



The XPaths Project

Challenges and Solutions to Implement the SDGs in the Drylands

Final Project Report

Stockholm
Resilience Centre



FORMAS

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Executive summary

Drylands are the home of more than 2 billion people, covering 40% of the surface of the world. Therefore, the fate of the drylands will directly affect the world's future. Historically seen as unproductive, poor and vulnerable to droughts and desertification, drylands have a lot of potential - if their particular characteristics are better understood and represented.



Campina Grande region, Brazil. Photo: Tais Sonetti González

XPaths stands for “Science in Action: Intersecting Pathways to the Sustainable Development Goals (SDGs) across Scales in the Drylands”. With **case studies in the arid or semiarid regions of three different countries, Brazil, Senegal and Spain**, the project XPaths has the dual goal of (1) advancing the knowledge about the core challenges and **solutions to reach sustainable and just futures in the drylands**, and (2) **co-design strategic action plans** based on this understanding. The project also explored how **global actors**, particularly from the European Union, can better support the achievement of the SDGs in the three case studies.

More than 500 actors from different sectors in Brazil, Spain and Senegal engaged in a **multi-scale participatory process** during the three-year-long research process. The selected cases, although sharing similarities through their location in dryland regions, exhibit a range of unique characteristics and contextual differences that distinguish them from one another. Among these distinctions are varied income levels and their distinct institutional and historical backgrounds.

The participatory process was based on a novel approach* that integrates system thinking and pathways approaches. The approach incorporates perspectives across different sectors and social groups, ensuring the inclusion of marginalized voices. A core premise supporting the new approach was that achieving the SDGs requires understanding the systemic structures locking the sustainable pathways in different contexts. Following this approach, a series of workshops was organized in each country to discuss pathways to sustainable and just futures.

* The 3H-CLD (Three Horizons with Causal Loop Diagrams) approach detailed in the body of the Final Dialogue report and also in Aguiar et al. 2024. Unravelling deep roots in drylands: A systems thinking participatory approach to the SDGs. Global Sustainability (under review).

Building upon the challenges identified in the multiscale workshops, each country worked closely with a strategic group of engaged participants to collaboratively pinpoint **critical challenges and solutions for realizing sustainable, equitable and just futures** within their unique contexts. This collaborative assembly is referred to as a 'coalition'. Figure 1 summarizes the core challenges and solutions co-designed in each country.

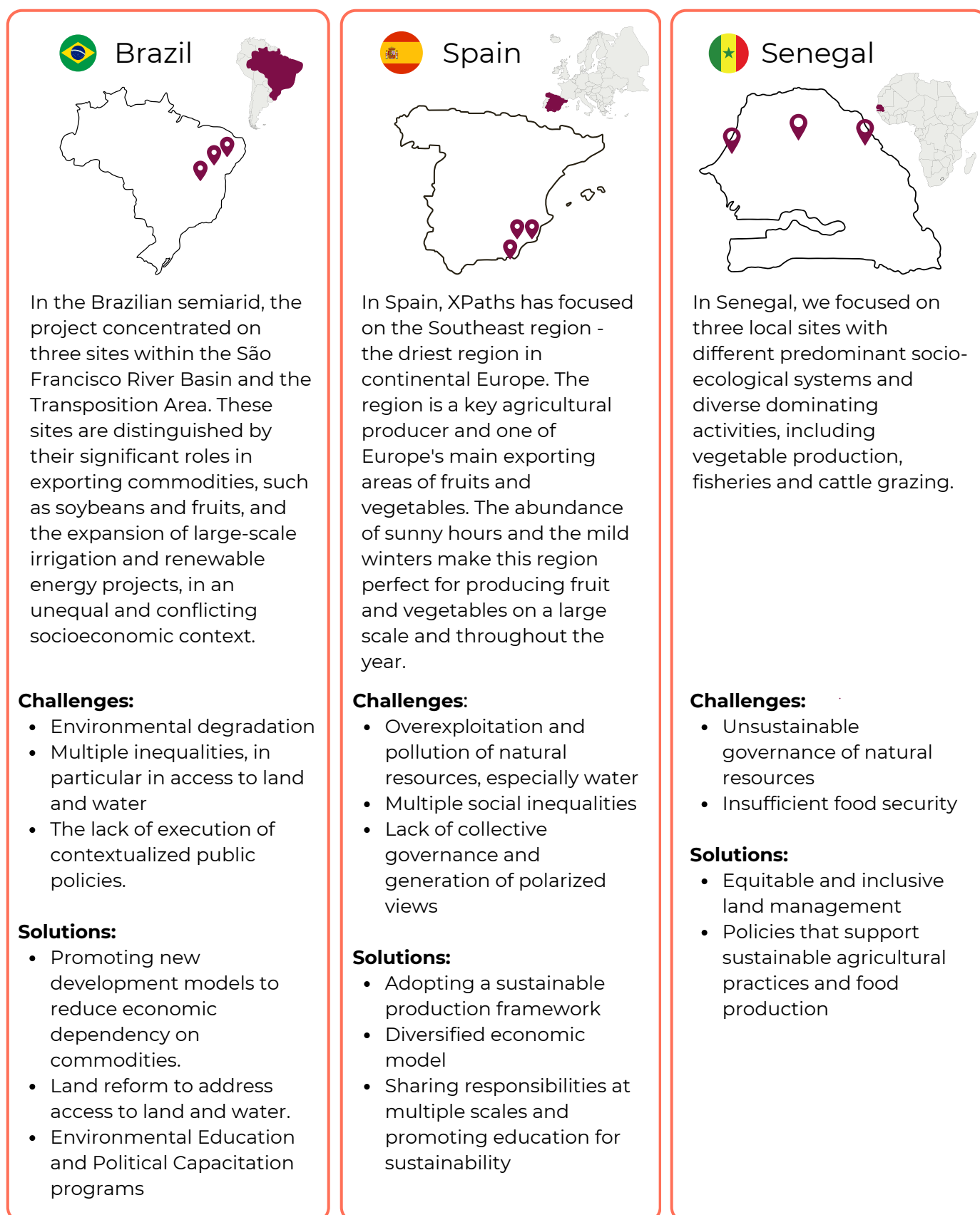


Figure 1 - Summary of core challenges and solutions in each case study.

Recommendations for Policy and Practice



Global Initiatives (in general)

Initiatives that influence local sustainability (e.g. trade agreements, development aid, renewable energy expansion) should consider:

- Local concerns and solutions that do not necessarily align with country-level hegemonic perspectives
- Multiple social-ecological impacts not restricted to the loss of vegetation in rainforest biomes. Locally, large projects may have impacts on water availability and pollution, health issues, conflicts and loss of natural vegetation and biodiversity in several biomes.
- Multiple inequalities and asymmetrical power relations that can potentially be reinforced by such initiatives.



