Resilient Rules

Finding solutions
in resilient agricultural systems

Protocol

Studying Institutional Diversity in Agricultural Systems

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Protocol for the study of institutional diversity in agricultural systems

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Contents

History of changes

Version	Date of change	Responsible	Description of change
1.0	Feb 6th, 2023	IPI,ATP	Creation
1.1	From Feb 14th to May 19th, 2023	IPI	Included disclaimer, added Project manager, added Appendix Interview guide, Appendix Study case log, section 7.2.5 about long-term consent, and reviewed all sections
1.1	From Feb 14th to May 19th, 2023	ATP	Added section 7.1.1., Appendix D, E, N and O
1.1	From Apr 15th to May 19th, 2023	RTC	Added Appendix Adhesion agreement and Appendix G. Safety protocol and ethics assessment
2.1	From May to June, 2023	RTC, IPI	Included information in section7.1.2.3. Assessment of potential risks for research participants
2.1	June 20th, 2023	RTC	Added information 7.1.3. Selection of research participants Leader of community interview, Added information 8.1.1.Making data findable, Request identifiable data,
2.1	June 21trst, 2023	RTC	Appendix Request for Data
2.1	June 28th, 2023	RTC	Added information 7.1.2.3. Sentences related to keep the data safe to contact participants medium-long term
2.1	July 5th, 2023	IPI	Included the brief MacArthur Competence Assessment Tool for Clinical Research in the oral and written consent forms and in the record of mental capacity
2.1	From June 5th to July 13th, 2023	ATP	Redesign of Appendix F (Initial social-ecological assessment of case studies)
2.1	July 17th, 2023	RTC	Modification Appendix D (Adhesion agreement). Necessity of approval of local Ethic Committee and invitation to write a co-authored paper added. Appendix A Infographic of the protocol included.
2.1	July 18th, 2023	RTC	Included request for ethics committee contact information. Included in the text the appendix to request for approval from the head of the community.
2.1	July 19th, 2023	ATP	Merged and modified Appendices of "Collection of written documentation" and "Procedure to request written documentation" in Appendix K (written regulation script).
2.1	July 26th, 2023	RTC	Invite to research collaborators email included in the list of appendix C, Appendices Oral consent, information sheet and written consent modified and translated into English
2.1	July 27th, 2023	RTC	Cognitive capacity replaced by mental capacity (page 21) References of decision-making capacity included Appendix G. Safety protocol: considerations, actions or solutions to be taken in the community studied from a gender perspective, and reference added

Version	Date of change	Responsible	Description of change
			Mandatory inclusion of local ethics committee approval prior to interviewing by investigators added. (page 12) Procedure in case of personal data breach added
2.1	August 21rst, 2023	RTC	Changed decision capacity for mental capacity, removed references to Dropbox, included recommendations to storage personal data
2.1	August 23rd, 2023	RTC	Request for data appendix R included in the protocol Appendix O (letter of authorization) included
2.1	August 25th, 2023	ATP	Appendix K (Written regulations script) updated and translated into English ; Appendix E (Good practice guide for interviews) updated; Appendix Q (Study case log) updated and translated into English; Appendix F (Social and ecological assessment) updated and translated into English; amendment to the Protocol subsection "7.1.1.3 Classification of Rules"; amendment to the Protocol subsection “7.1.1.5.Resilience”; KEY REFERENCES updated in the Protocol
2.1.	August 29th, 2023	LXE	Appendix H (Interview description guide) included
3.1	September 4th, 2023	RTC	Changes in the infographic included
3.1	September 13th, 2023	ATP	GLOSSARY section completed
3.1	November 8th, 2023	RTC	The same person may be interviewed as a participant in the study and then be interviewed as a witness in a different interview, but never the other way around. Page 21
3.1.	December 10th, 2023	LXE	Amendment to appendix H (Interview description guide), section 3 “Changes and evolution”.
3.1	January 8th, 2024	ATP	Amendment to the Protocol subsection “7.1.1.2. The Institutional Analysis and Development (IAD) Framework”, Table 2.
3.1	January 15th, 2024	ATP	Appendix F (Social and ecological assessment) updated; KEY REFERENCES updated in the Protocol
3.1.	February 15th, 2024	LXE	7.2.4. (Interview guide) updated. 7.2.1. (Informed consent procedures for the research participants) Criteria for witness selection updated. 7.1.3.1. (Selection of research participants) updated. New section “7.1.3.2. Fieldwork planning” included. Appendix Q. Study Case Log updated (Interviewee confirmation of the accuracy of the community description and the instructions to get offline coordinates included). APPENDIX M. Criteria for witness selection updated APPENDIX H. Amendment to the final section - Interviewee confirmation of the accuracy of the community description.
4.0	April 4th, 2024	LXE	Change of the name and descriptions of section 3 in the Interview description guide (Appendix H)
4.0	April 4th, 2024	LXE	Text of section 7.2.5. moved to section 7.2.1. regarding final oral consent to keep the information for future research and documentary projects.
4.0	April 4th, 2024	RTC	Secure erasure options available for deleting participant ‘personal data (Page 27), Information about the padlocked document holder Included (Page 25).

Version	Date of change	Responsible	Description of change
4.0	April 17th, 2024	AMS	New questions and structure added in the Socioecological assessment and in the Safety protocol
4.0	April 17th, 2024	RTC	Measures to protect documents with personal data (Page 27)
4.1	April, 2024	FJL, IPI	Creation of version 4.1 (new format)
4.2	July 2024	AMS	Updated appendices G and F (format and content)
4.2 and 4.3	October, 2024	LXE, IPI	Creation of version 4.3 (format changes)
4.3	October 15	FJL	Update Appendix B
4.3	October 18, 2024	LXE	Updated all appendices (new format), updated name of appendices J, O, P.
4.4	June 15, 2025	BVT, CGD	Biographies of BVT and CGD included.
4.4	June 20, 2025	BVT	Collaborator's biographies included.
4.4	July 3, 2025	LXE	Updated biographies of core team members and research collaborators
4.4	July 3, 2025	LXE	Wording adjustment using gender-neutral pronouns
4.4	July 5, 2025	LXE	Adjustment of in-text references to Appendix P: “Consent Form”
4.4	July 5, 2025	LXE	Wording adjustments in the Interview Guide description (Appendix H)
4.4	July 8, 2025	LXE	Updated the number of case studies, and the APPENDIX L: written consent

1. Core research team

Irene Pérez Ibarra, PhD, Principal Investigator. Associate Professor at University of Zaragoza (Spain), and co-IP of the Social-Ecological System research group of the Agrifood Institute of Aragon (IA2). With a background in ecology and environmental sciences, she works in the interdisciplinary field of social-ecological research, and her research focuses on the governance and resilience of small-scale agricultural systems under global changes. She teaches graduate and undergraduate courses in the economic, sociology, and agricultural policy area. Before going to Zaragoza, she was a researcher at Miguel Hernández University (Spain, 2007-09), the Center for the Study of Institutional Diversity at Arizona State University (USA, 2010-14), and the School of Social Work at Columbia University in the City of New York (2016-2019). Email: perezibarra@unizar.es

Alicia Tenza Peral, PhD, Scientific Coordinator. She is a social scientist with a background in agroecology and rural development and specialized in computational modeling applied to study complex social-ecological systems. Her research has focused on studying human well-being, traditional local knowledge, sustainability, and resilience of rural areas and how these factors are affected by socio-economic and environmental local, regional, and global changes. Before working at the University of Zaragoza, she was a researcher at Miguel Hernández University (Spain, 2009-2013;2018-2020), the Center for Behavior, Institutions and the Environment at Arizona State University (USA, 2019), and the Center for Biological Research of the Northwest (Mexico, 2014-2017). Email: atenza@unizar.es

Rocío de Torre Ceijas, PhD, Project Manager. She is an ecological scientist with a background in restoration ecology, connectivity and conservation in anthropic environments, analysing ecological patterns across time and space. Before working at the University of Zaragoza, she worked as a researcher at Complutense University of Madrid (2013), research assistant and tutor at Otago University of Dunedin, New Zealand (2014-2015), and environmental consultant (2015-2019), developing reports and projects for e.g. the Zaragoza City Council, the Ministry of Biodiversity of Spain, Heidelberg Cement company, CSIC (Centro Superior de Investigaciones Científicas). In her career she has applied innovative and active methodologies for teaching science in secondary school and university, and being involved in many organizational tasks. Email: rtorre@unizar.es

Laura Ximena Estévez Moreno, PhD, Data collection coordinator. Ecologist with a background in rural development, agricultural sciences and global health. Her research work is focused on society-nature relationships in the context of rural territories. She has studied the role of agriculture in rural livelihoods; sustainable agricultural production and consumption using a farm-to-table perspective; and human-animal relations and farm

animal welfare using the One Welfare approach. Before working on the Resilient Rules project, she was a researcher at the University of Zaragoza (2019-2021, Interreg-Poctefa DIETAPYR2 Project), at the Autonomous University of the State of Mexico (2014-2016), and at the Pontifical Javeriana University (2004, 2005, 2007, 2009-2010). and has taught undergraduate and graduate courses on the use of rural landscapes and sustainable livestock farming (Pontifical Javeriana University 2008-2012, Agrarian University Foundation of Colombia 2021-2024). Email: lestevez@unizar.es

Andrea Martín Suárez, Researcher Assistant. Veterinary with a background in veterinary medicine, primatology research, organic production and global health. Her research focuses on the study of subjective resilience in the face depopulation and climate change in rural areas, socioecological systems and institutional diversity in agricultural systems. Email: andrea.martin@unizar.es

Ismael Lare David, PhD Researcher. PhD researcher in the Department of Agricultural Science and the Environment at the University of Zaragoza. He holds a degree in Environmental Sciences from the Universidad Pablo de Olavide and a Master's degree in Integrated Water Management from the University of Cadiz. He worked at the Spanish Geological and Mining Institute (CSIC-IGME) as a research assistant in groundwater resources management. His research focuses on analysing and quantifying institutional diversity using natural and social science methods to assess global patterns of resource governance and the resilience of agricultural systems to global change. Email: ilare@unizar.es

Francisco Javier Lacosta García Researcher Assistant. He is a researcher assistant in the Department of Agricultural and Environmental Sciences at the University of Zaragoza. He graduated in 2021 in Environmental Science at the University of Zaragoza. In 2024 he graduated in a Master of Spatial Planning and Environment at the University of Zaragoza. He co-authored the Ten-year Report of the Spanish MaB Programme Committee's Scientific Council of the Ordesa-Viñamala Biosphere Reserve. Also, he worked in a project about helping to make CO2 reduction projects competitive. His research focuses on the study of agricultural commons around the world and the study of nature's contribution to people. Email: flacosta@unizar.es

Blanca Vidao Teruel. PhD Researcher Assistant. PhD researcher in Sociology and Publics Politics at the University of Zaragoza investigating mountain tourism, focusing on social and cultural aspects of the communities. Holds a bachelor's degree in History of Art, master's in Tourism, Leisure and Territorial Development and master's in Education. Her professional career has been developed between France and Spain. In 2021 she completed an international doctoral research stay focused on tourism, water, and climate change at UMR TREE of University of Pau. Her doctoral research examines the social impacts of COVID-19 on the tourism sector in the central Pyrenees through a mixed method composed by qualitative and quantitative tools and establishing public policy proposals for the recovery and sustainable development of post-pandemic tourism in rural areas. Email: bvidao@unizar.es

Carlota García Díaz. Researcher Assistant. Carlota García Díaz is a research associate in the Department of Agricultural and Environmental Sciences at the University of Zaragoza. She earned her Bachelor's degree in Environmental Sciences from the University of Zaragoza in 2018 followed by a Master's in Science, Technology and Environmental Management from the University of A Coruña in 2019. She has contributed to the drafting of climate action plans for various city councils, most notably the Zaragoza City Council. She has also collaborated on several European projects related to climate change adaptation in urban environments. Her research interests include the analysis of risks and vulnerabilities associated with the effects of climate change. Email: carlota.garciad@unizar.es

Diego José Soler Navarro: PhD Researcher Assistant. PhD candidate at the University of Zaragoza. Holds a bachelor's degree in Environmental Science and a master's in Biodiversity and Conservation Biology. His research explores the social and ecological dynamics that shape the sustainability and resilience of traditional livestock systems in the face of global change. He also examines the ecosystem services and disservices associated with these systems, as part of the SOSLIVESTOCK Project. Email: djsolnav@unizar.es

2. International research collaborators

International research collaborators, from the countries of the local case studies, lead the socio-ecological assessment and data collection from case studies.

Ahmad Hamidov, Uzbekistan
Ahmad Hamidov is senior researcher at the Leibniz Centre for Agricultural Landscape Research (ZALF, Germany) and professor at the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers (TIIAME, Uzbekistan). He has extensive experience in conducting research related to natural resource management (e.g. water, land, and pasture) in Central Asia. His research interests include sustainability assessment of land and water resources, water-energy-food nexus, community-based natural resource management, irrigation governance, institutions, climate change, and social-ecological-technical systems analysis. Moreover, he applies institutional economics and common pool resource theory to natural resource and environmental governance, particularly in the context of sustainable development. Ahmad has authored more than 40 peer-reviewed journal articles or book chapters on these topics. Ahmad is originally from Uzbekistan, where he obtained his university degree on economics of agricultural water resources at TIIAME. He completed his PhD in agricultural economics at the Humboldt University of Berlin, Germany.

Akouegnon Ferdinand Aymasse, Benin
Akouegnon Ferdinand Aymasse is a forester by training and is currently a Biodiversity Specialist at the FAO's Forestry Division. His professional expertise is in biodiversity and ecosystem services mainstreaming for food, agriculture, climate resilience, and youth engagement in the forest sector. His previous research background is on (i) the domestication and marker-assisted breeding of indigenous agroforestry tree species, and (ii) socio-institutional drivers of vegetable consumers' behavior. He has significant experience in collecting qualitative field data on farmers' crop trait preferences and the local population's perceptions of ecosystem services, with national and international research institutions. His research interest is on (a) the valuation of biodiversity and ecosystem services, and (b) the socio-ecological economics of different land use systems through a systemic approach.

Alessandro Pagano, Italy
Associate Professor in Hydraulic Systems at the Polytechnic University of Bari, Italy. His main research interests, developed within several EU (NAIAD – H2020, REXUS – H2020, LENSES – Prima, BIOTRAILS – HE) and National projects, relate to the Water-Energy-Food-Ecosystems Nexus understanding, assessment and management. The focus of his activities is on sustainable water resources management, and on the identification of strategies for the sustainable development of complex socio-ecological systems,

including the selection, co-design and implementation of resilience-enhancing measures such as Nature-based Solutions. His work deals also with water infrastructures for irrigation and for drinking purposes, with an interest for extreme events. He has been working with integrated modelling approaches (mainly hydrological modelling and System Dynamics Modelling) with a strongly participatory component.

Amine Saidani, Argelia

Andiswa Finca, South Africa
Andiswa Finca is a researcher at the Agricultural Research Council, focusing on sustainable communal rangeland management and improving market access for livestock farmers and rural youth. She adopts an interdisciplinary approach, combining participatory methods with environmental assessments, GIS, and remote sensing to address challenges and promote sustainable rangeland management solutions. She co-chair the Eastern and Southern African Regional Support Group (ESA-RISG) of the International Year of Rangeland and Pastoralist (IYRP). She leads the South African IYRP Support Group and serve on the steering committee for the African Rangeland and Pastoralist Platform (RP3), she is part of the committee member of the Grassland Society of Southern Africa and represent the ARC in the Strategic Source Water Area - Governmental Authorities Committee (SWSA-GAC) as well as the National Cross-Sectoral Extension Reference Group. She is also a member TRANSECT initiative, an international collaboration between South Africa, Canada, and Germany. Her research interests focus on: Communal Rangeland Management, Rangeland Condition Assessments, Livestock Tracking, Rural Youth Engagement in Agriculture and Hydroponics.

Anushiya Shrestha, Nepal
Anushiya Shrestha holds a PhD from Wageningen University, the Netherlands. She is a Senior Researcher at the South Asia Institute of Advanced Studies (SIAS), a recognized policy research organization in Nepal. Her research interests include the policies and practices around changing resource use and management, especially on changing water use and management issues in urbanizing contexts. She has published several articles on water security issues in Nepalese and international peer-reviewed journals such as Ecology and Society, Water Alternatives, Climate Policy, Critical Asian Studies, Contemporary South Asia, book chapters, and social media blogs in acclaimed national dailies and international news sites such as The Third Pole. Currently, she is coordinating an ACIAR-funded project on Springwater management for resilient rural livelihoods in the mid-hills of Nepal.

Arezoo Mirzaei, Germany-Iran
Postdoctoral researcher in the Department of Agricultural, Environmental and Food Policy at Martin Luther University of Hall-Wittenberg in Germany. Her Interdisciplinary research focuses on the governance of natural resources, particularly water, from a socio-economic institutional perspective. She examines the formal and informal rules, norms, and strategies that shape the use and management of these critical resources.

Augustine Perrin, France
During her thesis at Toulouse University, she studied French livestock farms' resilience. During this work, she studied farms as complex socio-ecological systems. For this, she used conceptual and methodological frameworks borrowed from various disciplines: agronomic sciences (e.g., agronomy of forage systems, zootechnics of livestock systems) and social sciences (e.g., sociology, anthropology), both of which being essential for a systemic understanding of farms. Part of her researches led her to assess farms' resilience by considering the issue of farmers' work. She went to the farms and worked with farmers to understand how their management of human resources, combined with the management of the farm's natural resources, could lead to greater resilience in the face of uncertainties. Since 2023 she works on her own farm, they rase dairy heifers and can welcome up to 34 persons in their guest host. She cooks for hosts and owns a 'mountain guide' diploma to hike with groups of people on the mountain.

Beatriz Lima Riveirio, Brazil
Beatriz Lima earned a B.A. in Social Sciences and a M.A. in Social Anthropology at the University of Brasília, Brazil. She is interested in Social-cultural Anthropology with focus on the study of politics, institutional ethnography, and multi-scale governance. Now pursuing her PhD, she focuses on the dilemmas of Indigenous peoples' participation in global environmental governance, and the challenges of engagement in United Nation's forums on climate change and biodiversity for Indigenous peoples. Currently, Beatriz is a PhD Candidate in Anthropology at Indiana University, member of the Center for Analysis of Socio-Ecological Landscapes (CASEL), former Ostrom Workshop Fellow and current Ostrom Research Awardee.

