL BLINDNESS**

10. Step by step, we also got rid of our soil blindness. Soil stewards played a key role in teaching the public the secret skills of soils. We learned that healthy soil, unlike air and water, needs to be more than just 'unpolluted'. Healthy soil is an ecosystem full of life, and that requires a long period of careful attention. Soil stewards also motivated gardeners to submit soil samples to regional testing labs. In return, they received information about their soil's microbiome, texture, acidity, nutrients and organic matter. In just a few years, this generated an impressive amount of data on Flemish soil quality.

More and more media outlets also considered soils worthy of consideration and connected environmental problems with soil health. Climate policies finally mentioned the capacity of healthy soils to pull carbon out of the atmosphere. Conscious retailers increasingly worked with the Global South to set up food chain projects around soil health, based on mutual trust, minimum prices, and purchase guarantees. Finally, the interaction between our daily food choices, global production patterns, soil health and climate change became clearer to a broader public.

All these factors - growing your own food, citizen science, food transparency and the soil stories told around us - increased people's soil awareness. Soil was no longer just dirt. People understood that a healthy soil is the foundation of the whole food system, and crucial for human survival. Instead of a resource, soil became a living thing you have a relationship with. Over time, our health and the health of soils became one and the same.

## **OVERREACH, FRAGILITY AND A CHANGING CLIMATE**

These remarkable shifts in ethos, lifestyle and sensibilities took place against a background sentiment of overreach and increasing fragility. The generations living through the 2020-2050s had to accept that no tree grows to the sky. Climate also continued to spin out of control. After the first tipping points were reached, a cascade of falling dominoes dragged our climate into something wholly new, which we had no experience dealing with.

11. The summer of 2024, for example, was sweltering. A still poorly understood weather mechanism – the ‘omega block’ - kept an area of high-pressure stationary above Europe for almost a month. Temperature records were smashed all over the continent, but once more Southern Europe suffered the most. In August, Toulouse noted +45°C temperatures and high humidity for three weeks in a row. The dramatic heatwave of 2003 had caused an estimated 50,000 excess of deaths in the EU, mostly in France, Spain, Portugal and Italy. In 2024 the numbers looked even more dire, with around 85,000 victims, mostly elderly people. In addition, European wheat harvests had declined by a quarter compared to the average of the previous decade.
12. Apart from the massive but unsustainable use of air conditioning, the aggressive greening of urban spaces was the only feasible medium-term strategy for the majority of cities to combat the deadly heat island effect.

## **A NEW SUB-POLITICAL MOVEMENT**

The challenges of a changing environment, our growing soil awareness, and the revival of local communities, created a new sub-political movement with a bioregional sensibility. It became quite normal for citizens to organise themselves to take care of their bioregion, and put it on the map.

13. The aim of bioregional stewardship was threefold. First, to accept - not mute - political opposites and turn the eco-movement into a bird with a left

and a right wing so it could fly straight again. The second aim was to raise awareness about a bioregion's 'natureculture' qualities through ecological education, information signs, heritage walks, forest soil charters, and collectively maintaining the land. Even religious leaders were taken on board to 'eco-convert' their followers by addressing them in their own, religious language and setting the example. Ultimately, soil and land stewards wanted to protect a bioregion from ecological destruction by building social cohesion, and finding a balance between nature and culture.

14. Bioregionalism was driven by place-based activist research which united a diversity of people: citizens, professionals (farmers, lawyers, architects, urbanists, engineers, teachers), scientists (historians, geologists, ecologists and soil scientists), local business leaders, creatives (artists, designers) and landowners. Instead of seeing culture as nature's enemy, or nature as a victim to be saved, bioregionalists saw humanity and culture as part of nature. Decisions were taken using the deep democracy principle which takes various voices, worldviews and mindsets into account - from constructive to clashing - instead of only the majority. The result was true consensus, instead of fragile compromises.
15. The movement was so successful, that by 2045 the birthplace on passports was replaced by the bioregion you lived in. A bioregional citizenship was granted after fulfilling conditions such as sufficient knowledge of the local - both cultural and natural - languages, and a minimum of years having helped to preserve the bioregion.

#### **PAYING FOR ECOSYSTEM SERVICES**

16. More often than not, local policy makers became allies in these initiatives. Things also started moving on a national level when the successes of soil stewards caught governmental attention. From 2028 on, the existing soil legislation was complemented by new regulations that incorporated ecosystem services in the value of land. For example, when you wanted to trade a piece of land, the extent to which it had been degraded or improved

since the last purchase was partly included in the land price. Governments experimented with fair soil carbon pricing mechanisms, rewarding climate-and-circular farmers and landowners who built up organic carbon, the new black gold.

A national Soil Care Fund was launched as well, which businesses and citizens paid into. The fund stimulated farmers to keep their soils healthy and switch to drought resistant crops, such as quinoa and buckwheat, instead of water-intensive cash crops. By 2035, soils were considered to be 'utilities providers', which made anyone who benefited from their services or products pay for it.

