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Executive summary

Salinisation is one of the main challenges of contemporary agriculture threatening food and water security. Climate change with more persistent droughts, floods and sea-level rise is expected to increase this challenge making it one of the most common land degradation processes. At the same time, an increasingly complex institutional landscape has emerged across multiple areas of global environmental governance related to salinisation. This can be seen in a myriad of public, private, and hybrid international institutions coming together by creating transnational initiatives to address the issue of growing salinisation through saline agriculture. Therefore, the aim of this paper is to characterise the status quo and development of a governance landscape of cooperative initiatives for saline agriculture in Mediterranean and North Sea regions.

The results show a few overarching trends in the sample of 99 initiatives selected for the analysis. We suggest that initiatives can play an important role in the governance landscape of saline agriculture and can contribute to the upscaling of saline agriculture by advancing the scientific research and participating in the policy debate. However, findings suggest that the fragmented landscape of initiatives is predominated by public actors and research institutions. This potentially hampers benefit sharing and upscaling opportunities. There is an increase in the number of cooperative initiatives focusing on saline agriculture over time, particularly in years 2019-2020, suggesting increased interest or need for these initiatives. Their main governance functions are operational activities followed by information sharing and networking. However, for upscaling more ICIs are needed that commit to funding & standards and commitments' activities. Thematically, most of the initiatives focus on the development of new crop varieties and water and soil management practices. The key SDGs addressed by them are SDG2 "Zero hunger", SDG13 "Climate action", SDG6 "Clean water and sanitation" and SDG8 "Decent work and economic growth". Our results indicate that most of the initiatives do not report publicly, but those with reports exhibit high verification rates. Implementation of these accountability mechanisms is crucial for tracking the performance of the initiatives in terms of output, outcome and impact. The lack of employment of these mechanisms might obstruct effectiveness. Furthermore, the short duration and research focus of the international and transnational cooperative initiatives indicate a discrepancy between science and practice, which could hamper upscaling opportunities. More focus should be put on mobilising and transferring knowledge in order to make it accessible to a wider audience, thus increasing uptake, implementation and impact.

Interdependencies among the policies of other governance areas such as climate change or biodiversity allow for mutual learning. This exchange should not be limited to academic and public institutions, but include, inspire and empower all those who are affected by salinized lands in order to ensure community food security.

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SALAD project

SALAD (Saline AgricuLture for ADaptation) is a transcontinental, innovative research project in the field of food systems and climate. It addresses the research area of food security under climate change through saline agriculture, aligning vision, research and practice among European and African countries focusing on saline agriculture upscaling. The project involves both basic and applied transdisciplinary (biophysical, social, cultural, economic and environmental) research. It includes a consortium of four countries from the EU: Belgium, Germany, Italy, Netherlands, and two from Africa: Egypt, and Morocco. SALAD focuses on promoting innovative technology deployment and improving climate resilience through saline agricultural practices.

Projected climate change and sea-level rise scenarios for 2050 predict a significant decrease of crop yield over the decades to come, in particular in low lying coastal areas as well as irrigated (dry land) agricultural areas around the Mediterranean and the North Sea. Climate change effects such as more frequent floods and droughts will increase the salinity in agricultural soils, affecting food systems overstretched by an increasing global population. According to the FAO's reports, progressing salinisation is one of the major drivers of soil degradation in Europe as well as Near East and North Africa, exerting increasing pressure on conventional farming which is based on freshwater resources (FAO, 2015).

SALAD aims at improving the resilience of food production in saline and potentially saline agricultural areas in the Mediterranean and North Sea regions by:

1) supporting the development and sustainable use of innovative salt-tolerant crops,
2) identifying and further developing crop cultivation suited to saline conditions,
3) exploring and testing innovative market development techniques and instruments to upscale several crop/food chains across the EU and Africa,
4) exchanging knowledge and transferring practical and adaptive solutions.

SALAD focuses on implementing climate-smart agricultural solutions through the upscaling of saline agriculture to change the behaviour, strategies and agricultural practices along the value chain raising awareness for climate change impacts and adaptation possibilities to salinisation among stakeholders.

By adopting a novel and innovative approach, first, we investigate soil-water-plant interactions for the selected crops (WP1). Second, we conduct production pilots and experiments to examine prospects for horizontal upscaling production from farm to regional scale for four different crops under saline conditions: New Zealand spinach, potatoes, quinoa and tomatoes (WP2). Third, we engage a wide range of stakeholders and analyse knowledge transfers (diagonal upscaling, WP3). Fourth, we conduct a market analysis to investigate opportunities and constraints for vertical upscaling, present marketing and certification options and start a dialogue with the investors (WP4).

Glossary

Governance

Processes, systems and actors involved in addressing collective problems and guiding society towards socially desirable collective outcomes.

Governance triangle

A heuristic framework developed by Abbott and Snidal, to structure and analyse governance of different areas (Abbott and Snidal 2009a; 2009b; Abbott 2012). Within the triangle, institutions are placed based on their governing members (public, firm and CSO). Furthermore, the governance triangle is divided into seven zones, which represent the potential combinations of actor types (public, private and hybrid). Finally, the triangle highlights the governance institutions' role (standards & commitments, operational activities, information & networking and/or financing).

Institutions

Structures of rights, rules, norms, agreements and decision-making procedures that induce social practice or social order. Institutions assign roles to participants in that social practice or order and guide interactions among occupants of these roles.

International and transnational cooperative initiatives

Initiatives that are: '(i) international and transnational institutions, which not only have the (ii) intention to guide policy and the behaviour of their members or a broader community, but also explicitly mention the (iii) common governance goal, accomplishable by (iv) significant governance functions' (Widerberg, Pattberg, and Kristensen 2016a, p. 16). Cooperative initiatives consist of companies, civil society organisations, and national, regional or local governments.

Governing members

Actors involved in governing an institution, i.e. holding a formal position to influence the rules, norms, operations or performance of the institution.

Saline agriculture

Agricultural practices using saline land and saline irrigation water to achieve better production through the sustainable and integrated use of genetic resources (plants, animals, fish, insects, and microorganisms) avoiding soil recovery measures (Aslam et al., 2009; Ladeiro, 2012).

Transnational

Operating across different levels, which could imply across country borders, among different organisations with different constituencies (public, private and/or subnational). In the case of this paper, transnational refers primarily to institutions that govern or engage members beyond the state level and include actors from two or more countries.

List of abbreviations

COP	Conference of the Parties
CSO	Civil Society Organisation
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
ICI(s)	International and transnational cooperative initiative(s)
NGO	Non-governmental Organisation
SDG(s)	Sustainable Development Goals
UN	United Nations

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1. Introduction

Salinisation of water and soil resources is a substantial driver of land degradation and freshwater shortages, particularly in arid and semi-arid regions (Vengosh, 2003). This global phenomenon is a long-term environmental problem and has affected many aquifers, freshwater lakes and river basins (Vengosh, 2003). Soil and water salinisation are often a result of anthropogenic processes, such as unsustainable water management and irrigation practices (Gelburd, 1985). It can result from natural processes such as sea seepage, flooding or unfavourable geological conditions (Singh, 2021). Consequently, anthropogenic salinisation has occasionally contributed to the destruction of formerly successful agrarian societies, like ancient Mesopotamia and the Tigris-Euphrates valley (Gelburd, 1985). Salinisation depletes the soil of pivotal nutrients and is a significant constituent of desertification processes (Ingram, 2011; Williams, 2001), decreases the water quality and overall supply for the agricultural sector, and could thus lead to the collapse of agricultural systems (Williams, 2001). This potentially threatens global food security and nutrition needs (Ingram, 2011). Moreover, it can trigger the collapse of agricultural industries, reduce biodiversity, change local climatic conditions and create severe health problems (Williams, 2001). Salinisation thus poses a significant threat to ensure food security under the pressures of population growth and climate change (Rojas et al., 2016). Effective management of salt-affected soils can mitigate factors accounted both to high environmental and social costs (Rojas et al., 2016). Pure and hybrid modes of governance show promise to recover social and environmental systems from such environmental change and degradation (Lemos & Agrawal, 2006). Across the global environmental governance landscape related to salinisation, an increasingly complex institutional composition has emerged (Negacz et al., 2021). This aligns with the Western political shift from government to governance (Mayntz, 2017). However, at present, these institutional compositions are characterised by a lack of coordination (Vellinga et al., 2021).

Considering the contemporary challenges and governance opportunities, a sustainable transition in the environmental governance landscape can contribute to mitigating salinisation and meet the growing food demand. A sustainable transition can be set in motion by a collective effort of experimental niche initiatives (Rotmans et al., 2016). These transitions require system innovations that transcend individual actors and construct relationships between private, civil society and public entities (Rotmans, 2005).

In the past 10 years, a myriad of international cooperative initiatives (ICIs) has emerged around the topic of salinisation and saline agriculture. These initiatives involve non-state and subnational actors, (such as regions, companies, non-governmental organisations, communities, indigenous peoples, research institutions) often working in collaboration with national governments and intergovernmental organisations. ICIs operate across national borders and perform governance functions related to implementation of salinity-related projects as well as provision of information and funds to achieve common goals (Widerberg et al., 2016a). As such, they provide an opportunity to address the global challenge of soil and water salinization.

