



NOVASOIL

INNOVATIVE BUSINESS MODELS FOR SOIL HEALTH

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Tamarguillo Park (Spain)



Project Consortium

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1 Background, focal question and needs

Due to the case study has not implemented a business model, this section no proceeds. More information can be found in the case study factsheet.

2 Policy mix

Table 1 Key elements of national **policy mix and institutional framework around soils**, based on and adapted from Rogge and Reichardt, 2016; Williamson, 2000.

Domains	Elements to consider	Description	Lickert (1-5)	
			P ¹	Q ²
0.Awareness and understanding	Definition of soil health	A healthy soil is one that is not degraded by any threat and is capable of hosting the maximum biodiversity possible and providing other goods.	3	3
1.Policy concern	Soils as policy priority	Soil degradation exists on a global scale; however, although there are regulations related to soil protection, there are other local priorities such as the increase in housing prices that ultimately affect soil health. Increasingly, soil is being protected by regulations related to the activities carried out as well as ecosystem restoration. For example, the inventory of contaminated soils to subsequently develop a recovery plan. However, to have a real impact, the collaboration of different sectors will be necessary to achieve soil health objectives.	3	4
2.Policy agenda on soils	Political commitment towards soil health, non-binding targets	Spanish autonomous communities are taking measures to adapt to climate change and improve soil management. These strategies include the restoration of damaged ecosystems, more efficient water management, and the promotion of sustainable agricultural practices. In addition, rural development programs,	4	

¹ P=priority. Please rank accordingly to 5 point-Likert scale based on how these elements are currently considered in your case study: 1 no priority; 2 low priority; 3 neutral; 4 moderate priority 5 high priority

² Q=quality. Please rank accordingly to 5 point-Likert scale based on the current quality of the political process in your case study: 1 very poor -2 poor; 3 acceptable; 4 good 5 very good



		with European and state funding, support initiatives to improve the quality of agricultural soil, protect biodiversity, and conserve the landscape. On the other hand, land use plans, although not always mandatory, establish rules for land use at the regional and local level. In summary, there is a growing effort to reconcile economic development with environmental protection and adaptation to the challenges of climate change.		
3. Institutional environment	Binding national regulations on soil	At the regional and local level, land use plans establish the general guidelines for land use, taking into account factors such as environmental protection, landscape management, and economic development.		
4. Policy integration	Interactions between and within policy sectors	In general, both the agricultural and forestry sectors are the ones that implement policies related to soil health the most. In urban environments, the obligation to identify and communicate contaminated soils would be the most relevant.		
5. Governance structures	Levels of governance involved, roles and functions	The Seville City Council has the East-Alcosa District with responsibilities for maintenance, cleaning, security, event organization, and responding to neighborhood demands. Then we also have the Urban Planning Department, which is responsible for lighting, accessibility, and adaptation to safety regulations. Also at the city council level, we have the Parks and Gardens Service, which is responsible for pruning and maintaining vegetation. At the regional level, we have the Ministry of Agriculture, Livestock, Fisheries, and Sustainable Development, which has competencies in protected areas, biodiversity, etc. At the national level, we have the Ministry for the Ecological Transition and the Demographic Challenge, which can intervene in ecological restoration projects, biodiversity conservation, etc., and the State Agency for Air Safety, since the park is located near the airport and has competencies in regulating lighting and constructions in the park's surroundings.		



