

Tools and Perspectives for Sustainability, Innovation and Resilience in Galapagos

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1 Introduction

1.1. What is this booklet for?

This booklet presents the background and findings of the ongoing interdisciplinary research being conducted in Galapagos by the University of Edinburgh, in collaboration with local and international partners. In particular, the booklet presents the results of a series of focus groups held in June 2021 with local institutional representatives, NGOs and community members around the themes of resilience and sustainable development in the province. The findings from these focus groups include diverse local perceptions on what Galapagos needs to be resilient to, what the challenges and opportunities are in relation to building resilience in the archipelago, what support is required, and how collective action can aid in achieving progress. The booklet summarises these findings and provides a conceptual framework to support local actors in collaborating to co-design research and actions to achieve a future vision of a more sustainable, inclusive and diversified economic model that supports the province's world-leading conservation goals while increasing the well-being and prosperity of local people. The booklet also outlines the goals of a recently-launched collaborative research, innovation and capacity-building platform, the 'Galapagos Hub for Sustainability, Innovation and Resilience', and an online forum and information repository, FORGalapagos¹,

which we have created to support the multi-stakeholder knowledge exchange and cross-sectoral collaboration that must take place to achieve these ambitious, yet tangible, goals. Importantly, this booklet offers a new starting point for collaboration around resilience and sustainable development in Galapagos — rather than providing a finite set of methodologies or strategies, our hope is that the conceptual framework and findings described in this booklet will support local stakeholders in co-creating appropriate research and actions to tackle the modern challenges facing Galapagos, in particular through the work of the new Galapagos Hub.

1.2. Project Overview

Since 2018, the University of Edinburgh, the Government Council of Galapagos, the Ecuador-UK Chamber of Commerce, the Charles Darwin Foundation, and the University of Cambridge have been collaborating on research themes around sustainable development, clean energy transition, and community-based resource management in Galapagos (Fig. 1, p. 10). The goal of this partnership is to work with local communities, NGOs and institutions to identify pathways towards more balanced and inclusive governance that promote the active engagement and empowerment of communities. The collaboration recognises that the world-leading conservation goals in Galapagos can be strengthened by ensuring that development in the inhabited parts of the archipelago is sustainable and allows both people and environment to thrive.

¹ Visit www.forgalapagos.com. See Annex 1 for a guide to setting up a user profile and participating in the online forum FORGalapagos.

Box 1: Research Themes

The agenda and activities of the 'Galapagos Hub for Sustainability, Innovation and Resilience' will initially be guided by the following four themes, which are expected to evolve further through initiatives that will engage additional local, national and international organisations:

Resilient Covid-19 Recovery

- **Achieve a sustainable economic recovery from Covid-19.**
- **Improve tourism sustainability and support a shift towards a knowledge economy.**
- **Increase resilience against future shocks, such as climate change and pandemics.**

Prior to the Covid-19 crisis, the Galapagos economy was heavily dependent on tourism activities. The effects of the pandemic on the economy and the livelihoods of local people were immediate, exposing the vulnerability of Galapagos to this shock. The aim of this research theme is to learn from the challenges and opportunities that occurred as a result of the pandemic and work towards a sustainable economic recovery from Covid-19. Relevant actions would support a shift towards a knowledge economy and a more sustainable tourism model that will form the basis of a more diverse, stable and sustainable economy for Galapagos, increasing resilience against future shocks such as climate change and pandemics.

Conservation and circular economy

- **Reverse species' declines and ecosystem degradation.**
- **Improve detection and management of invasive species and maintain ecological isolation.**
- **Increase local education around, and participation in, conservation activities.**
- **Reduce waste and support a transition to a circular economy.**

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Water-Energy-Food (WEF) Nexus

- **Increase food security and local production.**
- **Improve management of the agricultural areas.**
- **Increase sustainability of food systems, including both fishing and farming.**

The Water-Energy-Food (WEF) nexus framework is an alternative approach to sustainable development. It involves the analysis of water, energy and food resources, their management and interconnections, trade-offs and synergies, in order to achieve an optimal outcome for the entire socio-ecosystem by balancing its component parts. For example, energy is used in the water sector to pump water and perform desalination, and in the food sector to process food and provide electrification and transport; water is used in the food sector to grow produce and supply to livestock; the food sector supplies biofuels, etc. The implementation of a WEF nexus approach is context-specific and requires public participation in decision-making. The objectives of such an approach are to achieve a sustainable management of resources and equal access for all. In the case of Galapagos, a WEF nexus approach is advantageous due to the local natural (i.e., island setting) and legal (i.e., strong legal protections of the environment) conditions. The aim of this research theme is to improve cross-sectoral coordination and promote participatory decision-making to achieve food security by increasing local food production, the management of agricultural areas and the sustainability of food systems, including both fishing and farming.

Prior to the Covid-19 crisis, the Galapagos economy was heavily dependent on tourism activities. The effects of the pandemic on the economy and the livelihoods of local people were immediate, exposing the vulnerability of Galapagos to this shock. The aim of this research theme is to learn from the challenges and opportunities that occurred as a result of the pandemic and work towards a sustainable economic recovery from Covid-19. Relevant actions would support a shift towards a knowledge economy and a more sustainable tourism model that will form the basis of a more diverse, stable and sustainable economy for Galapagos, increasing resilience against future shocks such as climate change

Innovation in energy transition

- **Pilot innovative, scalable ideas aimed at sustaining energy resources whilst reducing carbon emissions.**
- **Improve clean drinking water availability across the inhabited islands.**

This approach is also reflected in the recent Galapagos 2030 Strategic Plan (Galapagos Government Council, 2021; see further details in Section 1.4), which emphasises understanding the province as a socio-ecosystem, with policy guided by the five pillars of governance, community, environment, habitat and economy. One aspect of our research is to assist the Galapagos Government Council in outlining pathways towards achieving zero fossil fuel use in the province by 2040, which represents a flagship climate change mitigation policy for Ecuador. However, for such a transition to be effective and sustainable in a province with ca. 25,000 residents and over 200,000 tourists per year (prior to the Covid-19 pandemic), our view is that solutions must be directly co-produced with Galapagos communities, to ensure real engagement with needs and priorities at the local level. This requires establishing inclusive spaces to develop solutions that involve a diverse range of stakeholders throughout the whole process, while valuing the different types of knowledge they bring to the discussion.

Furthermore, the Galapagos economy was severely affected by the crisis brought on by the Covid-19 pandemic due to a heavy reliance on tourism, with jobs both directly in and indirectly dependent on tourism severely affected. However, within the crisis, local communities and the Galapagos Government identified new ways to diversify the economy, with a greater focus on harnessing local skills and products. The pandemic has therefore brought new opportunities to rebuild the local economy towards achieving greater sustainability (e.g., reducing imports, thus reducing the threat of invasive species) and resilience (i.e., to shocks such as economic crises and climate change). However, the crisis has also brought demands from local residents to open up more direct air traffic routes and resume long-line fishing in the protected marine reserve, bringing threats to conservation. This illustrates the important interlinkages between Galapagos communities, their wellbeing and livelihoods, and the protection of the environment. Our

research seeks to support local Galapagos partners as they recover from the pandemic, and to widen our collaboration to include a diversity of actors involved in activities that will underpin a sustainable economic, energy, and resource (e.g., food and water) management transition.

Our work so far has provided the principles for such a transition, based on scientific data collection in relation with energy and resources, and mapping these findings with government policy. Interviews conducted with community members in Galapagos have provided insights on resource co-management and citizen participation actions, as well as collective actions for a resilient recovery from the Covid-19 crisis. The findings from this research are summarised in a report on the "Social, environmental and energy context of the Galapagos islands" and an open-access article on the "Drivers, opportunities and challenges for integrated resource co-management and sustainable development in Galapagos", published in the academic journal 'Frontiers in Sustainable Cities'.

An exciting outcome of the research collaboration between the partner institutions was the launch in May 2021 of the 'Galapagos Hub for Sustainability, Innovation and Resilience', created on foundations of collaboration around research and knowledge exchange, policy advice, education and capacity-building. The fundamental objective of the Hub is to develop research and innovation around economic recovery, energy transition and conservation of the natural heritage of Galapagos, supporting the objectives of the Galapagos 2030 Strategic Plan and the achievement of the United Nations (UN) Sustainable Development Goals (SDGs) in the archipelago. The Hub's framework is rooted in sustainable and inclusive development through the empowerment of stakeholders, with appropriate recognition and management of the synergies and conflicts between different (existing and future) development and conservation initiatives,

which are a common topic of debate in ocean island ecosystems. By presenting an open space for dialogue on economic productivity within the principles of sustainability in such a fragile environment, the work of the Hub will enable Galapagos to lead as a global example.

Following the success of the initial research collaboration described above, and in preparation for the COP26 summit (the UN Conference of Parties climate summit which will be held in Glasgow, United Kingdom, in November 2021), the next phase of our work is aiming to continue and widen our engagement with local communities, NGOs, and authorities. To this aim, an initial series of focus groups were held in June 2021 with key stakeholder representatives to share findings on the potential drivers and opportunities for resilience and sustainable development in Galapagos, as well as to explore the perceptions of local communities, NGOs and institutional actors around resilience to future shocks. The focus groups also explored the potential opportunities that the creation of the Hub could bring for local people. The findings from these activities have contributed to the creation of this booklet (see Section 2) and were presented at the online event 'Tools and Perspectives for Sustainability, Innovation and Resilience' in September 2021.

We have also created FORGalapagos, a website functioning as an interactive space for knowledge exchange on energy transition, resilience and sustainable development in Galapagos: <https://en.forgalapagos.com>. Local stakeholders from the public and private sectors, as well as members of academia and government, are invited to participate in this virtual discussion and share their knowledge, experience and thoughts on how to improve the environmental, economic and social conditions in Galapagos, to work towards a sustainable and resilient future.