Until now, little is known about the institutional landscape of saline agriculture ICIs. Therefore, in this report, we address the following research questions:

1. What are the characteristics of the institutional landscape of saline agriculture?
    a. What institutions populate the institutional landscape of governing for saline agriculture transnationally?
    b. What functions do institutions in the institutional landscape of governing for saline agriculture perform?

    c. What themes do institutions in the institutional landscape of governing for saline agriculture focus on?
    d. What is the geographic focus of transnational cooperative initiatives?
2. How do transnational initiatives on saline agriculture monitor their performance through accountability mechanisms?
3. What are the implications of ICIs actions for the policy debate?

The second section of this report sets the scene for the analysis of saline agriculture ICIs by introducing causes and consequences of salinisation addressed. In the third section, we introduce the methodology applied in this report. We continue with the results of our analysis including the mapping and characterisation of ICIs according to a set of selected variables and discuss the implications of these findings. In the final section, we close off with some final remarks and pave a way forward for governing saline agriculture and future research.

2. Setting the scene

Salinisation is connected to multiple areas including land degradation, water, climate and food systems governance. Global climate change catalyses soil salinisation, as soil salinity dynamics are found to significantly correlate with variables attributed to climate change (Bannari et al., 2020). Sea-level rise and precipitation changes, induce floods and facilitate the intrusion of seawater on coastal lands (Teh et al., 2016). Coastal areas are particularly vulnerable to these events (Várallyay, 1994). The factors contributing to soil salinisation are projected by the Intergovernmental Panel on Climate Change to be more persistent in the future. Droughts, sea-level rise and more extreme weather events will occur more frequently in the future due to climate change (Arneth et al., 2019). Estimates of the total surface of salt-affected land vary widely among different studies depending on time and methods used for measurement. One billion hectares of land, divided over more than 100 countries can be classified as salt-affected (Ivushkin et al., 2019). Around 10% of the global arable land (Shahid et al., 2018) are salt-affected. In some countries, up to 50% of irrigated land is salt-affected, as mapped through remote sensing (Metternicht et al., 2003).

Current academic research focuses on the identification and exploration of strategies that mitigate or adapt to salinisation. Saline agriculture often translates to mitigation techniques that aim to either move soluble salts to lower soil depths through leaching, natural or artificial drainage systems or by removing salt through mechanical or biological means (Qadir et al., 2006). For example, halophytic plants with desalinising properties have been successfully utilised for soil reclamation (Saddhe et al., 2020). Next to saline mitigation techniques, there is a growing field of knowledge and practice on saline adaptation. Saline agriculture seems feasible for crops that can withstand relatively large amounts of salts that have been built up in root zones Cuevas et al., 2019). This could be achieved by using salt resistant rootstocks, either by genetic modification or classical breeding (Cuevas et al., 2019).

As a typical nexus, salinisation appears in land degradation, water and food policies on different governance levels. For example, on the international level, the United Nations Convention to Combat Desertification (UNCCD, 1994), mentions salinisation in the context of "unsustainable exploitation of water resources leading to serious environmental damage, including chemical pollution, salinisation and exhaustion of aquifers" as occurring in Mediterranean and Central and Eastern European region. In the Food and Agriculture Organisation (FAO) of the United Nations and UNEP, it is often discussed in the context of marginal lands understood as land supporting a yield of only up to 40% of its productivity potential (Ahmadzai et al., 2021). Recently, the FAO has also established networks and working groups focusing on salinisation such as the International Network of Salt-Affected Soils, the Global Framework on Water Scarcity in Agriculture (WASAG) with working group on Saline Agriculture and the Global Alliance for Climate-Smart Agriculture (GACSA).

Ahmadzai et al. (2021) found that marginal lands in Africa were largely omitted by the Green Revolution, with a considerable impact on livelihoods, markets and farming systems. Also, there are no specific policies dedicated to salinisation in most European countries, e.g., the topic of salinisation is never explicitly mentioned in the European Union's most recent Common Agricultural Policy (CAP) documents. Whilst salinisation is not a topic on the political agenda yet, the EU recognizes the severity of soil and land degradation due to salinity issues in its member states. To illustrate, the EU's 2030 soil strategy identifies salinisation as a severe threat to further land degradation processes (European Commission, 2020). This EU strategy mostly focuses on the mitigation aspect of salinisation issues, as attention is devoted to measures that avoid soil salinisation. It is mentioned that specific crop species are able to adapt to dry climatic conditions. However, there is little

attention to adaptation strategies specifically to salinisation. Within the EU, these trends also occur on the national level. Salinisation is merely addressed in public policy, e.g., in the National Strategy on Spatial Planning and the Environment in the Netherlands (BZK, 2020) and in the context of water security, as captured in the Dutch National Delta Programme (I&W,, 2021) or in Water Supply Concept Lower Saxony in Germany (MU, 2022). In the Middle East, it became a point of interest, innovation and investment, which led to the establishment of The International Centre for Biosaline Agriculture (ICBA) in 1999 by the Government of the United Arab Emirates and the Islamic Development Bank.

Salinisation on a global scale is a problem of complexity, positioned in a complex and fragmented institutional landscape, where many private, public and hybrid actors are involved (Pattberg et al., 2014). No clear pathway or solution can solve the issues caused by salinity, threatening global food and water security. Many stakeholders are involved, with volatile perceptions regarding associated problems and solutions. These characteristics make this a wicked problem, as defined by Rittel et al. (1973), and need to be resolved by incorporating design thinking in the process (Thienen et al., 2014). To achieve this, a systematic, structured and interdisciplinary approach must be taken.

In this report we explore the institutional landscape of saline agriculture focusing on ICIs understood as collaborative institutional arrangements including state, non-state and sub-national actors that operate across national borders, performing governance functions in an attempt to steer society towards a common goal. Known also as “transnational governance initiatives” (Bulkeley et al., 2012), “multi stakeholder” (Pattberg & Widerberg, 2016) and “public-private partnerships’’ (Börzel & Risse, 2005), ICIs became an increasingly important element of environmental governance architecture in the past decades. Previous studies proposed that ICIs can improve collaboration, bring together knowledge from various corners of society and foster implementation of global policy goals by bringing together practice, science and policy (Andonova, 2010; Bansard et al., 2017; Bäckstrand, 2006; Negacz et al., 2020; Pattberg et al., 2017) bringing together practice, science and policy.

3. Methodology

This section presents the methodology for mapping the institutional landscape of governing saline agriculture. We begin with explaining the definition of ICIs and the data collection process including creation of the SALAD database. We then describe the data analysis procedure. The section finishes with limitations of the adopted approach.

3.1. Definition of international and transnational cooperative initiatives

For creating the database, we applied the definition of ICIs by Widerberg, Pattberg, and Kristensen (2016a: pp 13). The initiatives included in the dataset are "(i) international and transnational institutions, which not only have the (ii) intentionality to steer policy and the behaviour of their members or a broader community but also explicitly mention the (iii) common governance goal, accomplishable by (iv) significant governance functions".

We focus on international and transnational initiatives that operate across national borders[1]. The ICIs included in the database are collaborative in nature which means that they partner with at least one other organisation from the same or different actor type. Foundations, farms or companies that do not explicitly cooperate with others were excluded. An exception was made for the institutions which set standards and certification schemes, because they often collaborate with other entities on the basis of membership. If initiatives work under an umbrella organisation such as FAO, each of them is coded separately. We excluded campaigns, commitments, and initiatives that do not have a mission statement or website due to their temporary character or lack of data.

3.2. Data collection

The source of data for this analysis is based on the SALAD database, collected by a team of researchers between 2021-2022. The database includes 99 ICIs (Annex D), each of which has been coded across 65 variables (Annex C). The database was established through a systematic approach (see Figure 1).

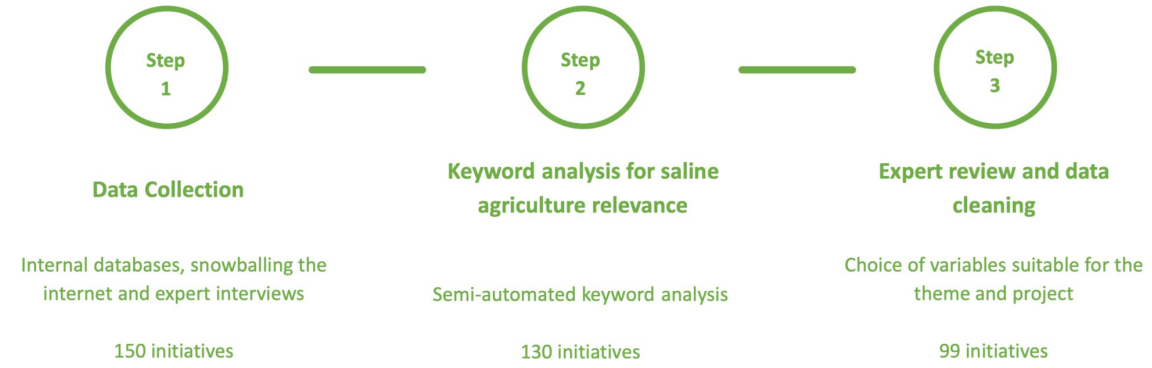

Figure 1 Selection process for creating the database

[1] If initiatives operate across borders of emirates, or constituent monarchies, within a federal state, e.g., United Arab Emirates, the ICI is also considered transnational.