In particular, initiatives related to food systems:

Multiple perspectives and conflicting narratives need to be taken into account:

- The dominant narrative of agricultural intensification and expansion is incentivised and encouraged by important global initiatives. However, there are divergences about this narrative due to its social-ecological implications, leading in many cases to conflict and violence at the local scale.
- Brazil, Spain and Senegal are at different stages of the agriculture intensification process following the dominant narrative - which is being pushed top-down in Senegal. The social and environmental impacts currently seen in Brazil and Spain can be avoided in Senegal.
- The contrasting narratives are not only related to technical aspects of the production system but to the role of different actors in the production (corporations, small farmers, large farmers, etc.). Issues related to land ownership and unequal distribution of land (present and future) are often neglected in food system transformation literature and forums.
- Integrated planning and management of the Food, Energy, Water and Land Tenure nexus is crucial to sustainable and just futures.

Figure 2 - Summary of recommendations for global initiatives derived from the cross-country analysis.

The analyses conducted in the scope of XPaths were the comparison of the dialogue results within and across the three countries and the analysis of distal drivers, in particular the role of the EU from a policy perspective. Figure 2 summarizes key insights from these analyses. These apply in general to global initiatives affecting the sustainability of the drylands, and in particular to the initiatives related to food and agricultural systems. In summary, our results reinforce the need for **integration of policies in the drylands**. For instance, agriculture is affecting migration which affects inequalities, etc. Please, read the full XPaths Final Report for a deeper understanding of these conclusions. The results also show the importance of **multi-actor and multiscale solution-oriented processes**, which should be incentivised through **funding**. We hope the approach tested in XPaths can be useful in other contexts.



In January 2024, we organized a **Final Dialogue** with coalition members of the three countries and global actors. The goal of the dialogue was to present the projects' key insights and foster collaboration across countries and scales. In this report, we briefly describe the 3H-CLD approach, followed by a presentation of the project's results and lastly a description of our Final Dialogue.

The XPaths project is hosted by the Stockholm Resilience Centre at Stockholm University, with partners in several countries including the University of Almería - UAL (Spain), Université Cheikh Anta Diop - UCAD (Senegal), Centre national de la recherche scientifique - CNRS (France), the Free University of Brussels (Belgium), Chalmers University (Sweden) and the Brazilian Institute for Space Research - INPE (Brazil). It runs from 2020 to 2025, funded by the Swedish Research Council for Sustainable Development - [FORMAS](https://www.formas.se/). More information can be found on the project website: www.xpathsfutures.org.

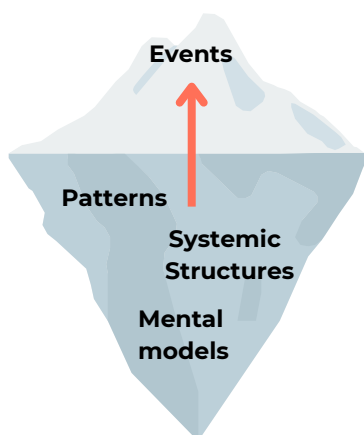
Introduction

Our premises and approach

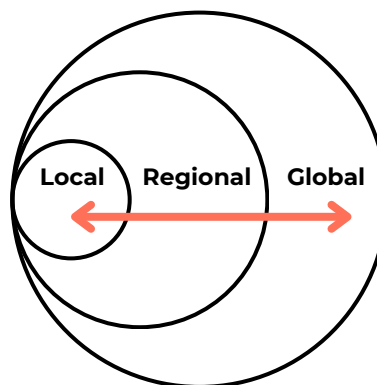
XPaths core premise is that designing multi-sectoral policies to implement all the SDGs in an integrated manner – respecting their “indivisible” nature – requires more than just understanding and addressing the interactions among the 17 SDGs. We argue there is a need to understand and break down the core systemic structures locking a region in unsustainable paths. This requires identifying the root causes of such unsustainable system behavior and its leverage points, namely, the points to intervene in a system to effectively transform its development towards a more desirable trajectory or future.

Furthermore, we argue that adopting multi-scale participatory processes to discuss sustainable futures is essential because to successfully implement globally defined goals it is necessary to discuss their relevance at different scales and make them actionable and contextualized at regional and local levels. To this end, it is important to capture the plurality of perspectives and tensions about the desired futures at these multiple levels.

XPaths core assumptions



Pathways to implement the SDGs require a deep understanding of root causes and systemic structures which lock countries in unsustainable trajectories.



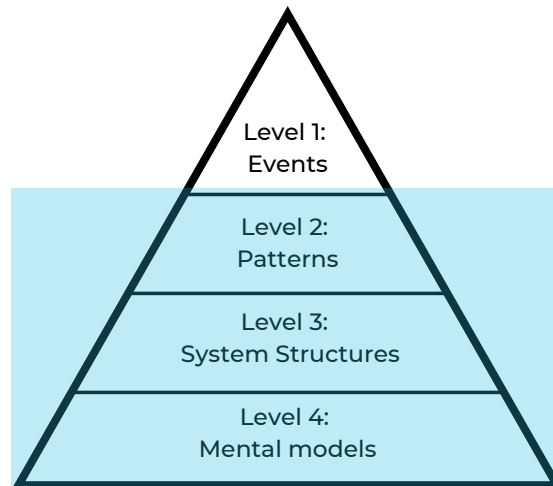
Implementing the SDGs requires a sense-making process about what sustainable and just futures means at multiple levels, considering multiple scales.

To address these needs, we developed a new approach to structure a multi-scale participatory dialogue in the context of the SDGs. This new approach is called the **3H-CLD***, as it combines the Three Horizons diagram and System thinking tools, in particular Causal Loop Diagrams (Box 1). Critical to the whole process is the engagement of a strategic group of local actors (coalitions) responsible for the co-design of “strategic action plans” based on the results of the participatory process - pushing for the actual implementation of solutions emerging from the workshops.

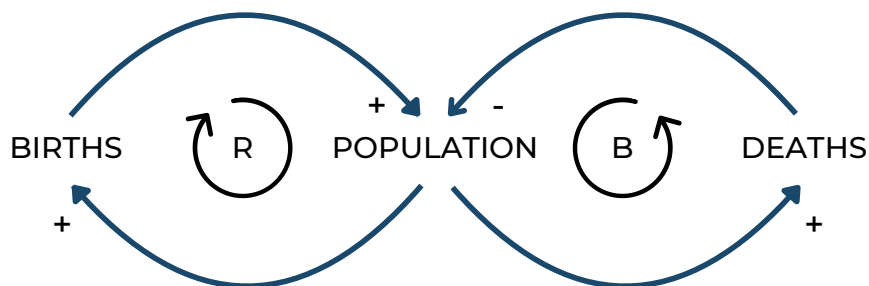
* Aguiar et al. 2024. Unravelling deep roots in drylands: A systems thinking participatory approach to the SDGs. Global Sustainability (under review).