Bernardo Bartolomé Paz Betancourt, Bolivia

Binganidzo Muchara, South Africa
Binganidzo Muchara is currently serving as a Senior Lecturer (Economics) at the University of South Africa's Graduate School of Business Leadership. He has also served the business school as a programme manager for the post-graduate diploma programmes (2021-2022) and as Head of Academic Quality Assurance &Enhancement (2022-2023). He worked as a Post-Doctoral Research Fellow with the International Water Security (IWSN), focusing on water security governance in selected Southern African river basins. Dr Muchara has been a principal/co-coprincipal investigator for a number of research projects funded by the Water Research Commission (WRC) (RSA), Department of Water and Sanitation (RSA), USAID and the Lloyds Register Foundation (UK). Binganidzo Muchara holds a PhD in Agricultural Economics from the University of KwaZulu-Natal and an MPhil Monitoring & Evaluation (Stellenbosch University). His research interests broadly include theoretical and applied empirical research in Institutional Economics, Water Governance, Resource Economics and Agricultural value chain analysis. He teaches business economics at post-graduate level.

Blessing Akpan, Nigeria
Blessing Akpan is the founder of *Inyene Agro*, an initiative tackling critical challenges in Nigeria's agricultural sector, particularly post-harvest loss. Through the establishment of modular food processing facilities in rural communities,

Inyene Agro seeks to reduce spoilage, adds value to agricultural products, and empower rural farming communities. By bringing processing closer to where crops are harvested, the initiative strengthens local food systems and currently supports over 50,000 smallholder farmers in low-income communities across Akwaibom and Nassarawa States of Nigeria. She is a graduate of Business Administration from Lagos state University, an international advisory group member of the just concluded Nutrition for Growth (N4G) sumit 2025 in Paris that raised a global fund of $27billion to fund Nutrition-focused initiatives and end malnutrition in all its forms, she is the Nigeria' South-South Region Deputy hub lead for Scaling Up Nutrition Business Network (SBN) an off-shoot of UN programme.

Bruno Bonté, France

Carlos Bopp, Chile
Carlos Bopp is an agricultural economist from Chile, holding both an MSc. and a PhD in agricultural economics and policy. With a solid academic background with a bachelor's degree in Agronomy, he brings a wealth of practical experience from growing annual crops. Currently, Carlos is engaged in a Postdoctoral project at the Universidad de Talca, Chile, where he conducts research focused on the role that structural conditions and human factors of Water User Associations play in users' cooperation and adaptation in central Chile. His research interests primarily revolve around the adoption of agricultural technologies, collective actions in irrigated agriculture, productivity analysis, and the effects of public policy incentives on farmers' behavior.

Christian Schleyer, Germany
His research and teaching focuses on ecological and institutional economics and environmental policy and sustainable use of natural resources in agrarian cultural landscapes. More precisely, he has been working on various challenges of and opportunities for the sustainable use of natural resources, such as soil, water, air, and biodiversity in agrarian and other cultural landscapes, utilizing and refining theories and practices of institutional change, collective goods, social-ecological systems, and ecosystem services in the process. He holds a PhD and habilitation in Agricultural Economics both from Humboldt-Universität zu Berlin (Germany) where he has been working as a lecturer (Privatdozent) for many years. Further, he is a Senior Researcher at the Section for International Agricultural Policy and Environmental Governance at the University of Kassel (Germany) and a Guest Professor for Human Geography at the Institute of Geography at the University of Innsbruck (Austria).

Collins Izuchukwu Igboji, Nigeria
Collins Igboji is a doctoral researcher and research assistant at the Brandenburg University of Technology, Cottbus-Senftenberg, Germany. With a solid commitment to sustainable development, his research focuses on how institutions—such as rules, norms, and strategies—influence yield gaps and on-farm losses in crop production systems, contributing to global efforts toward achieving zero hunger. Collins holds a bachelor's degree in Botany from the University of Nigeria and a master's in Environmental and Resource Management from Brandenburg University of Technology, Cottbus-

Senftenberg. He has been recognised with numerous accolades, including the 2018 DAAD award for exceptional achievement at the Brandenburg University of Technology and his selection as a Right Livelihood Junior Scientist in 2023. Beyond his research, Collins is actively engaged in social and cultural activities. He served as President of the Nigerian Students' Association in Germany, where he organised the university's first African cultural festival.

David Diaconu, Romania
David Diaconu is an Assistant Professor at the Faculty of Public Administration - National University of Political Studies and Public Administration (SNSPA). He earned a PhD in Political Science, and MA in Political Theory and Policy Analysis, and BA in Political Science from the SNSPA. He was a postdoctoral research fellow at the New Europe College and a James Buchanan Fellow at the Mercatus Center at George Mason University. His research interests are the study of collective action issues regarding the management of commons, utilizing mixed-methods research design.

Demetrio do Amaral de Carvalho, Timor-Leste

Edmond Gnangnimon Gbenakpon Totin, Benin
Edmond Totin is a social scientist by training. He is an Associate Professor and lecturer at the Universite Nationale d'Agriculture, Benin, West Africa. His expertise is in managing agricultural innovation, climate adaptation, policies, and governance. Edmond's work focuses on generating scientific outcomes to support development interventions. He pursues topics such as (i) demand articulation in the innovation processes, (ii) the potential of participatory planning to support transformational changes, and (iii) adaptation processes. He served as one of the Coordinating Lead Authors on the AR6-Africa Chapter of the IPCC 6th assessment report. He is also an Associate Editor for "Communications Earth & Environment" in the Nature Portfolio, and “Climate & Development Journal”, one of the leading platforms in climate sciences.

Edward Alan Ellis, Mexico
Edward Alan Ellis holds a Ph.D. (2001) in Forest Resources and Conservation from the University of Florida. Since 2004, he has been a Senior Researcher at the Center for Tropical Research, Universidad Veracruzana. For over 20 years, his research has focused on interdisciplinary approaches to understanding forest dynamics and land-use changes in complex socioecological systems. His studies in the Selva Maya of the Yucatán Peninsula have advanced knowledge of land-use change, deforestation, and degradation. He has also expanded understanding of community forest management, leading projects to assess and implement sustainable forestry practices that reduce environmental impacts, boost productivity, and conserve biodiversity. Dr. Ellis has published over 50 scientific articles, along with manuals, book chapters, and technical reports. He has collaborated on numerous forestry-related projects in Mexico with international and national organizations and academic institutions, including The Nature Conservancy, the University of Florida, UNDP, CCMSS, El Colegio de la Frontera Sur, and CONAFOR. He is a member of the International Society of Tropical Foresters.

Ellanie R. Cabrera, Philipines
She is an Assistant Scientist in Agricultural Economics, International Rice Research Institute (IRRI). Anaccomplished agricultural economist with extensive experience in socio-economic research, survey design, and policy analysis. Currently serving as an Assistant Scientist at IRRI, she has been instrumental in conducting socio-economic surveys, data analysis, and crafting manuscripts for research publications. With over 30 years of experience, her contributions span projects related to rice production systems, climate change mitigation, and sustainable agricultural practices. Her work focuses on empowering rice farming communities through innovative policy research, promoting adoption of sustainable technologies, and assessing the socio-economic impact of agricultural innovations across Asia and has co-authored numerous publications in the field.

Emmanuel Galindo Excamilla, Mexico
Professor Researcher in the Academic Area of History and Anthropology at the Autonomous University of the State of Hidalgo, Mexico, he teaches courses in environmental anthropology and social development. His research focuses on the study of self-managed organizations for the management of natural resources, especially water for human consumption and agricultural production. He holds a PhD in Anthropology from the Center for Research and Advanced Studies in Social Anthropology with a comparative study on the management of small drinking water systems. He also holds a Master of Science degree from the Colegio de Postgraduados with research on social organization for rainwater harvesting in jagüeyes. He holds a Bachelor of Economics degree from the Autonomous University of the State of Hidalgo with research on the productive specialization of a Rural Development District.

Enoch Mobisa Ontiri, Kenya

Felipe Bravo Peña, Chile
Felipe Bravo is a Fulbright and Ostrom Fellow, and a PhD Candidate in Environmental Science at Indiana University Bloomington (EEUU), in his fifth year. His research focuses on exploring the relationship between agriculture, the environment, and society. His primary research area involves understanding the factors and institutions that influence agricultural decision-making around sustainable production and climate change. He develops his doctoral research with Aymara indigenous communities in the Chilean Highlands. Felipe has consulted for Chile's Ministry of Agriculture, Ministry of Social Development, and Ministry of the Environment, as well as international organizations like IDB, ECLAC, IICA, GIZ, and FAO, among others. He earned degrees as a Doctor in Veterinary Medicine (UCh), a Master in Sciences (UCh), and a Master in Public Policy (PUC) in Chile. He also worked as a Researcher and Lecturer at the University of Chile.

Frank Yonghong Li, China
Frank Yonghong Li is a professor at School of Ecology and Environment of Inner Mongolia University, and director of Key Laboratory of Ecology and Resource Use of the Mongolian Plateau (Ministry of Education of China). Frank got his PhD in ecology from University of Montpellier (France), and has worked on grassland ecology and management in Chinese Academy of Sciences (Beijing), New Zealand Institute for

Pastoral Agriculture (Palmerston North), and currently in Inner Mongolia University. Frank's research covers biodiversity and ecosystem conservation, grassland functioning and ecosystem services, grazing management and carbon sequestration, climate change impacts and adaptation, and agricultural system modelling and decision-support, with a current focus on the pastoral areas on the Mongolian Plateau. He is a member of the executive committee of the Grassland Society and the Ecological Society of China, lead of the IUCN CEM Steppe Specialist Group, and associate editor of Journal of Arid Land. He has published > 200 papers in academic journals and 4 books.

Giacomo Pagot, Italy
Giacomo Pagot is a Postdoctoral researcher at the Department for Land, Environment, Agriculture and Forestry of the University of Padova, Italy. His background is in forest policy and economics with a focus on analysing the role of forest commons in the Alpine area as providers of ecosystem services and in rural development policies. His other research interests are Payments for Ecosystem Services and European Union policies for Forest Ecosystem Services provision.

Gimbage Mbeyale, Tanzania

Guangsi Lin, China
Guangsi Lin is the Professor and the Head of the Department of Landscape Architecture, and the Vice Dean of School of Architecture, South China University of Technology. His research interests include landscape architecture planning and design and its theory, the history of modern Chinese landscape architecture, the discipline and pedagogy of landscape architecture, and the policies, regulations and governance of landscape architecture. He has obtained 3 projects of the National Natural Science Foundation of China as PI, published more than 140 academic papers, published 1 academic book (in Chinese) and translated 2 academic books from the English to Chinese. He was granted 1 Landscape Innovation Award of the Landscape Institute, 2 Science and Technology Awards of Chinese Society of Landscape Architecture, one IFLA (International Federation of Landscape Architects) AAPME Awards and 3 IFLA ASIA-PAC LA AWARDS professional awards from the regional executive committees of the International Federation of Landscape Architects.

Hassen Abdelhafidh, Tunisia
Hassen Abdelhafidh is Professor and Head of the the Department of Rural Economics and Management at Higher School of Agriculture of Mograne, University of Carthage. He earned his PhD in Rural Economics and Development from the National Institute of Agronomy of Tunis, Tunisia. M.Sc. in Natural Resources Management. His main research interests are in Water Economics & Policy; Agricultural Economics and Environmental Economics. He has published more than 50 journal and conference papers. He has worked as a consultant for a range of national and international agencies on natural resource economics, agriculture, and water economics & policy in the Middle East and Tunisia.

Isabel Guerrero Ochoa, Perú
Isabel is an environmental, natural resources and development economist. She is currently an Assistant Professor in the Department of Economics at the Pontificia Universidad Católica del Perú (PUCP). She has a bachelor's degree in economics from the Universidad del Pacífico (Lima - Peru). She has a master's degree and doctorate in Applied Economics from Oregon State University (OSU). Her master's thesis focused on an Econometric Analysis of Production Supply and Input Demand in the Oregon Lumber and Plywood Industries. Her doctoral dissertation focused on prioritizing policies focused on the conservation of agrobiodiversity in Andean landscapes, paying special attention to the role of cultural practices of Andean communities. Isabel has worked for different multilateral and cooperation organizations at the national and international level such as the World Wildlife Fund (WWF), Helvetas Swiss InterCooperation, USAID Prevent Project, GIZ, UNEP-Panama, FAO-Rome, and WFP-Colombia.

Joahana Herrera Arango, Colombia
Researcher and professor at the Faculty of Environmental and Rural Studies at Javeriana University, director of the Observatory of Ethnic and Peasant Territories (OTEC) at the same university. Ecologist, Master's degree in Cultural Studies and PhD in Sustainable Development from Loyola University (Spain). Experience in research on socio-ecological systems, common goods, collective tenure, artisanal fishing, maritorios, ecological and cultural sustainability, interactions between natural resources and peacebuilding, and participatory GIS. Experience as an advisor to state entities, international cooperation agencies, and non-governmental organizations, working with rural communities and ethnic-territorial organizations for the management and planning of collectively managed coastal ecosystems.

Jonathan Bill Doe, Ghana
Jonathan Bill Doe is a PhD student at the Chair of Technoscience Studies, Brandenburg University of Technology (BTU). Jonathan has research expertise in urban gardening, wetland management, local knowledge, resilient rules and the concept of the commons in postcolonial states. He served as a research assistant for the BTU Environmental Humanities program and as an administrative assistant at the Historical Society of Ghana. Jonathan has shared his research findings at universities and conferences, earning him the DAAD 2021 award for the best student for international collaboration at his university. He has been working on regenerating local commons in his home country, Ghana, in partnership with traditional authorities in Aŋlo. His PhD is focused on the intersection between urban gardening, land and water use from postcolonial historical and philosophical perspectives.

Joseph (Joy) Kallarakal, India
J. Joy is a Senior Fellow with Society for Promoting Participative Ecosystem Management (SOPPECOM), India. He is an activist-researcher working on people's rights to natural resources, democratization of resource governance and institutions, water conflicts, social movements, water ethics and people's alternatives. He has been part of networks like Forum for Policy Dialogue on Water Conflicts in India, Vikalp Sangam, India Rivers Forum, and Campaign to Defend Nature and People. He is a visiting faculty at the Shiv Nadar University in its Masters programme in Water Science and Policy and

Rural Management. He was a member of the Drafting Committee constituted by the Ministry of Water Resources, Government of India, in 2019 to draft a new national water policy. He has published extensively on water-environment-development issues.

Jun He, China
Dr. Jun He is a Professor in Human Ecology at the School of Ethnology and Sociology, Yunnan University. His research interests lie in global value chain, indigenous knowledge, non-timber forest products, agroforestry and forest governance. His has extensive experience work in Southeast Asia, Napal and North Korea. His publications have appeared in World Development, Ecosystem Services, Journal of Rural Studies, Land Use Policy, Human Ecology, Forest Policy and Economics, and Development and Change, Journal of Peasant Studies, among others.

Jia Xiangyu, China
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Kelvin Mtei, Tanzania
Kelvin Mtei is an associate professor of Agro-environment holding a PhD in agricultural sciences with vast experience in research and academics for about twenty years. He has been delivering lectures in various public universities both at undergraduate and postgraduate levels. His research endeavours focus on application of science and technology in a social-ecological context with a focus on Sustainable farming systems; Remediation of degraded land; Agricultural Water Management and re-use. He has received several research grants through which he has produced more than 100 publications in peer review journals, conference proceedings and books.

Lana Slavuj Borčić, Croatia
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Lapologang Magole, Botswana
Dr Lapologang Magole is a Senior Lecturer at the University of Botswana's Department of Architecture and Planning and Senior Consultatnt in SESU Environmental Management Institution in Botswana. She is a Regional Development Planner by profession. She holds a Master of City Planning (MCP, Regional Development Planning) (1995) from the University of Manitoba, Winnipeg, Canada. She received her PhD in Development Studies (Environmental Policy Analysis) at the University of East Anglia, UK in 2003. Her research work and interest covers; natural resources governance in general and common property (land and water) resources management in particular.

Luz Ángela Rodríguez, Colombia
Luz A. Rodríguez is an assistant professor at the School of Environmental and Rural Studies at Pontificia Universidad Javeriana. She holds a degree in economics and a Ph.D. in environmental policy from Duke University. She has more than fifteen years of experience exploring issues related to the collective governance of common resources, following socioecological systems frameworks, and its intersections with environmental justice and peacebuilding. She has participated in interdisciplinary research projects in Colombia and Mexico following multimethod approaches that combine qualitative and quantitative tools with participatory research to study the governance of common-pool resources and the vulnerability of rural communities to deal with changes associated with climate change and social instability.

Mabrouk Laâbar, Tunisia
Mabrouk Laâbar is a researcher at the Arid Regions Institute in Tunisia that is a public research institute in charge of conducting research on agricultural development and natural resource conservation in the arid zones of the country, specifically in Southern Tunisia where the average annual rainfall is less than 200 mm per year. In his current post at the Laboratory of Economy and Rural Communities, he is actively involved in research on managing natural resources in the context of Southern Tunisia. Before joining the Arid Regions Institute in 2019, he worked as a civil servant at the Ministry of State Domains and Land Affairs in Tunisia for about eight years. He holds a Postgraduate diploma in general management from the National School of Administration in Tunisia, a Master's degree in mathematical economics and econometrics from the University of Tunis El Manar, and a Bachelor's degree in quantitative methods from the University of Sousse in Tunisia.

Mai Nusir, Jordania
Mai Nusir is an environmental engineer and economist. She holds an MSc in Regional and Environmental Economics from Corvinus University of Budapest (2021) and a BSc in Civil Engineering from the Jordan University of Science and Technology (2019). Currently pursuing her doctoral research at Brandenburg Technical University (Cottbus-Senftenberg), funded by DAAD within a global climate research center in the Middle East, she focuses on institutional economics and natural resource management, specifically on the management of common-pool resources within tribal and Indigenous communities in Jordan.

Manoel Auffray, France
Manoel Auffray holds a PhD in Geography from the University of Toulouse. His research focuses on how food systems policies and actors are affected by contemporary social and ecological changes. He has worked several years on the political ecology of grasslands in southwest France, analyzing how spatial government instruments were affecting socioenvironemental relations and subjectivities. Currently based at the University of Bordeaux, he works as a postdoc with farmers and citizens involved in a local food democracy initiative, using an economic sociology approach to understand innovative ways to face multiple crisis.

María Eugenia Amorós, Uruguay
María Eugenia Amorós is a Uruguayan working in Montevideo, at the Faculty of Chemistry, Universidad de la República of Uruguay, in the Laboratory of Chemical Ecology. She Is an Agricultural Chemist, with postgraduate studies in Agricultural Sciences and she Is currently doing postdoctoral work.
She teaches under-graduate biology at the university and do research in agricultural sciences. Her primary research focus is the development of sustainable pest management strategies tailored to Uruguay's agricultural sector, with a strong emphasis on low-impact methodologies. She Is the fourth generation of an immigrant family, which has deep roots in Uruguay's agricultural history. Her ancestors actively contributed to the early days of sugar cane cropping and industrialization in northern Uruguay, and they were instrumental in the founding of CALPICA—the organization she presents as case study for this project.