17. On the one hand, financial incentives like these made us more dependent on markets to indicate ecological value, pushing aside other ways of valuing nature. On the other hand, it raised our awareness of soil value and changed land use drastically. After all, the rewards of carbon farming were two-fold: direct rewards came from payments for ecosystem services and fairly priced produce; indirect rewards resulted from soils remaining productive for a much longer time. Finally, soil-caring farmers were recognized for their age-old stewardship.

## **NEW STANDARDS AND CLASSROOM REVOLUTIONS**

18. As a result, high quality organic food became the new standard in supermarkets. External costs were included in the food price, and the water footprint of crops was made transparent to consumers. This made food produced in a sustainable way less expensive than conventional agricultural products.
19. Educational curricula responded by giving more space to place-based, civic and nature education. Children's vocabulary was rewilded with words that helped them to care for the natural world: 'nematode', 'taproot', 'humus', 'critical zone' and 'podsol' entered the young minds. 'Unless we have a word for something, we are unable to conceive of it.' Soil became visible again.



## VIGNETTE 1

# Regional landscape ambassadors (2045)

A powerful, but often overlooked driver of environmental activism is 'oikophilia', or the love of your home. Soil stewards try to evoke this motivational 'power of place' in various ways. This is important, because standing up for your home ground - taking care of its ecological health and having the knowledge of how to do this - often arises from deep personal involvement in a particular place. Only at the scale of a community, can sustainability turn from a concept into a lived reality.

*"In a volatile world with people stepping in and out of projects, 'place' is a strong anchor to assure the continuity of projects. After all, our relation to the natural world always takes place in a place. Place is the starting point."*

Together with the community, soil stewards try to identify and communicate a region's character and uniqueness, called 'place branding'. Bioregional qualities can be both visible and hidden, tangible and emotional, natural and cultural: nature reserves, (agri)cultural and industrial heritage, small-scale farms, hiking- and cycling networks, local stories and businesses, natural beauty and community values. These are the bedrock of a bioregion's identity.

*"Branding a bioregion is not only a way to boost sustainable tourism; it also inspires locals to 're-inhabit' their environment, turning them into proud ambassadors of their region. Moreover, the bioregional perspective recognizes that all boundaries are permeable, with each region influencing the health of other regions, and beyond. Bioregionalism is both locally empowering and globally engaging, a crucial combination."*

*"As a soil steward, I help landowners to manage their properties in a more durable way. One example is replacing the wire around meadows with hedges, which are a rich habitat for birds. Hedges not only improve biodiversity but also strengthen a region's identity. A well-managed*

*countryside provides a lot of natureculture services.”*

Another way to restore the link between people and the landscape, is the promotion of art-science experiences. In deep mapping workshops for example, participants survey their surroundings through both cultural and ecological spectacles. After all, we not only live in cities, villages or rural areas, we also live in watersheds, ecosystems, and eco-regions. The outcome is a multi-layered map, or ‘a biography of the living landscape’ in words and images.

*“A deep map conveys memories, sensations, historical events, myths, taboos and other cultural elements connected with the landscape, as well as information about flora, fauna and topography. This gives us, soil and land stewards, a tool to communicate to policymakers the value of invisible, but deeply-felt meanings of native fauna, flora and natural sites.”*

A third way in which stewards try to reconnect people of all ages to their land, is place-based education. Students go into the field, listen to local experts - the community is the classroom - and develop local solutions before moving on to global issues. This ‘progressive’ localism creates a sense of place that is also sensitive to broader ecological and social relationships. It offers a powerful counterforce to nationalism and complements globalism. It can create a new understanding of soil stewardship and should be an essential part of every climate strategy according to the IPCC.

*“Place-based education gives young people a lifelong affinity with local nature and a sound knowledge of it, so that they don’t become rootless cosmopolitans without a sense of place.”*

## VIGNETTE 2

# Urban well-being connectors (2030)

To truly thrive, cities should become ecosystems of well-being. Soil stewards can help building these by linking human health with soil health. Not only are healthy soils a source of nutrients and natural filters for contaminants, taking care of soils through gardening also makes people healthier and happier. Gardeners find respite, recovery and resilience in seeing the seasons change, learning new skills, gaining confidence, meeting people and being active outside, in an oasis of calm.

*"I am a horticultural therapist running gardening projects for people with learning disabilities and mental health problems. In my eyes, social care is at its best when it's activity based. Working outdoors makes people loosen up and gives them a more positive focus. When you're suffering from depression, for example, it's hard to think about tomorrow. Seeing plants growing week by week helps you to think about the future."*

*"Scientific studies confirm the value of green therapies for our wellbeing. The flexible nature of gardening allows people to feel empowered in a non-threatening space. It also develops nurturing skills and increases serotonin and dopamine levels."*

The soil perspective enables stewards to work on various goals, from physical and mental health to social justice, inclusion and empowerment. Their projects range from small to large scale, from low to high-tech, from soil loving Instagram accounts, green therapy sessions and citizen science workshops, to lectures on soil bioremediation and courses to reskill people into professional urban farmers.