This research process can be described in the following steps:

1. **Collection of the initiatives**

Firstly, we defined inclusion criteria as described in section 3.1. Secondly, we scanned a number of existing internal datasets (see Annex A for additional details). Further, we conducted a systematic internet search. We identified a set of search areas and keywords relevant to governing saline agriculture such as "salinisation"[2], "saline agriculture" and "brackish water" defined in an expert workshop in 2022 and applied an internet snowballing approach. Keywords were entered into the Google search engine (see Annex B for an overview of the chosen keywords). The first 10 pages of the search results were scanned for ICIs, which were added to the dataset.

Subsequently, we conducted expert consultations within the SALAD project to identify additional initiatives. Six experts from Belgium, Germany, Egypt, Italy, Morocco and the Netherlands were asked to identify potential initiatives. Their suggestions were checked against the adopted definition of the ICI.

We also collected ICI's self-formulated governance statements available at their websites. The type of statements included are: "Mission/Vision", "About", "Strategy", "What we do", "Objectives", "Function", "Operation", "Background", "Work Areas", "Guiding Principles" and "Charters". Statements and keywords were cleaned to ensure matching formats. All special characters were removed, all letters were changed to lowercase, lists and bullet-points were dissolved and double-spacing removed.

2. **Keyword analysis for saline agriculture relevance**

To make sure the identified ICIs have goals related to saline agriculture, we conducted semi-automated keyword analysis of their mission statements. We applied a broad conceptualization of saline agriculture, and used 48 key terms identified via expert consultations to capture various aspects relevant for governing saline agriculture (see Annex C for additional information).

Through expert consultation, these key terms were classified under 12 'strong' keywords and 36 'weak' keywords. If a statement included a keyword classified as 'strong', i.e. "saline agriculture", the corresponding initiative was added directly to the final database. 66 initiatives were classified in this group. If a statement mentioned at least one of the 'weak' keywords, i.e. "aquaculture", it was reviewed before adding the corresponding ICI to the database. In this process, 33 initiatives were selected for the expert screening.

3. **Expert review and data cleaning**

The initiatives selected for review were forwarded to a group of nine experts in saline agriculture. In case of disagreement among the experts, the ICIs were checked in detail by the IVM and UNIFI research team and compared to the initial criteria for inclusion. The team also screened the dataset for potential mergers and take-overs among initiatives. The final database mapping the institutional landscape of governing for saline agriculture consists of 99 ICIs (see Annex D: List of initiatives).

[2] Both the British term 'salinisation' and the American term 'salinization' have been checked during internet search and keyword analysis. The British spelling was encountered slightly more frequently.

3.3. Data analysis

To analyse the ICIs, we developed a detailed codebook to ensure consistency. The coding was conducted between 2021 and 2022 and cross-checked by at least two researchers. Based on these data and using descriptive statistics, we analysed characteristics of ICI in governing saline agriculture.

Table 1 shows the characteristics of ICIs included in the database. For most of the variables, data were available on the initiatives' websites or in their progress reports. For some, the required information was present in the press articles or on third-party websites. Finally, in some cases, the information presented was not explicit and required deeper investigation by the research team. The full list of the variables is included in Annex E.

Table 1 Types of variables collected

Variable	Description	Example of database record
Zone of the governance triangle	Type of actor involved in the initiative.	Public actor
Research institutions	Indicates whether research institutions are involved in the initiative.	YES
Number of members	Number of governing members, i.e. the actors holding a formal position to influence the rules, norms, operations or performance of the institution.	6
Launch year	Year of initiation of the initiative.	2015
Governance Function	Governance function of the initiative.	Information and networking
Thematic Focus	The thematic focus of an initiative.	Conventional crops
Sustainable Development Goal Addressed	States whether the goals of the initiatives align with the SDG's and its targets (explicitly or descriptively).	Addressing SDG2: Zero hunger
Geographical focus	Geographical focus of the initiative's actions.	Mediterranean
Measurement, Reporting and Verification (MRV)	Describes different MRV measures that the initiative takes to collect and report data.	Public reporting
Funding Scheme	The source of the monetary funds which facilitate the initiative or project, if applicable.	European Union Horizon 2020
Annual Funding	The amount of funds an initiative receives per year for its operations from the funding scheme	€1.000.000 / year

To describe the main actors, we used the *governance triangle*, which is a heuristic tool used to sort initiatives in the governance landscape according to the type of governance they engage in, i.e. public, private or hybrid. The tool was developed by Abbott and Snidal (2009a; 2009b). The governance triangle allows us to place ICIs in one of seven parts of the triangle based on their governing members (government, corporate, or civil society actors) and to describe the composition of actors (being public, private or hybrid in nature) involved in ICIs (Pattberg, 2016) (see Figure 2). Zone 1 only includes public actors, zone 2 only includes corporate actors, and zone 3 only includes civil society actors. By contrast, zones 4, 5 and 7 involve a mix of (two or three) types of actors and are hybrid in nature. Furthermore, we mapped whether to what extent research institutions such as universities or research centres are involved in the ICIs. We classified them according to the actor types: public, private and civil society.

The variable *number of members* refers to governing members understood as the actors involved in a governance institution, in this case international cooperative initiatives, holding a formal position to influence the rules, norms, operations or performance of the institution. The variable was created by calculating the number of governing members stated on the initiative website. If it was not explicit, the role of the members was cross-checked with their governance documents.

Launch year is understood as a year when the initiative was established, or if not available, when it began its operations. In case of conventions and protocols, it is a year when it was signed.

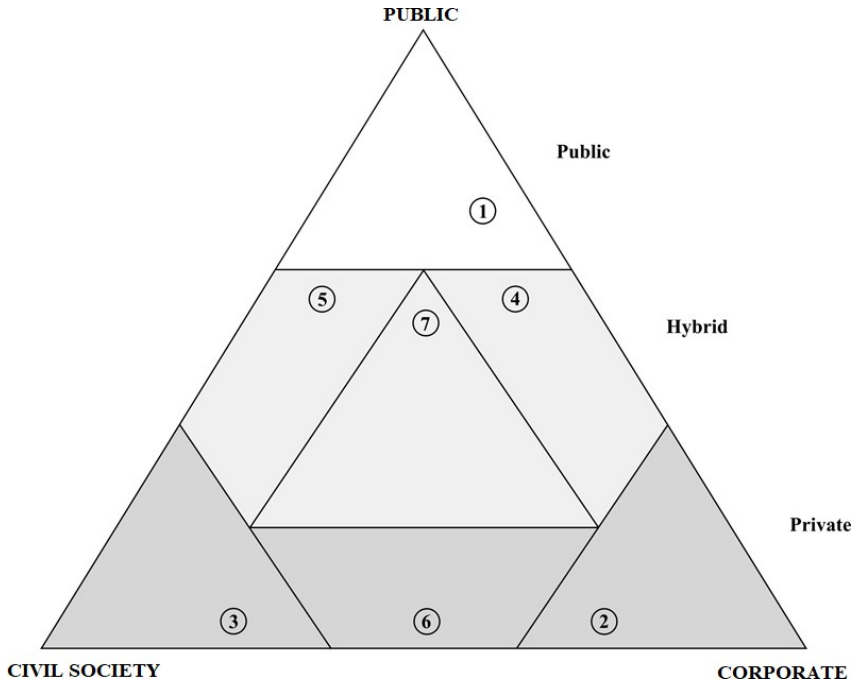

Figure 2 The governance triangle. The seven zones indicate the constellation of actors: (1): public, (2): corporate, (3): civil society, (4): public-corporate, (5): civil society-public, (6): corporate-civil society and (7): public- corporate-civil society. Source: adapted from Abbott and Snidal (2009a; 2009b, Abbott 2012).

Further, we applied the four *governance functions* developed by Abbott and Snidal (2009a) being (1) including standards and commitments, (2) operational activities, (3) information & networking, and (4) financing. These functions are not mutually exclusive, as many governance schemes may engage in several activities at once. Rule-making and implementation schemes (standards & commitments) comprise mandatory compliance, standards for measurement and disclosure of activities, and voluntary and private standards and commitments. Operational schemes focus on, for example, technology research and development, pilot projects, demonstration and deployment activities, skills enhancement, and best practice dissemination. Forums for information-sharing and networking (information & networking) provide technical consulting, training, and information services to build capacity, share knowledge, and support local government (Widerberg et al., 2016a). Finally, financing is a specific type of operational activity which entails providing funds or facilitating access to financial resources.