Box 1 - Tools combined in the 3H-CLD approach

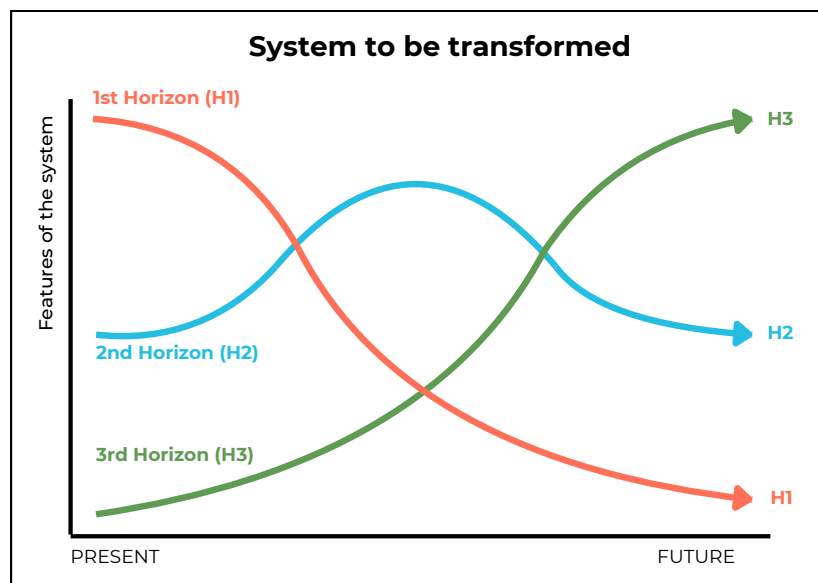
(a)



(b)



(c)



Box 1 : (a) Causal Loop Diagram example (prepared by the authors); (b) Four Levels of Thinking model (prepared by the authors based on Maani and Cavana 2010)*; (c) The Three Horizons Diagram (prepared by the authors, based on Sharpe et al. 2016)**.

a. Four Levels of Thinking Model: At the top level, **events** or symptoms, which in the iceberg metaphor constitute the “tip of the iceberg”, represent the most visible part of reality. Although underlying these events there are deeper problems, decisions and interventions often focus on these events or symptoms. The second level of thinking, which in the iceberg metaphor constitutes ice beneath the water's surface, involves **patterns and trends of the events**, where a large set of events are linked together to reveal recurring patterns over time.

Moving deeper beneath the water's surface, we reach the third level or the **systemic structures**. Systemic structures demonstrate how different components and patterns within a system are interconnected producing the visible events. Finally, in the fourth level, we find the **mental models**. These include our cognitive understanding of reality and can be viewed as "systemic structure generators" because they shape our reasons for approaching things the way we do and guide the creation or change of various structures. Mental models reflect our individual personal beliefs, values, and assumptions, as well as collectively shared visions (Maani and Cavana 2010).

b. Causal Loop Diagrams (CLD): CLDs is a system thinking tool used to represent the interconnectedness of various components of a system, shifting away from linear causality (from a to b to c) to circular causality (from a to b to c and back to a). Capturing such causal relations using CLDs is an essential activity in our approach to collectively uncover the systemic structures underneath the problems of a region and, based on this understanding, propose integrated solutions to break unsustainable patterns. In a CLD an arrow represents a causal link between each pair of variables. The polarity sign (+ or -) depends on the type of cause-effect relationship. A '+' is used when both variables move in the same direction, while a '-' is used when the variables move in opposite directions. Circular relationships can be categorized as either reinforcing loops, which typically drive the system to continue in the same direction - amplifying an ongoing change - and balancing loops, which often steer the system towards stability.

c. Three Horizons (3H) diagram: In the 3H diagram, three lines are plotted against two axes. The first line represents the current system (H1), the second represents the transition process (H2), and the third represents potential future alternatives (H3). In groups, participants use the diagram to mediate a conversation about how to transform the system. The x-axis represents the time from the present into the future, and the y-axis represents the degree of dominance of certain elements, characteristics, initiatives or events of the system. The method also includes a discussion about which actors influence the necessary actions, as well as the role of power relations in transforming the system (Curry 2015; Sharpe et al. 2016).

* Maani, K. E., & Cavana, R. Y. (2007). Systems thinking, system dynamics: Managing Change and Complexity.

** Sharpe, B., Hodgson, A., Leicester, G., Lyon, A., & Fazey, I. (2016). Three horizons: a pathways practice for transformation. *Ecology and Society*, 21(2). <https://doi.org/10.5751/es-08388-210247>

3H-CLD approach overview

The 3H-CLD approach involves co-producing knowledge across a series of workshops organized at different geographic scales. In each workshop, participants are organized into small groups to discuss sustainable futures for a given region or locality. Each workshop/group produces similar results, which are later integrated and analyzed. The work within each group follows the same structure guided by the Three Horizons diagram and unfolds in three steps. Participants are asked to write down their thoughts in coloured Post-it notes according to the focus of the STEP:

- **STEP 1** on the 3rd Horizon ("The desired future"), participants in each group are invited to discuss their aspirations regarding a sustainable and fair future for their region, considering multiple dimensions of sustainability (e.g., social, environmental, economic and governance). This step also includes the identification of existing "seeds" (Bennett et al. 2016) or initiatives in the present that capture some of the features of the desired future. Under the proper conditions, growing such seeds can guide the transformation. At the end of STEP 1, the Post-it notes are synthesized as creative outputs (e.g., letters, drawings, plays) that aim to apprehend and internalize the collective aspirations of the group.
- **STEP 2** centers around the 1st Horizon, which identifies the "Current challenges" and participants are invited to prioritize some challenges. Guided by the iceberg model metaphor, the selected problems are typically seen as the tip of the iceberg. Participants are invited to collectively reflect on the causes of these challenges, building causal loop diagrams (CLDs), a system thinking tool. The CLDs are the main output of STEP 2 and are the basis for identifying entry points for transformative change (STEP 3).
- **STEP 3** concentrates on the 2nd Horizon, exploring "How to reach the desired future from the present". In STEP 3, based on the CLDs collectively built in STEP 2, participants are invited to propose actions that could break the systemic problems identified. They are also asked to consider how to nurture present good initiatives (STEP 1). Finally, they associate the actions with potential impacts on the SDGs. It is important to note that STEP 3 aims to avoid sectoral solutions or a focus on specific SDGs. Actions address core problems, their causes and relationships.

Divergences, i.e., differences in perspectives, views, or values, among participants in the same group or between groups are carefully documented. Such differences play a crucial and natural role in the process. They are instrumental in unveiling a deeper understanding of the solution space for potential transformations.