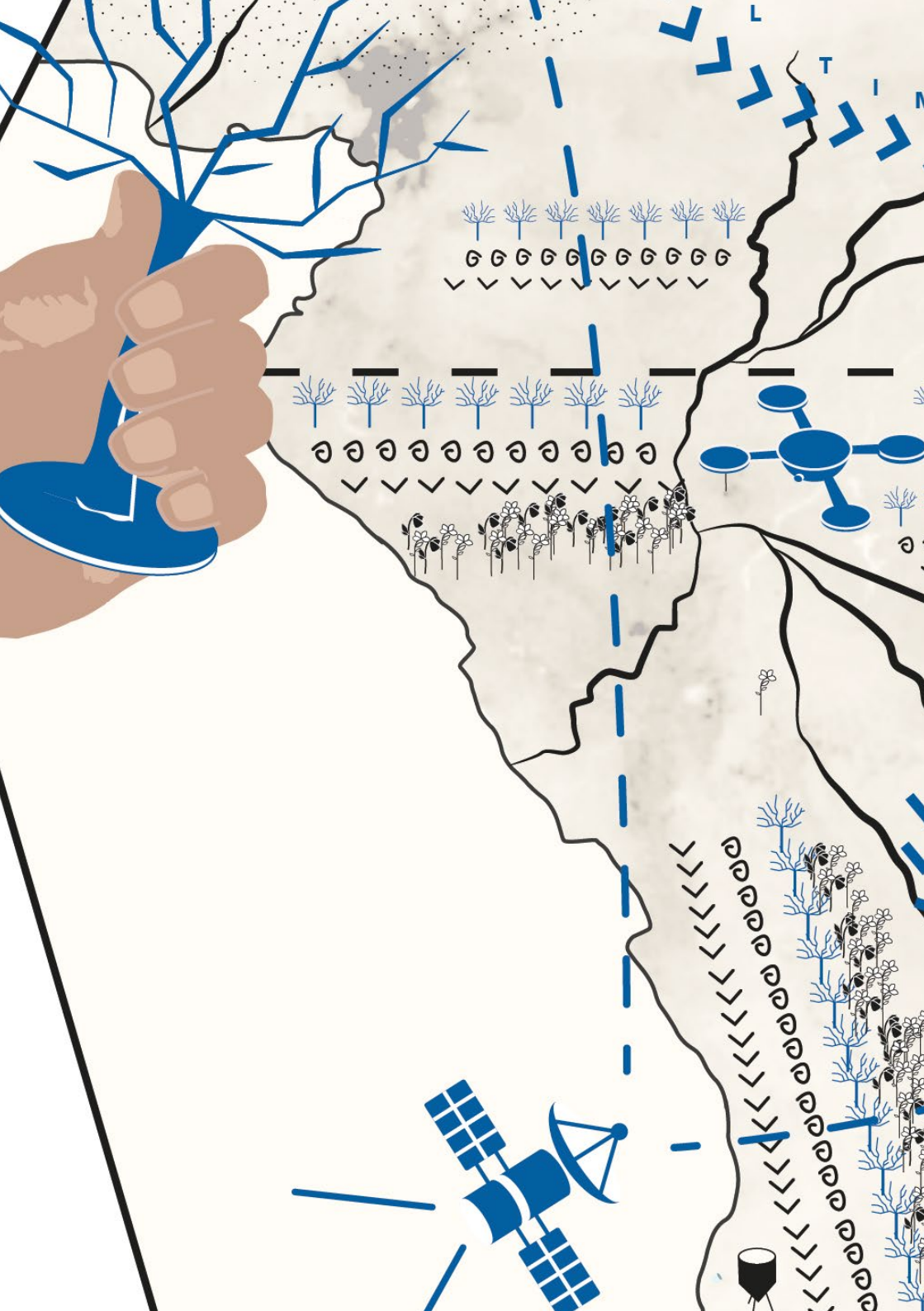
To make their grassroots movement last, and to expand their activities, soil stewards ally with local governments and urban planners. In this way, they hope to stimulate a large public to take their health into their own hands, and enable social transformation along the way.