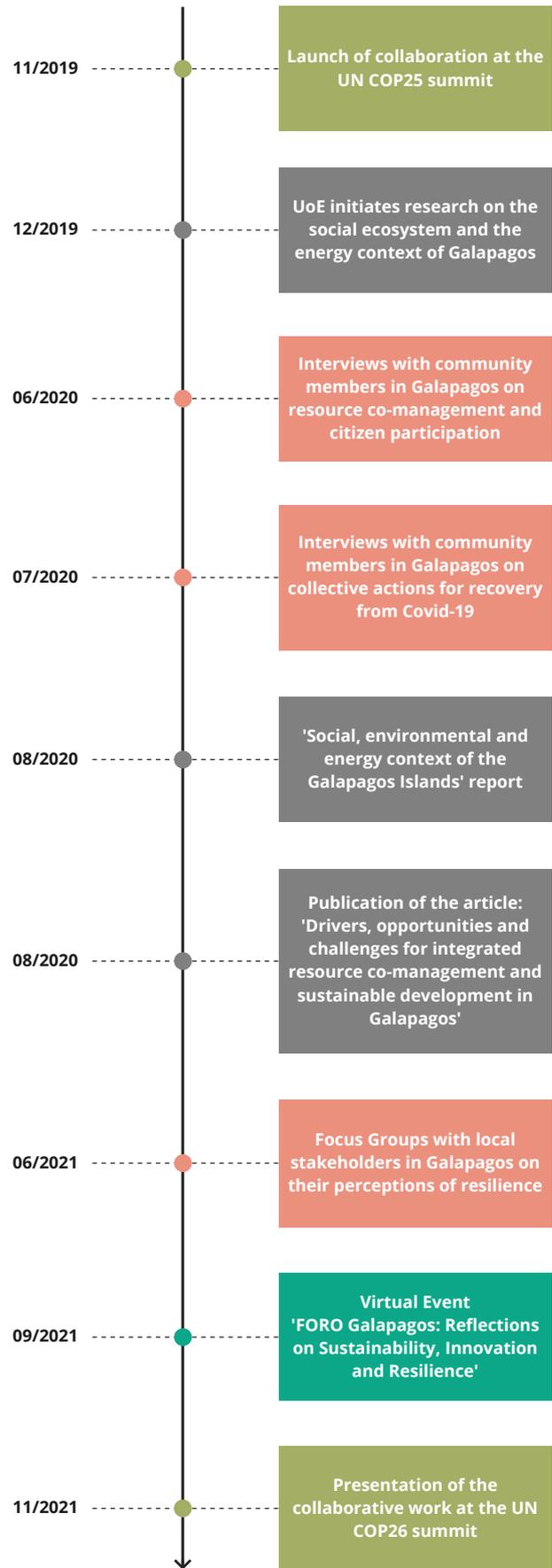


Figure 1: Timeline of the University of Edinburgh's collaborative research in Galapagos.

1.2. Key Concepts

+ Resilience

The concept of resilience considers the assets and attributes of a society that allow it to return to its regular functioning when a shock occurs, as well as how the system can be adjusted (i.e., through changes to governance or infrastructure for example) to ensure that the society can return to its normal functions. A shock may represent a pandemic and the accompanying economic crisis for example, or an extreme weather event or other environmental hazard, such as an earthquake or a volcanic eruption. For a community, resilience represents the ability to use its resources and capacities to absorb, resist and recover from the effects of such shocks. The Covid-19 crisis has brought preparation and resilience to shocks to the forefront for many communities.

However, the concept of resilience extends further than reducing existing risks and preventing the creation of new ones, to improving “a system’s performance in the face of multiple hazards rather than preventing or reducing the loss of assets caused by specific events” (Arup, 2014). Such a ‘system’ could for example represent the Galapagos archipelago, including its environment and its people, with the opportunity to challenge and alter its functioning to adapt to risks, and thus reduce their impact. Pelling (2011) defines three levels of adaptation to risks, including:

- **resilience**, in which the functional integrity of a system is maintained, and the status quo is preserved. Existing practices are improved, but the underlying assumptions in the system are not questioned and unjust practices may continue;
- **transition**, where incremental changes in governance are made by altering rules and decision-making, but the overarching norms, principles and socio-political regime are unchanged;

- **transformation**, involving a regime change in which the root causes of vulnerability and deprivation are addressed, and the underlying values of the system are questioned, from individual behaviour to the structures and mechanisms of the system’s economy.

Following the ideas proposed by Pelling (2011), our work in Galapagos aims to move beyond achieving resilience, to transform the socio-ecosystem to face a range of emerging and ongoing risks (climate change, economic shocks, etc.). Building this transformation requires solutions that are designed and implemented based on the knowledge of different stakeholder groups (e.g., Aguilar-Barajas et al., 2019). Complex problems, such as those related to extreme climate events in the context of an aggravating climate crisis, represent opportunities for solutions to be co-created by a range of stakeholders, based on sharing knowledge between them, with the aim of building short- and long-term capacity to maintain or rapidly return to a functioning and thriving society in the face of a disturbance. Furthermore, the process of building resilience, with the ultimate goal of reaching transformation, can be viewed as a social and environmental ‘capacity building’ process, through acquiring knowledge, learning to adapt, and organising around specific goals (Borquez et al., 2017).

In the context of Galapagos, building resilience is best approached through the lens of a socio-ecosystem: in other words, an ecosystem in which humans play a fundamental role that should not be viewed as separate from the conservation of the natural environment. In this view, sustainable development for the people of Galapagos is tightly connected to the conservation of the natural environment, and appropriate decision-making and governance can allow progress in both of these areas in conjunction. To begin to address this topic, our research has asked what set of policies, mechanisms and institutional structures will allow conservation approaches that are

in synergy with sustainable development and vice-versa. We know from our previous research in Latin America that these elements are linked with actions at a range of geographical scales, and therefore must include participation from a diverse group of stakeholders. Thus, communities living in the affected areas represent fundamental participants in the identification, development and implementation of actions towards more sustainable development, resilience, and adaptive transformation. In our approach, appropriate decision-making and policies in Galapagos can and should be determined through the involvement of all the different stakeholders, including for example fishers, farmers, people working in the tourism industry, the national park, and local and provincial government, among others.

+ Co-production and Participation

‘Co-production’ is defined as a collaborative approach in which various stakeholders participate in and benefit from the delivery of a service or a policy. In particular, co-production typically involves the active participation of the end-users of these services. The concept arose in the context of the implementation or improvement of urban services such as water supply or sewerage, typically in communities where these services are inadequate. However, our work has explored the concept of co-production in the context of developing strategies for risk and resource management in growing urban areas. In this context, co-production represents an approach to identifying management strategies (e.g., in relation to resources, risk, environmental conservation, urban development policies, etc.) in which people working within different sectors of the same socio-ecosystem collaborate, negotiate and reach consensus in decision-making. This process is known as a ‘dialogue of knowledges’ because it brings together people with diverse types of knowledge (e.g., local, traditional, technical, academic, etc) to identify solutions.

In this sense, co-production represents an innovative and inclusive approach to governance as it recognises the knowledge and expertise of the multiple stakeholders involved in the process. In essence, co-production moves beyond consultative participatory processes to actively involve stakeholders in designing appropriate solutions, integrating various types of knowledge and avoiding an exclusive preference or reliance on scientific or technical understandings, to the detriment of other knowledge types (Howarth & Morse-Jones, 2018, p.78). Co-production aspires to empower stakeholders by valuing their participation and acknowledging their various contributions towards identifying and implementing solutions for the improvement of their community (Ostrom, 1996). Valuing this social capital offers the necessary social viewpoint and relationships that bring communities together and build capacity and resilience (Randolph, 2011).

The concepts of co-production in particular, and citizen participation more generally, are therefore especially valuable for building resilience: the understanding and evaluation of risks, such as climate change-related risks, and their impacts can be enriched by leveraging information and knowledge provided by those who are directly exposed and affected at a local level, allowing for more informed decision-making (Bennett et al., 2014). It is important to bear in mind that participation can have different interpretations and outcomes depending on the context of the process, who is invited (or not) to participate, and whether participation is compulsory or voluntary (Cornwall, 2008). Participation can therefore be seen either as an ‘institutional arrangement’ that is part of decision-making processes in governance, or as a ‘right’ in collective actions of claiming citizenship (Kalandides, 2018). Any form of participation, including co-production processes, should be flexible enough to meet project goals, as well as the needs of the stakeholders. It should allow the practice of social learning and enable the exchange of knowledge and information between the

actors involved, regardless of their expertise (Milupi et al., 2017).

In our research, we are addressing the concept of co-production and participation in the development of risk management strategies in the growing urban areas of the Galapagos islands through the promotion of such a 'dialogue of knowledges', seeking to engage with key local actors and valuing both local and external (e.g., academic or technical) knowledge in the co-production and negotiation of solutions and strategies. This approach has been shown to be effective in building resilience and empowering communities to take a central role in managing risks (Armitage et al., 2011). By linking co-production processes to the concept of building resilience and adaptation following a shock (such as the Covid-19 crisis), rather than simply reverting to existing practices, which may include unsustainable or unfair practices, it is possible to imagine different governance structures or policies that support a more equitable, inclusive and sustainable society. Co-production mechanisms, in which all stakeholders collaborate, have the potential to address these deeper changes, enabling the Galapagos socio-ecosystem to manage risk and resources in a way that builds resilience and promotes adaptation.

+ Community-based natural resource management

The role of community in resource management (e.g., water, energy, food) is critical for sustainable development. In the context of a complex socio-ecosystem such as Galapagos, achieving sustainable development relies on the existence of effective governance mechanisms as well as collaborative, inclusive and sustainable natural resource management that must also respond to the socio-economic needs of local citizens (Garcia Ferrari et al., 2021). In this context, community-based natural resource management (CBNRM) initiatives place communities and community-based organisations at the centre of resource

management, in line with the view that these actors are more capable of sustainably managing resources because of their closer connections to local nature and knowledge (Armitage, 2005).

The success of CBNRM initiatives relies on the sustainable management of resources by those who use them, incorporating the principles of equity, participation, rights and empowerment, collective choice and conflict resolution, and is directly associated with users' social and economic wellbeing (Milupi et al., 2017). Another key aspect of successful CBNRM initiatives is community solidarity, to ensure the balanced cooperation and participation of the members of a community and/or between communities (Stone & Nyaupane, 2014). Furthermore, Agrawal and Gibson (1999) highlight that CBNRM initiatives should acknowledge the different interests of community members, the relationships between them and the institutional arrangements in place.

More recently, community-based approaches to resource management have evolved into the field of 'adaptive co-management' (Armitage et al., 2007), which seeks to empower local stakeholders through processes of experimentation, monitoring, deliberation and responsive resource management, in conjunction with multi-level organisations, such as governmental agencies, educational institutions and NGOs (Hasselmann, 2017). Furthermore, adaptive co-management harnesses accumulated socio-ecological knowledge and experience, while relying on the participation of diverse and multi-scale interest groups, ranging from local communities, municipalities, regional and national institutions and international-level organisations (Folke et al., 2002).

Incorporating community-based or adaptive co-management initiatives into resource management can therefore drive the empowerment of local communities, by securing livelihoods and promoting social justice and environmental stability, as well as improving institutional governance, to

build resilience to climate change and other shocks.