For the *thematic focus*, we used two variables: the *main theme* and *SDGs addressed by ICIs*. In order to further describe the functioning of the initiatives, we have listed their thematic focus across seven different themes including salinity adaptation, salinity mitigation, halophytes, conventional crops, aquaculture, water management, soil management. ICI's goals were further classified under their individual alignment with SDGs and targets, either explicitly or descriptively. As the UN states: "the Sustainable Development Goals are the blueprint for achieving a better and more sustainable future for all. They address the global challenges we face, including those related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice. The Goals interconnect, and in order to leave no one behind, it is important that we achieve each Goal and target by 2030" (United Nations, 2020). In particular, the following SDGS were identified as strongly related to saline agriculture: Goal 2 (Zero Hunger), Goal 6 (Clean Water and Sanitation), Goal 8 (Decent Work and

Economic Growth), Goal 9 (Industry, Innovation and Infrastructure), Goal 12 (Responsible consumption and production), Goal 13 (Climate Action), Goal 14 (Life below Water) and Goal 15 (Life on Land) (Negacz et al., 2021). Additional to these, all the remaining SDGs have been documented in the database as well: Goal 1 (No Poverty), Goal 3 (Good Health and Well-Being), Goal 4 (Quality Education), Goal 5 (Gender Equality), Goal 7 (Affordable and Clean Energy), Goal 10 (Reduced Inequalities), Goal 11 (Sustainable Cities and Communities), Goal 16 (Peace, Justice and Strong Institutions) and Goal 17 (Partnerships).

Geographical coverage describes the geographical focus of the initiative's work according to countries in Europe, North Africa and the Middle-East. Therefore, the categories of the database have been limited to the following: international (including areas within our geographical scope), Europe (specified where possible under the sub-categories of North Sea region and Mediterranean region), Middle East & North Africa region (specified where possible under the sub-categories of North Africa or the Arabian Peninsula).

We operationalised *accountability mechanisms* as monitoring, reporting and verification using seven binary variables or sub-conditions, indicating whether the ICIs have a monitoring framework and numerical targets, produce progress reports, use annual reporting, apply internal or external verification systems, and finally, if they have any provisions for sanctions in case of non-compliance (Mejía Acosta, 2013). Based on scores for these seven variables, we designed an accountability index being the cumulative average score across the seven accountability indicators, which is as a sum of these binary variables per initiative (Negacz et al., 2022b). Hence, this index ranges from 1 to 7,where a high number indicates a great amount of MRV measures employed by the respective ICI. Additionally, we investigate financial reporting operationalised by documenting the disclosure of funding schemes and annual financial input from external sources. Financial reporting plays a significant role, as it provides fundamental information required to evaluate sustainable development performance (Almagtome et al., 2020) and impact investing.

3.4. Limitations

Despite our attempt to devise a robust methodology, we are aware of five main limitations appearing in this report. First, our approach may not capture all possible ICIs focusing on saline agriculture. The reason for this could be the lack of keywords in the mission statements or using a national language for their website. We collected national initiatives for Belgium, Germany, Egypt, Italy, Morocco, and the Netherlands but due to their different nature, we excluded them from the analysis in this report. Second, we only used search words in English, which limits the scope of our database and may bias our sample of ICIs. Third, there might be some ICIs that fit our selection criteria that do not maintain a website, thus limiting their exposure. Through expert interviews we tried to capture as many of these ICIs as we could. However, it is inevitable that some ICIs still were excluded after this process. Fourth, the analysed sample is relatively small, thus we remain cautious in interpreting our findings, especially in comparison with other governance areas. Nevertheless, it allows us to gain a first understanding of ICIs in this previously unexplored empirical area. Fifth, some of the variables (e.g., SDGs addressed) were subject to interpretation by the coding team. As such, there may be a certain bias in categorisation of the ICI's characteristics if they were not explicitly mentioned on their websites.

4. Institutional landscape of saline agriculture and its implications

This section presents results of our mapping of the institutional landscape of governing saline agriculture. It starts with presenting an overview of actors involved in this governance area. Further, it shows temporal changes in the landscape. It continues with functions and thematic scope of the initiatives according to main themes and the SDGs. We then turn to the geographic coverage of the ICI actions. The section concludes with an overview of the accountability mechanisms of ICIs including financing schemes.

4.1. Distribution of international and transnational cooperative initiatives in the governance landscape

Of all the initiatives in the database, 22% exclusively include public actors as their partners, whereas merely 1% of the initiatives include exclusively private actors and 2% include exclusively civil society actors (see Figure 3). Examples of purely public ICIs include *Saltycrops* and *the International Network of Salt-affected Soils*. *Red Sea Farms* is an example of private ICI and *the Salt Farm Foundation*, a civil society led ICI. The initiatives listed in the database that include partners from all three actor groups account for 15% of all listed initiatives including ICIs such as *IUCLAND* or *the Soil Doctors*. A union of public and private actors accounts for 27% of the database entries (e.g., *Fresh4Cs* and *The Integrated Sustainable Agriculture Initiative)*. Similarly, 28% of the initiatives consist of an amalgamation of public actors and civil society such as *the Salicornia for Biosaline Agriculture* and *Investigation of Elite Date Palm for Salt Tolerance initiatives*, whereas merely 3% of the initiatives exclusively hold private actors and civil society as their actors (e.g., *Saline Agriculture Worldwide*). Furthermore, 88% of all ICIs include at least one research institution as an actor, such as *HaloSYS*.

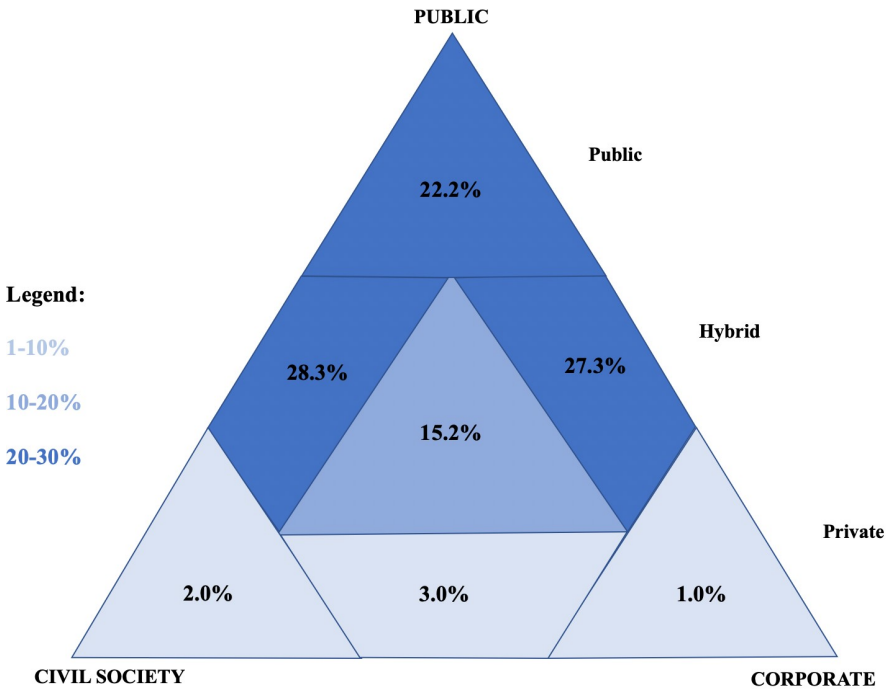

Figure 3 Governance triangle (adapted from Abbott and Snidal (2009a; 2009b, Abbott 2012)) for ICIs on saline agriculture. The seven zones illustrate the percentages of actor constellations within the 99 analysed initiatives.

Next, we turn to the distribution of the number of governing members among the ICIs on saline agriculture, denoting a right skewed distribution (see Figure 4). This implies that most of the initiatives have up to ten members. The sample mean of actors is 8.1 members, while the standard deviation is 6.4, indicating a relatively high variance in the data.

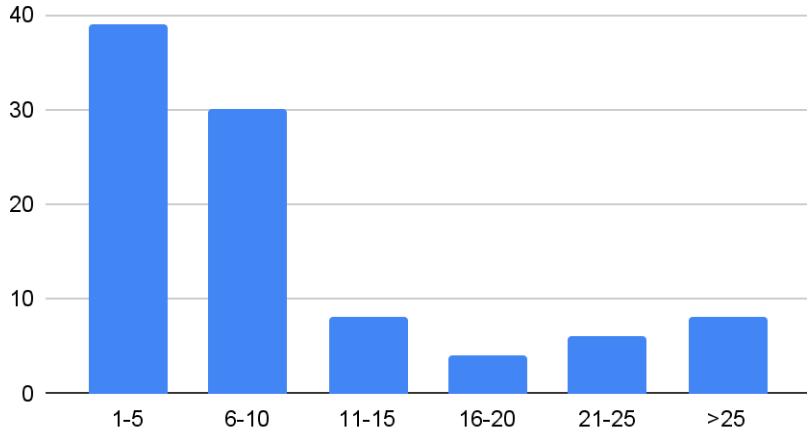

Figure 4 Number of governing members per ICI

4.2. Historical development of international and transnational cooperative initiatives

This section reports on the year of initiation and the temporal trends in the governing saline agriculture landscape over time.

Cumulatively, 91 initiatives started their operations between 2013-2022 (see Figure 5). This accounts for 85% of the total ICIs in the database. Opposingly, only 16 initiatives started their operations in 2012 or before, which accounts for 15% of the initiatives. The earliest initiative started in 1997. This shows that most of the initiatives are relatively recent. The median year for the initiation of initiatives is 2018.