6.Contracts	Property rights enforcement , land tenure agreements	The importance of soil health will depend on the action to be carried out. Only in some cases of recent social gardens supported by food safety and environmental regulations		
7.Validation and coherence	Mechanisms in place to measure impacts and ensure compliance to targets and limits	Normally, inspections are carried out either through soil analysis or monitoring of the activity. Depending on the activity, they must comply with ISO 14001 for environmental management. On occasions, follow-up committees are formed.		
8.Non-governmental actors	Role of different actors and multi-stakeholder coordination	Research centers and universities, as well as different NGOs, provide their knowledge in round tables or conferences and, of course, in monitoring activities or carrying out studies in the area.		
9.Allocation of resources and sources of finance	Available budget for soil health and blended finance	There are both national and European R&D&I calls that allow action in degraded environments for their recovery using innovative techniques. FEDER, Life, and Next Generation funds.		
10.Policy consistency with soil health	Synergies and trade-offs between policy sectors and towards soil ES	Although there are various round tables, many times it only remains at that. More cooperation and collaboration are needed.		
11.Contextual factors	Enabling and disabling conditions	On the one hand, non-governmental organizations and neighbourhood associations seek a model more focused on the creation of green spaces that promote biodiversity and the enjoyment of all citizens, while the political will to create new housing in order to achieve political objectives promised in their campaign.		

3 Policy directionality

Aim of this section is to assess how existing instruments (regulatory and economic) put in place by the national policy mix are able to support business models for soil health. Policy instruments constitute the concrete tools to achieve overarching objectives and are usually associated with specific goals, i.e. the intended effect of instruments



on the medium-long term. Furthermore, policy narrative are defined as the key words and concepts that express the political understanding of a problem, i.e. soil health.

3.1 Instruments

Table 3 Assessment of **policy instruments** (adapted from Rogge and Reichardt, 2016)

PRIMARY TYPE	PURPOSE TYPE		
	Supply	Demand pull	Systemic
Economic instruments	RD&D* grants and loans, tax incentives, state equity assistance	Subsidies, feed-in tariffs, trading systems, taxes, levies, deposit-refund-systems, public procurement, export credit guarantees	Tax and subsidy reforms, infrastructure provision, cooperative RD&D grants
Regulations	Patent law, property rights; land tenure;	Technology/performance labels and standards, prohibition of products/practices, application constraints; public procurement	Market design, grid access guarantee, priority feed-in, environmental liability law Information
Information	Professional training and qualification, entrepreneurship training, vocational training, advisory	labelling programs, public information campaigns; consumers organizations	Education system, thematic meetings, public debates, cooperative programs, clusters

Supply	Demand pull	Ecosystem Services Payments (PES): Seville could implement PES in urban gardens,	Fertilizer regulations: Seville could introduce a local ordinance regulating the use of fertilizers and	Informative workshops and advice: Aimed at urban garden managers and interested citizens,	Minimum soil cover: Soil cover in urban gardens is essential to prevent erosion and loss of organic
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		where garden managers receive financial incentives for improving soil health through practices such as composting and crop rotation.	compost in urban gardens to prevent soil contamination. This ordinance would impose limits on the use of synthetic fertilizers and promote organic options.	these workshops will provide information on best soil management practices and how to comply with local environmental regulations.	matter. These tools would help ensure that soils are not left unprotected, especially during rainy periods, and improve soil quality.
Private or state-financed	Systemic	Public/private funding: Funds provided by the government or private entities with the aim of promoting soil health in urban areas. This includes incentives to finance efficient irrigation infrastructure in urban gardens.	Mandatory winter soil cover: Similar to regulations in agricultural areas, Seville's regulations could require gardens to maintain a minimum soil cover during the winter months to prevent erosion.	Knowledge transfer: Seville could organize public events and workshops to share experiences on best practices for sustainable soil management in urban gardens.	Soil health improvement: These incentives and regulations would promote year-round cover cropping, improving soil health by preventing erosion and retaining nutrients in urban community gardens.
	Systemic	Investing in green infrastructure: Seville is investing in green infrastructure	Chemical use restrictions for soil protection: Regulations to restrict	Environmental education: Public education programs to raise	Compliance and penalties: Implementing regulations such as



		re by providing grants for projects such as urban gardens, which promote soil health.	the use of chemicals in urban gardens, promoting natural alternatives to safeguard soil health.	awareness about the importance of soil health in urban gardens and their role in urban sustainability.	limiting synthetic fertilizers would help prevent soil and nearby water body contamination. Failure to comply with these regulations could result in the establishment of penalties.
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3.2 Policy narrative

Policy narrative (and scale of action)

Seville has placed the protection and enhancement of urban parks and community gardens at the heart of its local environmental policies. The city's strategy involves expanding green spaces, integrating ecological infrastructure with productive urban gardens to mitigate climate change, enhance urban living, and foster sustainability. This predominantly local and regional approach is driven by municipal policies promoting urban gardens as a means to improve soil health and deliver a range of environmental, social, and economic benefits.