*"Our local urban farm does much more than selling fresh, high-quality vegetables and increasing our vitamin intake. It also gives the community jobs, knowledge and social connections. Each week, I look forward to picking-up my basket there, it feels like a second home. Their food is fresh, friendly and beautiful."*

## SUMMARY OF SCENARIO 2

### **WE ARE SOIL**

The pandemic of the 2020s has opened our eyes. We need to shift our focus from cure to prevention, a strategy called 'salutogenesis'. The best way to fight viruses is to boost our immune system through a healthier lifestyle and environment. Human, animal, plant, water, air and soil health are closely related. We are part of nature. This human-ecological concept of health becomes the new paradigm and drives a renewed 'sense of soil'. Soil stewards stimulate gardening, urban agriculture, place-based education, the 'rewilding' of suburban lawns, and the collection of soil data. In parallel, a new sub-political, bioregional movement emerges. It wants to boost soil and land stewardship by stimulating a deeper connection to place. Bioregionalism is both locally empowering and globally engaging. It makes the interaction between our daily food choices, global production patterns, soil health and climate change, clearer to a broader public. Fifteen minute-cities - where all you need is within walking or cycling distance - become bioregional engines of ecological and economic recovery. All these regional successes inspire changes on the national level as well. Fair pricing mechanisms reward landowners who build up soil carbon, the water footprint of products is included in their price and organic becomes the new standard. While climate change is spinning out of control, our ecological, mental and socio-economic resilience is growing. Soil becomes visible again.





**scenario 3**

# **Operation Soil**



# Operation Soil

An international alliance pioneers radical change

## THREE SUPERPOWERS, THREE STRATEGIES

By the middle of the 21st century, the geopolitical order had crystallized around three super-powers: the US, China and the European-African Axis (EAA). They played on different chessboards with different logics of power. The US hegemony was still based on military might, initiated with the atomic bombings of 1945. This legacy got a new flavour when droughts and wildfires increasingly plagued the planet. In 2035, the much-dreaded 'water wars' became a reality when the US started seeding rain clouds above the Great Plains - just before they crossed borders with Canada and Mexico.

China's pivotal moment occurred in 2001 when it got free access to the global economy by entering the World Trade Organisation. In just a few decades, it manoeuvred itself into a central trade position by controlling the networks (physical and virtual, transport and communication), standards (currencies, IP addresses and 5G) and platforms (e-commerce, stock exchange markets) that supported the global exchange of goods and information.

1. The EU chose environmental stewardship as a lever for geopolitical power, in tight partnership with the African Union. This more inclusive governance model tried to restore the damaged moral authority of the West by tackling universal challenges such as climate change, poverty and pandemics. Spreading an idea of world affairs that attracts others enables you to both advance your objectives and amplify your values, more than you could do on your own - that was the idea behind it.

## A TRINITY OF CRISES

2. Europe's tipping point occurred between 2020 and 2025. First, there was the Covid-19 pandemic which had dramatic implications for both European and African economies. Secondly, in the night of 2 December 2022 France was ravaged by Lena. This class 2 thunderstorm took over 3,500 people's lives, caused 2 billion euro in damage, and uprooted millions of trees. Its psychological impact was intensified by two disasters that hit the nation in



its very heart: the Notre Dame cathedral, structurally damaged during the 2019 blaze, collapsed under the impact of the storm; and the Eiffel Tower's indestructible top platform crashed down after it had been struck four times by lightning.

3. Thirdly, in 2024 the number of migrants who entered Europe by sea rose above the 250,000 mark for the first time. An estimated 12,300 people lost their lives in transit. The capacity of Southern European nations to receive the refugees was overwhelmed. The two drivers behind the rise in African migrants were the economic backlash of Covid-19, and three successive failed harvests in the Sahel which had put many livelihoods under pressure.

This trinity of systemic crises opened a brief window for radical change in sustainability and governance - a couple of decades, perhaps. If we missed that, no previous conflict would compare to the chaos to come.

### **AN ALLIANCE BASED ON THE POWER OF SOIL**

1. Finally, the momentum was strong enough. Already in 2023, the European Commission announced an expanded Green Deal package of 1,200 billion euro. This ambitious spending program had a two-fold aim: to revive the stagnating EU economy, and to make significant progress in mitigation and adaptation measures to tackle the climate emergency. In 2026 the newly installed commission doubled the Green Deal investment once more and established a partnership with the African Union, the EAA. The plan was to tackle the migration challenge at the root and create more resilient rural economies in Sub-Saharan Africa. Ambitious climate change measures could strongly improve local livelihoods.
4. The EAA strategy rested on three pillars: development of circular economies on a micro-, meso- and macro-scale, electrification through renewable energy, and sustainable land and water management. In the latter, the rebuilding of soil carbon played a key role. It was well known that soils were the largest land-based reservoir of carbon on Earth, able to store three times

more carbon than is found in the atmosphere. Carbon farming was therefore a vital way to reduce atmospheric carbon, with associated benefits to agriculture and ecosystems. However, as it can take decades for soils to soak up large amounts of carbon, prompt action was needed.