Marin Cvitanović, Croatia
Principal academic in human geography at Bournemouth University, UK. His main areas of interest are socio-environmental systems, with an emphasis on human drivers of land use/cover changes, and cultural ecosystem services. His work is rooted in geography, but his interests extend to environmental history, biology, cultural studies, social psychology and political science. His previous research focused on post-socialist landscape transformation in Croatia, human-induced mangrove changes in East Africa, endangered species' habitat fragmentation in the UK, and the evolving significance and functions of urban allotments in Zagreb, Croatia.

Michael Cox, USA
Michael Cox is an environmental social scientist specializing in environmental governance, with a particular emphasis on community-based natural resource management. He has conducted extensive fieldwork in the Southwestern United States and the Dominican Republic. His first book, "Common Boundaries
The Theory and Practice of Environmental Property", delves into the significance of environmental property rights across academic disciplines, cultures, and types of environment policy. Additionally, Cox co-hosts the In Common Podcast, which features discussions of the lives, research, and endeavors of scholars and practitioners dedicated to fostering sustainable human-environment interactions.

Michael Schoon, USA
Michael Schoon is a professor in Arizona State University's School of Sustainability, focusing on policy and governance in sustainable systems. His dissertation work at Indiana University's Ostrom Workshop in Political Theory and Policy Analysis focused on transboundary conservation in southern Africa, which won the American Political Science Association's best dissertation award. His current work on collaborative governance in response to environmental dilemmas in Arizona and Ecuador looks at the institutional resilience of social-ecological systems. He is a board chair of the Resilience Alliance and on the science board for Future Earth's Programme on Ecosystem Change and Society. He was the past editor-in-chief of the International Journal of the Commons.

Mogamat Igshaan Samuels, South Africa
Dr Igshaan Samuels is a specialist researcher in rangeland ecology and pastoralism for the Agricultural Research Council in South Africa. He has worked in dryland pastoral landscapes and biodiverse ecosystems for almost 20 years. His research focuses on the dynamics of pastoralism on indigenous lands, plant ecology, climate change adaptation and plant-animal interactions particularly in the arid zone and has led several international and national projects under these themes. Dr Samuels is the Global Co-chair for the International Support Group for the United Nations declared International Year of Rangelands and Pastoralists in 2026. He is also a member of the International Rangeland Congress continuing committee.

Oginot Germier Manasoa, Madagascar
Oginot Germier Manasoa is a PhD student at CIRAD and the Ecole Doctorale de la Gestion des Ressources Naturelles et Développement at the University of Antananarivo. His research focuses on the governance of extensive pastoral areas from three angles: the rules and land rights of agropastoralists, the interaction of agropastoralists with other actors and authorities, and land tenure security. He draws on institutional economics in his approach, and seeks to better understand the extent to which Ostrom's commons may be similar to or different from pasture land, and which legal tool for land security meets the needs of agropastoralists and other stakeholders. Trained as an agricultural engineer, he graduated from the Ecole Supérieure des Sciences Agronomiques in Antananarivo before embarking on research into land tenure, natural resource governance and pastoralism. Mr. Manasoa is a founding member and current coordinator of Think Tany, a think tank on land issues in Madagascar.

Oscar Miranda Rodríguez, México
Oscar Miranda Rodríguez is a native of the municipality of Ixmiquilpan, in the state of Hidalgo. Graduate in Social Anthropology from the Universidad Autónoma del Estado de Hidalgo. Master of Science in Rural Development from the Colegio de Postgraduados. He is currently pursuing a PhD in Rural Development at the Colegio de Postgraduados. Project in which he has participated as a student in training: “Historia hidráulica de la subcuenca del río Tula, siglos XVI-XX”; with Dr. Verenice Cipatli Ramírez Calva as project manager, and currently in the project: “Pueblos, caminos, haciendas, ranchos, minas y el abasto de agua en la subcuenca del río Actopan, siglos XIX y XX”, with Dr. Emmanuel Galindo Escamilla as the head of the project. The topics he has focused on are: social organization, peasantry, political ecology, natural resources and social property.

Paola Gatto, Italy

Rike Stotte, Austria
Rike Stotten is associate professor at the Institute of Sociology, University of Innsbruck and leads the working group Rural Sociology. Her research focuses thematically on Rural Sociology and Agro-Food Studies and spatially on mountain areas. Here, she is interested in the manifold relationships and interconnections between urban and rural areas, production and consumption, as well as the underlying processes, structures and power relations. She is spokesperson of the Rural Sociology Section of the Austrian

Sociological Association and deputy spokesperson of the Mountain Agriculture Research Unit at the University of Innsbruck. She worked as a research assistant at the Institute for Spatial and Landscape Development at the Swiss Federal Institute of Technology Zurich and at the Competence Centre for Urban and Regional Development at the Lucerne University of Applied Sciences and Arts. She obtained her habilitation in 2023 with her work on 'European Mountain Areas as Socioscapes: An Integrative Perspective in Rural Sociology'.

Sabina Vlad, Romania
Sabina E. VLAD is a postdoctoral researcher at Ovidius University of Constanța, Romania. Her research primarily focuses on understanding how anthropogenic alterations, biological invasions, habitat characteristics, and environmental conditions influence wildlife ecology, with a particular emphasis on the life history and adaptations of ectothermic vertebrates. Additionally, her work highlights social-ecological research, utilizing social surveys to examine public perceptions, disturbances, and environmental awareness. These surveys address topics such as human-wildlife interactions within protected areas and habitat restoration in ecosystems affected by human impact.

Sebastián Restrepo Calle, Colombia
Sebastián Restrepo Calle holds a degree in Environmental and Natural Resource Management from the Universidad Autónoma de Occidente, a master's in environmental management, and a PhD in Environmental and Rural Studies from the Pontificia Universidad Javeriana. He currently serves as an Assistant Professor in the Department of Rural and Regional Development and as the Ecology program Director at the Pontificia Universidad Javeriana. His research interests encompass studying environmental governance structures and analyzing socio-ecological systems in the context of rural transitions in Colombia.

Tejendra Pratap Gautam, India

Thea Xenia Wiesli, Austria
Thea Xenia Wiesli is a postdoctoral researcher at the Institute of Sociology of the University of Innsbruck. She is a member of the research Group "Rural Sociology". Her research involves sustainable development, food studies, meat consumption and regional sociology. She teaches sustainable development, rural sociology, and qualitative and quantitative empirical methods. She completed her PhD in Sociology at the Centre for Development and Environment (CDE) of the University of Bern in February 2022. In her thesis, "Quality of Life in Context of Sustainable Development", she explored the connection between sustainability and quality of life in rural areas and nature parks. In additional research projects, she focused, for example, on village relocations in Switzerland and food justice in Brazil and Switzerland. Her research has been published in peer-reviewed international journals and presented at international conferences and third mission events

Tungalag Ulambayar, Mongolia
Dr. Tungalag Ulambayar (Tungaa) works for the Zoological Society Luujin, a Mongolian conservation NGO. Tungaa holds a Ph.D. in Rangeland Ecosystem Science from

Colorado State University, where she studied community-based rangeland management, pastoral institutions and common property resources theories. Tungaa has extensive experience with various international organizations, including leading the Environment and Disaster Risk Reduction team at the United Nations Development Programme in Mongolia and advising to the Minister of Environment and Tourism of Mongolia. Tungaa was one of the pioneering facilitators of Participatory Rural Appraisal for community-based natural resource management in Mongolia. Currently, she is an independent member of the Science Policy Interface, UNCCDD and a member of the Continuing Committee of the International Rangeland Congress.

Valerien O. Pede, Philippines

Virginia Rosa Coletta, Italy
Post-doc Research Fellow at the Water Research Institute – National Research Council (IRSA-CNR) of Bari, Italy. Her research focuses on the analysis and management of complex eco-socio-hydrological systems, particularly within the Water-Energy-Food-Ecosystem Nexus framework. She has worked on several EU and international projects, including REXUS, LENSES, RESET (H2020-funded), CUSSH (Wellcome Trust-funded) and CAMELLIA (UKRI-funded), developing integrated hydrological and socio-hydrological models to support sustainable water resource management. Her expertise includes integrated modelling (such as participatory System Dynamics modelling) for flood risk mitigation, irrigation management, and Nature-Based Solutions co-design. She collaborates with multidisciplinary teams to assess strategies for increasing eco-socio-hydrological system resilience. Her work also involves multi-stakeholder governance approaches for water-related risk management, with a strong focus on adaptation to climate change impacts.

Wenxiu Chi, China
Wenxiu Chi is a PhD candidate in Department of Landscape Architecture, School of Architecture, South China University of Technology. Her research interests include landscape governance, community resource management (especially the blue infrastructure in rural areas). Her PhD dissertation focuses on the dike-pond system in the Pearl River Delta, China, and delved into the relations between community management and landscape outcomes.

Witness Kozanayi, Zimbabwe
Witness Kozanayi is a holder of a Ph. D in Environmental and Geographical Sciences from the University of Cape Town, South Africa, an MSc in Environmental Management for Business from Cranfield University, U.K., BSc (Agriculture Management) and a Diploma in Agriculture, both from Zimbabwe. He is a researcher cum development expert in the field of agriculture, natural resources management and rural livelihoods in southern Africa. He has worked in academia and local and international Non-Governmental Organizations. Much of this work has been carried out in Zimbabwe, Zambia, Malawi, and South Africa. His specific interest lies at the interface between customary and statutory forms of governance and how this duality affects livelihoods and ecological outcomes. He is the Chairperson of the Department of Wildlife and Fisheries Management at Marondera University of Agricultural Sciences and Technology, Zimbabwe.

Xiangyu Jia, China
Xiangyu Jia (贾翔宇) is a PhD candidate in the Department of Environmental Management at Peking University. He graduated from the College of Environmental Sciences and Engineering at Peking University. His research focuses on the property institutions and their evolution within the rangeland commons on the Tibetan Platuea. He is a visiting researcher at the University of Zaragoza from 12.2023 to 12.2024. He is also a collaborator of the European project RESILIENT RULES, which aims to quantify institutional diversity in agricultural systems at a global scale and to assess the relationship between institutional diversity and long-term resilience.

Yingjun Qi, China
Yingjun Qi, Doctor of Science, is currently a Xingnong Young Scholar in the Department of Agricultural Economics, College of Economics and Management, China Agricultural University. He received his Ph.D. in Environmental Science from Peking University in 2021, and was a postdoctoral researcher at Peking University from 2021 to 2023. His research mainly focuses on socio-economic development and ecological protection in grassland pastoral areas, climate change and pastoralists' climate adaptive behavior, community-based grassland resource governance and collective action, evolution of property right system of grassland resources, and green transformation of grassland animal husbandry. He has published more than 10 academic articles in SSCI/SCI journals and Chinese CSSCI journals. He has chaired one China Postdoctoral Science Foundation grant project and one doctoral dissertation fellowship project of China Institute for Rural Studies, Tsinghua University, and participated in a number of projects of the National Natural Science Foundation of China, "One Belt, One Road" project of National Administration of Foreign Experts Affairs, and projects of National Forestry and Grassland Administration.

Zarina Aranda, Paraguay
She is a committed professional with broad experience in rural development, academia, and interdisciplinary research. Her career began with a degree in Human Ecology Engineering from the National University of Asunción, followed by work at the Ministry of Agriculture, where she gained hands-on experience in rural organization and development. She holds master’s degrees in Territorial Rural Development and Social Anthropology, and is currently pursuing a PhD in Social Sciences at the National University of Jujuy, Argentina. Her research focuses on culture, women, and sexuality within rural contexts. She has served as a technical lecturer at the National University of Asunción and contributed to both the General Directorate of University Extension and the Directorate of Postgraduate and International Relations. Throughout her career, she has developed key skills in project management, leadership, and problem-solving. Passionate about continuous learning, she seeks to keep growing and contributing meaningfully to her field.

3. Scientific Advisory Board

Andrés Baselga, PhD. Associate Professor at University of Santiago de Compostela, Spain. He is a quantitative ecologist with a research focus on the ecological process that organizes biodiversity. His research is framed within the disciplines of community ecology and biogeography.

Marco A. Janssen, PhD. Director of the Center for Behavior, Institutions, and the Environment and Professor at School of Sustainability, Arizona State University, USA. He is an internationally recognized expert on the governance and resilience of social-ecological systems.

Ruth Mace, PhD. Professor of Evolutionary Anthropology at University of Oxford, UK. She specialises in the evolutionary ecology of human demography and life history, and in phylogenetic approaches to culture and language evolution.

Tine de Moor, PhD. Professor of Institutions for Collective Action in Historical Perspective at the Department for Social and Economic History of Utrecht University, Netherlands. She is an international expert on the long-term historical evolution of rural commons.

Saba Siddiki, PhD. Associate Professor of Public Administration and International Affairs and a Senior Research Associate in the Center for Policy Research at Syracuse University, USA. Her research focuses on policy design, collaborative policy making, and regulatory implementation and compliance. She is the organizer of the Institutional Grammar Research Initiative (IGRI).

4. External Ethics Board

Lydia Feito Grande, PhD. Associate Professor and Director of the group Research in Bioethic, deliberation and Applied Ethic (BDEA) at Complutense University of Madrid.

Manuel López Baroni, PhD. Associate Professor at University Pablo Olavide, Spain, member of the Observatory of Bioethic and Law, and Co-director of the Master in Bioethics and Law at University of Barcelona.

Ricard Martínez Martínez, PhD. Associate Professor at Valencia University, Spain and Director of the Cátedra de Privacidad y Transformación Digital Microsoft-UV. He is the Data Protection Delegate of many Universities in Spain.

5. Study description

RESILIENT RULES is an interdisciplinary research project focused on studying the variety of rules and norms (i.e., institutional diversity) that agricultural communities use to govern shared resources (e.g., grazing land, irrigation waters). It aims to study the spatial and temporal patterns of such diversity and to understand its contribution to long-term resilience under global changes (**Appendix A**).

RESILIENT RULES focuses on institutions of small-scale agricultural systems distributed across a full range of biogeographic and cultural regions of the world. Around 50 agricultural and pastoral communities will be studied (**Appendix B**) using semi-structured interviews with key stakeholders and recompilation of institutional documentation (i.e., written regulations shared by actors of the community). Factors such as isolation, net primary production, political regimes, or world biomes were used to select case studies.

Written and oral institutions will be codified using the typology and taxonomy of rules, and the institutional grammar. An interdisciplinary approach will subsequently be applied to the resulting codification for quantifying institutional diversity and the evolution of institutions.

6. Data collection

Here we describe the list of activities occurring before (preparation), during (development), and after (processing) fieldwork. This protocol is designed to avoid bias and ensure accuracy and compliance with the ethical standards of the European Union and the data protection and ethical requirements of the countries were the case studies are located. The external collaborators with an ethical board from their own institutions must also follow their own institutions' guidelines. Research collaborators will be invited to participate in the RESILIENT RULES project (**Appendix C**) and will sign an adhesion with the study protocol agreement before starting their participation in this project (**Appendix D**).

6.1. Preparation of fieldwork

6.1.1. Workshop program

Before starting fieldwork, research collaborators will attend a workshop entitled "Evolution of institutional diversity" to learn about the aims of the project, the key concepts and the methods for the collection of rules and norms, to practice all the steps of data collection and data sharing, and to review all the fieldwork materials (**Table 1**). During the workshop, aspects related on how to conduct a good qualitative interview (**Appendix E**), the initial socio-ecological assessment of each case study (**Appendix F**), the safety protocol and the strategy for obtaining local ethical approval (**Appendix G**) will be discussed. Also, the translation of the interview guide, information to participants, and other documents directly translated to the language of the communities by means of direct translator applications will be revised.

- **Theory of common-pool resources**

Shared or common-pool resources, such as water, pastures, and fisheries, are natural or cultural resources that are shared by many people. Because of their high substractability and difficulty of exclusion, it is challenging to implement sustainable management practices, and this often leads to a social dilemma known as the “tragedy of the commons”. While it was once recommended that state control or private property regimes were the only solutions to avoid the tragedy of the commons, many studies have shown that resource users can self-organize to prevent the overuse of shared resources. Establishing effective local institutions that limit access and regulate harvesting practices, is essential to enable individuals to use the resources in a sustainable manner over a long period of time. Examples of long-enduring common-pool resource institutions are the irrigation systems in the east of Spain or the hybrid systems of private and communally owned institutions in the Swiss Alpine meadows. Elinor Ostrom's work established the theoretical framework for the study of institutions and identified design principles associated with robust institutions that have successfully governed common-pool resources for generations (**Table 2**).

Table 1. Contents of the workshop "Evolution of institutional diversity"

Topic	Main contents
Theoretical and methodological background	Common-pool resources theory: • Type of goods • Design principles • Polycentricity • Coupled Infrastructure System (CIS) framework • Resilience and outcomes of social-ecological systems • Rules typology and taxonomy • Institutional grammar
Assessment of case studies	Presentation of the Case Studies Social-ecological Initial Assessment
Research tools and selection of research participants	Selection and characteristics of informants Characteristics of a good interviewer and qualitative interview Interview guide Case study log Protocol to collect written regulations
Research tools and ethics issues	Study protocol before, during, and after fieldwork Safety protocol Ethics and open science Informed consent procedures Data transfer and data protection protocol

- **The Institutional Analysis and Development (IAD) Framework**

To analyze and understand the institutions and governance systems that shape human interactions and decision-making, particularly in the context of common-pool resources and collective action problems, Ostrom proposed the Institutional Analysis and Development (IAD) framework (**Figure 1**). This framework is designed to capture the complexity of social interactions with rules and norms in all possible situations (e.g., agricultural systems, schools, markets, etc.).

Using as example the trade of organic products between farmers and consumers, the elements of the IAD framework are the following: The action arena is the physical and social context where the trade of organic products between farmers and consumers takes place. It embraces the participants and the action situation. The participants are the farmers who produce organic products and the consumers who purchase and use these products. Other relevant stakeholders may include certification bodies, regulatory agencies, retailers, and intermediaries involved in the supply chain. The action situation refers to a specific set of conditions within the action arena where participants make choices and take actions regarding the trade of organic products. It involves decision-making processes, resource allocation, negotiation of contracts, and compliance with rules and regulations. The interactions refer to the relationships, exchanges, and communication among participants within the action situation. In the trade of organic products, interactions can include negotiations between farmers and consumers, supply and demand dynamics, information sharing about farming practices, market feedback mechanisms, and collaboration between actors in the supply chain. The **outcomes** represent the results or consequences of the interactions and actions within the action situation. In the context of organic product trade, can be economic, environmental and

social outcomes like income generation for farmers, reduced use of synthetic chemicals, and consumer trust and satisfaction. The **evaluative criteria** are the measures or criteria used to assess the performance, effectiveness, and sustainability of the system. In the trade of organic products, evaluative criteria can be the economic efficiency (e.g., profitability), environmental sustainability (e.g., reduced pollution), social equity (fairness and equity in the distribution of benefits and costs among stakeholders, including farmers, consumers, and other actors in the supply chain), and institutional legitimacy (the credibility and acceptance of the rules, regulations, and institutions governing organic product trade).