Policies and incentives in place

Municipal grants for urban gardens: Seville has implemented financial aid for the development and maintenance of community urban gardens. These grants enable communities to sustainably manage cultivation spaces, improving soil health through agroecological practices.

Tax incentives: Businesses and non-governmental organizations collaborating in the management of urban parks and gardens can benefit from tax deductions, encouraging the adoption of sustainable agricultural practices and promoting soil restoration in urban environments.

"Green Urban" program: Seville's "Green Urban" initiative promotes the integration of green spaces and gardens into the city, with a strong focus on improving soil quality and biodiversity. This program provides materials and technical advice to communities managing urban gardens.



Land tenure and contracts

Temporary concessions: Urban gardens in Seville typically operate under a temporary concession granted by the City Council, allowing communities and associations to manage a public plot for a specific period (5 to 10 years), under the condition of implementing sustainable practices that protect soil health and promote regeneration.

Public-private partnerships: Contract models exist that allow private companies to participate in green infrastructure projects in urban parks, sharing the responsibility for maintaining the gardens and ensuring environmental

Management strategies applied

Organic farming and permaculture: Seville's urban gardens promote agroecological practices such as crop rotation, composting, and efficient water management to restore soil fertility and improve water retention. These practices help maintain soil biodiversity and reduce compaction and erosion.

Integrated green space management: Urban parks, including gardens, are managed using an integrated approach that includes planting native species and employing sustainable irrigation methods (such as drip irrigation) to maintain soil health and maximize biodiversity in urban areas.

Soil functions interested

Water filtration and retention: Urban gardens play a key role in absorbing and filtering rainwater, helping to reduce the risk of flooding in urban areas of Seville, particularly during heavy rainfall. These soils act as a natural water retention system, improving infiltration and preventing surface runoff.

Carbon sequestration: Sustainable soil management in urban gardens contributes to carbon sequestration, helping to reduce greenhouse gas emissions in urban areas.

Supporting biodiversity: The soils in these urban parks and gardens provide a habitat for a diversity of beneficial organisms, including earthworms, microorganisms, and plants that improve soil structure and fertility.

Ecosystem services addressed

Food provision: Urban gardens in Seville produce local food in a sustainable way, contributing to food security and reducing the carbon footprint associated with food transportation. Food production is also educational, fostering a connection between citizens and nature.

Water filtration and nutrient purification: The soils in urban gardens and parks absorb, store, and filter water, improving the quality of groundwater aquifers and preventing contamination by nutrients and pesticides.

Providing recreational and cultural space: Urban parks and gardens offer spaces where citizens can gather, grow food, and engage in recreational



activities. This fosters a sense of community and social well-being, and contributes to the city's cultural development.

Enhancing biodiversity: The creation of urban gardens increases plant and animal biodiversity, providing habitats for both local species and pollinators, which in turn improves soil health and urban ecosystems.