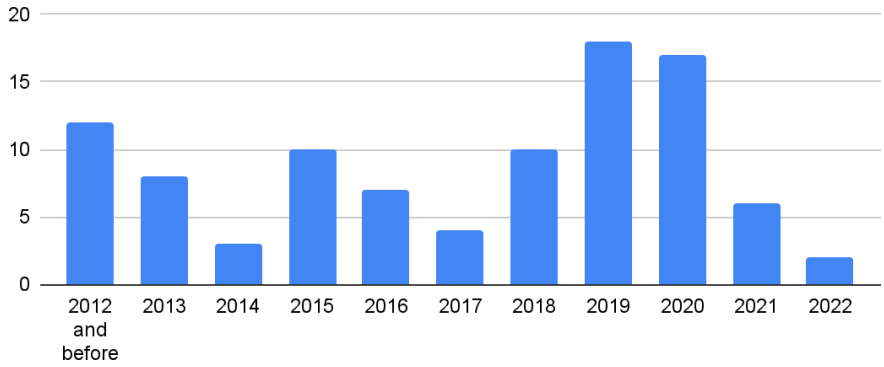

Figure 5 Year of initiation of the ICIs

The temporal analysis reveals that the saline agriculture ICIs are relatively young in comparison to climate or biodiversity governance (Widerberg & Stripple, 2016b; Pattberg et al., 2017). It may be a consequence of the geographic scope of our analysis as older saline agriculture ICIs were established in the USA, Australia and Asia. One of the earliest examples of an initiative investigating the potential

of saline agriculture dates back to 1954, when the U.S. Salinity laboratory was launched. At the same time, we observed a steady rise in the number of ICIs peaking around the years 2019-2020. This may stem from international events in the field occurring around that time such as a launch of INSAS (2019), conferences in Europe (e.g., SalFar's Saline Futures Conference in 2019) and NENA region (e.g., ICBA's Global Forum on Innovations for Marginal Environments 2019) but also increased interest or need for these initiatives. The lower number of ICIs in the year 2021 may be explained by the corona pandemic but also delay between establishment and making information publicly available.

Of all the ICIs, 72% have a defined finite period of duration. Most ICIs last up to three years (51%), followed by ICIs operating for 4-6 years (18%). Only one of the ICIs has a time perspective beyond 10 years. For all the ICIs that have a defined finite period of duration, the average time for duration is three years, which shows a rather short time orientation. In addition, 18% of ICIs have explicitly stated that they do not have a planned finite date in which they will end their operations. This suggests that these ICIs intend to remain operational in the medium- to long-term. The remaining 10% of the ICIs do not disclose any information regarding their year of termination, but do however, disclose that the initiative is planned to operate on the short- term.

On average, the relatively short lifespan of the ICIs is mainly due to the nature of research projects with a short-term orientation and easily quantifiable results while ignoring the long-term impact with a broader scope. In order to improve soil properties and observe an impact on the ground, a more long-term orientation is needed. Research conducted over a short period of time is insufficient for offering pragmatic solutions that work in site-specific contexts (Chatterji, 2004). A productive solution has been advocated for, the Extended Term Mixed Method (ETMM) approach, which is grounded in reason and observation and is summarised by Chatterji (2004) according to five principles. The first one of which is the *employment of a long-term timeline with a significant life-span tracking the course of an intervention including periodical evaluability assessments.* This vision could be applied in the context of saline agriculture, thus leading to more effective interventions and environmental governance.

Figure 6 shows the development of the constellation of actors over the years. The number of ICIs led by public actors has increased especially since 2019.

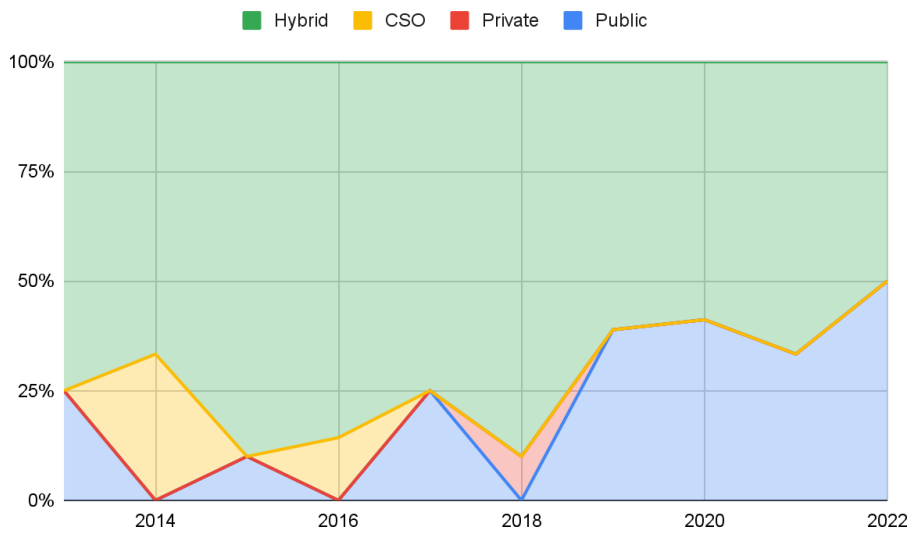

Figure 6 Constellation of actors of the ICIs over the years of initiation

The prominent position of research institutions, public and hybrid actors may explain the relatively large number of short-term projects for scientific purposes, which in turn is a barrier to upscaling that requires more long-term orientation and participation. On the other hand, involvement of public and academic actors facilitates access to certain sources of funding, such as subsidies. Only a few companies and civil society organisations lead the ICIs. Similar trends were observed in the biodiversity governance dominated by public and hybrid ICIs (Kok et al., 2019; Negacz et al. 2020; Visseren-Hamakers & Glasbergen, 2007). Further research is needed to define the governance level of actors involved in ICIs and thus their impact on engaging stakeholders from local, national or international levels.

4.3. Functions of initiatives

The majority of the initiatives hold an operational function as their primary or secondary function (82%) (see Figure 7). Examples of these ICIs include *Aquacombine* and *Saltycrops*. The second most utilised governance function, either jointly or exclusively, was information and networking with ICIs, such as *FAO WASAG* or *FAO INSAS*. Of the sample, 43% of initiatives held this function as part of their procedure. Financing and standards and commitments are modestly represented. Only 5% of initiatives exercise either one of those governance functions as part of their operations. Examples of these ICIs are *PROSIM*, which holds a financing governance function and *SalFar*, which holds a standards and commitments governance function. Operational and informative governance functions are often interconnected for the initiatives on saline agriculture within our geographical scope. In total, 30% of initiatives employed both roles. Furthermore, 60% initiatives engaged exclusively in operational activities, against 16% cases of exclusively informative and networking activities.

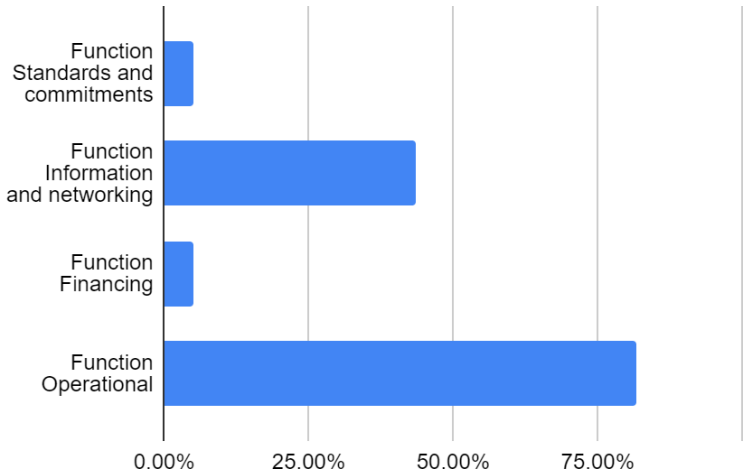

Figure 7 ICIs by governance functions

When comparing the actor constellations with functions of ICIs, we see that the ICIs that perform operational functions most often are led by public actors or partnerships of public and civil society actors or public and corporate actors (see Table 2). Information & networking ICIs include in particular collaborations between public and civil society actors or all three types of actors, followed by public-private partnerships. ICIs employing fewer common functions, i.e. financing and standards & commitments, consist of hybrid actors slightly more often.

Table 2 Numerical summary of ICI's actor constellation by governance functions

Actors	Function Standards & commitments	Function Information & networking	Function Financing	Function Operational
Public actors	2	8	1	23
Private actors	0	1	0	1
Civil society	0	2	1	0
Public + Private	1	9	1	21
Public + Civil society	0	11	0	24
Private + Civil society	0	2	0	2
Public + Private + Civil society	2	10	2	10
Total	5	43	5	81

The exceptional focus on operational activities, including pilot experiments, technological innovation and academic research, aligns with other research that shows that these activities are often led by public actors (Visseren-Hamakers, 2013) and by hybrid ICIs (Widerberg et al. 2016a; Sanderink et al. 2018; Guerra et al. 2015; Arnau et al. 2017). The focus of saline agriculture ICIs on these functions may be due to the large amount of funds available for these types of activities (e.g., EU's Horizon 2020 funding programme). For other governance areas, such as climate and biodiversity, information & networking is often a dominant function (Widerberg et al., 2016a; Negacz et al., 2020). However, for upscaling more ICIs are needed that commit to funding & standards and commitments.