A typical in-person 3H-CLD workshop usually takes one day and a half, with some groups working in parallel. In sum, the following products are generated in each group:

1. Desired Futures (post-it notes counted and grouped on similar themes);
2. Creative processes illustrating/illuminating and synthesizing desired futures;
3. "Good seeds" (initiatives) of the future already existing at present;
4. Problems/challenges of the present (post-it notes counted and grouped on similar themes);
5. Systemic understanding of the roots of the problems and actors involved (CLD);
6. Actions to achieve sustainable futures and grow seeds (post-it notes counted and grouped on similar themes);
7. Divergences noted during the workshop (within/ across groups).

Following the workshops, the task of integrating, synthesizing, and analyzing the data generated by all groups and at all scales begins, involving researchers and stakeholders. Multiple products can be derived from the collected data. Our emphasis in this report is discussed in the next section.

The 3H-CLD dialogues in XPaths

A focal area in each country was selected and, within this area, three contrasting local sites with heterogeneous social-ecological characteristics were chosen with the local coalitions. Between 2021 and 2023, more than 500 people participated in at least five 3H-CLD workshops per country in which comparable results were generated (Figure 3): a regional workshop, then three local workshops and a final cross-scale workshop*.

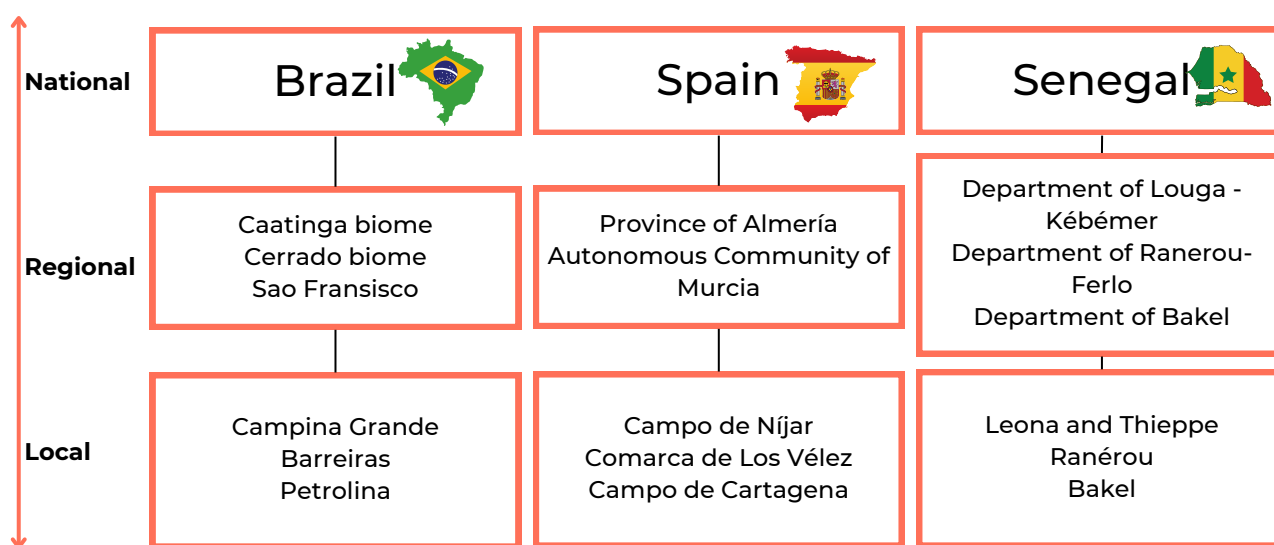


Figure 3 - Selected sites in each country. There were variations in each country, but this figure gives a general idea of the workshops. The proposal was to organize a regional workshop, then three locals, and a final cross-scale one. For details, see specific reports

The participants from diverse sectors with the capacity to implement changes include members of traditional communities, indigenous populations, and both small- and large-scale farmers, along with representatives of the business sector, academia, and government. For further details on the participatory process in each country, including information on specific regions and participants, please visit our website.

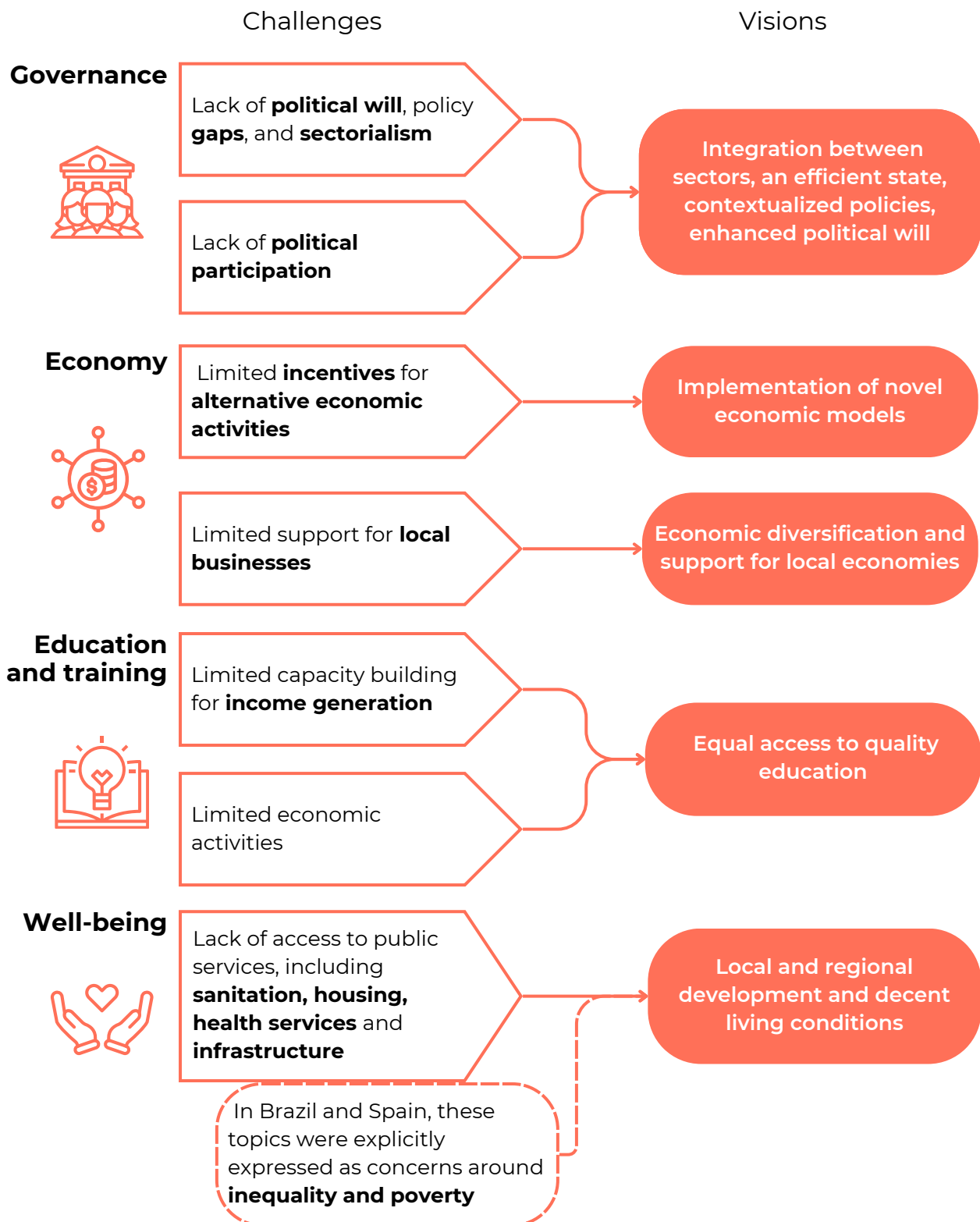
A core analysis in each country consisted of integrating the CLDs from each workshop to identify systemic structures and leverage points. This effort ultimately led to the co-development of strategic action plans for each country with the local coalitions. For more information on each country's action plans: www.xpathsfutures.org). In this report, we focus on key results derived from integrating the workshop results, detailed in the next section.