### **FARMING FOR CLIMATE**

5. In 2026 a new European Soil Strategy was agreed upon for the first time in history, harmonizing national soil legislations with respect for bioregional variations and habits. One of its most ambitious chapters was an international soil carbon policy to make soil carbon stocks grow by an average of 0.5% per year.
6. First, efforts were done to understand soil (bio)diversity and the impact of decades of intensive farming. The EAA rolled out a smart Soil Data Observation Network based on remote sensing and a web of local antennae to generate a repository of open and robust soil data. The damage done by intensive farming was found to be extensive and hard to repair. It would take a long time to restore organic carbon and soil (bio)diversity.
7. The EU also started to support farmers who made the transition to circular, agroecological farming. By taking good care of the soil, they took good care of us - and that deserved structural support. The standard mindset became one of expectations of optimal yields for a sustainable system, instead of maximal, soil-depleting yields. The policy mindset shifted from regulations and restrictions to facilitation and setting horizons. Farmers were addressed as entrepreneurs free to reach carbon farming goals in their own sustainable way, and they were rewarded for it. Instead of being part of the problem, farmers became part of the solution.
8. As a result, soil-and-climate-friendly practices were adopted on a much larger scale, instead of being a niche conservation activity. Often entire farming systems changed by implementing agroforestry and enriched crop rotation, banning commercial fertilizers, and striving for overall resource

efficiency. This was completed with practices such as zero-tillage, wood chip mulching, cover crops and contour cultivation. Agroecological farming was no longer a romantic ideal, but became the new, professional standard.

### **AN AGRICULTURAL RENAISSANCE**

9. By 2030 Europe was in the midst of an agricultural renaissance, with more and more young people getting interested in farming to serve local markets, and in its underlying ecosophy. Researchers further investigated soil enhancing practices, from low-input to high-tech. Fired by a boom in artificial intelligence, climate-smart technologies were fine-tuned and widely used: precision agriculture, nanotechnology-based soil improvements, rhizosphere interventions, drones and remote sensing. In parallel, more time-honoured techniques such as agroforestry were rolled out on an international scale.
10. A huge reforestation project in Africa, for example, stretching from Dakar to Djibouti, regenerated no less than 110 million ha of degraded land. A spearhead in the Sub-Saharan strategy was the Gao tree. Its root system, nearly as big as its branches, draws nitrogen from the air which fertilizes the soil. Insights from this African achievement found eager adoption in Southern Europe which was increasingly losing land to desertification. Just as their African peers, to increase both resilience and income, European farmers started integrating more crops with tree systems such as apple orchards, olive groves, and walnut plantations. The regeneration of soil became the task of a whole generation.

### **FROM A GREEN TO AN EVERGREEN REVOLUTION**

11. The first positive results of the EAA's carbon farming strategy became visible in the mid-2030s. The worrying trend of thinning topsoils across Europe was reversed. Drylands became farmable again. Soil-lifespans increased, together with yields and biodiversity. The measures that improved soil life, its food web, structure and bearing capacity, also improved soil resilience

in the face of intense drought and flooding. Consumers' soil connectedness and time literacy, or recognizing our long-term impact on ecosystems, grew in tandem. Soils came to life in people's minds. Over time, soil and land stewardship became a self-evident, culturally ingrained practice.

Both results and changing mindsets were important incentives for Europe to widen the scope of its agricultural policy, and make it grow into a more visionary, common soil and land stewardship policy. While this was already a radical departure from the past, the EU was thinking even bigger. By 2050, it had transformed its soil and land policy into an all-inclusive food strategy, integrating not only healthy production and a healthy environment, but also healthy processing, healthy consumption and healthy socio-economic relations. A new global value system no longer reduced nature to a commodity, a mere object of trade. The ecological-economic school emphasised the interdependence and co-evolution of the human economy and natural systems. Our economy is part of the Earth's ecosystem, which is the foundation of our existence, not something exogenous.

Carbon became a universal currency. Farmers and gardeners were paid to capture carbon in soils, carbon sequestration became a public good. This benefited farmers, bakers, consumers and the environment, not investment banks and hedge funds. Our rivers and ecosystems were not managed by the invisible hand of the market, but by democratic collectives. Sometimes, over 1,000 stakeholders negotiated water fees and pollution charges. This kind of politics was intense, but it worked. At least Wall Street and other markets could no longer transform Mother Nature into the mother of all casinos.

### **SOIL ADVOCACY AND EARTH DEMOCRACY**

The reform of Europe's food and farming system was not only crucial to reach the sustainable development goals for land restoration, food and water security. It also helped the continent to address broader social problems, from youth unemployment to the public health crisis.

However, there were setbacks too. In 2036, wildfires erupted in the Tatoi forest north of Athens, and fanned out to the capital. Roughly 10% of its buildings were destroyed; 123 residents and 34 firemen were killed. The Acropolis remained untouched but was blackened with soot. These dramas underlined our ecological entanglement and increasing fragility. It created a sense of urgency to establish an even more holistic framework. Humanity was at the crossroads of its relationship with nature.