+ WEF Nexus

The Water-Energy-Food nexus (WEF nexus) framework is an alternative approach to sustainable development which encompasses the study of the water, energy and food sectors and how they are managed, along with their interconnections, including synergies, conflicts and trade-offs (Simpson and Jewitt, 2019). The goal of such an approach is to achieve optimal system outcomes, avoiding one sector thriving at the expense of another. The implementation of a WEF nexus approach in a given setting is necessarily context-specific, and requires public participation in decision-making to ensure that livelihoods and basic human rights, such as water and food security, are protected. The overarching objectives of a WEF nexus approach are to achieve the sustainable management of resources and thereby support achieving the UN SDGs in an integrated manner.

Garcia Ferrari et al., (2021) defined the cornerstones of a WEF nexus approach to resource governance as follows:

1. Taking a complex systems view is required to achieve interconnected SDGs, necessitating an understanding of the synergies, conflicts and trade-offs within the WEF resource sectors, as well as the integration of multiple stakeholders and organisation types in the management of resources.
2. A focus on sustainable livelihoods is vital to better understand the relationship between socioeconomic development and environmental concerns, which directly impact resource security, particularly in terms of food security for the poorest in society.
3. The environmental integrity of ecosystems is fundamental for sustainable development, requiring policy frameworks that ensure the

sustainability of WEF resources while facilitating equitable access to resources for all.

4. Greater stakeholder involvement in planning scenarios is needed to shape policies and develop simulation models (e.g., of how different resource sectors are interrelated) to successfully implement sustainable WEF resource governance. This would allow evaluation and monitoring processes to take place.

In our view, a WEF nexus approach to resource governance in Galapagos is called for due to the insular setting with naturally limited resources, the strict environmental conservation laws protecting 97% of the territory as well as the Marine Reserve, and the current pressures on resources, including an unsustainable over-reliance on tourism. Based on a series of interviews conducted with local stakeholders in June 2020, we propose that a model of community-based resource management incorporating the principles of a WEF nexus approach and those of adaptive co-management, in which multiple stakeholders collaborate to debate, negotiate and test strategies for sustainable resource management, could provide an appropriate framework for managing resources in Galapagos (Fig. 2). Future work will focus on gathering local perceptions of and required modifications to this proposed framework, to inform progressive future policies on resource governance supporting local livelihoods, well-being, and the UN SDGs. Applying such a framework could enable horizontal communication and coordination between the water, energy and food sectors, minimise stakeholder conflict and improve the management of resource systems towards sustainability and resilience.

		WEF NEXUS CORNERSTONES			
		Complex systems view	Livelihoods	Environmental Integrity	Deliberative scenario testing
ADAPTIVE CO-MANAGEMENT (ACM) CORNERSTONES	Institutional arrangements, leadership, policies and legislation that promote an enabling environment	Policies that promote sectoral integration, bringing all legitimate stakeholders to the table	Cross-sector policies acknowledging tradeoffs and synergies to support diversified and enhanced livelihoods	Integrated policies considering sustainable development and environmental conservation as indivisible	Framework in place to implement co-produced policy decisions
	A focus on 'learning by doing' through experimentation, monitoring and evaluation	Adaptive policy making with a complex systems view	Inclusive forms of engagement through social learning processes that incorporate and legitimise multiple stakeholders	Capacity to test and monitor strategies that are aimed towards conservation and sustainable development	Stakeholder deliberation to reach optimal system outcomes
	Collaborative dynamics between stakeholders that share resources	Collaborative dynamics allow resource systems to be managed sustainably	Win-win synergies between different sectors support sustainable livelihoods and reduce negative impacts related to one sector thriving at the expense of others	Resource users and conservationists brought into dialogue	Different types of knowledge placed on a level platform, builds trust and provides a space for conflict resolution
	Continuity through cyclical and iterative assessment processes	Develop appropriate indicators reflecting both sectoral and system evolution	Develop indicators to assess livelihood diversification	Develop indicators to assess environmental integrity	Comparison of predicted versus actual outcomes and adaptive policy making

Figure 2: Proposed framework for community-based resource governance in Galapagos, incorporating the key principles of adaptive co-management and a WEF nexus approach (from Garcia Ferrari et al., 2021).

1.4. Challenges and Opportunities in Galapagos

+ Overview

Galapagos is a unique archipelago, a World Heritage Site and one of the most important conservation areas in the world (Galapagos Hub for Sustainability, Innovation and Resilience proposal, 2021). It is also home to >25,000 residents who, prior to Covid-19, supported an annual influx of >250,000 tourists. While tourism has generated employment in Galapagos and continental Ecuador, these economic opportunities have

driven human population growth, which in turn has led to an overwhelming of social services and the rapid spread of damaging invasive species.

On the islands, some parts of the largest town, Santa Cruz, are experiencing overcrowding, and local services, including healthcare, education, water provision and waste management, are all substandard. Agricultural production is unprofitable and undervalued, resulting in high levels of food importation and poor management of the agricultural areas in the humid highlands, which, in turn, is driving further increases in invasive species. In addition, the sensitivity

of the archipelago to small changes in ocean currents and weather patterns means that climate change is an important phenomenon to understand, mitigate, and adapt to. The recent collapse of tourism in Galapagos due to the global Covid-19 pandemic has generated additional economic and social challenges, further highlighting the urgent need for economic diversification.

While improvements in this complex situation are sought by many key actors, and ambitious goals have been set, barriers to efficient reform remain. Contradictory sectoral policies, conflict between national and local perspectives, poor communication of available evidence (from both scientific and local knowledge) to policymakers, regular disbandment of policy and planning teams, and deficiencies in the participation of local and national stakeholders, all seriously hamper progress and require resolution if the Galapagos 2030 Strategic Plan and the vision to achieve zero fossil fuel use in the province by 2040 are to be achieved.

To tackle these issues and enable a change of course for this unique archipelago, there is a need for increased innovation, knowledge sharing and capacity building, as well as reshaping the policy-making process. The 'Galapagos Hub for Sustainability, Innovation and Resilience' aims to address these challenges through supporting collaborative research and capacity building, and co-producing solutions and strategies for: SDG achievement; restoration of biodiversity; reduction in carbon emissions; transition towards circular and knowledge economies; population stability and sustainable development; development of new technologies; education and training; improvements in wellbeing ('Buen Vivir'); reforming policy processes; and resilience against climate change, among other shocks.

+ Covid-19 in Galapagos

The arrival of the Covid-19 crisis in Galapagos led to an almost complete disappearance of the province's main economic activity in March 2020, as the tourism industry

collapsed. Coupled with the sanitary crisis, the economic crisis highlighted the extreme vulnerability of Galapagos to shocks, and economic diversification emerged as a renewed priority.

To offset the economic losses brought by the crisis, Galapagueños working in the tourism industry requested more direct international flights (which are generally viewed as a biosecurity hazard) facilitating the arrivals to the archipelago, and those working in the fisheries sector requested permission to use long-lines in the Marine Reserve (threatening protected species). In this sense, the Covid-19 crisis, by threatening the livelihoods of Galapagos residents, threatens to reverse progress on conservation goals, demonstrating the clear link between development and conservation in the archipelago.

Conversely, the crisis has led to greater visibility and government support for local producers, in particular through the provision of government-subsidised food parcels aimed at injecting liquidity into the collapsed economy, as well as supporting food security for families whose livelihoods disappeared. The crisis has also led to an upsurge in community-led associativity and new actions and forms of communication to support food security, particularly in the fisheries sector, demonstrating the importance of an engaged community capitalising on locally-held knowledge to support sustainable development and resource management.

As local communities revert to forms of economic activity that were previously more dominant, such as agriculture and fishing, the changes brought by the crisis could herald a possible future that is more economically diverse and more sustainable, with strengthened local food security. Progress towards these goals will hinge on defining the instruments and tools, particularly around knowledge development, citizen participation, and alternative sustainable economic patterns, that will allow these objectives to be achieved.

1.4. The Galapagos 2030 Strategic Plan

The Sustainable Development and Land Management Plan of the Special Regime of Galapagos 2020–2030, or Galapagos 2030 Strategic Plan² (Galapagos Governing Council, 2021), is a strategic plan prepared by the Galapagos Government Council outlining the proposed vision for the province over the next decade. It is the product of an extensive “multi-level, multi-sectoral and multi-generational” process of citizen participation, in which over 400 Galapagueños were consulted over the four inhabited islands and the mainland. The plan is framed within the UN 2030 Agenda, which recognises the importance of investing in the community alongside conservation of the environment to achieve more balanced and sustainable development. Adherence to the UN 2030 Agenda and the associated SDGs underpins all planning processes in the province.

The Galapagos 2030 Strategic Plan recognises the need to diversify the province’s economy, moving away from an over-reliance on tourism by rethinking the systems of production and consumption. The plan is based around the following five axes (Fig. 3): governance, community, environment, habitat and economy, aiming to tackle local and global challenges, and build social, environmental and economic resilience in the Galapagos socio-ecosystem. Within the plan, these five axes are linked to goals, strategies, policies, actions/projects and indicators towards the fulfilment of the vision outlined for Galapagos, providing “a roadmap for all institutions, organisations, groups and citizens”.

The Galapagos 2030 Strategic Plan also incorporates a Reactivation Plan which was developed in a participative manner in response to the Covid-19 crisis through conducting workshops with local actors, as

well as a survey of households and businesses. The Reactivation Plan defines short-term programmes and joint actions among the province’s authorities, the private sector, and international partners, and is centred around well-being, productivity, connectivity and institutions. In order to encourage livelihood diversification and generate income for Galapagueños who were impacted by the collapse of the tourism industry, the plan is supporting activities related to the commercialisation of new products (i.e., innovation), new forms of business marketing, home services, and boosting agricultural production. The strategies outlined involve supporting community and small business empowerment through financial and technical assistance, including for example training, setting up digital platforms for commerce, and encouraging added value chains using local products. In addition, a Provincial Planning and Participation Assembly (Asamblea Provincial de Planificación y Participación Ciudadana) has been set up as the designated highest institution for government–citizen dialogue in the province, to ensure efficient implementation of plans and programmes, as well as transparency and accountability.



Figure 3: The five axes of the Galapagos 2030 Strategic Plan (reproduced from Galapagos Governing Council, 2021).