Table 1. List of Ostrom's design principles reviewed and reformulated by Cox et al. (2010) for successfully governing the commons.

Principle	Description
1A User boundaries	Clear boundaries between legitimate users and nonusers must be clearly defined.
1B Resource boundaries	Clear boundaries are present that define a resource system and separate it from the larger biophysical environment.
2A Congruence with local conditions	Appropriation and provision rules are congruent with local social and environmental conditions.
2B Appropriation and provision	The benefits obtained by users from a common-pool resource (CPR), as determined by appropriation rules, are proportional to the amount of inputs required in the form of labor, material, or money, as determined by provision rules.
3 Collective-choice arrangements	Most individuals affected by the operational rules can participate in modifying the operational rules.
4A Monitoring users	Monitors who are accountable to the users monitor the appropriation and provision levels of the users.
4B Monitoring the resource	Monitors who are accountable to the users monitor the condition of the resource.
5 Graduated sanctions	Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and the context of the offense) by other appropriators, by officials accountable to the appropriators, or by both.
6 Conflict-resolution mechanisms	Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.
7 Minimal recognition of rights to organize	The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.
8 Nested enterprises	Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.

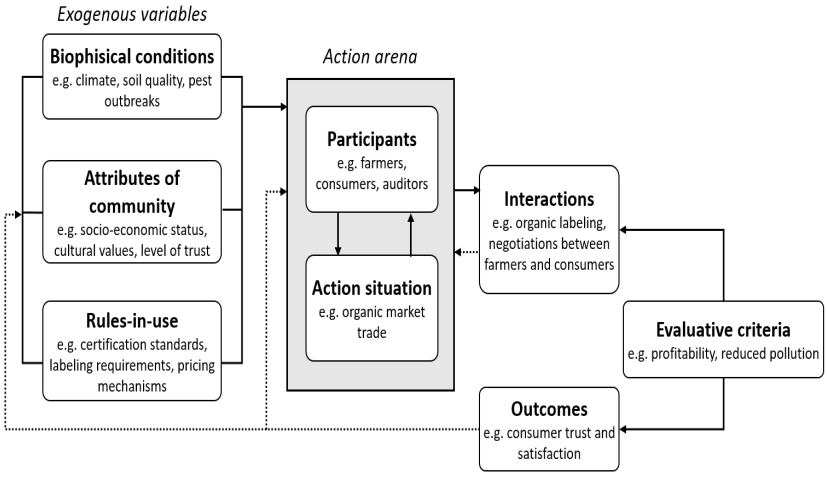


Figure 1. Institutional Analysis and Development Framework (adapted from Ostrom, 2005).

The action arena does not take place in a vacuum. Participants interact in an action situation that is influenced by a broader context. This context involves some **exogenous variables**, which are external factors that influence the dynamics of the system but are beyond the immediate control of the actors involved, like biophysical conditions, attributes of the community, and rules-in-use. The **biophysical conditions** are the natural conditions that affect organic farming, such as climate, soil quality, availability of water resources, and pest pressure. The **attributes of the community** refer to the characteristics and attributes of the community of farmers and consumers involved in the organic product trade. It includes factors like their socio-economic status, cultural values, level of trust, access to resources, and knowledge about organic farming practices. The **rules-in-use** encompass the existing norms, formal and informal regulations, and market mechanisms that govern the trade of organic products. For example, certification standards, labelling requirements, pricing mechanisms, and quality assurance processes.
The structure of all action situations can be analyzed using a common set of variables (**Figure 2**). **Participants** are assigned to **positions** that represent their roles or identities within the system. In the organic trade, farmers are assigned the position of organic producers. They are responsible for growing and harvesting organic crops, following organic farming practices, and meeting certification requirements. Consumers are assigned the position of buyers of organic products. They have the role of purchasing and using organic products based on their preferences, health considerations, and environmental concerns. According to the position, there are choices and behaviors (**actions**) that participants can take. For example, farmers choose organic farming practices, invest in organic inputs, and comply with certification standards. Consumers take actions such as researching and identifying organic products and purchasing organic products from specific suppliers or retailers.
In an action situation, participants have varying degrees of **information** about the system and **control over** the **potential outcomes** of their **actions**. In trading organic products, participants need information about factors such as organic certification, product quality, availability, price, and the environmental and health benefits of organic products. Farmers and consumers gather information to make informed choices and decisions about their commercial actions. Farmers have control over outcomes related to the quality of their organic products, compliance with certification standards, crop yields, and financial

returns, while consumers have control over their own satisfaction with the organic products they purchase and use.

Potential outcomes in an action situation are associated with **net costs and benefits** for participants, which function as incentives and disincentives. Farmers may experience benefits such as higher prices for organic products, increased demand, access to niche markets, and enhanced reputation for sustainable farming. They may also face costs related to certification expenses, additional labor or management requirements, and market risks. On the other hand, consumers may experience benefits such as access to healthier and environmentally-friendly products, supporting sustainable farming practices, and aligning with personal values. Costs may include higher prices compared to conventional products and potential dissatisfaction with product quality or availability.

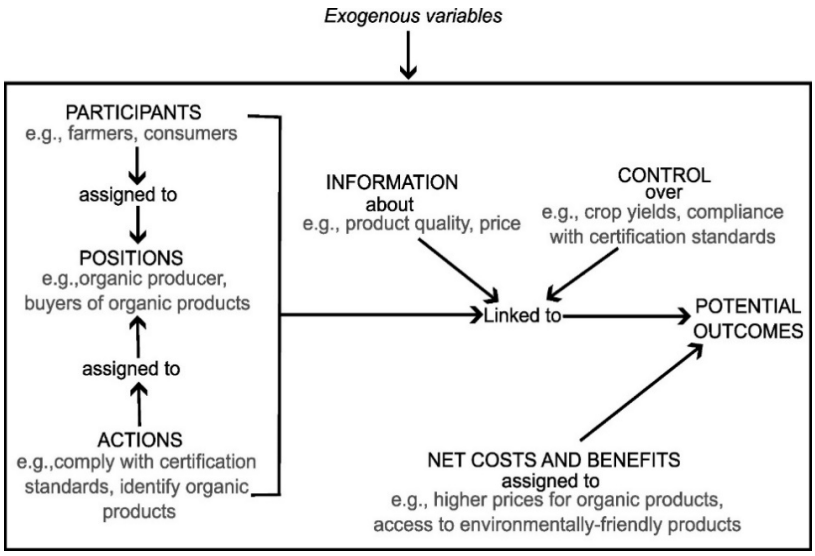


Figure 2. The internal structure of an action situation (adapted from Ostrom, 2005).

- **Classification of rules**

The IAD framework, especially the structure of action situations, is the basis for Ostrom's proposal to classify rules. In a broader sense, we can distinguish between rules-in-form and rules-in-use, which are concepts used to describe the ways in which rules and regulations operate in different settings:

• *Rules-in-form* (formal rules) refers to the official, written rules and regulations that are established by authorities or organizations. These rules can take the form of laws, policies, or formal procedures. They are often created to provide guidance or control over behavior in specific contexts, such as in the workplace or in public spaces.

• *Rules-in-use* (informal rules) refers to the actual practices, customs, and behaviors that people engage in when they are interacting with each other and with the world around them. These can be written and unwritten rules that guide our behavior, such as social norms, traditions, and habits. For example, in a pastoralist community there may be an unwritten rule that, despite the existence of private properties, access to water points is shared among the pastoralists, especially in drought periods. These rules-in-use can often differ from the official or written rules that are put in place to regulate behavior.

The relationship between rules-in-use and rules-in-form is complex, and it is not always the case that the formal rules are followed or even known by people in a given context.

Table 2. Ostrom's classification of types of rules.

Type of rule	Definition
Position	Specify a set of positions and how many participants hold each position. Position rules allocate roles and responsibilities, establish hierarchies, and define decision-making power. These rules define the rights and duties of individuals within a community.
Boundary	Specify how participants are chosen to hold these positions and how participants leave these positions. These rules define: (1) who is eligible to enter a position, (2) the process that determines which eligible participants may enter (or must enter) positions, and (3) how an individual may leave (or must leave) a position.
Choice	These rules govern the actions that individuals can take within a community. Choice rules set out the options available to individuals and the conditions under which they may be exercised. Specify what a participant occupying a position must, must not, or may do at a particular point in a decision process in light of conditions that have, or have not, been met at that point in the process.
Aggregation	Determine whether a decision of a single participant or of multiple participants is needed prior to an action at a node in a decision process. These rules determine how individual actions are combined to produce collective outcomes within a community.
Information	Information rules affect the level of information available to participants. They authorize channels of information flow among participants, assign the obligation, permission, or prohibition to communicate to participants in positions at particular decision nodes, and the language and form in which communication will take place. These rules govern the flow and use of information within a community, determining what information is available, how it is accessed and shared, and how it is used to inform decision-making.
Payoff	Assign external rewards or sanctions to particular actions that have been taken or to particular outcomes. These rules directly impact the net costs and benefits of actions or outcomes for actors in an action situation.
Scope	Affect a known outcome variable that must, must not, or may be affected as a result of actions taken within the situation. Scope rules affect the width of the outcome space (number of state variables affected), and specify the range on each outcomes variables included in that space.

Often, people's behavior is influenced by a combination of both types of rules, as well as other factors such as individual values, beliefs, and attitudes.

Ostrom introduced a classification system for studying and understanding institutions by categorizing rules. The classification is based on identifying the element within an action situation that is most directly affected by each rule. The elements include participants, positions, actions, outcomes, information, control, and costs/benefits (**Figure 2**). In line with this approach, there are seven overarching types of rules, namely position rules, boundary rules, choice rules, aggregation rules, information rules, payoff rules, and scope rules (**Table 3**). This classification framework allows for a structured analysis of the wide variety of rules that shape institutional arrangements. The Resilient Rules team has created a new taxonomy of rules, incorporating tiers into the seven types of rules to recognize the diversity and complexity within them.
In *RESILIENT RULES* in-depth interviews are used to collect the rules-in-use in small-scale agricultural systems. The interview guide has been structured according to this typology of rules in order to try to collect them all (**Appendix H**).

- **Institutional statements and institutional grammar**

Introduced by Crawford and Ostrom in 1995, the Institutional Grammar (IG) is a standardized approach that enables consistent analysis of individual institutional statements. Parsing individual institutional statements with the institutional grammar and the rule typology allows for a greater understanding of the effect of rules within action situations. The IG decomposes all institutional statements into six basic elements (**Table 4**). One letter of each grammatical elements gives the acronym ADIBCO to this type of tool. Based on the presence of different syntactic elements, institutional statements can be classified as strategies (AIC or AIBC), norms (ADIC or ADIBC), or rules (ADICO or ABDICO). With the IG, researchers and practitioners can systematically analyze institutional statements and gain a deeper understanding of their underlying structure, function, and efficacy their efficacy, and propose recommendations for improvement.

Table 3. Components of institutional statements.

Component	Definition
Attribute	The actor to which the statement applies
Deontic	It tells if an action is permitted, required, or forbidden
aIm	Generally a verb that describes the goal of the institutional statement and the action to which the deontic refers
oBject	The thing that receives the action specified by the aim as acted on by the attribute
Context	When or where an action may, must, or must not take place
Or else	The consequence or sanction of not following a rule

An example of the application of institutional grammar is: “Farmers must comply with certification standards. Non-compliance will entail the immediate loss of organic certification.” Attribute = “farmers”, Deontic = “must”, aIm= “comply with certification standards”, Context = by default “always”, Or else = “immediate loss of organic certification”.
Since many of the rules collected by RESILIENT RULES will come from the in-depth interviews, the interview guide has been specifically designed to cover not only all types of rules, but also to try to capture all elements of the institutional grammar (**Appendix**

H). With all the rules collected, the institutional grammar will be used to analyze the strategies, norms, and rules that small-scale agricultural systems use to collectively manage natural resources, and then quantify their diversity and evolution.

- **Resilience**

The agricultural systems studied in *RESILIENT RULES* are examples of what are known as socio-ecological systems. These are complex and interconnected systems made up of social and ecological components that interact and influence each other. Changes in social dynamics, such as population growth, economic activities, or governance structures, can have profound effects on ecological systems. Similarly, ecological changes, such as climate change, habitat degradation, or resource depletion, can have significant social impacts, affecting livelihoods, well-being, and cultural practices of resource users. In the context of social-ecological systems, resilience refers to the capacity of a system to persist, adapt, and (if necessary) transform in the face of disturbances or changes, while maintaining essential functions, structures, and feedbacks. A resilient social-ecological system is able to absorb and recover from shocks, disturbances, or stresses, and to adapt to changing conditions, without losing its identity or key functions. Resilience is not a fixed property of a system, but rather a dynamic and adaptive capacity that emerges from the interactions between the components of the system and the external drivers and pressures. It depends on the diversity, redundancy, modularity, and connectivity of the components, as well as the feedbacks, learning, and innovation processes that enable the system to adjust and reorganize. Resilience is therefore an important concept for understanding and managing complex and dynamic social-ecological systems, particularly in the face of global changes and uncertainties. Some important concepts related with resilience include adaptability, robustness, stability, transformability and vulnerability. For definitions, see the Glossary.

The capacity of a social-ecological system to cope with a particular type of disturbance or shock is known as specific resilience ("resilience of what to what"), i.e., the resilience of a specific component or subsystem of the system to a particular type of stressor. For example, the resilience of a livestock farming system to droughts. On the contrary, general resilience considers the overall system's capacity to adapt to disturbances or shocks, even unexpected, and to transform in response to new conditions. Both general and specific resilience are important for the long-term sustainability and functioning of social-ecological systems.

Several methodological approaches allow us to measure or assess the resilience of social-ecological systems. Depending on the nature of the approach, we can distinguish between 'objective resilience' and 'subjective resilience'. The former, refers to the actual capacity of the social-ecological system to absorb and recover from disturbances or changes. This can include factors such as the diversity of species or resources, the presence of redundant systems, the level of connectivity and feedbacks within the system, and the availability of adaptive management strategies. Objective resilience is based on measurable criteria and can be assessed through quantitative or qualitative indicators. On the other hand, subjective resilience refers to the perception of individuals or communities about their ability to adapt and cope with environmental or social changes. It reflects their beliefs, values, and attitudes towards the changes and their perception of their own ability to cope with them. This perception can influence the actions taken by

individuals or communities to address the changes and can impact the overall resilience of the system.

RESILIENT RULES will measure subjective resilience of small-scale agricultural systems to climate change. To do this, the Subjective Evaluation of Resilience Scale (SERS) will be used. The SERS is a self-report questionnaire designed to assess individuals' subjective perceptions and evaluations of their own resilience using a Likert Scale of five points (1=strongly disagree, 5=Strongly agree). It captures individuals' beliefs, attitudes, and feelings regarding their ability to cope with and recover from adversity or challenges. It typically consists of a series of items or statements related to different aspects of resilience, such as personal strengths, problem-solving abilities, social support, and positive emotions. Participants are asked to rate their level of agreement or disagreement with each statement based on their own experiences and perceptions. *RESILIENT RULES* adapted the SERS questionnaire to analyze the resilience to climate change of the communities under study (**Table 5**).

Table 5. Adaptation of the SERS survey to study the subjective perception of resilience to climate change in the studied communities. (1=strongly disagree, 5=Strongly agree)

	1	2	3	4	5
Your *community* can bounce back from any challenge the ***climate*** throws at it.	☐	☐	☐	☐	☐
During times of ***climate-related hardship***, your *community* can change its primary income or source of livelihood if needed.	☐	☐	☐	☐	☐
If ***climate*** threats to your *community* became more frequent and intense, your community would still find a way to get by.	☐	☐	☐	☐	☐
In times of ***climate-related hardship***, your *community* can access the financial support it needs.	☐	☐	☐	☐	☐
Your *community* can count on the support of its members when they need help with ***climate issues***.	☐	☐	☐	☐	☐
Your *community* can count on the support of politicians and the government when it needs help with ***climate issues***.	☐	☐	☐	☐	☐
Your *community* has learned important lessons from past hardships that will help it better prepare for future ***climate threats***.	☐	☐	☐	☐	☐
Your *community* is fully prepared for any future ***climate-related threats*** that may occur in your area.	☐	☐	☐	☐	☐
Your *community* receives useful information that warns you in advance of future ***climate-related risks***.	☐	☐	☐	☐	☐

6.1.2. Initial assessment of case studies

- **Social and ecological assessment**

The environmental, cultural, political, and sociodemographic contexts of the case studies, as well as the main social and ecological challenges they face today, and the main social,

institutional, and ecological changes that occurred in the last four decades will be assessed by research collaborators before starting fieldwork (**Appendix F**).

- **Assessment of potential risks for researchers**

Both the quality of research and the security of the researcher are a function of how well-planned the research is, taking into account the local context and the risk environment. All selected case studies are in *a priori* low-risk areas for researchers. However, previously to develop the fieldwork, an evaluation of the security risks for field researchers in each specific case study will be done. **Appendix G** identifies potential risk factors influenced by socio-political and environmental context and infrastructure availability, as well as common measures to address them. It also suggests a range of actions that can effectively reduce risk for the health and well-being of the researcher, as well as other risks to the person and associated to environmental threats. Research collaborators will specify the measures needed to reduce risk in each case study (**Appendix G**).

- **Assessment of potential risks for research participants and their communities**

The behavior of research collaborators in a community under study should reflect a commitment to scientific rigor, ethical practice, and social responsibility, avoiding risks for the participants and their communities. Research collaborators responsible for collecting data will identify potential vulnerabilities to the communities under study in order to design a specific protocol to protect them, prevent coercion and undue inducement, exacerbation of their vulnerability, stigmatization and minimize any health and wellbeing, personal and environmental risk. Local and international NGOs and other private and public organisms that could help research participants to solve specific risks (e.g., Red Cross, Human Rights Watch) will be identified (**Appendix G**). Research collaborators will discuss with the Principal Investigator about the best measures to reduce risk following the systematic risk assessment developed in the **Appendix G**. In addition, if an unexpected risk to research participants related to human rights, well-being, environmental and/or health risks is identified during fieldwork, research collaborators will inform the Principal Investigator to discuss the seriousness of the risk the appropriate actions to take (**Appendix G**).
Participants' personal information must be kept secure by research collaborators throughout their involvement in the project by encrypting the data, using passwords to access the data, keeping paper documents in a secure location, or using secure channels for data transfer. In the event of a personal data breach, the following steps will be taken: First, the research collaborator will report the data breach to the *RESILIEN RULES*' principal investigator, who will take the necessary actions. Second, the individuals whose personal data was affected by the breach will be notified.