* There were variations in each country given the heterogeneous contexts and the different impacts of the COVID pandemic. Please see the 3H-CLD reports for each country on our website.

Core results of the project

Commonalities across the cases

Despite the differences in historical and socioeconomic contexts, the XPaths dialogues identified some **overarching similarities** in visions and challenges across the three dryland countries. Such similarities relate to topics like Governance, Economy, Education and Training, Well-being, Identity and Heritage, Environment, and the Food-Water-Energy Nexus. Figure 4 details the similarities in each of these categories. Despite such general similarities, in detail the challenges and proposed solutions are very context-dependent, as presented in the next section.



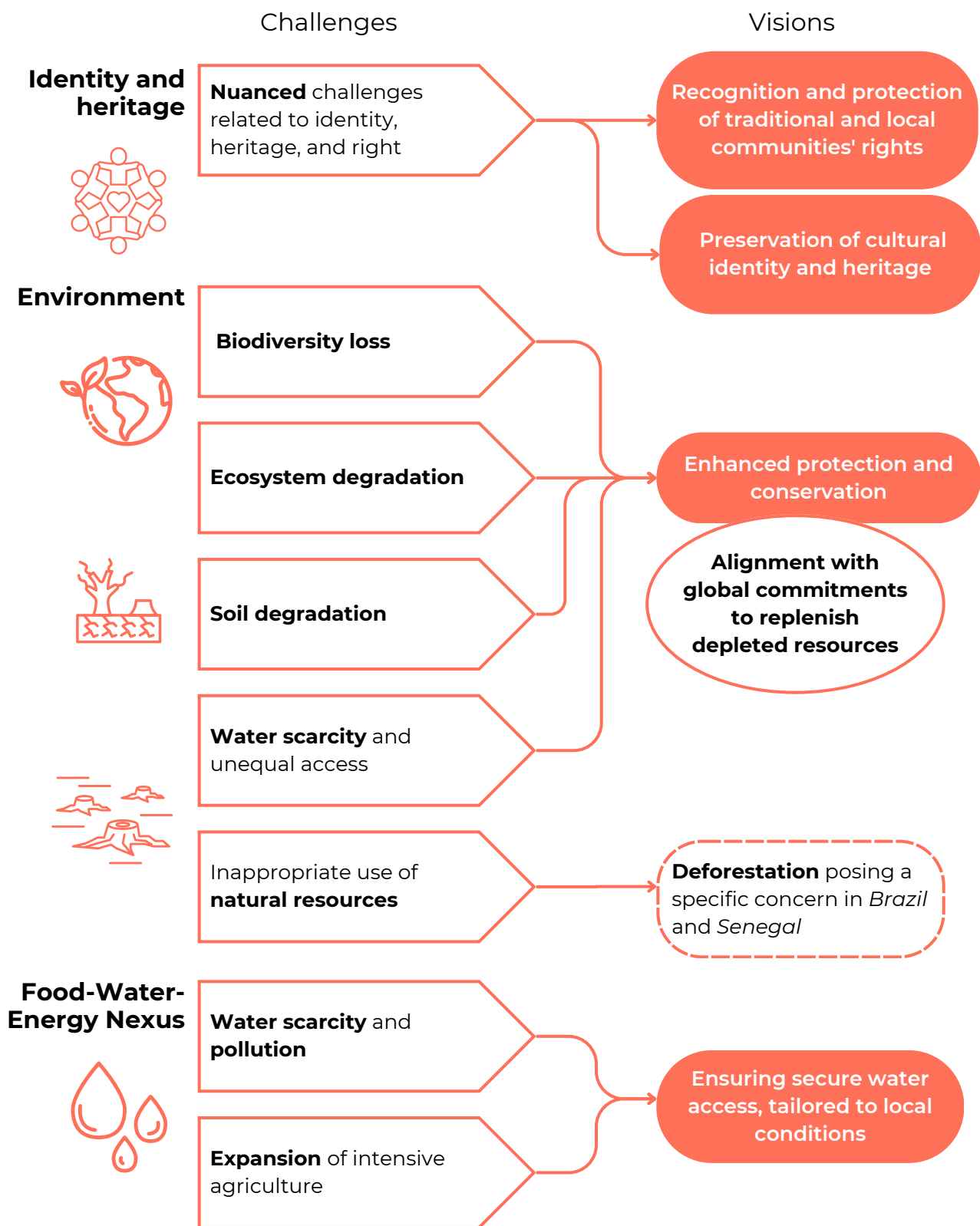


Figure 4: Results of a thematic comparison across the three countries about aspirations (STEP 1) and challenges/problems (STEP 2).

Key results per country: core challenges and solutions

Brazil

In the **Brazilian semiarid**, pervasive challenges include **environmental degradation**, such as deforestation and water pollution, and inequalities in income, wealth, land and water access, and power asymmetries, along with poverty. Issues of **violence**, and **social-ecological conflicts** are also prevalent. These problems stem from the discontinuity of public plans, intertwined with Brazil's dependence on commodities and mega-projects, exacerbating historical land concentration and political power in specific economic sectors. To address these challenges, the **solutions** proposed by XPaths participants aim at fostering a **new development model** based on socio-environmental diversification. The goal is to steer Brazil away from the growing economic dependence on commodities, deindustrialization and multiple inequalities. As a basis, participants see the need for a broad environmental and political capacitation program, and land redistribution and demarcation for traditional populations addressing the historical land concentration process. More specifically, the implementation of new development models would require **national** and **global** level actions, summarized in Figure 5.