² The Galapagos 2030 Strategic Plan can be downloaded here: <https://unidosporgalapagos.com/>

Importantly, the Galapagos 2030 Strategic Plan outlines the balance between community and environment as key to sustainable development in Galapagos: “Investing in people is investing in conservation” (Norman Wray, Galapagos 2030 Strategic Plan). For example, in the period 2018–2020 the Galapagos Government Council organised an inter-sectorial consultation process around the UN SDGs. This process recognised that managing the terrestrial and marine ecosystems in Galapagos (SDGs 13, 14 and 15; Fig. 4) is key for the province’s sustainable development. However, additional factors

related to a variety of other SDGs were also highlighted as critical to achieve these aims, such as education, water provision and sanitation, reducing inequalities and building sustainable communities and cities (SDGs 4, 6, 10, 11; Fig. 4). Our work in Galapagos is contributing towards these broader goals through working with institutions, NGOs and communities to understand local perceptions and priorities, and collaborate in the design of research and solutions that address integrated resource and risk management, to build resilience and adaptive transformation, and support achieving the SDGs.

SUSTAINABLE DEVELOPMENT GOALS



Figure 4: The United Nations Sustainable Development Goals (United Nations, 2021).



Quiet Family Gardens (Huertos Familiares Tranquilos) local agriculture initiative.

2 Local stakeholder participation

2.1. Initial guiding framework

As outlined in Box 1, the collaborative research of the 'Galapagos Hub for Sustainability, Innovation and Resilience' founding partners in Galapagos suggests that the following key themes should guide the initial work of the Hub:

1. i) Resilient Covid-19 recovery;
2. ii) Conservation and circular economy;
3. iii) Water-Energy-Food (WEF) nexus;
4. iv) Innovation in energy transition.

Although the collaborative work of the Hub will evolve over time with the active involvement of local stakeholders, these four themes allow us to structure an initial framework to begin a series of consultations to better understand local perceptions and priorities.

Furthermore, the central role of WEF resources and their management for sustainable development in Galapagos motivates us to explore interconnections between this theme and the other research themes (Fig. 3). For example, important avenues for collaborative research at the intersection of the 'WEF nexus' and 'Resilient Covid-19 recovery' themes include food security and support for innovative forms of local production, such as regenerative agriculture and sustainable artisanal fishing.

Research on these themes will assist in identifying more diverse and sustainable local livelihoods, protecting resources, and establishing a local network of distribution and exchange of produce that strengthens food security and minimises dependence on imports.

At the intersection between the 'WEF nexus' and 'Conservation and circular economy' themes, collaborative research should explore, for example, sustainable and locally-appropriate solutions for proper wastewater disposal, as well as the systemic changes needed to support redesign-recycle-reuse schemes, with the aim of reducing pollution, particularly of the marine environment, and reducing imports to guard against invasive species. These themes also highlight the potential for community-led initiatives to manage waste more effectively and protect local water resources from pollution.

Finally, at the intersection between the 'WEF nexus' and 'Innovation in Energy Transition' themes, collaborative research around clean energy technologies, alternative transport, and community-led energy initiatives will support the identification of novel strategies to reduce energy demand and eliminate the use of fossil fuels, along with the accompanying risk of water pollution. A focus on the WEF nexus within the principles of innovation in energy transition can also ensure that the use of water, energy and food resources is optimised across the Galapagos

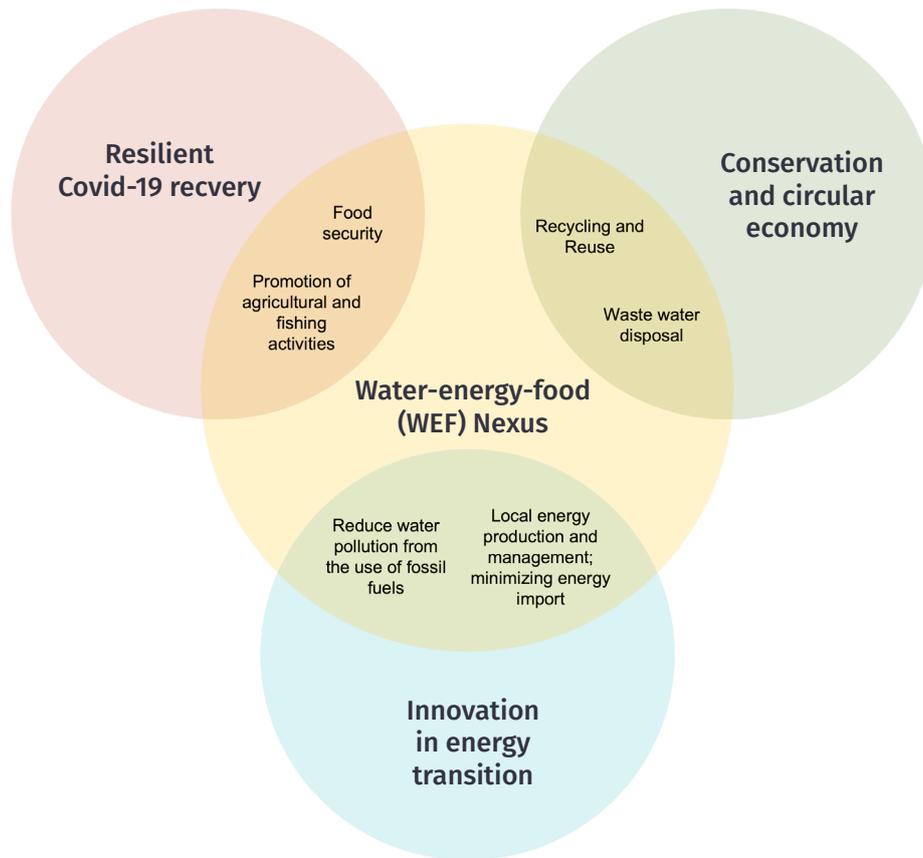


Figure 5: Research topics emerging from the intersection of the 'WEF nexus' theme with the other core research themes of the 'Galapagos Hub for Sustainability, Innovation and Resilience' (see Box 1).

socio-ecosystem, avoiding the pitfalls of treating these strongly interconnected sectors in isolation.

2.2. Stakeholder Focus Groups

Based on the research framework outlined above, local views on these themes were gathered through a series of focus groups in June 2021 with local institutions, NGOs and community members, to enhance our understanding of local dynamics and shape the collective vision towards a more resilient socio-ecosystem in the Galapagos archipelago. The objectives of the focus groups were as follows:

- To share our ideas, research, and findings from the work completed so far by researchers at the University of Edinburgh;

- To further understand perceptions around resilience at the local level, and the needs and priorities of Galapagueños, as well as expectations from collaborative research going forwards, particularly through the platform of the 'Galapagos Hub for Sustainability, Innovation and Resilience';
- To identify education gaps and opportunities for knowledge sharing;
- To highlight the potential for capacity building and the willingness of community groups to get involved in research and pilot activities;
- To offer an online platform to continue engagement and discussion, via the FORGalapagos forum.

Three focus groups were conducted, including the following stakeholders:

Focus Group 1: Institutions

- Former Adviser to the President of the Galapagos Government Council
- Director of the Ministry of Agriculture in Galapagos
- Councilwoman of the Municipality of Santa Cruz
- Planning and Development Technical Secretary at the Municipality of Santa Cruz
- Director of Planning of Galapagos National Park Directorate
- Former Director of the Ministry of Tourism in Galapagos

Focus Group 2: NGOs

- President of the Un Cambio por la Vida Foundation
- Director of the Un Cambio por la Vida Foundation
- Science Director of the Charles Darwin Foundation
- Coordinator in Galapagos of the Jocotoco Foundation
- Director of the Emma Darwin Foundation
- Agriculture Specialist at Conservation International Ecuador
- Coordinator of the Galapagos Project at the Foundation Heifer Ecuador

Focus Group 3: Community members

- Coordinator of the 'Frente Insular de la Reserva Marina' community group
- Vice-President of the Provincial Planning and Participation Assembly (Asamblea Provincial de Planificación y Participación Ciudadana)
- Independent researcher in gender studies, Coordinator of MAGMA (Women's Activist Movement) in San Cristóbal
- Organic coffee plantation and organic farm owner (Lava Java Farm)
- Regenerative agriculture promoter, researcher and farm owner (Huerta Luna Farm).
- Representative of the Youth Council of Santa Cruz (Consejo Consultivo de Jovenes de Santa Cruz)

The discussion was structured around the following questions:

Perceptions of resilience from the local level

- What do you feel you need to be resilient to as a group, community, or society?
- What synergies can you identify between sectors to achieve this level of resilience?
- What is your perception of the perspective on resilience that we described? Are the themes relevant and the synergies, correct? Can you add additional ones?

Opportunities and challenges for building resilience

- What are the opportunities or challenges to contribute to the resilience of Galapagos from a holistic perspective?
- What mechanisms exist and what mechanisms should be developed?
- Are there sectors that should be more involved to achieve interaction and knowledge exchange?

Reflections on local initiatives

- Can you share initiatives you know of that attempt to cope with challenges/risks, and what has been their success and failure? Why?
- What type of support might have helped that you that you did or did not have?

Scaling up actions from the individual to the collective level

- What are the benefits of collective action?
- How can these initiatives be scaled up?
- What opportunities can we expect from a collaborative platform such as the Hub (e.g., education, knowledge sharing, etc.)?
- How would you like to be involved?

2.3. Analysis

The analysis was performed by compiling key points from each of the focus groups (i.e., from institutional actors, NGOs, and community members) and grouping these by theme. The identified themes were driven by the questions posed to participants (Section 2.2), and relate to: i) perceptions of resilience at the local level; ii) opportunities and challenges for building resilience in Galapagos; iii) local initiatives that have taken place; and iv) how to move from individual to collective actions to scale up community efforts.

+ Perceptions of resilience from the local level

An important point that was made by several participants in the NGO focus group is that it is critical to understand 'community' in Galapagos from a heterogeneous perspective to approach building resilience, as well as to better understand the different levels of vulnerability that exist in the territory. Within this approach, participants in this group noted that to understand resilience in Galapagos we must study what each sector (e.g., fisheries, agriculture, tourism) and each island (i.e., Santa Cruz is much more dependent on tourism than Isabela for example) needs to build resilience to, and what their adaptive capacity is. In other words, the diversity in the Galapagos community results in a need to disaggregate this community into sectors, actors, and community members who have different perceptions of resilience and different levels of vulnerability. Furthermore, participants in both the NGO and institutional groups noted that the Galapagos province as a whole needs to be resilient to the effects of events or changes that occur both on a local and global scale (e.g., economic shocks, public health shocks, environmental shocks). This could be tackled through programmes and strategies that are inclusive, sustainable and help to build resilience in the short, medium and long terms. Community members highlighted the need to conserve the natural

environment, to become more resilient against food insecurity, to better manage energy and to fight corruption.