4.4. Addressing thematic areas

The data on variables relating to the thematic focus are displayed in Figure 8. Conventional crops are thematically addressed most frequently. Of all initiatives, 76% address conventional crops at some stage during their operations. Water management is a focus area for 55% of the cases, whereas soil management is mentioned by 19% of the ICIs. Salinity adaptation gets slightly more focus amongst the initiatives compared to salinity mitigation. Those themes are relevant for 43% and 31% of the ICIs respectively. Halophytes (19%) and aquaculture (8%) are only marginally addressed amongst the initiatives.

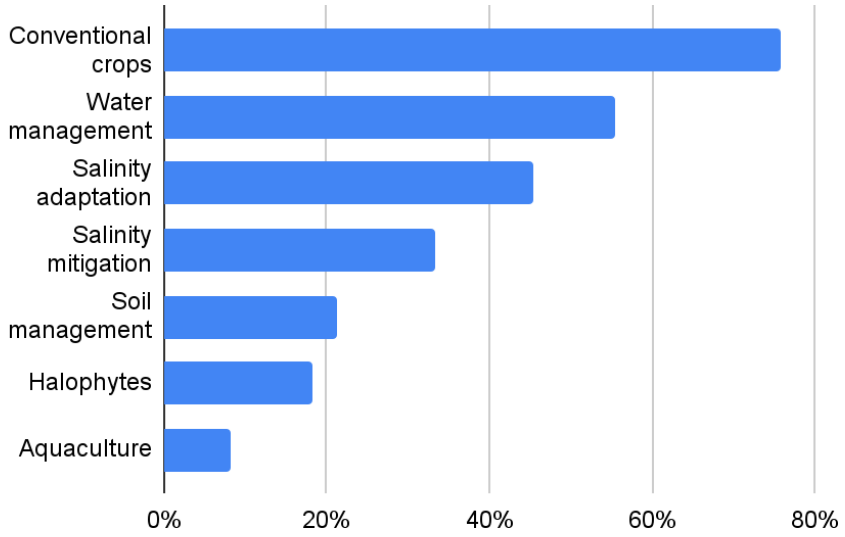

Figure 8 Thematic areas addressed by the ICIs

Looking at the connections between actor constellations and key themes, we find that public ICIs and public-private ICIs most often focus on conventional crops and water management (see Table 3). Civil society led ICIs and public+civil society led ICIs as well as hybrid ICIs often choose salinity adaptation as a thematic focus, in addition to conventional crops. Public+civil society ICIs have additionally a particular interest in halophytes.

Table 3 Numerical summary of ICI's actor constellation by thematic areas

Actors	**Conventional crops**	**Water management**	**Salinity adaptation**	**Salinity mitigation**	**Soil management**	**Halophytes**	**Aquaculture**
Public actors	14	14	7	10	6	3	1
Private actors	1	1	1	0	0	0	0
Civil society	2	1	2	0	1	0	0
Public + Private	22	19	9	11	4	5	3
Public + Civil society	21	10	15	9	3	8	3
Private + Civil society	2	2	2	0	2	0	0
Public + Private + Civil society	13	8	9	3	5	2	1
Total	75	55	45	33	21	18	8

Further, we examined initiatives addressing SDGs. Amongst all SDG's mentioned either explicitly or descriptively, SDG 2 on "Zero hunger" is the most common with 58% of the ICIs (Figure 9) with an example of *Quinoa for Marginal Environments initiative or European Soil Partnership*. It is followed by

SDG13 on “Climate action” (47%) with an example of Global Alliance for Climate-Smart Agriculture and SDG6 on “Clean water and sanitation” (39%). Other commonly addressed goals are SDG8 “Economic growth” (31%), SDG15 on “Life on land” (29%), SDG 9 on “Industry, Innovation and Infrastructure” (25%) and SDG 12 on “Responsible Consumption and Production” (23%).

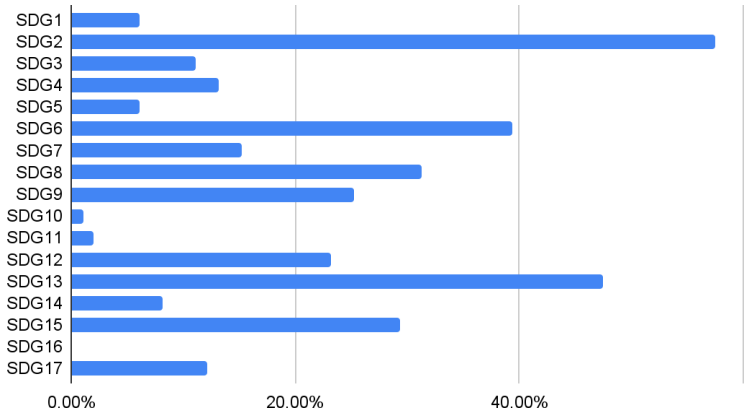

Figure 9 Sustainable Development Goals addressed by the ICIs

The thematic focus of the ICIs on conventional crops and water management is in line with SDG2 and SDG6. Salinity adaptation and mitigation correspond to SDG13. Conventional crops may be the most common focus area of the ICIs because they correspond to a market need. Water management in turn is closely related to sustainable management practices which are necessary for saline agriculture. Our findings are in line with previous analysis about SDGs related to saline agriculture (Negacz et al., 2021), although climate action (SDG 13) seems to be more prominent among the ICIs. It is also one of the most common themes for ICIs from other governance areas such as biodiversity or forestry, (Kok et al., 2019; Guerra et al., 2015) which implies the impact of climate change on these governance areas. In order to foster upscaling of saline agriculture, the ICIs should focus more on education, equity and partnerships, which are currently rarely addressed. The lack of educational focus may be caused by a disparity between science and practice (Negacz et al., 2021). A substantial number of the ICIs are research projects, and researchers often focus on innovations in plant physiology instead of making knowledge accessible to a wider audience. Focusing on knowledge mobilisation and transfer among farmers in areas vulnerable to salinisation will increase uptake, implementation and impact of saline agriculture.

4.5. Geographic coverage

Next, we turn to the geographic coverage of the ICIs for saline agriculture. Firstly, we analysed the geographic distribution of the actors involved in the ICIs (see Figure 10a). Among European countries, most ICI’s actors are located in Italy (28) and Spain (22). In the Middle East, most actors have headquarters in the United Arab Emirates (26). In North Africa, the majority of actors participating in ICIs come from Tunisia (20) and Egypt (19). In general, countries located in the west tend to have more actors.

Secondly, we examine which countries and regions the initiatives address with their activities through pilot plots (see Figure 10b). In Europe, Italy and Spain are also the most common countries where ICIs perform their activities, with 17 and 12 initiatives respectively. In the Middle East, also the United Arab Emirates are the most common focus of the ICIs (19). North African countries follow a similar pattern with 17 ICIs addressing their activities in Tunisia and 15 in Egypt. Countries located around the Mediterranean Sea tend to have more pilot plots.