- **Compliance with personal data transfer and local ethical requirements**

For countries outside Spain, a case-specific protocol to ensure compliance with the ethical and personal data transfer requirements of the countries where case studies are located needs to be developed. Research collaborators should use their experience conducting research in the case studies to determine the local institution(s) that needs to approve the study protocol (**Appendix G**). Institutions might include the Ethics Committee of the study region or country or the field researcher's institution. Local ethics

approval must be obtained before fieldwork. Information on the *RESILIENT RULES* project for submission to local ethics committees is available in **Appendix I**. Copies of approvals by the local ethics committees and/or regulatory approval will be kept on file. A detailed justification will be recorded if local ethics approval is not feasible (**Appendix G**). In the case of the absence of a local ethics committee, permission will be asked to the head of the community (e.g., village mayor or community chief or president) (**Appendix J**).

- **Selection of research participants**

The study subjects are elderly farmers, from 50 to 70 years old, both men and women, from a range of small-scale agricultural communities. If necessary, the age range will be broadening to ensure a sufficient sample size of five interviewees in each community. Priority should be given to interviewing community leaders, both current and past, for their in-depth knowledge of how the community has functioned.
Only adults able to give free prior informed consent will be involved in this project. Research collaborators are responsible of selecting potential study participants based on their experience in doing ethnographic research in the communities under study and ensuring that, on the one hand, they comply with the recruitment criteria and, on the other, they can verify that potential study subjects are able to give free prior informed consent. This last issue is especially important since potential study participants are elderly from small-scale agricultural communities, and it is expected that a relatively important proportion of the study participants might be illiterate. The need of a translator that speaks the specific dialect of potential research participants needs to be determined. Also, in order to integrate a gender perspective and to ensure inclusivity and fairness, a field assistant of the opposite gender of the research collaborator may be needed in certain communities (**Appendix G**). Lastly, research collaborators will identify the best procedure to request copies of written documentation of institutions in each case study (**Appendix K**).

- **Fieldwork planning**

Research collaborators can choose the order in which the five interviews are conducted (according to their own level of knowledge about the community rules associated with natural resources management). For example, it may be possible to conduct the first interview with an ordinary community member to get an overview of the rules governing natural resource management and then interview the current leader to elaborate on the types of rules. When contacting each potential interviewee, research collaborators should: (i) inform them of the general topic to be covered in the interview; (ii) arrange a date, time, and place for the interview, bearing in mind that it will last between one and a half to two hours; and (iii) request the presence of a witness to accompany them during the interview. All these steps will help to ensure that the interview will not be interrupted due to interviewee's time constraints and that the witness is present throughout the interview. However, if the interview has to be interrupted due to unforeseen circumstances, it can be resumed after an agreement has been reached with the interviewee. The same person can be interviewed and then be a witness in another interview, but not the other way around.

6.2. Development of fieldwork

6.2.1. Informed consent procedures for the research participants

Before interviewing a research participant, consent to participate must be obtained. Since in most of the cases a written consent cannot be provided (**Appendix L**), consent will be orally obtained following the next steps:

a) Follow the "Oral consent Script" (**Appendix M**) which includes information about the name and institution of the interviewer, the institution responsible for the research and finance source; project details and aims; the reason for selecting them as a potential study subject; a description of tasks, benefits, risks, rights, data sharing, access, confidentiality, and data storage, as well as ethics review details and data protection statement.

b) Give a copy of the "Information sheet" (**Appendix N**) translated to the language of the research participant. This sheet summarizes the objectives of the study, funding details of the project, and contact information of the principal investigator and the data protection unit of the University of Zaragoza.

c) If needed, the interviewer will use the help of a translator that speaks the specific dialect of the potential research participants.

If necessary, permission to participate will be obtained from family or community members of research participants in accordance with local customs and regulations (**Appendix O**). The person giving permission cannot act as a witness for the participant.

d) During the oral consent, the interviewer responds to any questions or concerns that the study subject might have. The interviewer evaluates the mental capacity of the interviewer. This is a qualitative assessment of the subject's understanding of the aims of the project, as well as the benefits and risks of their participation. It also includes an evaluation of whether the project conflicts with the personal values of the study subject or whether their emotional state hinders their participation. This assessment is done during the oral consent procedures by asking the participant to explain with their own words what they think we are studying in their community, what they think are their risks and benefits, and whether their personal values or emotional state interfere with their participation in this study. The research collaborator must assess the capacity of the participant by filling out the assessment of the participant's eligibility in the "Consent form", which also includes the interviewee's name, the interview's date and time, and a checklist confirming the consents given by the study subject (**Appendix P**).

If the researcher collaborator assesses the subject's incapacity to understand the project's aims and their benefits and risks, or that the study subject' personal values and emotional status can interfere with their correct participation (**Appendix P**), the subject is withdrawn from the study. If the interviewee is considered to be able to give free informed consent, the interviewer asks the participant consent to:

- Participate in this research project
- Be interviewed
- Be audio recorded
- Be photographed
- Be re-contacted to clarify/validate information
- Be asked about their name (to be written in the "Consent form", **Appendix P**)

The oral presentation of the consent information and interview is attested by an impartial witness. The witness must be a person selected by the participant, must be 18 years of age

or older, and must not be in an asymmetrical power relationship with the interviewee that could lead to coercion of the interviewee's answers. The witness observes the oral presentation and sign the “Consent form” in which s/he verify that the aims of the research have been clearly explained to the participant and that s/he did not observe coercion or intimidation by the field researcher or other member of the community or lack of understanding of the aims of the research or the rights as a research subject. The witness, previously consented, provides their name, relationship with the interviewee or position in the community, and contact information in the “Consent form” (**Appendix P**).

e) Once participation and audio recording consent is obtained, the interviewer starts the audio recording using a voice recorder provided by the Principal Investigator. The witness will be present during the interview. Research collaborators follow the script to introduce the interview which includes information about the name of the community or village of the interviewee, the date and time of the interview, and state that the interviewee has given consent to be interviewed, audio-recorded, and, if applicable, photographed (**Appendix H**), and after that proceeds with the interview guide. On the contrary, if consent for participation and audio recording is not obtained, interviewer acknowledges the time of the subject and stop their implication in the project.

f) Once the interview is completed, the research collaborator reads aloud the description of the community, previously prepared based on the initial social ecological assessment (**Appendix F**), to the interviewee to get their views on how they should be represented as an individual community in future publications and other project outcomes (**Appendix Q**). At the end of the interview, participants will be asked to consent to the retention of the data collected, including audio recordings of the interview, transcripts of the interview, photographs, and contact information for future use in documentary and research projects. Participants will also be asked to consent to the sharing of anonymized data with the scientific community and to specify the information that cannot be shared because of risks to the individual or the community (see addenda at the end of the "Consent form", **Appendix P**).

6.2.2. Rights and freedoms of the research participants

RESILIENT RULES follows the European General Data Protection Regulation 2016/679 and the Spanish Organic Law 3/2018 on data protection (*Protección de Datos y Garantías de los Derechos Digitales*) to safeguard the rights and freedoms of the research participants. During the consent procedure, interviewer clearly explain to the participants their rights and freedoms as research participants by using a language that they can understand (see the Oral consent script in **Appendix M**). Research collaborators make sure to build trust with the research participant and that the participant understands all their rights and freedoms (see the assessment of the participant's eligibility in the "Consent form", **Appendix P**). At any moment, research participants will be able to exercise their right to object, to data portability, to restrict processing, to erasure, to rectification, to access information, and to be informed by contacting the Principal Investigator, the head of the data protection unit of the Principal Investigator’s institution (*Delegado/a de Protección de Datos de la Universidad de Zaragoza* (dpd@unizar.es), or the Spanish Data Protection Agency (*Agencia Española de Protección de Datos* https://www.aepd.es). If needed, research collaborators act as the contact person and link between those institutions and the research participant. During the oral consent

procedure, research collaborators provide information about the rights of the participants. An information sheet with the contact information of the Principal Investigator and the above-mentioned data protection units is provided to research participants (**Appendix N**).

6.2.3. Benefits of participating in this research

RESILIENT RULES aims to contribute to value the importance of the rules and norms used by local communities for the long-term sustainable use of natural resources and as an important part of their intangible cultural heritage. Although research participants are not economically compensated, they have the opportunity to share the traditional practices they have used to cooperate and thus contribute to this knowledge.

6.2.4. Interview guide

The interview guide is designed to collect the present and past rules and norms used by agricultural communities to manage shared resources like water, land, and pastures as well as the associated public infrastructure (e.g., irrigation canals). The interview guide has the following structure (**Appendix H**): **(i)** a first section where the agricultural system is defined and characterized; **(ii)** a second section where present and past rules are collected; **(iii)** a third section where the linkages between rules and norms from organizations at different levels of governance are identified; **(iv)** a fourth section asking about changes in socio-ecological outcomes (number of members, quality and quantity of public resources and shared infrastructure, etc.) and additional changes in rules; **(v)** a fifth section where subjective resilience of the case study is measured; **(vi)** a sixth section to collect the sociodemographic and psychographic information of the participant. The interview lasts between 90 to 120 minutes.
During the interview, research collaborators will complete the “Case study log” (**Appendix Q**), which includes a closed-ended code to describe the case study and questions about resilience and other sociodemographic and psychographic characteristics. In accordance with the data minimization principle, only the necessary personal data to respond to the project’s objectives is collected. This data includes: the name of the research participant written in the "Consent form” (**Appendix P**), voice recorded during the interview, gender, age, and educational level. If consented, research participants will be photographed. Any other personal data, including sensitive personal data (i.e., racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or data concerning a natural person's sex life or sexual orientation), as listed in art.9 of the General Data Protection Regulation 2016/679, is not asked and will be removed from the transcripts if it is voluntarily expressed by the research participants during the interview. Thus, recorded information includes:

a) Individual level
- Age
- Gender
- Educational level
- Subjective perception of the resilience of the community (i.e., access to assets, flexibility to switch between strategies, social organization, learning)

• Subjective socio-cognitive constructs (i.e., risk attitudes and personal experience; perceived response capacity, and level of optimism, happiness, and satisfaction with life)

b) Community level

- Main religion and ethnicity
- Description of the agricultural activities
- Rules and norms used to govern shared natural resources (e.g., water, pasture, land)
- Rules and norms used to create and maintain public infrastructures
- Assessment of the status of the shared natural resources and public infrastructures, number of members of the community, and the level of trust, well-being and rule compliance
- Subjective measure of the resilience of the community

During fieldwork, it is important to store research participants' personal data securely, prioritizing privacy and data protection. Data privacy and protection help ensure that sensitive data is only accessible to approved parties. Some recommendations are to implement data encryption or to secure storage and access controls (store personal information on secure places or servers with limited access, implement robust access controls, including strong passwords, multi-factor authentication and role-based permissions to limit access to authorized personnel). The voice recorder and documents containing personal information about the interviewees are stored in the padlocked document holder provided by the Resilient Rules project.

6.2.5. Collection of written documents of regulations

Written documents of regulations (past and current) of the studied agricultural communities will be collected. Although the best protocol to request such information is discussed between the research collaborators and the core research team during the workshop, it can happen following the sequence explained in **Appendix K** which tries to anticipate a wide range of situations to obtain the written ordinances.
In general, the researcher collaborators will need to meet with a community representative (e.g., president, secretary) to present the project and explain the importance of obtaining written institutions from local communities. For this, the researcher collaborator must follow the script described in the **Appendix K** and give the "Information sheet" to the community representative (**Appendix N**). Then, the procedure to obtain such written documentation varies depending on whether the community representative can provide the current and past written documentations, whether they must request it from an assembly or the whole community, or wheter it should be provided by other person or organization, as it is specified in **Appendix K**. If for a certain community, the way to obtain such written documentation is not specified in the situations explained in **Appendix K**, they must contact the Principal Investigator to discuss the best way to approach it. Also, required funds will be provided to the research collaborators if a fee must be paid to obtain a copy of the written ordinances. Once the community representative (or the responsible person) has provided the written

documentation, they sign the permission form to use the writen regulations of the community for research purposes (**Appendix K**).

6.2.6. Risks to research participants and others

Participation in this study does not implies any major risks for research participants. However, if during data collection, the interviewee states that they or their community is at risk, interviewers must provide them with the contact information of the local NGOs and institutions identified. Some potential institutions are Red Cross, Human Rights Watch, and WWF (**Appendix G**). If the research collaborator detects a risk to the research participant or the studied community not previously expected, s/he needs to hold a videoconference with the Principal Investigator to discuss the measures that need to be taken. If the risk is considered imminent and severe, they decide, previously discussed with the data protection unit of the Principal Investigator's institution, if disclosure is necessary.
On the other hand, if during data collection the interviewer detects unexpected findings related to human rights, well-being, environmental and (or) health risks that may have been created by the research participant, the interviewer must inform the Principal Investigator, and a videoconference needs to be scheduled as soon as possible to discuss the severity of the risk and potential measures that might be needed. If the risk is considered imminent and severe, the Principal Investigator decides, previously discussed with the data protection unit of the Principal Investigator's host institution, if disclosure is necessary. Disclosure might be needed if there is a real, serious, and imminent risk that the research participant intents to harm themselves, other people, or the community, or develops illegal activities that might jeopardize human rights, the environment, or the community. In such cases, the Principal Investigator will inform the local authorities or a local NGO with sufficient national and or international relevance to take action in the country where the studied community is located.

6.3. Data processing

6.3.1. Data submission

As soon as fieldwork is completed, researcher collaborators will scan the "Consent form" (**Appendix P**), the "Case study log" (**Appendix Q**), and upload them to in the project-specific data storage location along with the voice-recorded interviews, photos, and scans of the written ordinances. Once the Principal Investigator confirms the proper receipt of the documents, research collaborators will lose access to the project-specific storage site. In addition, the research collaborators must safely erase them by shredding paper copies, removing the files from the voice-recorded and using a secure depletion app in their cell phones or another device to remove personal data (e.g., photos) of study participants. Some secure erasure options available are the free *Secure Eraser - Data Shredder* app in the Google Play Store for Android phones and iPhones and the free software *Eraser* (https://eraser.heidi.ie) for devices with Windows and macOS operating systems. Researcher collaborators do not keep any of the data collected for this project.

6.3.2. Access to personal data

All documents containing personal information collected by collaborators before and during fieldwork must be kept secure. Paper documents should be stored in the padlocked bag provided by the project and/or in a locked drawer. Digital files should be stored off-site in password-protected folders and should never be shared via email or social networking sites.

Only the Principal Investigator, the Project Manager, the Scientific Coordinator, and the Data collection coordinator will have access to the personal data recorded in the "Consent form" (**Appendix P**). They are responsible for the pseudonymization of the data, and for removing any personally identifiable data from the interview transcripts. Other sensitive personal data, including racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or data concerning a natural person's sex life or sexual orientation, as listed in art.9 of the General Data Protection Regulation 2016/679, will also be removed from the interview transcripts. For the pseudonymization of the data, the guide and tool proposed by the Spanish Data Protection Agency (https://www.aepd.es/prensa-y-comunicacion/notas-de-prensa/guia-y-herramienta-basica-de-anonimizacion) will by follow. The Principal Investigator keeps the paper copies and the data with personal data in a secure place. The rest of the research team will have access to the pseudonymized data.

7. Compliance with fair data principles

7.1. Making data findable

Anonymized datasets used in publications and study documentations of the project (protocol, forms, manuals) will be stored in ZENODO (https://zenodo.org/). Only data from communities that have consented to share their rules will be published in ZENODO. This repository assigns DOIs and URLs for identification and citation of datasets, and guarantees long-term data storage and availability.
Datasets will include:

- List of regulative and constitutive statements used in each community coded from interviews (not interview transcripts) and classified by type of rules
- List of institutional statements used in each community coded from written documentation of ordinances
- Grammar elements of the institutional statements
- Changes in the institutional statements used in each community over the last 40 years
- Social and ecological characteristics of the studied communities
- Average subjective resilience of each of the studied communities (not individual but groups' values)

Metadata of the datasets will include:

- Title of the datasets
- Publication date and version
- Creator and contact person
- Other contributors (e.g., fieldwork researchers)
- Description of the dataset (data collection and codification methodology, language, location, keywords, field descriptions)
- Funding

To protect the local communities studied, all the descriptive metadata that could facilitate the identification of the communities (e.g. language, location, field descriptions) will be kept by the Principal Investigator.

7.2. Making data openly accessible

Only anonymized datasets will be openly available. The personally identifiable information of respondents (gender, age, education level, voice recording) and communities (language, location) will not be publicly shared. To avoid risks for the research participants and the local communities, this data will be kept by the Principal Investigator. Any researcher who needs this information to develop their own research will have to request permission to access it, providing justification and the evaluation of a competent ethics committee for the use of these data using the form in **Appendix R**. Once the data is authorized for use, it will be transferred using a secure file transfer

service. There are a few exceptions that should be noted. One is that we cannot provide contact information for participants who have not given permission to be contacted in the future. In addition, we will not share community information, such as location, if research participants have indicated that doing so could put them at risk now or in the future. Also, the publication of regulatory statements from written ordinances requires the prior permission of the community leader.
To comply with the ethical protocol of the project, personal data including voice recordings and photographs will not be accessible. Due to the potential historical relevance of this data, a copy will be kept by the Principal Investigator if consented to by the study participants.
The data and associated metadata, and documentation will be deposit in the ZENODO repository. The R software (https://www.R-project.org/) will be used for data analysis, and the code scripts will also be openly available in ZENODO. The study protocol explaining the ethnographic procedures for collecting data on the rules and norms used by agricultural communities will be available both at the study website and the ZENODO repository.

7.3. Making data interoperable

Institutional statements will be coded following the institutional grammar 2.0 (IG) methodology, in which each statement is divided into grammar elements (Attribute, Aim, Condition, Deontic, Or else, and Object). Both, the IG Core and the IG Extended are used. The Core reflects the basic level of analysis and the IG Extended introduces nesting at the component level. In addition, institutional statements are classified in each of the seven rules typology (position, boundary, choice, aggregation, payoff, information, and scope).