As a result of the effects of the pandemic, as well as the growing impacts of climate change, food security remains a key issue in Galapagos. From an institutional perspective, as voiced by the representative of the Ministry of Agriculture, the focus is on strengthening local production chains in collaboration with NGOs, guaranteeing product quality, reducing food loss and waste, and strengthening the private agricultural sector. From that perspective, this participant noted that strengthening regional autonomy requires improving policies to support a resilient food system. Furthermore, this participant highlighted that, to ensure food security, the productive sector in the islands must be prepared to face multiple challenges. For example, local producers experienced a sharp fall in produce sales as a result of the Covid-19 crisis due to the lack of tourism activity, evidencing the direct relationship that exists between the productive sector and tourism.

Institutional participants also noted that the sudden global shutdown in early 2020, coupled with the province's overdependence on economic activity from the tourism sector, exposed a need to diversify the economy and strengthen capacities through training in technical knowledge (for example in agricultural techniques, farming and fishing). It is therefore critical to strengthen training and capacity building for local enterprises in Galapagos.

Institutional actors also noted that the Covid-19 crisis evidenced a need to develop more collaborative dynamics within and across government institutions and civil organisations, building on a shared responsibility to focus on common objectives, to address the most pressing needs of the local population. Furthermore, participants in the NGO group noted that the crisis revealed which groups were at risk from this type of shock. For example, the fisheries

and agricultural sectors proved resilient, as they adapted their format and rose to the challenge of providing food for those who needed it, which demonstrates adaptation capacity. Conversely, tourism was severely impacted, and was notably more vulnerable to the impacts of the pandemic than other sectors, including groups such as naturalist guides, who had not been previously thought of as a particularly vulnerable group.

In line with these perceptions, a key lesson from the Covid-19 crisis mentioned by institutional actors is the importance of planning to define priorities and strategies for resilience in the face of external factors and risks that could be mitigated in the future. In the context of Galapagos, a challenge perceived by these institutional actors is to plan with limited resources to not only reinstate pre-pandemic economic activities, but to improve upon the pre-existing system.

+ Opportunities and challenges for building resilience

Participants in the focus groups identified a set of opportunities and challenges in Galapagos for building resilience. These ideas were compiled during the focus group analysis and the following five categories of opportunities and challenges were identified across the three focus groups: governance and participation; sustainable policies; economy and livelihoods; associativity and collaboration; and systemic change.

Governance and participation

Participants in the group of institutional actors identified inter-institutional collaboration at the provincial level, as well as across interconnected sectors, as a key element of building resilience. State institutions were perceived to have been more successful when working together and developing synergies in their actions, regulations and norms. For example, collaboration between institutions during the initial stages of the pandemic was a fundamental element that allowed Galapagos to face the emergency, as government bodies set aside their exclusive

competences and focused on common goals that could be accomplished through joint efforts.

In addition, institutional participants viewed developing a strategic framework and vision within both public and private administrative structures as an important challenge. These participants noted that communication channels and strategic lines of communication must be strengthened to make better use of available information that can inform actions to face future threats. The institutional participants also suggested that public and private institutions should develop and implement risk analysis techniques (e.g., SWOT — the ‘Strengths, Weaknesses, Opportunities and Threats’ analysis tool) to build resilience to future challenges.

Participants in the NGO group noted that the Provincial Planning and Participation Assembly emerged from the impacts of the Covid-19 crisis, as citizens petitioned for an opportunity to establish a dialogue with authorities. However, community members still perceive a level of institutional resistance to civil society participation (e.g., resistance experienced by the MAGMA group — Movimiento Activista de Galápagos de Mujeres en Alerta — which formed and began advocating for women's rights during the pandemic in response to the wave of gender violence that was triggered by lockdowns; or the lack of funding and institutional support experienced by Finca Huerta Luna, a research project on regenerative agriculture and seed bank). An important challenge in the relationship between the state and the communities therefore lies in strengthening institutional capacities for supporting participative and co-production processes.

Sustainable policies

Participants in the community group voiced that there is a need for sustainability policies that are better informed by local experiences on the ground, integrated between sectors, and aimed at the long-term. These participants felt that such policies, grounded in the experiences, needs



MAGMA , Women's activist movement (Movimiento Activista de Galápagos de Mujeres en Alerta).

and priorities of local people, should guide sustainability in the islands, whereas until now the government has tended to invest in the newest technologies, some of which rapidly became obsolete. These participants were also aware of the interconnectedness of Galapagos with the rest of the world and opposed using technologies that drive secondary problems in other places (e.g., technologies that drive extractivism elsewhere).

Furthermore, community members noted that sustainable policies should aim to build trust between different actors, ensuring that the community has ownership over the policies, otherwise they will fail. In the view of these participants, policies must also be developed on a local level, as national laws sometimes clash with important priorities in Galapagos (e.g., plastic wrappers are mandated by national law for everything sold on the street, despite the importance of community efforts in Galapagos to minimise single-use plastics). In addition, community members noted that the inclusion of different actors in policy development may help in including and balancing different interests and priorities.

A challenge identified by community members was the greater workload created for certain groups by increasing work in the productive sector during the Covid-19 crisis. For example, the caring responsibilities of women increased during the pandemic and, coupled with the new agricultural work, this led to significant overworking. The systemic changes needed to support sustainable development and to build resilience must therefore be accompanied by adequate social policies, considering the diverse groups that exist in Galapagos and their distinct needs.

Economy and livelihoods

Participants in the NGO group highlighted that, when faced with the economic impacts of the pandemic, Galapagueños were resourceful and proactive. For example, these participants noted that the reappearance

during the crisis of trueque (bartering), which was a common method of conducting commerce in the early days of Galapagos society, may represent an opportunity to support a more circular economy going forward.

In addition, participants in the NGO group noted that the re-utilisation of the highlands for agricultural purposes during to the economic crash represents an interesting opportunity to strengthen local produce offerings, and food security more broadly. These participants noted that interesting programmes emerged through social organisations associated with this process. However, these participants highlighted an associated challenge, which is that many Galapagueños are now preparing to return to their roles in the more lucrative tourism sector and there is a chance that this new capacity and these new skills might be lost, in other words that the gains in resilience may be temporary. These participants voiced that some in Galapagos do not yet understand the value of having these skills and this more resilient system in place when a crisis occurs.

Another associated challenge perceived by participants in the NGO group is that an increase in agricultural activities can result in more intensive use of chemical fertilisers, which raises conservation concerns. However, these participants highlighted that organic and regenerative agriculture could be strengthened and supported. A related challenge noted by community members is the need to support emerging markets of local sustainable products. These community members noted that, in addition to education around resilient food systems, support and buy-in is needed from local sectors to solidify these emerging markets. Policies are needed to encourage this buy-in, which requires identifying actors that could potentially have a significant impact in driving these markets forward and obtaining the required commitments (e.g., local tourist businesses could be incentivised to purchase local rather than imported produce).

Furthermore, participants in the NGO group highlighted that, although the crisis has driven experimentation (i.e., workers switching livelihoods to agriculture, new markets created for fish and produce), financial and economic considerations often outweigh other aspects relating to livelihoods, forcing people to revert to the status quo. These participants noted that the prevailing focus on the financial aspects of life for many Galapagueños may be associated with a lack of viable alternative livelihoods beyond the tourism sector.

Associativity and collaboration

Participants in the NGO group noted that solidarity was a key element of the response to the Covid-19 crisis and an important element of resilience. For example, surplus food that could no longer be used for the tourist industry was sold to locals, who gained a new appreciation for local products. Surplus fish was distributed door to door to feed hungry families. In addition, these participants noted that spontaneous forms of organisation occurred during the crisis in the community, for example through local entrepreneurs. These informal forms of participation and collaboration were also an important component of resilience. In other words, the different levels of vulnerability during the pandemic helped Galapagueños to set aside personal grievances in order to collaborate.

Furthermore, participants in the NGO group noted that those who had a better ability to associate themselves with others tended to fair better in the crisis. However, others were not open to change and adaptation, which led to missed opportunities. These participants also expressed that trust was an issue that limited people's willingness to work with the government or certain institutions.

An important challenge highlighted by community members is the accessibility of research in and about Galapagos. For example, useful studies may exist but are not available outside academia. Thus, communities perceived the importance of

inclusion, i.e., ensuring that local knowledge and voices are heard and fed into research, but also that the results of this work are made accessible so that impact is possible. These community members identified that a solution to the challenge of accessibility is co-authorship with local practitioners/researchers, which also offers a way to take advantage of lived experiences, as well as an avenue for impact, as it enables structures or practices to be changed.

Systemic change

Community members highlighted that within a relatively small community such as Galapagos, with its strong focus on the natural environment, there exists the potential to change the paradigm that people working in agriculture have to be poor. This paradigm shift is perceived as both a challenge and an opportunity. For example, farmers need a network of consumers who buy their products regularly so that undertaking this type of activity is sustainable over time. Community members voiced that within a vision for the future of Galapagos, regenerative or sustainable forms of farming should represent a profitable profession that is valued for its contribution to the local economy and well-being, as well as helping to achieve conservation goals. This vision is in line with the recent appreciation for local products developed during the Covid-19 crisis.

Community members also highlighted the challenge in scaling up sustainable solutions from the level of one household to that of the community. For example, rolling out biodigester systems (which convert human and animal waste to pathogen-free fertiliser and biogas) to many households requires not only to provide the necessary equipment, but also to ensure the correct systems are in place in each island to support this change (e.g. supplies to feed the biodigester, agricultural land to receive the output, etc.). Community members noted that this requires better collaboration between sectors in the community. Systemic change is therefore needed to support sustainable



Canastas ACA is a collective action initiative based on solidarity that arose from the agricultural and fishing productive sectors with aims to provide food security during the Covid-19 crisis in Galapagos.

development and building resilience, but participants in the NGO group noted that this change must be driven by imaginarios — visions and plans for the future of Galapagos — that are informed by co-created research and supported by adequate policies and incentives.

+ Reflections on local initiatives

Several initiatives that address the above challenges around issues of food security, community empowerment and environmental activism were identified by the focus group participants. For example, the Canastas ACA initiative provided products from regenerative agriculture to ensure that Galapagueños had sufficient food during the pandemic, via a collaborative network of actors. In addition, the 'Yo Solo Vendo lo que Produzco' ('I Only Sell What I Produce') project used online platforms and tools to develop innovative marketing strategies and new marketing channels (e.g., a mobile application, website and a 'farmer's store') to directly link consumers and the tourism industry with local producers, reducing the costs generated by intermediaries. These community-based initiatives therefore strengthened local production and food security, helping the province to cope with the crisis.