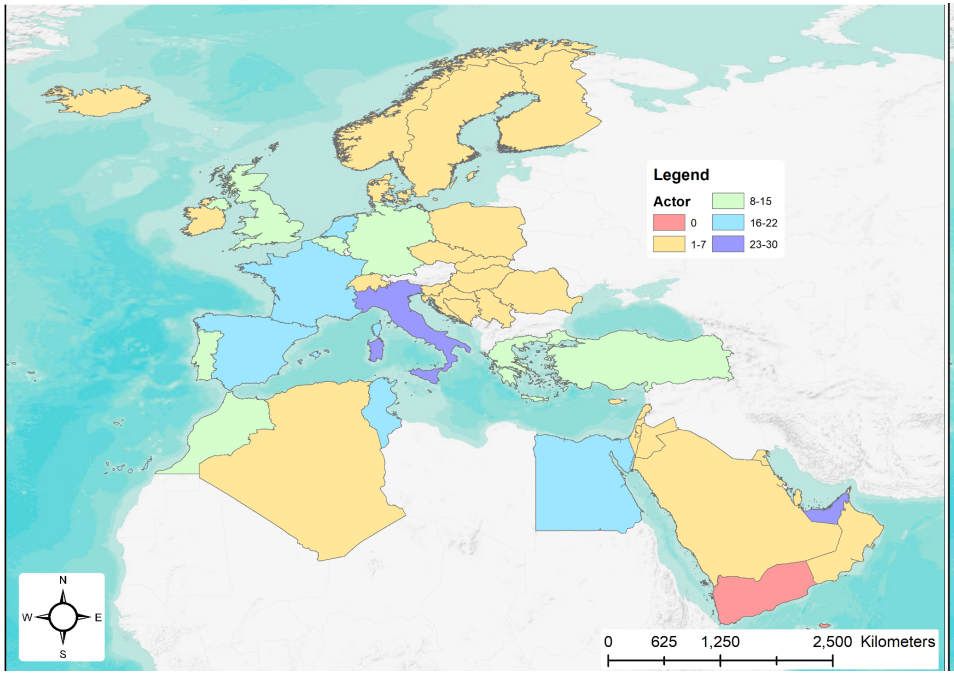

Figure 10a Location and number of actors involved in the ICIs

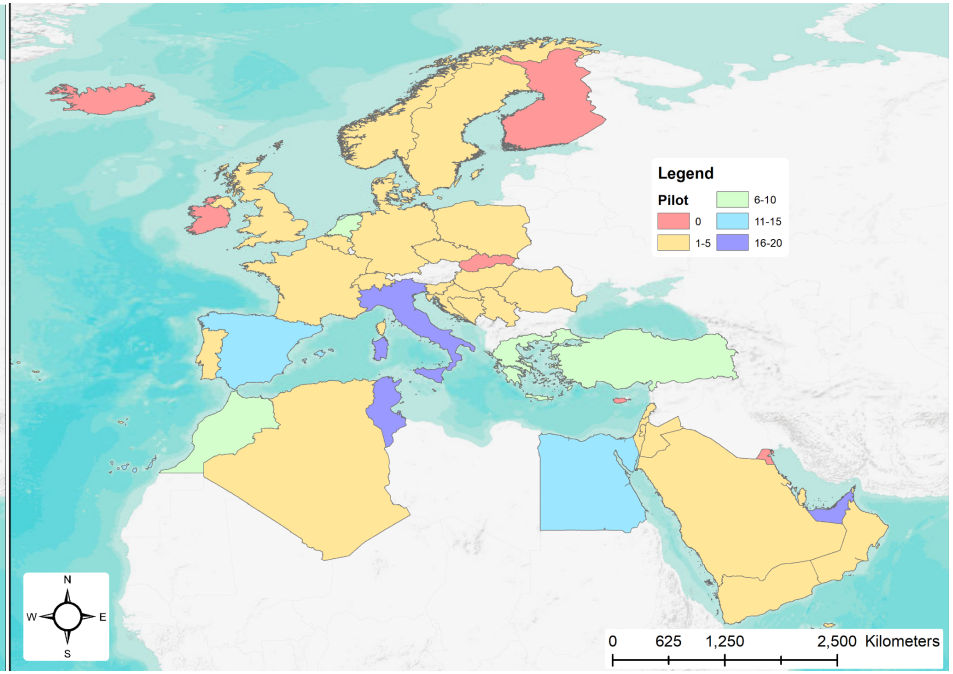

Figure 10b Location and number of pilot plots of the ICIs

The geographic coverage of ICIs in saline agriculture is related to main salt-affected areas such as Egypt, Tunisia, Morocco in the NENA region, and Spain and Italy in Europe (Ghassemi et al. 1995; Wicke et al., 2011; FAO, 2021; Negacz et al., 2022c). Climate smart agriculture has a distinctive context-specific nature (Mwongera et al., 2017). The seemingly target-based approach embodied in the ICIs, therefore signals towards context-specific effectiveness, thus supporting upscaling efforts. This is also a visible link to locations with means of funding such as the United Arab Emirates and Italy with FAO headquarters in Rome. In the North Sea Region, we observe a large number of ICIs in the Netherlands which may result from the country's expertise in water management and attitude to explore innovative solutions to deal with impacts of climate change. These results cannot be fully compared to other governance areas which usually have a global focus.

4.6. Accountability mechanisms

Next, we analyse how ICIs monitor their performance through accountability mechanisms operationalized in the form of MRV (Figure 11). More than 33% of the ICIs have a monitoring framework. Examples of these initiatives are *the 3E-Center for climate, smart saline land, water management and natural capital accounting (NCA)* and *BIOSAFOR*. However, only 8% quantify their goals in the form of numerical targets (e.g., *Soil4life*). Almost 20% of the ICIs report about their performance publicly with examples of *XTREMEBIO* and *Near East and North Africa Soil Partnership*, but only 4% do it on an annual basis (e.g., *Saltycrops*). Finally, both internal and external verification is conducted by 25% of ICIs with ICIs such as *SMARTIES* and *SmaCuMEd*. The saline agriculture initiatives do not include sanction provisions. The average score for the accountability index, being a sum of the MRV variables, is 1.95.

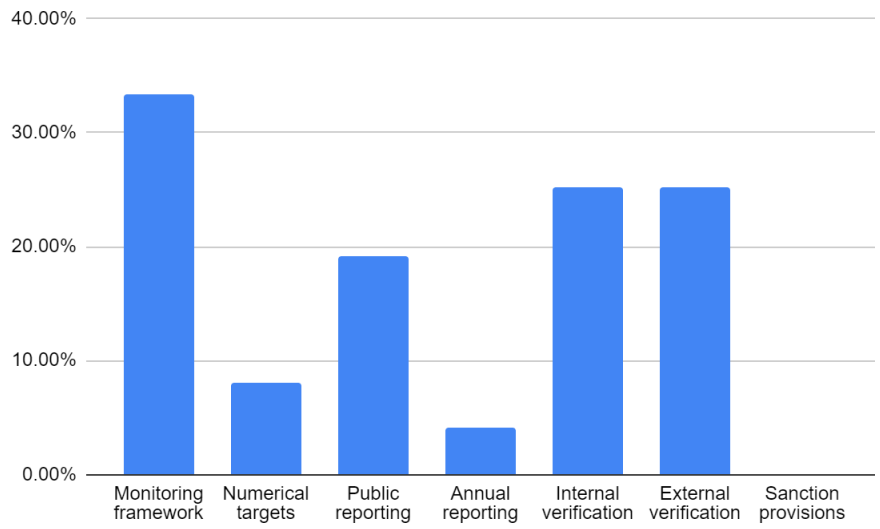

Figure 11 Monitoring, reporting and verification mechanisms of the ICIs

Regarding these accountability mechanisms, ICIs in saline agriculture perform relatively low in comparison to other governance areas such as climate or biodiversity (Pattberg et al., 2017; Negacz et al., forthcoming, 2022a). Similarly, the accountability index score is relatively low. This could be a result of a short-term orientation and internal reporting schemes for many public and research institutions. On the contrary, high verification rates may be caused by the high amount of research projects and funding requirements of ICIs with a public funding scheme. Implementation of accountability mechanisms is crucial for tracking the performance of ICIs in terms of output, outcome, impact, and thus effectiveness.

4.7. Financial Reporting

Finally, we analyse the financial reporting. Most ICIs disclose the funding schemes through which they receive financial capital (74%). However, less than half of the initiatives report the amount of funding received (40%). A substantial amount of the ICIs is (partly) funded by EU funding schemes (44%). Figure 11 depicts the annual funding that the ICIs receive, based on available data extracted from the sub-sample of 40% described above. The majority obtains less than €500,000 per annum (52.5%), while a quarter of the ICIs receive over a million euros in funding annually. On average, based on the available data, an ICI receives about €800,000 per annum. The median value is about €400,000 per annum, while the standard deviation is around €1,000,000, indicating a high variance in the budget, characterised by some high outliers.

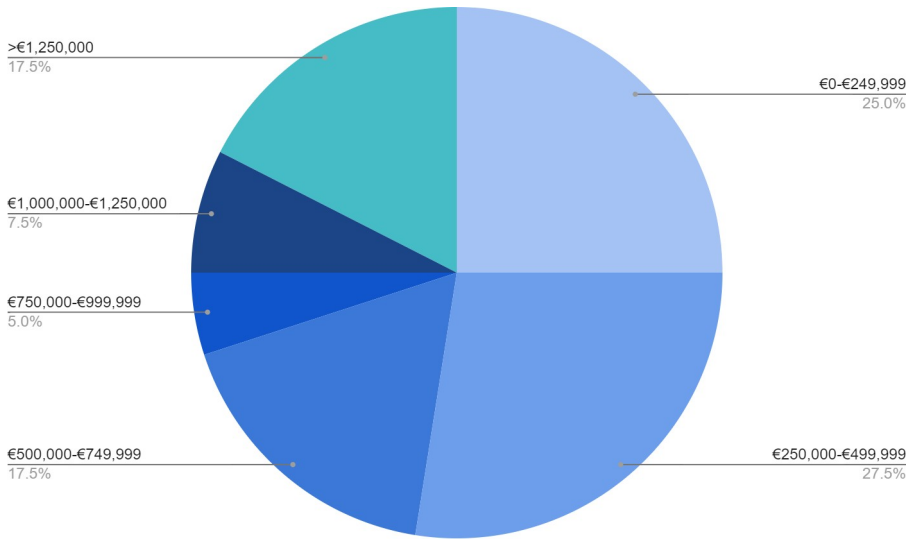

Figure 12 Annual budget of the ICIs

5. Final remarks and a way forward

The institutional landscape for saline agriculture includes not only national actors interacting within the UNCCD and FAO but also a number of non- and sub-state actors such as civil society organisations, companies and research institutions. This report maps and visualises the structure of the landscape. It explores the actor constellations of ICIs, the temporal changes in their numbers, governance functions of ICIs, key thematic areas related to salinity, SDGs, geographic coverage and finally accountability mechanisms. Starting with a sample of 150 ICIs, we have identified a subset of 99 ICIs populating the institutional landscape of governing for saline agriculture.