4 Mapping exercise

4.1 Synthesis of the value mapping

- a. Value proposition (look at pentagonal problem)
 - What are the causes of degradation?: *Land abandonment and pollutants in the soil*
 - What are the socio-technical solutions proposed (BM)?: *Increase the green area to improve soil health and ecosystem services provided such as water and biodiversity regulation and biodiversity.*
 - Why do soils matter in the BM?: *Because it is improved, may provide new services for human and environmental health.*
- b. Value creation and delivery
 - What soil ES are targeted by the business model? (list based on soil strategy): *SOC, Soil Biodiversity and Water quantity*
 - What soil ES are not provided / neglected? *It is not focused in the food provision but it can be improved by the increase of urban farms.*
 - Public/private - who can benefit from that values? *Local citizens and business*
 - What trade-offs emerge? Are the causes addressed? *Freeze the offer of new houses may have a negative impact on the growth of the city*
- c. Value capture
 - What soil ES are targeted by the incentives? *To increase SOC and structure to facilitate soil water infiltration and reduce erosion*
 - How is value distributed along the stakeholders? *The value is intrinsic for the maintenance of the green area and providing services for the local citizens*
 - Where do the resources come from (public/private)? *Public*
 - How is soil health described and framed by the business model? (place in the picture)

4.2 Solution mapping synthesis

Finally, participants to the workshop are asked to discuss the needs changes for the development of soil health BM and frame them on a temporal scale.



- a. What innovations and changes are we looking for?
- b. What regulatory and policy conditions would we need?
 - What regulations (binding or not) and resources (new incentives) are needed?
 - Is there some contradictions between tools and/or policies?
 - What could be the effect of the soil monitoring law?
 - What contractual solutions and terms and what kind of guarantees are needed for business model implementation? (e.g. certification)
- c. What resources could facilitate the change?

- a) What innovations and changes are we looking for?

Technological innovations for soil management:

- Use of sensor technologies to monitor soil quality, such as moisture, nutrients, and temperature, enabling more precise and sustainable management of urban gardens.
- Implementation of smart irrigation systems that optimize water use, which is crucial in Seville due to its hot and dry climate.
- Development of on-site composting and circular agriculture techniques to convert urban organic waste into natural fertilizer that enriches garden soil.

Changes in urban management and planning:

- Integration of urban gardens into Seville's urban development plan, considering them as vital green infrastructure for the city. These spaces can help improve biodiversity and soil health, as well as provide social and educational benefits.
- Promoting urban agroecology through crop rotation, cover crops, and planting native species that improve soil structure and retain more carbon.

Social innovations:

- Encouraging citizen participation and a sense of community through educational workshops and volunteer programs in urban gardens, increasing awareness of soil health and sustainability.
- Creating cooperative business models where the economic benefits from gardens are shared among participants, promoting sustainable agricultural practices.

- b) What regulatory and policy conditions would we need?

Regulations (binding or not) and resources (new incentives) needed

Binding regulations:

- Introduction of specific regulations for urban soil management, including clear limits on the use of chemical fertilizers, pesticides, and soil-degrading practices.
- Implementation of soil cover regulations, requiring a vegetative cover in gardens year-round, especially during rainy seasons, to prevent erosion and nutrient loss.



Economic incentives:

- Local subsidies to incentivize the creation and maintenance of sustainable urban gardens and the use of practices that improve soil health.
- Payments for ecosystem services (PES), rewarding garden managers who adopt sustainable practices that contribute to biodiversity, water retention, and carbon capture.

Is there some contradictions between tools and/or policies?

Contradictions between tools:

- There could be contradictions between environmental and urban planning policies. For example, promoting urban growth in Seville may conflict with efforts to preserve green spaces like urban gardens.
- There may also be a contradiction between irrigation policies that promote efficient water use and the need to maintain a vegetative cover year-round, which could increase water demand in gardens.

What could be the effect of the soil monitoring law?

A soil monitoring law would have a positive impact on urban garden management, as it would allow for:

- Real-time monitoring of soil health, detecting potential problems like compaction, erosion, or nutrient loss before they become severe.
- Helping garden managers adjust their soil management practices to optimize quality and long-term productivity.
- Facilitating data collection that could influence the creation of new policies and incentive programs based on scientific evidence about soil quality.

What contractual solutions and terms and what kind of guarantees are needed for business model implementation?