12. Because of their life-supporting role, soils received a new status in legal and policy matters in 2040. First, they were given more binding rights: the right to exist, the right to habitat and the right to flourish. The adoption of the rights of nature was the next logical step after humanity's moral and legal progress in areas like children's rights, gender equality and freedom of speech. By 2045, the UN had rolled out the Universal Declaration of the Rights of Nature. Soils received a legal personhood status and were represented and protected by democratically chosen stewards. From now on, human rights could no longer cancel out the rights of other entities.
12. Natural resources – from soils to rivers and forests - also received a structural voice in policy decisions that concerned them. Following France's example, several EU member states expanded their governance systems with a so-called 'Third Chamber'. Its members reminded decision makers that from now on, politics would be zoöpolitics and cosmopolitics. Because a politics detached from the cosmos is moot, and a cosmos detached from politics is irrelevant.
12. This new 'Earth democracy', land ethics and legislation framework enlarged the boundaries of the human community to include soils, waters, plants and animals, or collectively: the land. Not only the interests of human beings were included in the common good, but those of all living things - today, and in the future. By 2050, we had only just begun to love our planet.

## VIGNETTE 1

# **Bioneers breaking new ground (2035)**

Soil stewards pull out all the stops to regenerate soil ecosystems worldwide. By storing carbon in soils, they slow down climate change, make soils climate-resilient, and boost biodiversity below and above-ground. Stewards wear many hats, combining high-tech with nature-based solutions, common sense, and cross-border imagination.

*“Ultimately the only wealth that can sustain any community, economy or nation is derived from photosynthesis: green plants growing on a regenerated soil.”*

One example is stewards bringing together people who love soil with people who love data. A global Critical Zone Network of observatories run by citizens and scientists monitors our planet’s thin layer of rock, soil, plants, fungi, animals, water and air. These sophisticated ‘intensive care units for the Earth’ bring the lab outside, to the people, and are supported by an innovation-driven European policy framework. They turn the soil inside out and record everything: weather conditions, soil chemistry, crop yields, land cover, erosion, carbon sequestration and other soil health changes. Measure what you treasure, is the motto. All these data help both to predict floods, droughts, and fires, and to understand the human and climatological impact on soil and land use.

*“There is a magic machine that sucks carbon out of the air, costs very little, and builds itself. It’s called a tree. Growing billions of them around the world is the biggest and cheapest way to tackle the climate crisis, though coal, oil and gas burning must also end.”*

A trusted database also helps to solve the conundrum of the 2020s: which agricultural strategy is less polluting per unit of production, taking all ‘external’, long-term costs into account? We can turn a part of our farmlands into forests, peat bogs, grasslands and wetlands, while intensively farming

the remainder. Or we can adopt low-intensity, circular agroecological practices on the current farmland, supported by the latest monitoring technologies. Which system can both supply the growing food demand, and be sustainable in the long term?

*“Many initiatives focus on human-exclusive nature conservation, but in South-America I saw how much human-inclusive agroforestry can contribute to the rainforest.”*

Soil stewards tend toward the latter and help farmers to make the transition from conventional to regenerative agriculture. Together they observe fields, analyse data, compare techniques, experiment with forgotten varieties and refine processes until organic yields exceed those of conventional farming. Finally, farmers-stewards also receive solid European funding to measure and ‘prove’ their agroecological successes.

*“I love adapting ideas from around the globe to our local agro-environment, in dialogue with my colleagues. Nothing is more appealing to a farmer’s eye than what he observes in his neighbour’s field. I think that every farmer should be supported to dedicate, each year, some time, energy and land to wild agroecological experiments.”*

*“Regenerative agriculture grows topsoil, sequesters carbon, increases biodiversity and makes profit. It works with nature. Leaves, branches and roots provide carbon for compost, chicken mobiles activate the soil, eat and fertilize the compost, turning it into food for vegetables and trees.”*

Transitional farms evolve into lively learning places, reaching both local residents and the world through social media. Aimed at both thinkers and doers, nature and culture, they invite citizens, artists, scientists, designers, other farmers and chefs. They give courses on permaculture, ecophilosophy, systems thinking and holistic farm management. Local sales points, visibility, appealing stories, loyal supporters and name recognition are key to spreading their products and philosophy.

In general, soil stewards are holistic engineers rather than classic ‘watchmakers’. They are enablers on an equal footing with the rest of nature, rather than ‘takers and overseers’. Stewards form new engineering alliances of earthkeepers, bioneers and geotherapists who respect ecological limits, embrace natural processes as a tool to repair our broken climate, and catalyse beneficial relationships between land and all forms of life.

*“The wind pumps the water, which waters the garden, which grows the carrots, which feed the rabbits, who fertilize the soil, which feeds the earthworms. All this feeds the people. Each time you make a connection, as in nature itself, the whole becomes more stable, more strong and more healthy.”*

Interdisciplinary teams in public-private partnerships build analogues of ecosystems to remediate brownfields, urban planners turn polluted plots into eco-hubs for work and play, bioengineers crossbreed hardy strains that can withstand droughts, heat waves and freezes. There are numerous ways to be a soil steward, depending on your background, talents and interests.