This report reaches six main conclusions:

- We observe a prevalence of public and hybrid initiatives with a considerable involvement of research institutions. The ICIs are led by a small number of actors (1-10).
- Even though the number of ICIs is increasing, their duration remains relatively short with a 3-year average per initiative. To improve soil properties and measure impact of ICIs, long-term orientation is crucial.
- Current focus on operational activities (82%) and information & networking (43%) supports improving knowledge on saline agriculture and connecting actors in the field. To foster upscaling, more focus on funding and setting standards and commitments is needed.
- Key focus areas of the ICIs are conventional crops (76%), water management (55%), adaptation and mitigation. They correspond to relevant SDGs “Zero hunger” and “Clear water and sanitation”, as well as “Climate action”. Future initiatives could also address other SDGs related to education, equality and employment opportunities.
- Both actors and actions of ICIs are concentrated in countries in regions with substantial surface of salt-affected soil and market needs. This supports upscaling possibilities.
- Monitoring (33%) and reporting (20%) rates are relatively low for ICIs for saline agriculture. At the same time, they perform better with more sophisticated mechanisms such as verification (25%). Transparency and regular evaluation of ICIs performance may contribute to reaching their goals and support upscaling of saline agriculture.

Our analysis and partial positive assessment of ICIs should not be interpreted as advocating a less prominent role for governments. On the contrary, the governments play a crucial role in governing saline agriculture. They should monitor and incentivise ICIs to make an additional contribution to solving the challenges related to salinisation.

These conclusions provide some fruitful avenues for future research. Firstly, further studies could investigate to what extent ICIs encourage diverse stakeholder participation considering both spatial distribution and governance levels. Secondly, it would be interesting to investigate how effective saline agriculture ICIs are in addressing their goals outlined in mission and vision statements. To accomplish this, implementation of accountability mechanisms is crucial in order to track performance of ICIs in terms of output, outcome and impact. Thirdly, more in-depth qualitative analysis is needed to fully investigate the potential contribution of ICIs to upscaling of saline agriculture. Finally, comparative analysis of interactions among other governance areas such as climate change or biodiversity could show mutual interdependencies among the policies and allow for mutual learning. This exchange should not be limited to academic and public institutions, but include, inspire and empower all those who are affected by salinized lands in order to ensure community food security.

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Annexes

Annex A List of databases used for data collection and terms used in internet search

Databases	Pilot internal databases set up by IVM students for their Master theses, FAO partnership database, EU CORDIS database, European Commission LIFE public database, EIP-AGRI project database, Interreg North Sea Region project database, PRIMA project database, ENI CBCMED project database, ICBA project database, RVO project database.
Internet search areas & terms	Agriculture, agroforestry, agro-ecology, aquaculture, biofuel, climate change adaptation, community, conventional crops, desalination, desalinization, desertification, education, European, food security, halophyte, irrigation, initiative, landscape restoration, Mediterranean, Middle East, North Africa, partnership, project, saline agriculture, salinity, salinisation, salinization, salt tolerance, soil, sustainability, upscaling, water management

Annex B List of keywords for semi-automated content analysis

Strong keywords	Biosaline agriculture, brack*, coastal agriculture, halophyte*, saline, saline agriculture, salinity, salinisation, salinization, salt-affected-soil*, salt tolerant, sodic soil*
Weak keywords	Adapt*, aquaculture*, benefit*, biodiversity, climate change, coast*, cost*, crop*, cultivat*, desertification, drought*, ecosystem*, farm*, finan*, flood*, food*, food security, food sustainability, irrigat*, land degradation, landscape restoration, mediterr*, mitigat*, partnership*, polic*, resilien*, sea level, sea level rise, soil*, soil management, sustainab*, upscaling, water management, water quality, water security, yield*

* To search for multiple forms of this word.

Annex C List of variables in the database

General information
ICI name
Acronym
Umbrella organisation
Website
Launch year
End year
Duration of ICI
Research project
Actor variables
Zone of the governance triangle
Partnership
Number of actors
Geographic variables
Countries of actors
Geographical focus
Physical location of secretariats/ lead partners/ focal points
Area of action location
Funding
Funding scheme
Budget
Annual funding
Governance function
Thematic focus area
Sustainable development goal addressed
MRV variables

Quantitative targets
Monitoring framework
Public reporting
Source progress report
Annual reporting
Internal verification
External verification
Sanction provisions
Accountability index

Annex D List of initiatives

Acronym	Name
RDAF	Reclamation of Degraded Agricultural Farms in Abu Dhabi Emirate
QME2	Quinoa for Marginal Environments (Phase 2)
ELP2	EXPO LIVE project Phase II: "From desert farm to fork: Value chain development for innovative halophyte-based food products"
FNF	Feasibility of nano-filtration for desalinization of saline/seawater used for irrigating vegetable crops under Qatar conditions
GSST	Genetic studies of salinity tolerance in barley in field conditions
ELP1	Inland and coastal modular farms for climate change adaptation in desert environments
IAA	Integrated Aqua-Agriculture for Enhanced Food and Water Security
IEDP	Investigation of Elite Date Palm for Salt Tolerance
RSF	Red Sea Farms
SFBA	Salicornia for Biosaline Agriculture
SSPM	Soil salinity and properties mapping using remote sensing, geographical information system and field validation - Case study of Bahrain and United Arab Emirates
PAGCC	Unlocking the potential of Protected Agriculture in the GCC countries: cutting water consumption while supporting improved nutrition and food security
PFWJ	3E-Center for climate, smart saline land, water management and natural capital accounting (NCA) in Jordan
RIDM	Regional Initiative For Dry Land Management
OSS	Oman Salinity Strategy
APS	Alternative Production Systems, Technology Transfer and Capacity Building
SSEAD	Soil Survey for the Emirate of Abu Dhabi
USAID	Effect of using AQUA4D brackish water on irrigated bell pepper crops
AC	Aquacombine
BIOSAFOR	BIOSAFOR
COASTAL	COllaborative lAnd-Sea inTegrAtion pLatform
HALOSYS	Halosys
SALTGAE	Saltgae
SB	Simba
SOILCARE	Soilcare

ESP	European Soil Partnership
IUCLAND	IUCLAND
FGSS	EU Focus Group on Soil Salinization
OESP	Ökowerk Emden
FBCD	Food & Bio Cluster Denmark
SSO	Salty Soil
SSA	SoilSalAdapt
SALAD	SALAD
QQ	Quinao Quality R&D
SAW	Saline Agriculture Worldwide
SFF	Salt Farm Foundation
WASAG	FAO-WASAG workgroup on saline agriculture
GACSA	Global Alliance for Climate-Smart Agriculture
INSAS	International Network of Salt-affected Soils
PGRME	Plant Genetic Resources for Marginal Environments: Identification, Multiplication and Dissemination
QME1	Quinoa for Marginal Environments (Phase 1)
Salicrop	SaliCrop
SWFS	Saline Water & Food Systems Partnership
SDO	Soil Doctors
WFFP	Water For Food Programme
ICID	WORKING GROUP ON USE OF NON-CONVENTIONAL WATER RESOURCES FOR IRRIGATION (WG-NCWRI)
ISFERALDA	ISFERALDA
LAII	LIFE AGROWETLANDS II
MEDWET	MED-WET
MEDISS	Mediterranean Integrated System for Water Supply
MEDSAL	MEDSAL
MENAWARA	Non Conventional WAter Re-use in Agriculture in MEditerranean countries
REFORMA	REFORMA
Saltycrops	Saltycrops
SIMTAP	SIMTAP
SmaCuMed	SmaCuMEd
SMARTIES	SMARTIES

S4L	Soil4life
RMRS	The impact of the rhizosphere microbiota on root system development and tolerance to environmental constraints in cereals
ISAI	The Integrated Sustainable Agriculture Initiative
WATERMED	WATERMED4.0
XB	XTREMEBIO
4BIOLIFE	4BIOLIFE
VEG	Adapting Mediterranean vegetable crops to climate change-induced multiple stress
DSWAP	DSWAP
EADAN	EADANMBRT
FIGGEN	FIGGEN
FIT4REUSE	FIT4REUSE
FREE	FREECLIMB
GLOBAQUA	Globaqua
HALO	Halofarms
IDEWA	IDEWA
IGUESS	iGUESS-MED
IMPRESA	IMPRESA
INTHEMED	INTHEMED
PROSIM	PROSIM
FFF1	Food for Future
FFF2	Food for the Future II - Building Sustainable Networks and Unleashing Entrepreneurial Potential in Farming Communities living in Marginal Areas
MM	Molecular Mechanisms Involved in Salinity Tolerance in Barley
NENASP	Near East and North Africa Soil Partnership
ECESA	The improvement of livelihood of small farmers
MMCS	Micro- and macrostructure changes of soil under irrigation with AQUA4D-treated water
NWPM	NWP - Morocco Mission
MSP	Model for seed production of resilient salt-tolerant crop species for Climate Smart Agriculture in Egypt
PFWE	Development of saline agriculture in Egypt with brackish groundwater
FEQLP	Foum El Oued-Laayoune Project

IIQP	Quinoa Rehamna (ICBA IDRC Quinoa Project)
CONSIRS	CONSIRS
DSAT	Delphy saline agriculture training
DESALT	Dutch-Egyptian saline agriculture and water management learning and technology
SDT	Salt Doctors TMT
SDTM	Salt Doctors TMT+
ACCME	Adaptation to Climate Change in Marginal Environments in West Asia and North Africa
DDM	Double Dike Mariculture
F4C	Fresh4Cs
SF	SalFar
SFT	Salt Farm Texel
PV	The Potato Valley
TS	TOPSOIL