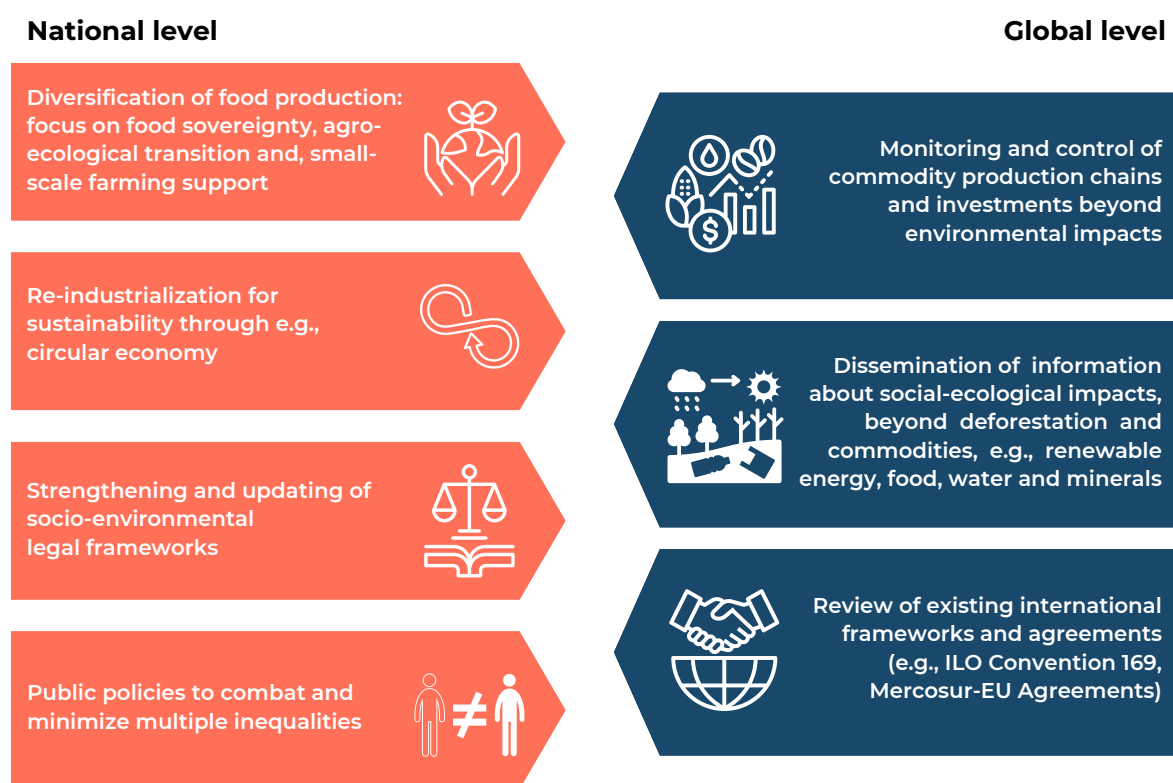


Figure 5 - Summary of national and international level actions proposed in the Brazilian Strategic Action Plan for the development of a new economic model based on socio environmental diversification.

Read the full participatory 3H-CLD dialogue results from Brazil [here](#). The Strategic Action Plan for Brazil can be found [here](#) (in Portuguese).

Spain

In Spain, there are multiple drivers of change occurring in the semi-arid region, amongst these the **overexploitation of natural resources** with particular emphasis on water resources, land use changes and pollution. These challenges increasingly lead to **biodiversity loss and ecosystem degradation**, pervasive challenges identified in our local sites. The predominant economic activity in the study sites is agriculture, and the region is one of Europe's main producers of fruits and vegetables. The current agricultural model, however, requires a sustainable transformation. Yet, participants in our multi-actor dialogue have divergent visions about what such transformation would entail (see Figure 6 below). Likewise, the region is experiencing social challenges, such as rising inequalities and migration dynamics, impacting the structure of local communities. Amongst the core challenges that participants perceive is the current socio-economic model, that goes beyond the biophysical limits in the region. To tackle these core challenges, we summarize **four main solutions** that aim to tackle present sustainability challenges across the three pillars of sustainability - economy, society and environment, including governance:

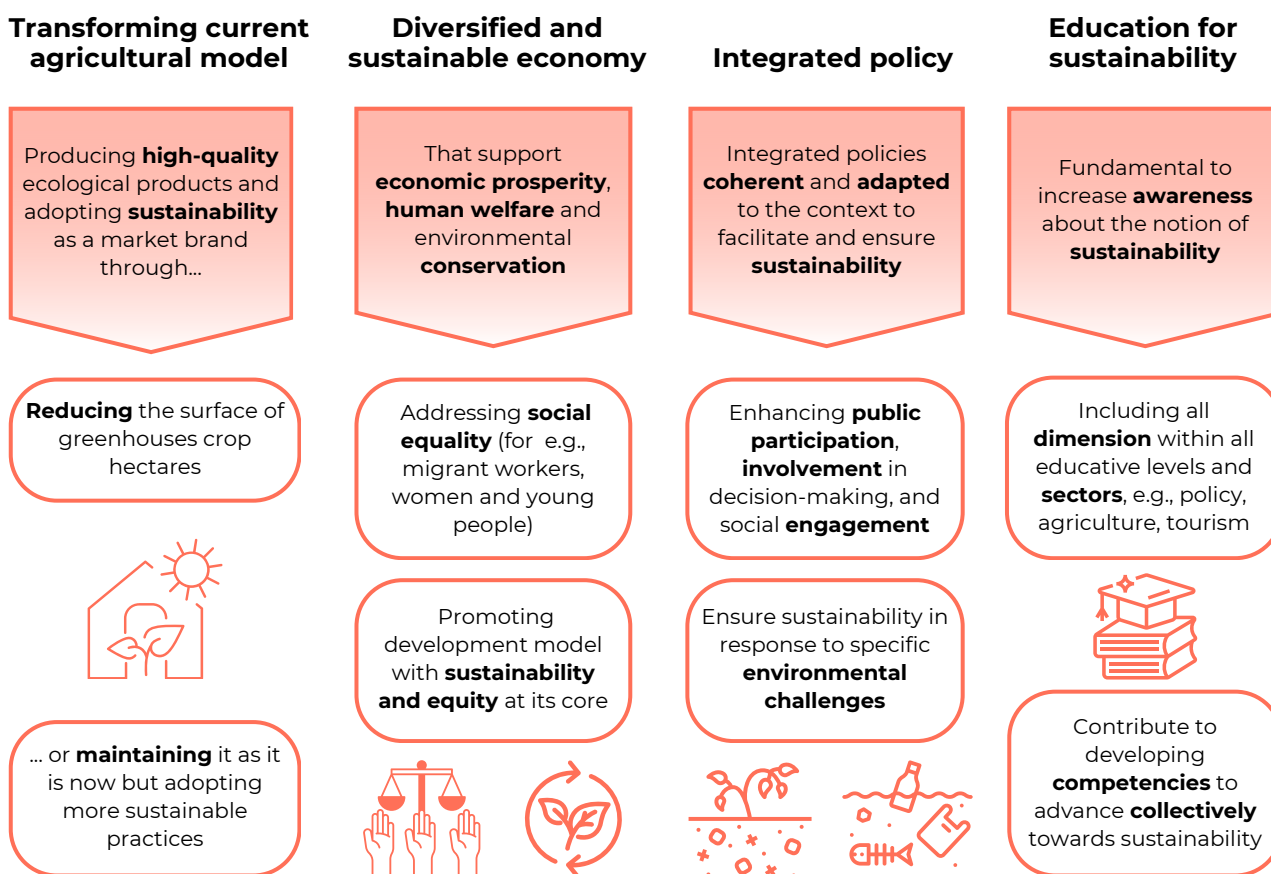


Figure 6 - Summary of solutions proposed in the Spanish Strategic Action Plan.