*“Living in a densely populated area like Flanders, I’ve learned to see soil remediation no longer as an obstacle, but as an opportunity to tackle other challenges too. For example, we couple the restoration of a polluted site with the installation of a heat network, which both speeds up the soil remediation process and offers energy benefits for the surrounding housing blocks. It not only makes the investment more attractive, but also increases the residential support for such a long-term project.”*

*“Another way to make brownfields more attractive, is to remediate them in phases. On-site, we outline a safe route and activate it with a café, a postal drop-off point, an open-air cinema, electric charging points and a local office space. On several spots along this path, residents can see how (phyto) remediation works. Once complete, our sites are places that have grown in people’s hearts and minds.”*



*“The transport of energy too should be sustainable. Take our electricity grid, with its pylons and high-voltage cables. Together with energy companies and municipalities, we turned their ground level from a no man’s land into an ecological corridor. Today, the Flemish electricity grid is a large national park, connected with the European ecological energy network.”*

*“In the 20th century, industrial activities and their material flows determined the urban landscape of roads, rails, waterways and housing. The opposite happened in the first decades of the 21st century. Almost all (im)material flows – water, energy, food, information - were hidden from sight. We forgot where our tap water came from, how our electricity was produced or where our food was grown. Centralised networks separated people, both in body and mind, from the landscape. Today, these flows have become visible again, but in a different setting. A circular economy reveals our dependency on natural resources and makes clear how biological and technical cycles interact.”*

## VIGNETTE 2

# Zoöpoliticians and Earthkeepers (2050)

Soil stewards are changing our ideas of ownership and agency in the nonhuman realm. What if trees would have a parliamentary seat? What if the legal status of mushrooms, rivers and bees would change from 'things' to 'legal persons'? What if the great apes could defend their interests in court through guardians and interpreters? Whose reality counts (more)? Stewards not only listen to nonhumans - earthworms, rainwater, roots and trees - but also look for ways to give them more legal, financial and political agency.

*"My main point is to move the conversation in a more imaginative direction. Imagination at scale is our only recourse. To generate new ideas, the adrenaline has to flow. We need a free space to play, to be cheerful and hopeful. The future starts today."*

One example of giving nature more financial agency are artificially intelligent platforms for people around the world to 'subscribe to the planet'. For half the price of a Netflix account, you can 'pay' earthworms so they can 'pay' local communities to protect precious nature hotspots on Earth. When an endangered earthworm population grows in health and number, so, too, will the amount of money given to the local human community.

Zoöps, another example, are legal formats that strengthen the position of nonhumans in human societies. They represent the interests of nonhumans and give them the means to counterbalance human-centred systems. For example, rivers and forests are given legal standing so they can directly sue their polluters. They no longer have to 'demonstrate' that humans suffer from their contamination; their own suffering suffices, so to speak.

*"Landowners can no longer neglect or contaminate their piece of land, just like that. The 'right to property' is no longer an absolute right. So if a contaminated piece of land wins its case, the polluter needs to fund its*

*recovery, which is managed by a democratically chosen council of land stewards or guardians. This approach no longer treats natural entities from a perspective of ownership and management, but as living beings connected with the whole community."*

Zoönomie foundations initially function in the classic economic framework, adding one crucial condition: they lead to increased biodiversity, biomass growth, cleaner air, water and soils, and benefit the quality of life for both nonhumans and humans, in the short and long term. But over time, zoöps expose the constraints of our economic and political models, and radically change the entire basis of our society. Humankind no longer stands at the centre of the universe.

*"We need to abandon our image of soil as passive, inert matter subjected to human use, and re-animate the life within it. This will create a sense of 'shared aliveness'. In a way, we are all unique moist packages of animated soil."*

Soil stewards extend our 200-year-old democratic toolbox with a 'Parliament of Things' which acknowledges and balances the interests of all beings, human and nonhuman. What are the interests of spiders? What does a mycelium consider its territory, and how does soil see its future? Only if we listen carefully to all the voices involved in a certain case, can we make deliberate decisions on how to proceed.

*"The question is of course, how many 'votes' an earthworm has. Perhaps a trade-off between protecting his habitat and a construction project is to the earthworm's disadvantage. But at least his concerns are heard and taken into account in the political realm, instead of only in the economic one."*

Education no longer misleads us about who we are and where we stand. Its purpose is not to get ahead of other people or nations, but to cooperate. The matters crucial to our survival are given the weight they deserve. Ecology and earth system science are not taught as isolated subjects but

placed at the heart of learning - from economy to language - just as they are at the heart of life.

Governments fund outdoor education and adventure learning. Soil stewards teach 'soil ecology' already in nursery schools. They use artificial intelligence to communicate with animals and plants, which radically changes our relationship with nature. In zoöps, humans and multi-species communities become allies. Many things can become possible once people have imagined it first.