7.4. Increase data re-use

Anonymized data from published results will be made freely available and re-usable. Data will be available in ZENODO on a long-term basis and there will be no embargo policy. Metadata of the shared dataset will include all information necessary to guarantee the quality of the data. This metadata will include information about the data collection procedures.
Personally identifiable information of respondents (gender, age, education level, voice recording) and communities (language, location) will be kept by the PI. Any researcher who needs this information to develop their own research will need to request permission to access the data, justifying the reasons and the evaluation of a competent ethics committee for the use of these data. Once the data is approved for use, it will be transferred using a secure file transfer service. There are a few exceptions: i) we cannot provide contact information for participants who have not given permission to be contacted in the future; ii) we will not share community information, such as location, if research participants have indicated that doing so could put them at risk now or in the future; iii) regulatory statements from written regulations require prior permission from the community leader.

7.5. Allocation of resources and data security

Data during the development of the project will be storage by the PI, who will be responsible for making periodic backups. All data will be pseudonymized for data analysis and anonymized for data accessibility. Documents containing personal data will be destroyed ten years after the end of the data collection or at the request of the research participants. Participants will be asked for permission to keep audio recordings of the interviews, photographs, and written documents of regulations because of their potential historical value. If permission is granted, these data will be securely stored by the PI. Personnel costs, including the costs of a data scientists (12 person-months) who will be responsible, under the supervision of the PI, for organizing, systematizing, and storing the data for data accessibility, as well as open access publication costs, will be covered by the project costs.

References

Theoretical and methodological background

Alliance, R. (2010). Assessing resilience in social-ecological systems: workbook for practitioners (revised version 2.0). Retrieved August, 22, 2011. Online: http://www.resalliance.org/3871.php

Anderies, J. M. (2015). Understanding the dynamics of sustainable social-ecological systems: human behavior, institutions, and regulatory feedback networks. Bulletin of mathematical biology, 77, 259-280. DOI: 10.1007/s11538-014-0030-z

Anderies, J. M., Folke, C., Walker, B. & Ostrom, E. (2013). Aligning key concepts for global change policy: robustness, resilience, and sustainability. Ecology and society, 18(2). DOI: 10.5751/ES-05178-180208

Anderies, J. M., Janssen, M. A. & Ostrom, E. (2004). A framework to analyze the robustness of social-ecological systems from an institutional perspective. Ecology and society, 9(1). https://www.ecologyandsociety.org/vol9/iss1/art18/

Anderies, J. M. & Janssen, M. A. (2016). Sustaining the commons. Online: https://sustainingthecommons.org/

Barnett,A.J., Partelow, S., Frey, U., García-Lozano, A., Mancha-Cisneros, M., Oberlack, C., Ratajczyk, E., Smith, H., Villamayor-Tomás, S. & Whitney, C.K. (2020). Defining success in the commons: Addressing problem orientations, multidimensionality, norms, and trade-offs. International Journal of the Commons, 14, 366-387. DOI: 10.5334/ijc.994

Brady, U., Basurto, X., Bennett, A., Carter, D. P., Hanlon, J., Heikkila, T., Lien, A., Chonaiew, S. M., Oliver, T., Schlager, E., Siddiki, S. & Weible, C. M. (2018). Institutional analysis of rules-in-form coding guidelines. CBIE Working Papers. Online: https://institutionalgrammar.org/wp-content/uploads/2024/04/IG-1.0-codebook.pdf

Cox, M., Arnold, G. & S. Villamayor, T. (2010). A review of design principles for community-based natural resource management. Ecology and Society, 15(4), 38. http://www. ecologyandsociety.org/vol15/iss4/art38/

Frantz, C. K. & Siddiki, S. (2021). Institutional Grammar 2.0: A specification for encoding and analyzing institutional design. Public Administration, 99(2), 222-247. DOI: 10.1111/padm.12719

Frantz, C. K. & Siddiki, S. (2022). Institutional Grammar. Foundations and Applications for Institutional Analysis. Springer International Publishing. DOI: 10.1007/978-3-030-86372-2

Janssen, M. A. & Anderies, J. M. (2023). Infrastructure for Sustainability. https://pressbooks.pub/cisi/

Janssen, M. A. Anderies, J. M., & Ostrom, E. (2007). Robustness of social-ecological systems to spatial and temporal variability. Society and Natural Resources, 20(4), 307-322. DOI: 10.1080/08941920601161320

Jones, L. & d'Errico, M. (2019). Whose resilience matters? Like-for-like comparison of objective and subjective evaluations of resilience. World Development, 124, 104632. DOI: 10.1016/j.worlddev.2019.104632

Jones. L. (2019). Running the Subjectively-Evaluated Resilience Score (SERS). Available online: https://lindseyjonesresearchcom.files.wordpress.com/2020/09/running-the-subjectively-evaluated-resilience-score-2.pdf

Meuwissen, M. P., Feindt, P. H., Spiegel, A., Termeer, C. J., Mathijs, E., De Mey, Y., ... & Reidsma, P. (2019). A framework to assess the resilience of farming systems. Agricultural Systems, 176, 102656. DOI: 10.1016/j.agsy.2019.102656

Ostrom, E., Agrawal, A., Blomquist, W., Schlager, E. & Tang, S.Y. (1989). CPR Coding Manual. Workshop in Political Theory and Policy Analysis. Indiana University, Bloomington, Indiana, USA. oNLINE: https://scholarworks.iupui.edu/bitstream/1805/25603/1/Ostrom1998CPR.pdf

Ostrom, E. (1990). Governing the commons: The evolution of institutions for collective action. Cambridge university press. Cambridge, USA

Ostrom, E. (2005). Understanding institutional diversity. Princeton university press. Princeton, New Jersey, USA

Ostrom, E., Janssen, M. A., & Anderies, J. M. (2007). Going beyond panaceas. Proceedings of the National Academy of Sciences, 104(39), 15176-15178. DOI: 10.1073/pnas.0701886104

Pérez-Ibarra, I., Tenza-Peral, A., Soler-Navarro, D., Arahuetes-de la Iglesia, D. & Garate-Marín C. (2023). Evolution and diversity of institutions: Using institutional grammar to analyze governance changes in traditional crop-livestock systems. International Review of Public Policy 5(2), 161-179. DOI: 10.4000/irpp.3332

Siddiki, S., Heikkila, T., Weible, C. M., Pacheco-Vega, R., Carter, D., Curley, C., ... & Bennett, A. (2022). Institutional analysis with the institutional grammar. Policy Studies Journal, 50(2), 315-339. DOI: 10.1111/psj.12361

Schlüter, A. & Theesfeld, I. (2010). The grammar of institutions: The challenge of distinguishing between strategies, norms, and rules. Rationality and Society, 22(4), 445-475. DOI: 10.1177/1043463110377299

Walker, B. (2020). Resilience: what it is and is not. Ecology and Society, 25(2). DOI: 10.5751/ES-11647-250211

Walker, B., Gunderson, L., Kinzig, A., Folke, C., Carpenter, S. & Schultz, L. (2006). A handful of heuristics and some propositions for understanding resilience in social-ecological systems. Ecology and society, 11(1). http://www.ecologyandsociety.org/vol11/iss1/art13/

Walker, B., Holling, C. S., Carpenter, S. R. & Kinzig, A. (2004). Resilience, adaptability and transformability in social–ecological systems. Ecology and society, 9(2). http://www.ecologyandsociety.org/vol9/iss2/art5

Watkins, C., & Westphal, L. M. (2016). People don't talk in institutional statements: A methodological case study of the Institutional Analysis and Development Framework. Policy Studies Journal, 44(S1), S98-S122. DOI: 10.1111/psj.12139

Risks for the researchers and the research participants and their communities

Allmark, P., Boote, J., Chambers, E., Clarke, A., McDonnell, A., Thompson, A., & Tod, A. M. (2009). Ethical issues in the use of in-depth interviews: literature review and discussion. Research Ethics, 5(2), 48-54. DOI: 10.1177/174701610900500203

Alshenqeeti, H. (2014). Interviewing as a data collection method: A critical review. English linguistics research, 3(1), 39-45. DOI: 10.5430/elr.v3n1p39

Hilhorst, D. J. M., Hodgson, L., Jansen, B., & Mena, R. (2016). Security guidelines for field researchers in complex, remote and hazardous places. International Institute of Social Studies. Online: https://library.wur.nl/WebQuery/wurpubs/fulltext/401380

Competence assessment and consent

Appelbaum, P. S., & Grisso, T. (2019). MacArthur Competence Assessment Tool for Clinical Research (MACCAT-CR) [Database record]. APA PsycTests.

Baón Pérez, B. S. (2013). Tesis doctoral. Adaptación y validación española de la entrevista MacArthur Competency Assessment Tool for Clinical Research (MacCAT-CR) y de un cuestionario breve para evaluar la capacidad de las personas para consentir participar en investigación. Universidad Complutense de Madrid, Madrid. Online: https://docta.ucm.es/bitstreams/022de41f-0141-4a00-89b3-51424da7a69a/download

Marrodán, I. A., Pérez, B. B., Acosta, M. N., López-Antón, R., Escolar, E. L. & Faci, T. V. (2014). Validación española de la entrevista MacArthur Competence Assessment Tool

for Treatment para evaluar la capacidad de los pacientes para consentir tratamiento. Medicina Clínica, 143(5), 201-204. DOI: 10.1016/j.medcli.2013.07.029

Glossary

Adaptability: Adaptability refers to the capacity of a system to adjust its functioning and structures in response to changing conditions or feedbacks. An adaptable system is able to learn from its experiences, experiment with new strategies or behaviors, and innovate to cope with new challenges or opportunities.

Assembly: Meeting of community members to discuss issues of common interest and, where appropriate, adopt decisions.

Collective action: Action taken together by a group of people whose goal is to enhance their condition and achieve a common objective.

Common-pool resource: A common pool resource is a natural or human-made resource whose size or characteristics make it costly, but not impossible, to exclude potential beneficiaries from obtaining benefits from its use. These resources are subject to overuse or exploitation because they are subtractable.

Institution: In the context of Elinor Ostrom's theory of the commons, an "institution" refers to the set of rules, norms, and strategies that govern the use and management of common pool resources. These institutions can be formal (such as government regulations or written agreements) or informal (such as community traditions and social norms), and they help establish clear rights, responsibilities, and mechanisms for resolving conflicts among users.

Institutional grammar: The Institutional Grammar (IG) is a standardized approach to encoding policy information in the form of institutional statements based on a set of predefined syntactic components (A = Attribute; B = Object; D =Deontic; I = Aim; C = Context; O = Or else).With the IG, researchers and practitioners can systematically analyze institutional statements and gain a deeper understanding of their underlying structure, function, and efficacy their efficacy, and propose recommendations for improvement.

Local community: a group of people who share the same rules to use a particular resource (e.g, irrigation community, farmers' association, shepherds' association) or public infrastructure (e.g., road).

Norm: In the context of social sciences and human behavior, a "norm" refers to a widely accepted standard or pattern of behavior, belief, or interaction within a particular group or society. Norms serve as guidelines for appropriate conduct and are considered as expectations about how individuals should behave in various social situations. According to the institutional analysis approach (using the Institutional Grammar), the main difference between a rule and a norm is that the latter does not establish any kind of consequence (sanction or reward) for non-compliance or compliance with the norm (it has no "or else" component; ABDIC).

Ordinance: Set of rules or orders that govern or regulate the good government and operation of something, for example, a community or collective action.

Public infrastructure: In the context of social-ecological systems, and specifically following the Coupled Infrastructure System (CIS) framework, "public infrastructure" refers to the physical or organizational systems that provide essential services or resources to a community or the public at large. It includes the physical infrastructure associated with the use of common pool resources and the social infrastructure (rules and norms) for managing and governing these resources.

Resilience: In the context of social-ecological systems, resilience refers to the capacity of a system to persist, adapt, and (if necessary) transform in the face of disturbances or changes, while maintaining essential functions, structures, and feedbacks. A resilient social-ecological system is able to absorb and recover from shocks, disturbances, or stresses, and to adapt to changing conditions, without losing its identity or key functions.

Robustness: Robustness refers to the ability of a system to withstand disturbances or shocks without undergoing significant change or losing its essential functions. A system is considered robust if it can absorb the impact of a disturbance without crossing a critical threshold that would trigger a regime shift or irreversible change.

Rule: A rule is a formal or informal principle or guideline that governs the behavior of individuals or groups within a particular social or organizational context. According to the institutional analysis, rules contain all the components of the Institutional Grammar (ADIBCO).

Rules-in-form: Rules-in-form (also known as rules-on-paper or *de jure*) refers to the official, written rules and regulations that are established by authorities or organizations. These rules can take the form of laws, policies, or formal procedures.

Rules-in-use: Rules-in-use (*de facto*) refers to the actual practices, customs, and behaviors that people engage in when they are interacting with each other and with the world around them. These can be written and unwritten rules that guide our behavior, such as social norms, traditions, and habits.

Stability: Stability refers to the ability of a system to maintain its identity and essential functions over time, despite fluctuations or perturbations in the external or internal conditions. Stability can be achieved through various mechanisms, such as negative feedbacks, self-regulation, redundancy, or buffering.

Transformability: Transformability refers to the potential of a system to fundamentally reorganize its structures, functions, and feedbacks in response to a major disturbance or a deliberate effort to achieve a new state. Transformability implies a willingness and ability to question and redefine the goals and values of the system, and to engage in collective learning, innovation, and governance.

Vulnerability: Vulnerability refers to the exposure of a system to harm or damage from internal or external pressures, such as climate change, economic crisis, or political conflict. Vulnerability is determined by the combination of exposure (the degree to which the system is affected by the pressure), sensitivity (the degree to which the system is responsive to the pressure), and adaptive capacity (the degree to which the system can cope with the pressure). A system is considered vulnerable if it has limited adaptive capacity and is exposed to high levels of pressure.

Written documents of regulations: ordinances or acts that specify the norms and rules that a community follows to use and manage shared resources (e.g., water, land, pastures) and distribute the benefits and costs among the users.

Appendices

A. Infographic

B. Case Studies

C. Invitation to research collaborators

D. Adhesion agreement to the study protocol

E. Good practice guide for interviews

F. Social and ecological assessment

G. Safety protocol

H. Description of the interview guide

I. Information for institutional review board

J. Permission request to conduct research

K. Request written regulations and consent

L. Written consent

M. Oral consent script

N. Information sheet

O. Permission request to interview subject

P. Consent form

Q. Case study log

R. Request for access to identifiable information of participants

Appendix A

Infographic

Funded by the European Union

European Research Council

Instituto Universitario de Investigación Mixto Agroalimentario de Aragón Universidad Zaragoza

Universidad Zaragoza

SISTEMAS SOCIOECOLÓGICOS agrarios sisec

RESILIENT RULES

Evolution of institutional diversity in a changing world:
Finding solutions in resilient agricultural systems

People involved

Core Research Team
International Research Collaborators
Scientific Advisory Board
External Ethics Board
Research Participants (farmers)

GOAL

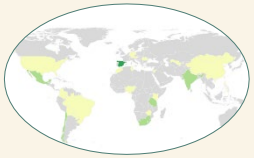
Quantifying the spatial and temporal patterns of global **institutional diversity** in **small-scale agricultural systems** from around the world in order to understand its contribution to long-term resilience in the face of global changes.

Theory of common-pool resources

Institutions (rules and norms) are essential for the sustainable governance of natural resources

Nobel Prize 2009
Economic Sciences

Data collection



50 agricultural and pastoral communities

Research Collaborators

Conduct **five Interviews with farmers**

Collect **written regulations**

Institutional Grammar

Strategies | Norms | Rules

Open Science

Compliance with **FAIR** data principles:
Findable
Accessible
Interoperable
Re-usable

Resilient Rules

Data analysis

Outcomes

Institutional Diversity

Institutional Evolution

Resilience

Timeline

Preparation of fieldwork
- Workshop for collaborators
- Social and ecological assessment
- Assessment of potential risks
- Local ethical requirements
- Selection of research participants

Development of fieldwork
- Informed consent procedures for the participants
- Interview five farmers, both men and women
- Consent for the long-term data retention
- Collection of written regulations

Data transfer
- Data submission

Web page: https://resilientrules.com

ERC-2021-CoG, Grant 101044225 RESILIENT RULES

Resilient Rules

Finding solutions
in resilient agricultural systems

Appendix B

Case studies

CASE STUDIES

RESILIENT RULES will study around 50 agricultural communities around the world. Factors such as isolation, net primary production, political regimes, or world biomes will be used to select case studies. The final selection of the communities to be studied will depend on the availability of local research collaborators and considering the security risks to the researchers and research participants. Figure 1, shows the countries where the studied communities are located. Figure 2, shows the type of system in the studied communities.

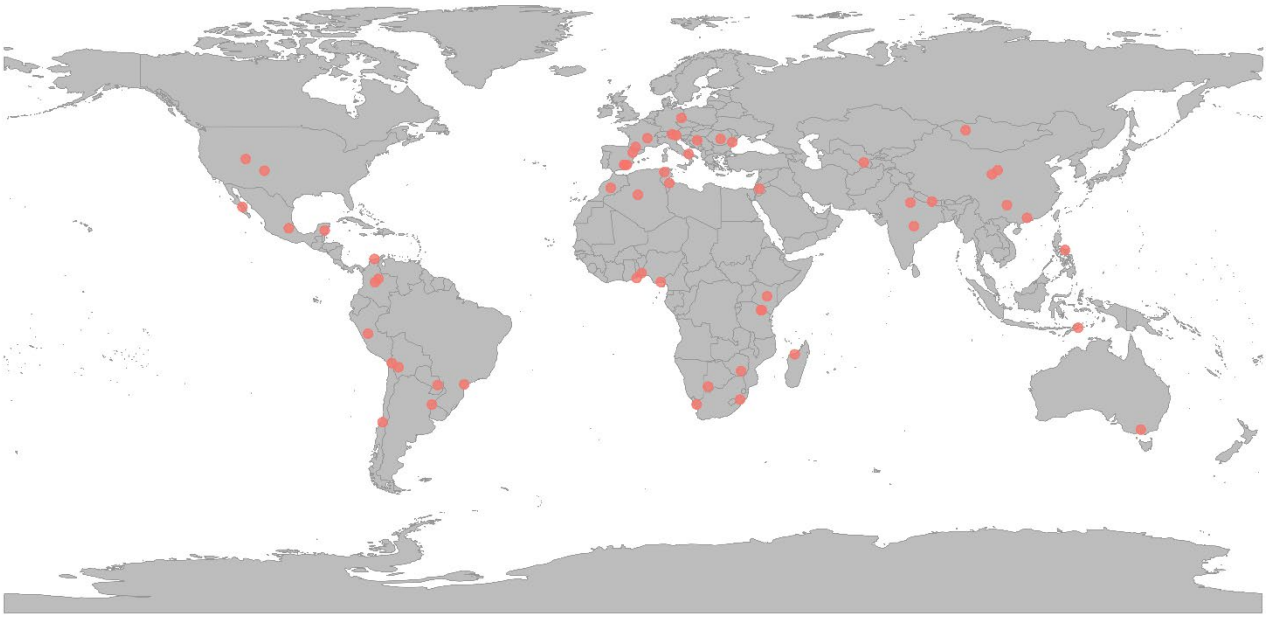


Figure 1. Location of studied communities.