However, these entrepreneurs face challenges in order to sustain these types of initiatives. For example, within the slowly recovering economy, workers are reverting to more lucrative jobs in the tourism industry. In other words, once the economic crisis had largely passed, issues such as food security and energy management gradually lost a sense of urgency and became less of a priority for the general population, many of whom can earn a better living with less onerous work in the tourism sector. Thus, appropriate policies that protect, support and promote diverse local economic activities (i.e., agriculture, local coffee production, fishing, high-value/low-numbers tourism, etc.) are needed to maintain the gains in resilience. In particular, there is

a perceived lack of commitment to local development from the tourism sector, which local producers feel could be doing more to support local enterprises.

In terms of environmental activism, the campaign to fight single-use plastics, which began prior to the Covid-19 pandemic, has been an emblematic community-led initiative. The successful campaign began with pressure on public policy, followed by empowering the community and the private sector to participate through actions. The initiative received support from NGOs and the private sector, and benefited from the willingness of local authorities to listen to and collaborate with civil society.

Finally, a joint initiative between civil society and the Municipality of Santa Cruz, which succeeded in reclaiming a derelict park to improve community well-being, was highlighted. The project responded to one of the current municipal administration's priorities for Galapagueños to appropriate and give meaning to their public spaces. This initiative represents a key example of community empowerment and, along with the previous examples, emphasises the importance of synergy between the authorities, community and political will. Similar initiatives in other neighbourhoods demonstrate that this synergetic dynamic is a key component for the success and sustainability of these projects. Mechanisms promoting and sustaining these collaborative dynamics are therefore valuable to replicate these successes, as well as mechanisms encouraging the participation of NGOs or other third parties (such as academia) who can facilitate these collaborative scenarios.

A call for support

The success of progressive local initiatives depends on multiple types of support (e.g. financial, organisational, educational, political). The need for support from institutions, local communities, and NGOs towards these initiatives was strongly voiced.

For example, community members highlighted that significant financial challenges exist for individuals or small groups undertaking sustainable initiatives (e.g., regenerative agriculture) and social initiatives (e.g., MAGMA), as they typically cannot make a sufficient living from these activities and therefore need to maintain another job, which leads to overworking. Funding is therefore key to supporting and scaling up these initiatives. Community members noted that individuals or small community groups often compete for funding with larger established NGOs who are more experienced at (and have established mechanisms for) attracting funding, which creates barriers for smaller-scale initiatives to access resources. Alliances between community groups and NGOs are therefore seen as a valuable solution that could ensure community-led projects become sustainable over time. However, there is a perception in the community that (1) there is a lack of will from NGOs to establish these partnerships; (2) available funds are not being redistributed among the community; and (3) some community-led initiatives fail due to lack of funding/support and the same ideas are then revived by the larger NGOs. An additional solution highlighted by community members is funding for citizen science through alliances with academia. These alliances are seen as highly valuable in terms of building trust and avoiding duplicating efforts.

In terms of supporting local production, participants in the NGO group called for strengthening the associative capacity of organisations, and implementing marketing strategies to position local products at the centre of the community. Furthermore, community members highlighted the need for better education opportunities, training and mentoring/assistance. In addition, institutional actors noted that initiatives by private companies to support local small-scale businesses can be beneficial to stimulate the economy. However, these need to be further supported and critically

evaluated in order to increase the impact of these initiatives.

+ Scaling up actions from the individual to the collective level

The benefits of collective action towards strengthening resilience lie in the diversity of perspectives, experiences, knowledge and skills that generate a more resilient socio-ecosystem. For example, participants in the NGO group noted that the opportunity to reclaim traditional practices that address specific vulnerabilities to shocks (e.g., food bartering — or trueque — during the pandemic) clearly increased resilience to the Covid-19 crisis. These participants highlighted that this opportunity arose as a result of inter-generational knowledge exchange, as people who had experience of this form of commerce are still living within the Galapagos community. In this sense, participants noted that, even if many Galapagueños return to their pre-pandemic activity in the tourism industry, their knowledge and skills developed during the crisis may be retained. In addition, the ‘multiplying effect’ of individuals participating in different civil groups or initiatives was highlighted as valuable for facilitating knowledge exchange across communities in Galapagos, for example the participation of young people in youth groups as well as social activism organisations such as ‘Frente Insular de la Reserva Marina’.

Furthermore, institutional participants highlighted the importance of supporting actions that aim to familiarise local community members and young people with the environment, through enabling synergies between the public and private sectors and the community (e.g., the project Galapagos Infinito, set up by the Naveducando Foundation and the Galapagos Government Council, allows children and young people from Galápagos to connect with their natural heritage). These initiatives are perceived as helpful for developing a sense of responsibility for the local environment and

of the importance of conservation, as well as building a sense of 'community' across the archipelago.

Participants in the NGO group noted the importance of valorising community-oriented actions that increased resilience, particularly those that were taken during the Covid-19 crisis, because recognising these can lead to others replicating them. Participants highlighted the importance of documenting and reflecting over actions that took place in the different islands to gain an understanding of why these actions took place and take advantage of the different ways of thinking when reacting to the recent crisis. Documenting these actions is perceived to facilitate the vision that change is possible in Galapagos, even if it occurred over a short time period (i.e., throughout the Covid-19 crisis). The NGO Fundación Un Cambio por la Vida is currently compiling a list of these initiatives and actions to showcase the adaptive capacity and alternative lifestyles that exist in Galapagos, and the efforts the community is making in terms of sustainable development.

In addition, institutional actors noted that adequate leadership is required from the private and public sectors in order to promote and sustain alternative lifestyles and the systemic changes needed to build resilience. These participants voiced that leaders must collaborate and work within a perspective of the common good, rather than the fulfilment of particular institutional or organisational objectives in isolation. For this, the training of new leaders is viewed as key to guarantee the consistency and sustainability of policies, plans and programmes. Furthermore, institutional actors noted that changing or breaking paradigms of goal-compliance can help to achieve a strategic and progressive vision that integrates notions of generosity and solidarity. In this view, leadership should focus on two axes: (1) producing more leaders who can maintain an overarching purpose while adjusting strategies according to global dynamics, and (2) leading and collaborating from the perspective of sharing skills and understanding ways to strengthen multi-stakeholder processes, rather than from the perspective of one specific sector.

3 Guiding sustainable, innovative and resilient development in Galapagos

3.1. Pathways for action

To move forward, it is essential to identify how Galapagos can develop the capacity to respond to the opportunities and challenges identified by the focus group participants. There exists a level of independence in Galapagos due to its insular setting and status as a special regime within Ecuador, but there is also a clear need to improve local institutional systems to define an integral vision for Galapagos. It is therefore important to understand within the current institutional framework, and in the context of existing plans and policies (i.e., the Galapagos 2030 Plan, the Provincial Planning and Participation Assembly, the 'Galapagos Hub for Sustainability Innovation and Resilience'), what opportunities these frameworks and platforms can offer to achieve a comprehensive vision that incorporates integrated and interconnected solutions to the diverse challenges in Galapagos, to guide strategies and actions towards building sustainability and resilience. Figure 6 highlights the challenges and opportunities identified by the focus group participants, including representatives of local institutions, NGOs, and community members. The diagram also summarises potential pathways for actions, drawing particularly on the

possibilities offered by the recently launched 'Galapagos Hub for Sustainability, Innovation and Resilience'.

The findings from the focus groups allow us to identify pathways for future collaborative research around these themes. In terms of building resilience, research should focus on understanding vulnerabilities and conflicts both within and across individual sectors (e.g. water, energy, fishing, agriculture, tourism), as well as in the context of the different inhabited islands, taking into account their different characteristics and capacities for adaptation. This research will inform institutional policies and programmes based around priorities that may differ across the province, aiding in planning to ensure resilience to future shocks. In addition, there is a need for stronger collaborative dynamics across institutions and civil society organisations, which can be achieved through supporting the work of the new Provincial Planning and Participation Assembly, ensuring that participation is inclusive and sustained over political cycles, with strong protocols for monitoring and accountability, as well as ensuring its work affects the design of policies, plans and programmes. Importantly, Galapagueños recognise the need for not only resilience, but adaptive transformation, taking advantage of the



Figure 6: Challenges and opportunities for building resilience in Galapagos, and corresponding pathways for action.

opportunities created by the Covid-19 crisis to 'build back better', by co-creating a new system that will be better prepared to face future shocks, such as climate change.

Local initiatives focussed on conservation, sustainable livelihoods and community well-being demonstrate the power of, and need for, further co-production of initiatives, actions and policies. Recent initiatives range from government programmes supporting local producers in providing food parcels to the community during the pandemic, to policies protecting the local economy from imported products, and citizen-government collaboration to reclaim public spaces in urban areas. These initiatives demonstrate the value of a supportive policy environment informed by local people's needs and experiences.

Finally, there is a need to carefully document and valorise the community-led actions and initiatives that allowed Galapagos to cope with the impacts of the Covid-19 crisis, in order to promote opportunities for these actions to be replicated. Inter-generational knowledge exchange and opportunities for local people to strengthen their relationship with their natural environment must also be supported. To scale up local initiatives that promote sustainability and resilience, there is also a need for leaders who can work and collaborate from the perspective of promoting the common good, rather than a predefined agenda that responds to broader goals distant from the actual situation in Galapagos.

3.2. Final remarks

Our collaborative work in Galapagos aims to provide research, management and policy support for sustainable development within the province, as well as building resilience and, ultimately, adaptive transformation through systemic change. In collaboration with local and international institutions and communities, we have built a number of tools to support this work, such as the 'Galapagos Hub for Sustainability, Innovation

and Resilience' and the FORGalapagos online forum, and have conducted a series of focus groups to guide future work. This toolkit has summarised the background context for sustainable development and resilience in the province, as well as the findings from the series of focus groups organised during the research, defining a proposed framework for future actions (Figure 6).

A key aspect that emerged from the focus groups is the importance of considering the situation that Galapagos was in before the Covid-19 crisis, and of returning not to that state but to a 'better' one. A new system must be proposed, but one that is inclusive of all groups of people and considers the environment, in addition to the priorities voiced in each island. In this context, policies and actions may need to be tailored for each inhabited island to fit with the particular context. Galapagueños voiced that now is the time to address this shift via appropriate and inclusive policies, and to take advantage of the opportunities that the crisis has created, which have highlighted the importance of solidarity. To achieve these objectives, a collective vision for the future Galapagos has been called for, based around solidarity, inclusivity, citizen participation, collaboration, and cross-sectoral and inter-institutional coordination. This vision should be adapted for the different islands of the archipelago and should fulfil the need for viable alternative livelihoods that retain and sustain people in activities that support a resilient Galapagos (such as regenerative and organic agriculture).