*"I developed an app that shows the making of all kinds of products through lifelike holograms. When you scan a smartphone, for example, a hologram appears of a worker mining the raw materials for your new phone. When you buy a piece of meat, a virtual swimming pool floods the supermarket with the amount of water needed to produce the cutlet in your shopping basket. Global connections become instantly clear. The app is so attractive and intriguing that people keep on using it, no matter how confrontational it is. We may be a destructive species, but luckily we are also very curious."*

*"An underground network of mycelia connects trees with each other, which turns a group of trees into a forest. I am an individual, but I am also part of the ecosystem of my body in which my cells regularly exchange DNA with microbes. A virus - not even a cell - is powerful enough to turn our whole world upside down. Everything is connected. I am part of the ecosystem of my body, my street, my city, my country and, ultimately, the ecosystem of the Earth."*

### SUMMARY OF SCENARIO 3

## **OPERATION SOIL**

Storms, wildfires, the pandemic's backlash, and an unprecedented migration crisis create a broad-based sense of urgency. An ambitious European-African alliance emerges, built on the power of soil and land stewardship. World leaders cooperate and launch a smart Soil Observation Network to better understand our impact on soil ecosystems. A transcontinental reforestation project needs to increase both our ecological resilience and incomes. Soil stewards focus on rebuilding soil carbon by combining agroecology, agroforestry, nanotechnology and precision agriculture. Europe expands its Green Deal and agrees upon a joint Soil Strategy to speed up the ecological transition. Regenerative farmers receive solid support, soil friendly practices are widely adopted, entire farming systems change. Europe goes through an agricultural renaissance with soil regeneration becoming the task of a whole generation. By 2050, Europe has developed a common food and agricultural policy, which pursues sustainability throughout the whole chain: not only healthy food production and a healthy environment, but also healthy processing, healthy consumption and healthy socio-economic relations. Drylands become farmable again and soil-lifespans, biodiversity and yields increase. Soil stewardship is now a culturally ingrained practice. We not only take good care of soils, but also give them more legal, financial and political agency. Humanity seems at the crossroads of its relationship with nature. Zoöpolitics enlarges the boundaries of the human community to include animals, plants, water and land. Ecology and earth system science shift to the heart of all learning - from economy to language. By 2050, we have only just begun to love our planet.

# Word by OVAM

*"We are all interested in the future, for that is where you and I are going to spend the rest of our lives."*

- Woody Allen

When looking at the future we tend to extrapolate from the past. The scenario methodology offers a disciplined way to look forward without falling into the trappings of mere prediction. Prediction is fine when the time horizon is short and the developments under study are relatively stable. But to grasp the dynamics of complex phenomena over longer periods of time, we need other tools. The scenario methodology allows groups of stakeholders to develop informed and plausible stories about the future. The point is not to 'predict' nor to 'dream' the future, but rather to mark out a space of possibilities.

In its process around Soil+Land Stewardship, OVAM starts from the existing strengths in its soil policy. In this way, the OVAM can deepen and attune its future soil remediation policy to the new social challenges related to soil care. We consider stewardship as a potential lever for activating this soil care.

The OVAM is currently drawing this path based on its own objectives and we would like to invite all interested parties to cooperate and co-create. We also want to offer the results to everyone. Given the fragmented soil policy within the Flemish and international policy context, soil care is a shared task and OVAM cannot take on the stewardship and associated soil care alone. It is certainly not the intention to question the different competences with regard to soil policy. On the contrary, this initiative is a warm invitation to other policymakers, organizations and stakeholders to jointly assume the shared responsibility for soil care. We'd like to walk this path together.

## Thank you

*We would like to thank everyone who contributed to the development of these scenarios, in some way or another. We would also like to invite you to give these scenarios due consideration. Not as an end point, but as a starting point for a dialogue on how to shape soil and land stewardship at the local, national and global level. In the future, starting today.*

## Timeline

**2018:** Exploratory Soil+Land Stewardship Study

**First half 2019:** Launch and preparation of scenario building - project team

**September 2019:** Delineation of guiding question - project team

**October 2019:** Determination of time horizon, geographical scope - online expert consultation

**October 2019:** Inventory of driving forces - online consultation experts

**November 2019:** Identify critical uncertainties, design scenario framework, develop scenario options - Ghent workshop

**December 2019 - April 2020:** First iteration narratives scenarios - project team with validation experts

**June - September 2020:** Second iteration narratives scenarios + vignettes + visualizations - project team

**September 2020:** Try out – presentation for OVAM colleagues - online presentation

**September 2020 - January 2021:** Final versions scenario narratives and visualizations- project team

**January 2021:** Show and celebration moment with expert team - online presentation

**January - March 2021:** Finalize documents and preparapublication - project team

**Spring 2021 and beyond:** Starting point for further journey with the scenarios: Getting to work with the scenarios in the international playing field, within the OVAM organisation and with the Flemish actors/ stakeholders

## Colofon

June 2021

The Future of Soil and Land Stewardship is a publication by the Public Waste Agency of Flanders (OVAM).

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D/2021/5024/13

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Annelies Beyens – De Landgenoten,  
Bavo Peeters – European Commission – DG ENV Soil,  
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Johan Ceenaeme - OVAM,  
Joris Aertsens - Rikolto,  
Karen Vancampenhout – KU Leuven,  
Kris Van Looy - OVAM,  
Kristine Martens – Colruyt Group,  
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