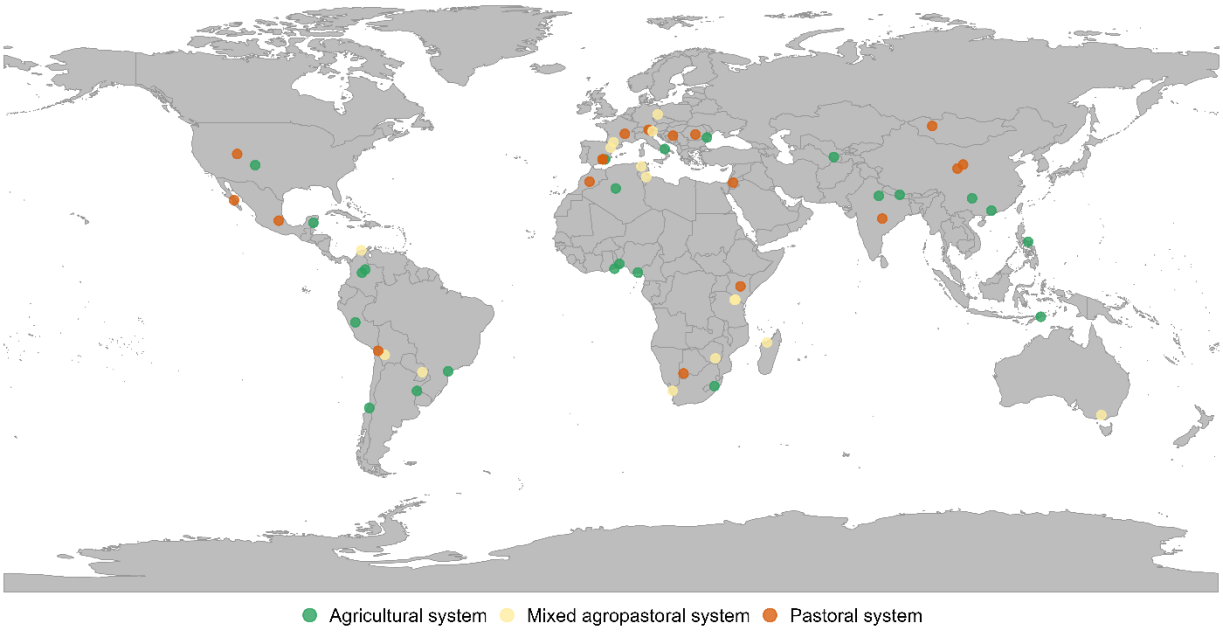


Figure 2. Type of system in the studied communities.

A detailed description of the studies communities can be found here.

Resilient Rules

Finding solutions
in resilient agricultural systems

Appendix C

Invitation to research collaborators

INVITATION TO RESEARCH COLLABORATORS

Dear Dr. [Recipient's Last Name],

I hope this email finds you well. On behalf of the core research team, I am pleased to extend an exciting invitation to you to **join the RESILIENT RULES research project, funded by the European Research Council** (ERC-2021-CoG, Grant 101044225), led by Dr. Irene Pérez Ibarra, and based at the University of Zaragoza, Spain.

RESILIENT RULES is an interdisciplinary research focused on studying the diversity of rules and norms that small-scale agricultural communities use to manage shared resources (e.g. grazing land, irrigation water). We will study about 50 agricultural communities around the world, selected on the basis of social and ecological variables. One of the selected communities is [**study area, country, further information**]. Your previous research in this community would be of great value to our project and we would like to invite you to join us as a **research collaborator**. This invitation could be extended to a researcher from your research group, a colleague, or a qualified doctoral student, subject to the approval of the Principal Investigator.

The main **tasks** as a research collaborator will include: interviewing five farmers of the selected community, describing the social and ecological characteristics of the community, and describing the risks of participation for the community. By participating in this project, the research collaborator will enjoy several **benefits**. **First**, the research collaborator will be compensated economically. **Second** we will provide the research collaborator with access to the study documentation, all the materials needed to conduct the fieldwork, and a certificate of participation in the RESILIENT RULES project. **Third**, the research collaborator will participate in a 5-day workshop at the University of Zaragoza prior to the fieldwork to discuss the theoretical and methodological aspects of this research, to review the social and ecological assessment of your study case, and to practise the study protocol; we will provide the research collaborator with a diploma for your assistance and participation in this workshop. All travel and accommodation expenses for your stay in Zaragoza, as well as travel health insurance if needed, will be covered by RESILIENT RULES. **Fourth**, the research collaborator will be invited to co-author a scientific article on the socio-ecological description of the 54 case studies.

If you are interested in participating, we will send you a study protocol adherence agreement that outlines the scope of the study, its objectives, and what is expected of research collaborators, as well as an invoice template for you to fill out with your budget request. Workshop dates are scheduled for 2024**:** April 29-May 3, June 3-7, September 16-20, December 16-19 and for 2025: January 13-17, May and June 2025 (dates to be announced). You are only asked to attend one of the scheduled workshops. Please let us know your preference and availability for the dates. If you are enthusiastic about joining our project, please let us know. If you have any questions or need further clarification, please do not hesitate to contact me or the Principal Investigator Irene Pérez Ibarra (perezibarra@unizar.es). We will be happy to provide further details and documentation and arrange a video call if necessary.

Thank you for considering this invitation to participate as a research collaborator. We look forward to the opportunity to work with you on this exciting project. If you are unable or uninterested in participating in this project, we would be grateful if you could provide us with the contact information of another researcher who is familiar with the study case and would be interested in participating in this project.

Best regards,

RR Core Team
AgriFood Institute of Aragon (IA2)
University of Zaragoza, Spain

Resilient Rules

Finding solutions
in resilient agricultural systems

Appendix D

Adhesion agreement to the Study Protocol

ADHESION AGREEMENT TO THE STUDY PROTOCOL

Adhesion agreement of

_____

_____
(Full name of the Research collaborator(s) and institution(s)) (hereinafter the Researcher/s)

to the Study Protocol of the project **"*RESILIENT RULES – Evolution of institutional diversity in a changing world: Finding solutions in resilient agricultural systems*" funded by the European Research Council (ERC-2021-CoG grant 101044225, hereinafter RESILIENT RULES).**
With this agreement, the Researcher/s confirms that he/she meets the requirements to be a collaborator of the RESILIENT RULES project **(1)**, commits himself/herself to carry out the data collection in

_____
(Name of Case Study, Region, Country) (hereinafter the Study Case)
and to comply with all the methodological, technical, and ethical requirements of the Study Protocol **(2)**, as specified below.

For her part, Irene Pérez Ibarra, affiliated to the University of Zaragoza in Spain (hereinafter the Principal Investigator), undertakes to:

- Economically compensate the Researcher/s for the development of the field work and for the compliance with the study protocol, as it is specified in the economic contract.
- Provide access to the study documentation, copies of the materials to conduct the fieldwork, and a voice-recorder for the fieldwork.
- Covering all the expenses for one Researcher to attend a 5-day workshop at the University of Zaragoza in Spain, including travel health insurance if not covered by the institution of the Researcher/s, to discuss the theoretical and methodological aspects of the project, to make an initial assessment of the Study Case, and to practice the study protocol.

  Please provide the full name of the Researcher/s and their participation role[1]:

  _____

  _____

  _____

- Provide a diploma for the assistance and participation to the workshop to the Researcher/s.
- Provide a certificate of participation in the RESILIENT RULES project to the Researcher/s.
- Invite the Researcher/s to participate in a co-authored paper on the socio-ecological description of the case studies.

(1) Requirements of the Researcher/s
1.a. The Researcher/s must be affiliated with an institution (e.g., university, research center) that can properly invoice payments and provide health insurance during the development of the fieldwork in the Study Case.
1.b. The Researcher/s must hold a visa, work permit, certificate, license, or other approval required to carry out the fieldwork in the country where the Study Case is located.

[1] E.g., attend the workshop and carry out the fieldwork, supervise fieldwork and initial assessments

1.c. The Researcher/s should have previous experience in developing ethnographic research in the Study Case, and enough knowledge about the Study Case to do an initial assessment of the ecological and social contexts of the Study Case, as well as a risk assessment for him/herself and research participants.

(2) Researcher/s compromises

2.a. The Researcher/s will follow the methodology specified in the Study Protocol.

2.b. The Researchers will comply the General Data Protection Regulation of the European Union (EU 2016/679) and that of the Spanish Law (*Ley Orgánica 3/2018 de Protección de Datos y Garantías de los Derechos Digitales*) to safeguard the rights and freedoms of the research participants, as it is specified in the Study Protocol.

2.c. The Researcher/s will conduct the fieldwork within 10 months of signing this agreement, or request an extension if necessary.

2.d. Before fieldwork**,** the Researcher/s will:

2.d.i. Elaborate an **socio-ecological assessment of the Study Case**, with the aim of defining the study system, identifying challenges, coping strategies, and changes occurred in the last decades.

2.d.ii. Elaborate a **security protocol specific to the Study Case** to protect communities and researcher/s from potential vulnerabilities and security risks.

2.d.iii. Elaborate a case-specific protocol to ensure compliance with the **personal data transfer and ethical legislation** of the countries and communities where the Study Case is located.

2.d.iv. Attend a 5-day workshop at University of Zaragoza, Spain. During the workshop: **a)** the characteristics, risks and ethical issues of the Case Study will be presented and discussed; **b)** the Study Protocol will be presented and practiced; **c)** the translation of the documents to be used during fieldwork will be reviewed.

2.d.v. Obtain approval from the local/country or institutional ethics committee before conducting fieldwork. In the absence of an ethics committee, permission should be obtained from the head of the community (e.g., village mayor or community president). Copies of local ethics committee and/or regulatory approvals should be provided to the Principal Investigator. If it is not possible to obtain local ethics approval, a detailed justification should be provided.

2.e. During fieldwork, the Researcher/s will:

2.e.i. Follow the Study Protocol to obtain informed consent of the research participants.

2.e.ii. Follow the interview guide to interview five people of the Study Case, both women and men.

2.e.iii. Collect written documents of regulations (past and current) of the Study Case if available.

2.e.iv. Follow the risk protocol if the Researcher/s detects there is a risk for him/herself, the research participant, or the community studied.

2.f. After fieldwork:

2.f.i. As soon as fieldwork is completed, the Researcher/s will upload a scanned copy of the paper documents along with the voice-recorded interviews, photos generated during the development of the fieldwork to the project-specific storage space.

2.f.ii. Once the Principal Investigator has verified the uploaded documents, the Researcher/s will erase them by shredding paper copies, removing the files from the voice-recorded, and using a secure depletion app in their cell phones to remove photos of study participants.

The Principal Investigator **Signature:**	**The Researcher/s** **Signatures:**
Name: Irene Pérez Ibarra **Place, date:**	**Name/s: Place, date:**

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Appendix E

Good practice guide for interviews

APPENDIX E

GOOD PRACTICE GUIDE FOR INTERVIEWS

Characteristics of a Good Interview

A good interview is one that is informative, interesting, and engaging for the participant. At the beginning of each interview, the interviewer makes introductions. Participants are always thanked at the end of the interview. The following characteristics are important for a good interview:

Natural and comfortable environment: The interview should be conducted in a natural and comfortable environment, where the participant feels at ease and is willing to share their experiences. When interviewing, try to make sure that the area is as quiet and private as possible. Whenever possible, it is recommended to conduct the interview indoors to prevent wind or ambient noise from affecting the quality of the interview recording. If this is not possible, the interviewer should try to stand with his or her back to the wind to act as a protective screen.

Flexibility: The interview should be flexible enough to allow the participant to tell their story in their own words. The interviewer should be willing to adapt to the participant's style of communication and not rush through the interview.

Focused on the topic: The interview should remain focused on the topic at hand. The interviewer should ask questions that are relevant to the research objectives and avoid tangents that may distract from the main theme.

Allows for elaboration: The interview should allow the participant to elaborate on their answers and provide more detail when necessary.

Characteristics of a Good Interviewer

A good interviewer is someone who is patient, empathetic, and non-judgmental. They should have strong active listening skills and be able to follow up on points made by the participant. Good interviewers should also be well-informed about the research topic and have a clear understanding of the purpose of the interview. Interviewers are responsible for being fully familiar with the questions, response categories, and skip patterns for each interview. These are some of the characteristics of a good interviewer:

Empathetic: The interviewer should be empathetic and able to connect with the participant on a personal level. They should be able to understand the participant's point of view and be supportive when needed.

Non-judgmental: The interviewer should be non-judgmental and avoid making assumptions about the participant's experiences or beliefs. They should maintain a neutral stance and refrain from imposing their own opinions on the participant.

Good listener: The interviewer should be a good listener and able to pick up on non-verbal cues that may indicate the participant's emotional state. They should also be able to ask follow-up questions to clarify any ambiguous answers.

Knowledgeable: The interviewer should be knowledgeable about the research topic and the specific questions being asked. They should have a good understanding of the context in which the research is being conducted.

Interviewer Bias

Interviewer bias can occur when the interviewer's own beliefs, values, or attitudes influence the responses of the participant. The following strategies can help mitigate interviewer bias:

Be self-aware: The interviewer should be aware of their own biases and try to remain objective throughout the interview.

Avoid leading questions: Leading questions can influence the participant's responses and may lead to biased data.

Acknowledge preconceptions: The interviewer should acknowledge any preconceptions they may have about the participant or the research topic and try to remain open-minded.

Communication Traps and Obstacles to Standardization

Communication traps and obstacles to standardization can arise when the interviewer and participant come from different cultural backgrounds, speak different languages, or interpret questions differently. Some of the usual communication traps are: (1) anticipating or answering questions directed to the participant with one's own thoughts; (2) hearing what one expects to hear; or (3) being drawn into a conversation. The following strategies can help mitigate these challenges:

Use open-ended questions: Open-ended questions allow the participant to respond in their own words and provide more detail than closed-ended questions.

Provide explanations: If the participant does not understand a question, the interviewer should provide an explanation in a way that is clear and easy to understand. In this regard, questions of the questionnaire can be rephrased to fit the context of the conversation.

Avoid technical jargon: Technical jargon may be confusing or intimidating to the participant. The interviewer should use language that is accessible and easy to understand.

To ensure a standardized interview, it is recommended to follow the order of the questions of the questionnaire as much as possible, but the interviewer must be flexible to ensure a fluent conversation. Try to follow the interview guide but prioritise to follow the respondent. Pick up on new information he or she brings up without losing track of where you are in the interview. This is because it is very important to be familiar with the interview guide.

Conducting the Interview

Interviewers must keep in mind that the interviewee is not familiar with the questions, their sequence and response categories. The manner in which an interviewer make a question can affect the quality of responses received from participants. Interviewers should avoid asking questions in an evaluative, judgmental, interpretive, or pedantic style, as these can discourage participants from answering questions fully. Interruptions during a response should only occur to focus or channel the participant's answer and should otherwise be avoided.

It is recommended not to read the interview guide during the interview, in order to maintain eye contact with the participant. Transition statements between sections of the questionnaire should be used to inform participants of the nature of upcoming questions, define key terms, establish a time frame, or clarify what is being asked in the question(s).

Appropriate interviewing styles include using neutral noises or statements to reassure participants, reduce the intensity of their emotions, or show understanding. This can include general clucking or an understanding murmur, as well as nondirective or understanding statements, such as repeating what the participant just said. These techniques are intended to show interest and reassure the participant without disrupting the flow of their response.

Probing can be used to seek additional information, encourage further discussion along a specific line of thought, or to present a question to the respondent. It is most appropriate when an answer is unclear, incomplete, inconsistent, or when no response is given. The most commonly used probe is silence, in which the interviewer pauses or hesitates and waits for the participant to respond. This allows the participant to review their experiences and formulate a response. Other types of probing include repeating the original question, seeking clarification when the participant provides ambiguous responses or multiple responses, and asking participants to choose between multiple responses.

The following steps can help ensure a successful interview:

Establish rapport: The interviewer should establish rapport with the participant at the beginning of the interview. This may involve introducing themselves, explaining the purpose of the interview, and establishing a comfortable environment.

Ask follow-up questions: The interviewer should ask follow-up questions to clarify any unclear responses or to encourage the participant to elaborate on their answers.

Be mindful of time: The interviewer should be mindful of the time and ensure that the interview remains focused.

Sensitive Content and Handling Participant Distress

In ethnographic research, participants may share sensitive information that could cause distress. Interviewers should be alert for signs of distress, such as hesitation, disengagement, or overt emotional responses, and respond appropriately. This may include giving the participant space, acknowledging their distress, and normalizing their experience. Appropriate responses might include phrases such as “I understand this must be very difficult for you,” “Take your time, I realize this is not easy to talk about,” or “Just let me know when you are ready to continue.” Interviewers should maintain a neutral and non-judgmental attitude, especially during these moments.

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Appendix F

Social-ecological Assessment

SOCIAL-ECOLOGICAL ASSESSMENT

This survey is an initial social-ecological assessment of the case study, completed by the researcher based on their prior knowledge of the community. To complete this survey, available grey and scientific literature can be consulted. Otherwise, respond to questions with "do not know," as traveling to the study communities for this initial assessment is not necessary. During the workshop "Evolution of Institutional Diversity," the responses to this survey will be reviewed and discussed with the Resilient Rules Core team.

LOCATION

Country: _____Region: _____ Site: _____

Community: _____ Coordinates: _____

The analysis of the case studies focuses on local communities, i.e. groups of people who share the same rules for the use of a particular natural resource like water, pastures, or the land (e.g. irrigation communities, farmers' associations, herders' associations, local committees for the management of common lands, etc.). Therefore, the following sections and subsections refer mainly to the existing local community of each case study, not to the general characteristics of the villages or towns in which the community is located.