An important message from the focus groups was the need for greater institutional and financial support for community-led initiatives. This need for dialogue and support led during the Covid-19 crisis to the establishment of the Provincial Planning and Participation Assembly, a participative space to interact with authorities and seek assistance, recognising the value of participation in this crisis. Going forward, subsidies are required to retain people in certain sectors that confer resilience

and could help Galapagueños perform these activities in a way that is in line with conservation goals, therefore explicit mechanisms to direct this funding to local enterprises are needed.

Future collaborative research within the Galapagos Hub will facilitate the co-creation of alternative imaginarios, policies, as well as risk and resources management strategies, by diverse stakeholders in the different islands of Galapagos and across sectors. Knowledge exchange and capacity building will ensure that the skills developed during the Covid-19 crisis are carried forward, ensuring that these new capacities are not lost, and leveraging the participation of those individuals or families who have permanently adjusted their lifestyles, to

demonstrate and support the existence of alternative livelihoods. Providing a space to facilitate inter-generational exchange will ensure that this awareness and these skills are carried forward by young people to strengthen resilience to future shocks. We hope that this toolkit, and the other tools our collaborative work has provided, will support the people of Galapagos in building resilience, developing sustainable development strategies and increasing the well-being of communities, while preserving the unique natural environment that they curate.



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Relevant links

Charles Darwin Foundaion: <https://www.darwinfoundation.org/en/>

Conservation Internacional Ecuador: <https://www.conservation.org/ecuador>

Emma Darwin Foundation: <https://www.emmadarwinfoundation.org/>

Frente Insular de la Reserva Marina de Galápagos: <https://www.facebook.com/frenteinsularRMG/>

Foundation Heifer Ecuador: <https://www.heifer-ecuador.org/>

Galápagos Infinito: <https://galapagosinfinito.com/>

Huerta Luna Farm: <https://www.huertaluna.com/english-home>

'I Only Sell What I Produce' Project (Yo Solo Vendo Lo Que Yo Produzco): <https://www.facebook.com/Yo-Solo-Vendo-lo-que-Produzco-2238900089463001/>

Jocotoco Foundation: <https://www.jocotoco.org/wb#/EN/home>

Lava Java Farm: <https://www.facebook.com/lavajavagal/>

MAGMA collective (Movimiento Activista de Galápagos de Mujeres en Alerta): https://pt-br.facebook.com/pg/magmagps/posts/?ref=page_internal

Un Cambio Por La Vida Foundation (FUNCAVID): <https://www.facebook.com/FUNCAVID/>

Youth Council of Santa Cruz (Consejo Consultivo de Jovenes de Santa Cruz): <https://www.facebook.com/ConsejoConsultivoJovenesdeSantaCruz/>

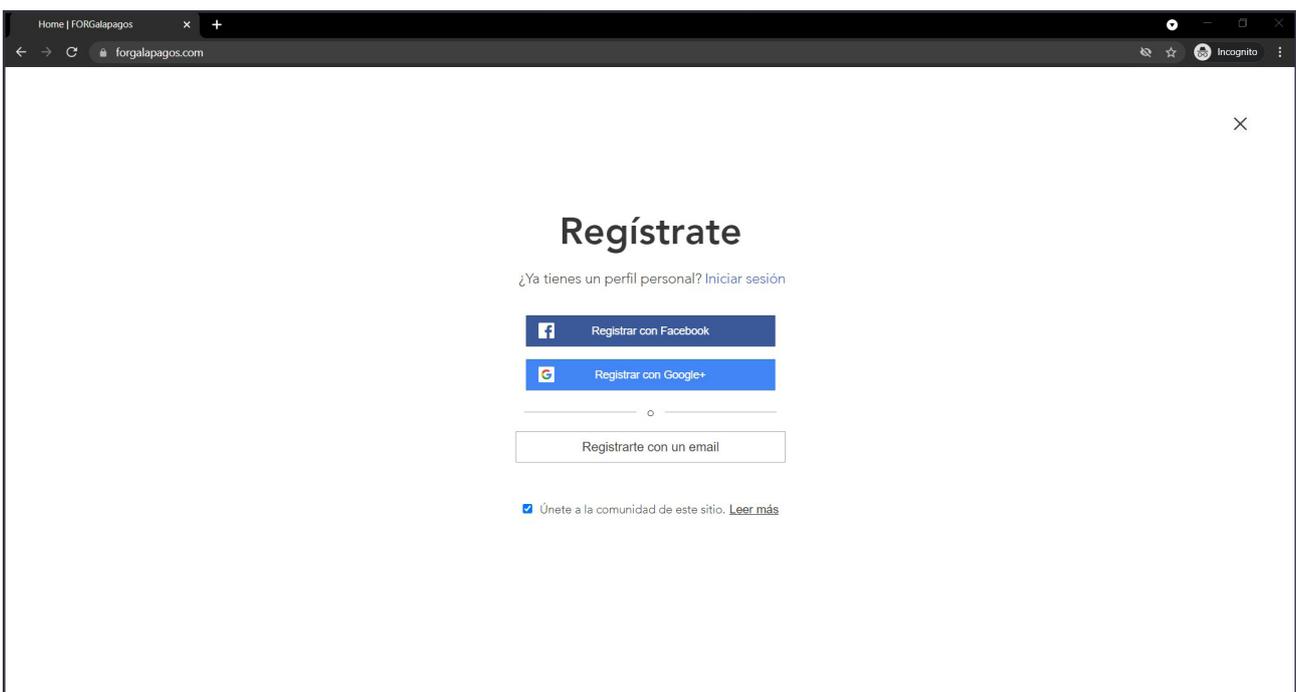
Annex 1

How to register at “Foro Resiliencia Galapagos” and post on the forum

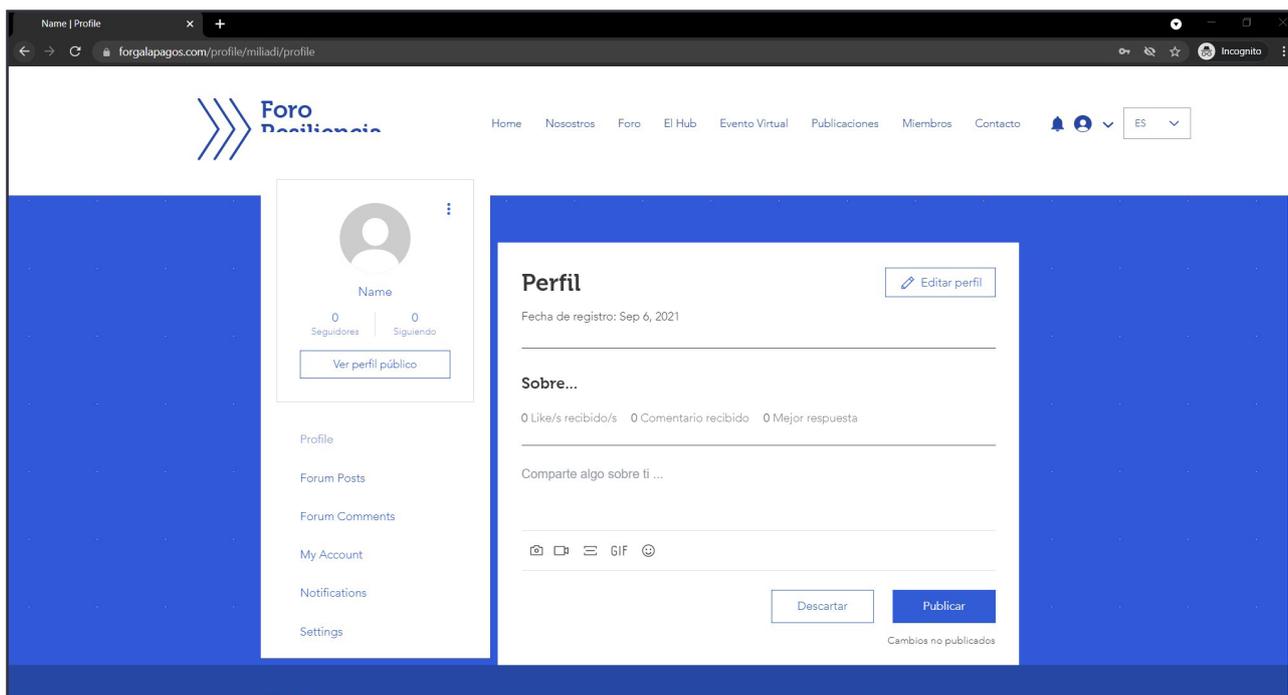
Step 1: Go to : <https://www.forgalapagos.com/>



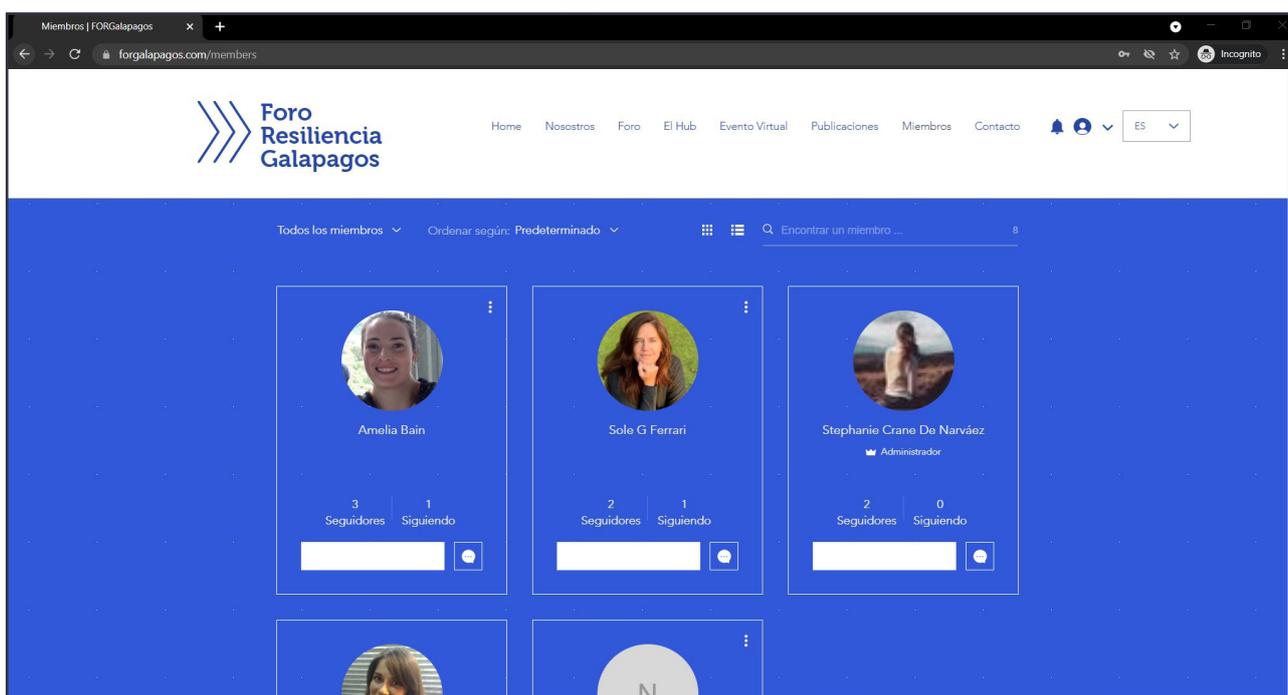
Step 2: Sign up to become a member. Click at the “Log in” button at the upper right corner of the screen. The registration screen will come up. Please follow the instruction to create a new account.