Read the full participatory 3H-CLD dialogue results from Spain [here](#). The Strategic Action Plan for Spain can be found [here](#) and booklet [here](#) (in Spanish).

Senegal

In Senegal, we can group the core **challenges** and their related **solutions** into two groups. First, the **natural resources** are currently used and governed in an unsustainable manner. The multiplicity of users, including farmers and herders, vying for the same limited resources (mainly water and land) leads to **overexploitation**, and accelerates land degradation and soil infertility, resulting in a decrease in land productivity. This weaves into the question of food self-sufficiency in Senegal, where the government tends to promote unsustainable methods and policies for agricultural food production, e.g., subsidies for chemical inputs, expansion of agricultural land and promotion of agribusiness, despite the political aspiration that promotes a transition towards more agroecological practices. The second challenge is that **public policy for development** is carried out through nationally and internationally invested, state-run programs which are conceived and operationalized in a highly sectorial manner. These programs are designed at the **national level** with little attempt to **contextualize** program content, resulting in a mismatch between program objectives and local needs. To address these problems, the XPaths team has identified the following key solutions at national and local scales (Figure 7):

Land management and food production

Co-construction and wide dissemination of an equitable land management plan by and for all land users at the local level



Promoting agricultural practices combining traditional methods and modern innovation and use of climate-adapted inputs (e.g., seeds, biofertilizers)



Contextualized policies



Promotion of an intersectoral, cross-scale approach to public policies that leads to a better contextualization of development projects and programs at local scales



Local populations should engage more into empowered civil society, to ensure that their vision for future development is taken into account

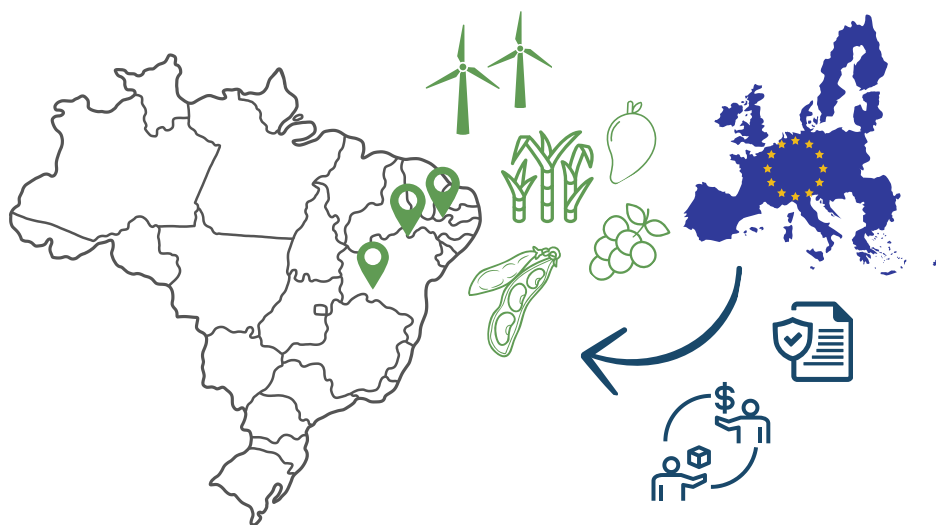
Figure 7 - Summary of solutions proposed in the Senageles Strategic Action Plan.

Read the full participatory 3H-CLD dialogue reports from Senegal [here](#). The Strategic Action Plan for Spain can be found [here](#) (in French).

The role of the European Union (EU)

Pathways towards sustainability must be territorialized in local and national contexts, but in the current globalized world, they are also substantially influenced by **interactions across scales**. In the results from the participatory process in each of the three countries, we identified core challenges and aspirations that are linked to international flows, for example goods and financial assets. We then identified and analyzed **relevant EU-level policies**, to understand their effects in our case areas.

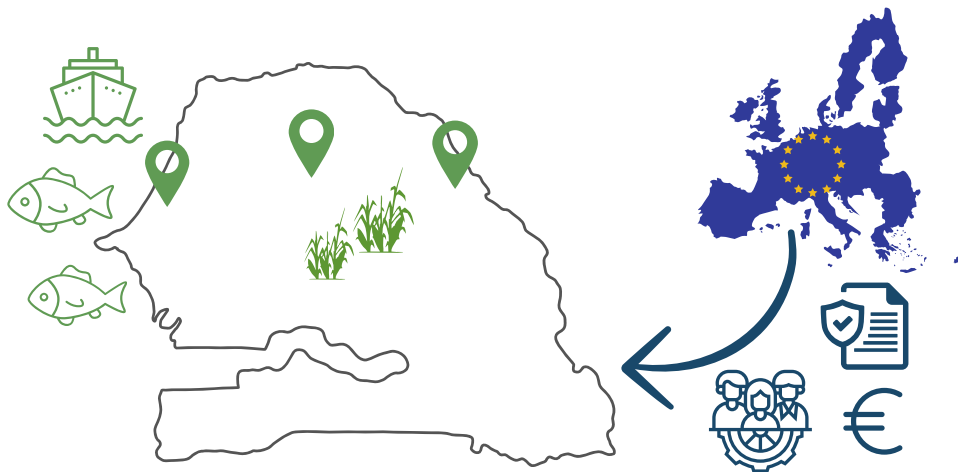
In Brazil, the social-ecological impacts of large-scale projects for agricultural production, renewable energy and mining are the results of the dependence of the Brazilian economy on commodity trade. Our case areas export soy, sugar cane, grapes and mangoes, including to the EU. The EU-Mercosur trade agreement is expected to increase trade between Brazil and the EU, and the preparatory documents have a dominant narrative of agricultural intensification and expansion, without attention to the implications of increased production of water-intensive crops in drylands. The EU has a Deforestation Regulation, to avoid the import of commodities contributing to deforestation, but the natural vegetation in our case sites is not defined as forest, and is thus not protected through this regulation. The EU is a big investor in mega projects for renewable energy, through its investment bank. In our sites, lack of consultation with local inhabitants, and displacement of people are concerns related to renewable energy projects.