- Long-term concession contracts: Urban gardens should be under a long-term concession (5-10 years) with the Seville City Council, guaranteeing that communities can manage these spaces without fear of losing access to the land.
- Sustainability certifications: Garden managers could obtain soil sustainability certifications that ensure their agricultural practices are environmentally friendly and contribute to soil health.
- Sustainability clauses: Contracts could include specific sustainability clauses, such as the obligation to maintain a minimum soil cover, use organic fertilizers, and participate in soil quality monitoring activities.

C) What resources could facilitate the change?

Financial:

- Public and private funds for the creation and maintenance of green infrastructure like urban gardens. These funds could finance the use of monitoring technologies, composting, and efficient irrigation.
- Subsidies and payments for ecosystem services specific to agricultural practices that improve soil health, such as crop rotation or cover cropping.



Human resources:

- Technical advisors and agronomists specializing in sustainable soil management in urban environments. These professionals would help communities implement best agricultural practices and comply with regulations.
- Volunteers and local communities to manage and work in urban gardens, promoting greater citizen participation and a sense of belonging.

Educational and knowledge resources:

- Environmental education programs for the public to raise awareness of the importance of soil health and how sustainable practices can contribute to improving urban quality of life.
- Knowledge transfer between different urban garden projects in Europe, through networks and forums for exchanging experiences on soil management in urban contexts.

Technological resources:

- Implementation of sensor technologies to monitor soil in real-time, such as moisture, nutrient content, and compaction, allowing garden managers to adapt their management practices.
- Development of digital platforms that allow garden managers and citizens to share information on soil health and best agricultural practices.

4.3 Pathways mapping

- 5 Based on what discussed above, complete the table below (i.e. not all categories might be applicable, in case not please write n.a.). If relevant point emerges also indicate what trends and divers as well as activities and resources might be needed.
- 6 - CHANGES: what is needed in terms of regulations and institutions; social habits; products and technologies, services and infrastructure?
- 7 - TRENDS/DRIVERS: what is the influence of the social, economical and environmental context?
- 8 - ACTIVITIES/RESOURCES: what skills, knowledge, partners are needed?

Table 4 Pathways mapping

	Short term (up to 3 years)	Medium (3 - 7 years)	Long term (after 7 years)
INNOVATIONS			
Regulations and binding policies	Law of responsibility for soil health in urban areas	Review of green infrastructure policies	Nationwide implementation of urban soil standards



Incentive instruments	Grants for pilot soil management research projects	Generation of new tax incentives for sustainable businesses	Creation of green bond frameworks for soils
Contractual solutions	Concession agreements with soil sustainability terms	Innovative contractual models for public-private partnerships	Compulsory certification of sustainable soils
Infrastructure	Implementation of sustainable irrigation infrastructure	Growth of rainwater retention systems	Extensive ecological infrastructure networks
Product	Innovative solutions for soil conservation	Marketing of products from sustainable management practices. For urban gardens, promotion in local stores.	Large-scale solutions for soil restoration
Services	Soil environmental consulting service	Expanding soil sustainability company(ies)	Growth of global soil health services
Technology	Soil moisture and quality measurement sensors	Advanced technologies for soil analysis, including improved satellite image resolution, are revolutionizing the field of agriculture.	Advanced regenerative techniques for the treatment of soils polluted with trace elements, focusing on in situ remediation.
Institutions	Development of local committees dedicated to soil conservation	National regulatory authorities overseeing soil health	International organizations focused on sustainable soil management
Actors' configuration	Public-private partnerships at the local level	Regional partnerships to improve urban soils	Global urban soil management communities



Coordination mechanisms and partnerships	Development of soil innovation hubs	Global research collaboration	soil	International partnerships for urban soils
RESOURCES				
skills, knowledge, R&D	Capacity building for urban managers in sustainability	Advanced training in soil conservation	soil	R&D for new soil technologies
DRIVERS: social habits, economic, environmental	Changes in consumer behavior towards sustainability	Growing recognition of soil's role in the environment		International regulations for soil sustainability

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