Step 3: After your registration is confirmed, log in to your account to set up your profile.



Step 4: Once your profile is completed it will appear on the page of the site members.



Step 5: You are now ready to join the forum. Go to the Forum page of the website and choose the theme you are interested in contributing.

The screenshot shows the homepage of the 'Foro Resiliencia Galapagos' website. The browser address bar shows 'forgalapagos.com/forum'. The website header includes the logo 'Foro Resiliencia Galapagos' and a navigation menu with links: Home, Nosotros, Foro, El Hub, Evento Virtual, Publicaciones, Miembros, and Contacto. There is also a language dropdown menu set to 'ES'.

El Foro Resiliencia Galapagos

El espacio del foro se divide según [los cuatro temas](#) identificados de resiliencia.

Para participar en el foro, regístrate [aquí](#) como miembro.

Las publicaciones en el foro pueden estar en español y / o en inglés.

Siga las reglas a continuación para garantizar un entorno de discusión respetuoso e inclusivo:

- Los participantes deben usar su nombre completo. No se permitirán nombres anónimos o seudónimos.
- Los participantes deben respetarse unos a otros.
- No se tolerará lenguaje obsceno o lenguaje inapropiado y comentarios.
- Cualquier publicación debe ser relevante para el tema en discusión.
- Los administradores del sitio web eliminarán todas las publicaciones que no estén alineadas con las reglas anteriores.

FOR Galapagos

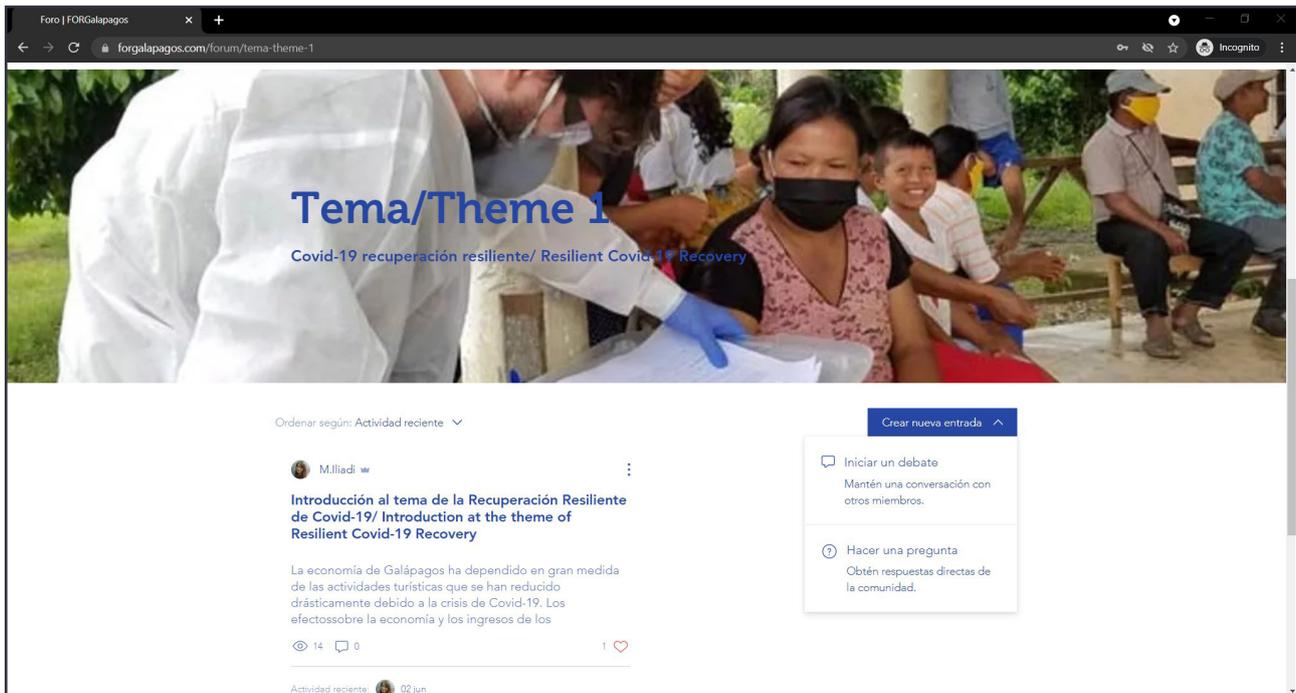
Buscar

Crear nueva entrada

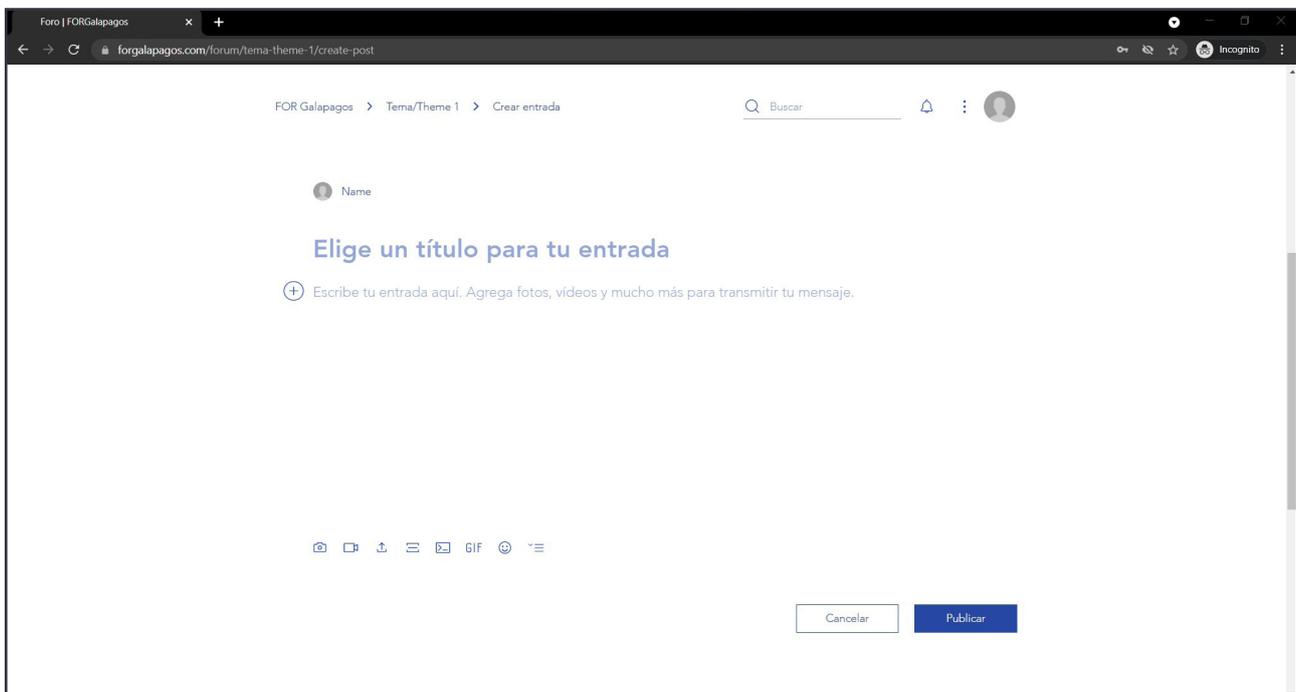
The screenshot shows the forum page with four themes displayed in a grid. Each theme includes a representative image, a title, a 'Seguir' button, and a count of views and replies.

Tema/Theme 1	Tema/Theme 2
	
Seguir	Seguir
14 1	4 1
Covid-19 recuperación resiliente/ Resilient Covid-19 Recovery	Conservación y economía circular/Conservation and Circular Economy
Tema/Theme 3	Tema/Theme 4
	
Seguir	Seguir
4 1	1 1
Innovación en transición energética /Innovation in Energy	Nuevas aguas y nuevos alimentos /New Water, Energy, Food, Nuevos

Step 6: Once you are in your selected theme, click on the button "Create a new entry" to post a new discussion or a question.



The screenshot shows a web browser window with the URL `forogalapagos.com/forum/tema-theme-1`. The page features a header image of people in a community setting with the text "Tema/Theme 1" and "Covid-19 recuperación resiliente/ Resilient Covid-19 Recovery". Below the header, there is a post by user "M.Jliadi" titled "Introducción al tema de la Recuperación Resiliente de Covid-19/ Introduction at the theme of Resilient Covid-19 Recovery". The post text discusses the economic impact of the COVID-19 crisis in Galapagos. To the right of the post, a blue button labeled "Crear nueva entrada" is visible, with a dropdown menu showing options: "Iniciar un debate" (Start a discussion) and "Hacer una pregunta" (Ask a question).



The screenshot shows the "Crear entrada" (Create post) form in the forum. The URL is `forogalapagos.com/forum/tema-theme-1/create-post`. The form includes a breadcrumb trail: "FOR Galapagos > Tema/Theme 1 > Crear entrada". There is a search bar and a user profile icon. The main form area has a "Name" field and a heading "Elige un título para tu entrada" (Choose a title for your entry). Below the heading, there is a text area with a plus icon and the instruction "Escribe tu entrada aquí. Agrega fotos, videos y mucho más para transmitir tu mensaje." (Write your entry here. Add photos, videos and much more to convey your message). At the bottom of the form, there are icons for adding media (photo, video, GIF) and a "Publicar" (Publish) button next to a "Cancelar" (Cancel) button.