Our case areas in **Spain** are major producers of fruits and vegetables that are exported to other countries in the EU. Fruits and vegetables are important in healthy diets, but consumption of produce from Spain maintains intense year-round cropping in the driest areas of Europe. As a member of the EU, Spain is directly influenced by its policies. Participants perceive that the Common Agricultural Policy (CAP) is shaping conditions in the case areas. The XPaths workshops were conducted under the previous CAP – where participants found that the policy focused on large-scale production and that the bureaucracy hindered smaller-scale actors from getting funding. Production of fruits and vegetables is laborlabour intensive, and many migrants work in the area. Lack of integration and social marginalization of migrant workers is seen as a core challenge in our sites. The EU's Seasonal Workers Directive should allow member states to regulate migration and allow the workforce to come and work during seasonal peaks in high laborlabour demand. However, this is not adapted to the fruit and vegetable production in our case areas where there are no seasons but almost a year-round production while leaving workers without long-term job security.



In our sites in **Senegal**, numerous programmes and projects for development operate, with national and international funding. The projects are not well coordinated and not well aligned to local contexts and priorities. The EU and Senegal have a joint strategy for cooperation, for which the national guiding document is *Senegal's Plan Sénégal Emergent*, meaning that the actions are more aligned with national remedies than with local contexts and priorities. It is for example unclear how the focus on agro-industry will lead to improved food security for smallholder producers and resilience to climate change, which are stated expected outcomes. Depletion of fish stocks in Senegalese waters is another core challenge. The EU has a fisheries agreement with Senegal. While not being the biggest actor in terms of foreign vessels, the EU-Senegal fisheries agreement lacks a transparency clause, making it difficult to know what is actually fished by EU vessels.



Recommendation for Policy and Practice

Based on the above results, we highlight two related recommendations:

Global initiatives that influence local sustainability such as trade agreements, EU-level policies, and Development Aid programs need to consider:

- Local concerns and solutions that not necessarily align with country-level hegemonic perspectives;
- Multiple social-ecological impacts beyond rainforest loss, such as water use and quality, pollution, health issues, and loss of natural vegetation and biodiversity, etc.
- Last, but not least, the multiple inequalities and asymmetrical power relations that can potentially be reinforced by international actions.

In particular, initiatives related to transforming food and agricultural systems need to increase awareness of divergent perspectives and conflicting narratives about the desired future:

- The dominant narrative of agricultural intensification and expansion is incentivised and encouraged by important global initiatives, for example, the proposed draft document of the EU Mercosur Trade Agreement, the Development Cooperation Strategy with Senegal, etc. However, there are divergences about this narrative due to its social-ecological implications, leading in many cases to conflict and violence at the local scale.
- Brazil, Spain and Senegal are at different stages of the agriculture intensification process following the dominant narrative - which is being pushed top-down in Senegal. The social and environmental impacts currently seen in Brazil and Spain can be avoided in Senegal.
- The contrasting narratives are not only related to technical aspects of the production system but to the role of different actors in the production (corporations, small farmers, large farmers, etc.). Issues related to land ownership and unequal distribution of land (present and future) are often neglected in food system transformation literature and forums.
- Integrated planning and management of the Food, Energy, Water and Land Tenure nexus is crucial to sustainable and just futures.

Final Dialogue

Goals and structure

TheXPaths project's final dialogue was held online, on January 25th 2024. The goal of the dialogue was to present the projects' key insights and foster collaboration between local and global actors. Through connecting local actors from the case countries the event fostered participants to engage in critical discussions on how the project's insights can align current and future policy recommendations towards the SDGs, encouraging like-minded organizations to explore collaborative strategies for action in the global efforts to support the implementation of the SDGs.

In the first part of the dialogue, we presented a synthesis of our approach, the commonalities across countries, a synthesis of the core challenges and proposed solutions (leverage points and interventions), and finally, an analysis of how the European Union could contribute to the implementation of the SDGs in each country. In the second part, we opened the floor for the participants to reflect on some guiding questions. The presentation can be found [on our website](#) in English, Portuguese, Spanish and French.

During the final dialogue, we had upwards of 50 participants joining from all around the globe. From Brazil, we had researchers and representatives from local organizations, social movements and representatives of Indigenous and traditional communities joining us. From Senegal, a range of different stakeholders joined, such as political representatives from local, departmental and national levels environmental experts and representatives of local NGOs and producer organizations. From Spain, we had researchers, political representatives from the province of Almería, institutional actors and representatives from environmental organizations and social movements. We also had global actors from the EU, from the Food and Agriculture Organization and from the United Nations Convention to Combat Desertification (UNCCD) joining the dialogue.

Input from the participants

During the second part of the Final Dialogue, we opened up the space for the participants to give their reflections on the Xpaths process, where we received valuable insights and hopeful messages. Many of them gave their thoughts on the project's potential for making short and medium-term impacts on implementing the SDGs in their regions:

"XPaths has succeeded in launching a multi-stakeholder process that has enabled decision-makers, technicians and communities to make the SDGs an object of their work and to talk about them. We need to continue in this direction." - **Coalition member Senegal**

We also received input on how this project can be useful on a higher political level:

"I think this research is a tool that we can use to talk to the government to better think about our local realities – talking about the semiarid with **people** living within it and with perspectives of the communities living here."
- **Coalition member Brazil**

Last but not least, many participants shared their hope of what they wish this project could lead to:

"I would love to see this project being replicated to other dryland regions - the solutions identified in the project could be **replicated** and **integrated** in public policies also elsewhere." - **Coalition member Spain**

"The XPath approach has been very **inclusive** and has enabled several stakeholders to contribute to the results. We now need to capitalize on this work, translating it to local languages and share it with communities, and the State for **implementation**." - **Coalition member Senegal**

"We are gathered from various countries and continents. Maybe we could consider creating a **network** of this to ensure that this Dialogue does not end today, but ensure that it gains more political strength, even **internationally**."
- **Coalition member Brazil**



Final considerations

XPaths has put together a multiscale participatory process in three countries, in which more than 500 people were involved. Inspired by previous work from the Stockholm Resilience Centre we sought to go beyond co-designing pathways to sustainable futures by fostering their implementation with coalitions, following the “Science-Action” nature of XPaths.

Officially, the project ends in 2024. During the following months, we will work on scientific publications and present the results at scientific conferences and local to global science-policy meetings, such as UNCCD (United Nations Convention to Combat Desertification). Through these events, we intend to support the coalitions in the dissemination and implementation of strategic actions. Our research ends 2024, but we hope the seeds of XPaths will continue through the efforts of the coalitions.

Finally, we also hope the 3H-CLD process will be useful in other contexts. The approach was designed to bring multiple perspectives from different sectors and social groups to the table, including marginalized voices. It offers a novel combination of system thinking and pathways approaches, based on the premise that understanding the systemic structures locking the sustainable pathways is critical to underpin structural change.

 Paths