AGRICULTURAL ACTIVITY AND INFRASTRUCTURES

Type of System

☐ Exclusively agricultural
☐ Exclusively livestock (including pastoral and silvopastoral systems)
☐ Mixed crop-livestock system (including agropastoral and agrosilvopastoral systems)

Type of subsistence strategy *[Mark ALL that apply]*

1.1. Non irrigated arable land: ☐ No ☐ Yes

☐Cereals	☐Oil crops	☐Tobacco
☐Rice	☐Fodder crops	☐Cassava
☐Maize	☐Roots and tubers	☐Vegetable
☐Pulses	☐Fiber crops	☐Other:

1.2. Irrigated arable land: ☐No ☐Yes

☐Cereals	☐Oil crops	
☐Rice	☐Fodder crops	☐Tobacco
☐Maize	☐Roots and tubers	☐Cassava
☐Pulses	☐Fiber crops	☐Vegetable
		☐Other:

1.3. Permanent crops: ☐ No ☐ Yes

☐Vineyards	☐Oil Palm	☐Sugarcane
☐ Fruit trees and berry plantation	☐Tea	☐Other:
☐ Olive groves	☐Coffee	
☐Banana	☐Cocoa	

1.4. What are the main varieties used for each type of crop?
Crop varieties refer to the different types of a particular crop that have been developed through selective breeding or genetic modification. These varieties often have specific traits such as resistance to pests, higher yield, or adaptability to certain climates. For example, crop varieties can be in terms of ***product use*** *(e.g. for consumption, fruit production, animal feed, silage...),* ***colour or size*** *varieties and/or* ***genetic varieties*** *(such as those developed by plant breeding companies).*

1.5. What are the special characteristics of these varieties? (e.g., are more productive, resist better to drought...)

1.6. Have these varieties changed since 1980? ☐ No ☐ Yes

1.6.1. If these varieties have changed since 1980, please describe the change and the main reasons for the change.

1.7. Type of land tenure *[Mark ALL that apply]*

☐Common lands	☐State-owned land	☐Other:
☐Private lands	☐Free access	
☐Leased lands	☐Do not know	

2.1. Pastoralism: ☐ No ☐ Yes

☐Extensive	☐Semiextensive	☐Intensive

2.2. Livestock specialization

☐Dairy cattle	☐Dairy goats	☐Camelids
☐Beef cattle	☐Meat goats	☐Other:
☐Dairy sheep	☐Pigs	
☐Meat sheep	☐Poultry	

2.3. Which animal breeds are used in the community?

2.4. What are the special characteristics of these breeds? (e.g., are more productive, resist better to drought...)

2.5. Have these breeds changed since 1980? ☐ No ☐ Yes

2.5.1. If these breeds have changed since 1980, please describe the change and the main reasons for the change.

2.6. Livestock mobility

[If the community has another type of mobility, tick the other option and give a brief description of the type of mobility].

☐Sedentary	☐Nomadic	☐Other:
☐Transhumant	☐Do not know	

DESCRIPTION OF THE SOCIAL-ECOLOGICAL SYSTEM AND RECENT CHANGES

To characterize the current state of the case study and identify the major changes that have occurred over the last four decades (since the 1980s), the Coupled Infrastructure System (CIS) framework (Figure 1) will be used (Anderies et al., 2004; Ostrom et al. 2007; Anderies 2015; Janssen and Anderies 2023). By considering the CIS framework, we can analyze the complex interactions and feedback loops between the main components of the studied social-ecological systems. This framework helps understand the social-ecological system's interdependencies, vulnerabilities, and dynamics and how exogenous shocks affect its functioning.

To better understand the CIS framework and all the components, here is an example of a fictional local community that manages common pasture lands for livestock grazing.

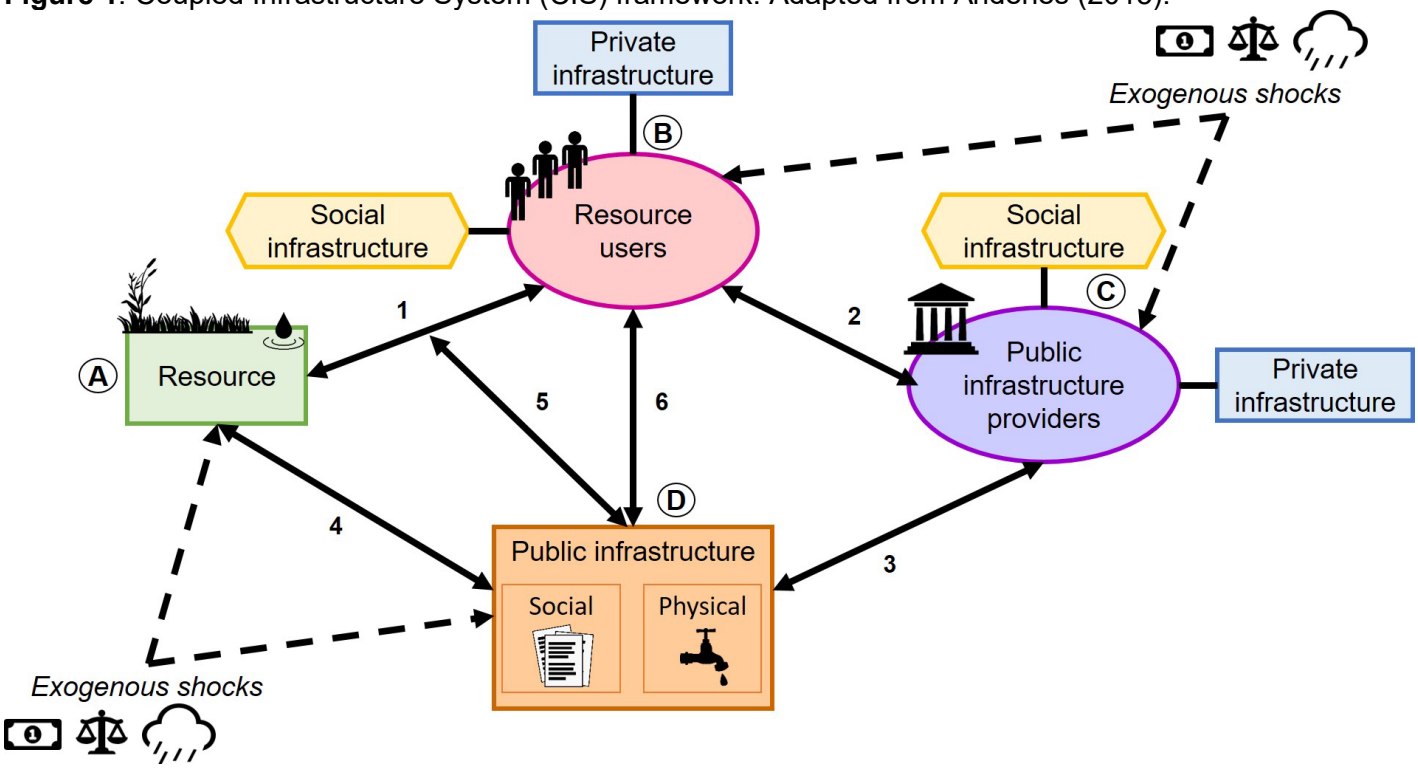
A. Resource. The natural or ecological system on which resource users depend for the development of their productive activities. It can be land, water, forests, or other natural resources. In our example, the resource is the common grazing land available for livestock grazing and the water that is collectively managed and used by the resource users.

B. Resource users. The individuals or groups who depend on and use the resource within the social-ecological system. They are typically involved in agriculture, livestock farming, or other resource extraction or use forms. In our example, these would be the herders or pastoralists who depend on the common rangelands for their livestock's feeding and forage needs. The private infrastructure of resource users could include their livestock (herds), the livestock products (meat, milk…), and the individual infrastructure owned and managed by the pastoralists, such as corrals, barns, water troughs, and individual grazing areas for their livestock. The social private infrastructure of the resource users could comprise, among others, the local and (or) traditional ecological knowledge.

C. Public infrastructure providers. Public infrastructure providers are the entities responsible for establishing, managing, and maintaining the social and physical infrastructure supporting resource users. They may be government agencies, non-governmental organizations (NGOs), or other public entities involved in providing essential services and facilities. In the case of a local community self-managing common pool resources, the resource users and the infrastructure providers would be the same. The private infrastructure could be the organization's facilities, while the social infrastructure could be the rules and norms for the entity's functioning.

D. Public infrastructure. It includes, on the one hand, the physical infrastructure provided by public infrastructure providers, used by resource users, and associated with using the resource. In our example, this could be water ponds, wells, roads, and fences that support livestock activities. On the other hand, it also includes the social infrastructure (rules and norms) for managing and governing common pool resources (e.g., access to grazing areas, access to water ponds, rotational grazing schedules, and conflict resolution among herders).

Figure 1. Coupled Infrastructure System (CIS) framework. Adapted from Anderies (2015).



The links in the CIS framework (1-6) represent the interactions and dependencies between the components.

1. **Link 1**: units of resource used by users, e.g., the amount of common land each herder can use.
2. **Link 2**: relation between resource users and public infrastructure providers (in our example, they are the same, the resource users are organized in a local community).
3. **Link 3**: the provision and maintenance of public infrastructure by public infrastructure providers, e.g., the creation or maintenance of water ponds or roads in the common lands.

4. **Link 4**: relation between public infrastructure and resources, e.g., the fences that define the boundaries of the communal lands and the rules that establish the scope of the resource system.
5. **Link 5**: the relationship between public infrastructure and resource use, e.g., the roads within the communal lands that facilitate access to the different areas, rules determining livestock mobility.
6. **Link 6**: the use of public infrastructure by resource users, e.g., the use of water ponds in the common lands.

Exogenous shocks include socioeconomic and environmental (or biophysical) changes affecting the social-ecological system. These shocks could be short-term (often surprising or unexpected) disturbances like outbreaks (e.g., COVID-19 pandemics), and long-term stresses or pressures like climate change or cultural values. In our example, they could be extreme weather events, disease outbreaks, policy changes, or market fluctuations. These shocks can affect the availability of grazing resources, the functioning of public infrastructure, the livelihoods of livestock keepers, and the governance mechanisms of the local community.

We must also consider the characteristics of the localities (villages or towns) in which the studied communities are embedded as **endogenous factors** that influence the dynamics of the social-ecological system and can modulate the impact of exogenous shocks. These endogenous factors include demographics, the local economy or connectivity to urban centers.

Based on the **CIS framework**, we have prepared the following **questionnaire** to describe the **current characteristics** and the **major changes** that have occurred over the last four decades **in the case study**. Some of the questions are based on Ostrom et al. (1989).

SECTION A – RESOURCES

A.1. What **natural resources** are shared by the local community? [*Mark ALL that apply*]
☐ Surface water
☐ Groundwater
☐ Grassland / Rangeland
☐ Forest
☐ Farmland
☐ Do not know
☐ Other:

A.2. The **boundaries in the shared natural resources are primarily a result of**:
☐ Natural/constructed attributes that limit entry
☐ Natural/constructed attributes that do not limit entry
☐ Institutional arrangements
☐ Natural/constructed and institutional arrangements that limit entry
☐ Natural/constructed and institutional arrangements that do not limit entry
☐ Do not know

A.3. **Boundaries** of the resources are:
☐ Smaller than the location
☐ The same as the location
☐ Larger than the location
☐ Do not know

A.1.3. Size of **resources** (in appropriate metrics measurements). [*If this data is not known could be estimated using maps, descriptions, or other sources*].

A.1.3.1. Surface area of resource (watershed, aquifer, pastures, forest area used for grazing…; in hectares):

A.1.3.2. Length of resource (irrigation canal, river, stream; in meters or kilometers):

A.1.3.3. Storage volume of resource (lakes, ponds, aquifer; in meters cubed):

A.1.3.4. Flow volume of resource (water average flow in liters/second or natural or pumped average flow rates; in e.g., L/s)

A.1.3.5. Since the 1980s**, has the resource changed in area, length, storage volume, or flow rate**?
☐ No, it has remained the same
☐ Yes, it has decreased
☐ Yes, it has increased
☐ Do not know

A.1.3.6. If any of these **resource characteristics** have **changed** since the 1980s, please **describe these changes** and the **main reason** for the change.

A.1.4. Number of **natural sources of water** (streams, rivers, temporary ponds, natural springs, etc.):

A.1.4.1. Has the number of **natural surface water sources changed** since the 1980s?
☐ No, it has maintained the same
☐ Yes, it has decreased
☐ Yes, it has increased
☐ Do not know

A.1.4.2. If the **number of natural surface water sources** has **changed** since the **1980s**, please describe why.

A.1.5. Average number of months during the year when the **resource is accessed:**

A.1.5.1. Has the **average number of months** when the **resource is accessed changed** since the 1980s?
☐ No, it has maintained the same
☐ Yes, it has decreased
☐ Yes, it has increased
☐ Do not know

A.1.5.2. If the **average number of months** when the **resource is accessed changed** since the 1980s, please describe why:

A.1.6. Resource quality
Some aspects that can help us assess the quality of the resource are physical indicators such as water turbidity, chemical indicators such as the presence of nitrates or other pollutants, or even biological indicators such as the presence of algae or invasive species.
☐ Good quality
☐ Fair quality
☐ Poor quality
☐ Do not know

A.1.6.1. Has the **resource quality changed** since the **1980s**?
☐ No, it has maintained the same
☐ Yes, it has decreased
☐ Yes, it has increased
☐ Do not know.

A.1.6.2. If the **surface water quality** has changed since the **1980s**, please describe why:

A.1.7. Is there considerable **variation** over **space** in the **quantity or quality** of the **resource**?
☐ Yes
☐ No
☐ Do not know

A.1.7.1. If yes, **is** this variation **predictable?**
☐ Yes
☐ No
☐ Do not know

A.1.7.2. Has this predictability changed since the 1980s (spatial variation)?
☐ No, it has maintained the same
☐ Yes, it has decreased
☐ Yes, it has increased
☐ Do not know

A.1.8. Is there considerable **variation** in the **quantity or quality** of the **resource within a single year**?
☐ Yes
☐ No
☐ Do not know

A.1.8.1. If yes, is this **variation predictable**?
☐ Yes
☐ No
☐ Do not know

A.1.8.2. Has this predictability changed since the 1980s (intra-annual variation)?
☐ No, it has maintained the same
☐ Yes, it has decreased
☐ Yes, it has increased
☐ Do not know

A.1.9. Is there considerable **variation** in the **quantity or quality** of **the resource from year to year**?
☐ Yes
☐ No
☐ Do not know

A.1.9.1. If yes, is this **variation predictable**?
☐ Yes
☐ No
☐ Do not know

A.1.9.2. Has this **predictability changed** since the **1980s** (inter-annual variation)?
☐ No, it has maintained the same
☐ Yes, it has decreased
☐ Yes, it has increased
☐ Do not know

A.1.10. Is the **variation** in **quantity or quality** of **the resource over time or space** a **source of conflict** among resource users?
☐ Yes
☐ No
☐ Do not know

A.1.10.1. If yes, please**, describe the conflict**:

A.1.10.2. Has the **variation** in **quantity** or **quality** of the **resource over time or space** been a **source of conflict** among resource users **in the past**?
☐ No
☐ Yes
☐ Do not know
If yes, please, describe it:

A.1.10.3. If yes, please, describe **the past conflict:** _____

A.1.11. Currently, the **balance** between the number of **resource units taken** and the **units needed** is:
☐ Extreme shortage or moderate shortage
☐ Apparently balanced
☐ Moderately or quite abundant
☐ Do not know

A.1.11.1. Since the 1980s, the **balance** between the number of **resource units taken** and the **units needed**:
☐ Has maintained the same
☐ Has improved (now the resource availability is in excess of user demand.; there is a surplus)
☐ Has worsened (now the users' demand exceeds the resource availability; there is a shortage)
☐ Do not know

A.1.11.2. If the **balance** has changed since the **1980s**, please **describe why**:

A.1.12. How **well-maintained** is the **resource**?
☐ Well-maintained
☐ Moderately well maintained
☐ Some resource deterioration occurs due to insufficient maintenance
☐ Considerable resource deterioration due to poor maintenance
☐ Considerable resource deterioration, but due to a natural disaster
☐ Do not know

A.1.12.1. Has the state of **resource maintenance** changed **since the 1980s**?
☐ No, it has maintained the same
☐ Has improved
☐ Has worsened
☐ Do not know

A.1.12.2. If the **state** of **resource maintenance** changed since the 1980s, please **describe why**.

A.1.12.3. If there are any **private resources** used by **community members**, please indicate which are the most relevant (e.g., farmland).

SECTION B – USERS

B.1. What is the approximate **number of resource users** (appropriators) for common pool resources?
☐ Less than 25
☐ 25-50
☐ 51-100
☐ 101-200
☐ 201-500
☐ 501-1000
☐ 1001-2500
☐ 2501-5000
☐ Over 5000
☐ Do not know

B.1.1. **Has** the number of resource users **changed since the 1980s**?
☐ No, the number of users has remained the same over time
☐ Yes, it has decreased
☐ Yes, it has increased
☐ Do not know

B.1.2. If the number of resource users has **changed** since the **1980s,** please describe why.

B.2. Are **resource users** formally **self-organized**?
☐ Yes
☐ No
☐ Do not know

B.2.1. **Has** the self-**organization** of resource users **changed since the 1980s**?
☐ No, it has remained the same over time
☐ Yes, in the past…
    ☐ Resource users were not formally self-organized
    ☐ Resource users were formally self-organized
☐ Do not know

B.2.2. If the **self-organization of resource users** has **changed** since the **1980s**, please describe why.

B.3. Describe as best you can the **social structure of the community**, including its groups and subgroups, hierarchy, and associated spatial boundaries.
For example, in some irrigation systems, irrigators are organized into subgroups based on the location of their agricultural parcels in a branch of the main irrigation canal or acequia for maintenance purposes, but all irrigators are part of a general water user association that includes all management and distribution of water related to the main acequia and all its branches. In addition, there may be a general water users' association that includes all the ordinary water users' associations associated with a watershed.

B.4. Describe as best you can the community's **decision-making structure**, including the groups or subgroups responsible for making decisions and their hierarchy.
In some livestock farming systems, farmers are part of an organization where the highest decision-making body is the assembly, which is made up of all the farmers. Then there is an executive committee made up of the president, secretary and treasurer, members of the society who are elected by the assembly. The executive committee has the power to make certain decisions throughout the year and represents the organization. There is also an audit committee made up of members of the organization that monitors the performance of the executive committee.

B.5. Please, **describe** the following attributes:

B.5.1. If the resource users are **farmers**, what is the **average size** of the **agricultural plots**? (in ha):

B.5.2. If the resource users are **livestock farmers**, what is the **average size** of the **herds**? (in number of heads or Animal Units, please, specify the units):

B.5.3. If the resource users are livestock farmers, what is the **average grazing area** (in hectares) each farmer has access to?

B.6. In the case of **agriculture,** what is the **destination** of **agricultural production**?
[*Mark ALL that apply*] *[If the local community does not practice agriculture, please, go to the next question]*
☐ Sold in local market(s)
☐ Sold in external market(s)
☐ Sold to intermediaries
☐ Not sold, used to produce other units
☐ Not sold, consumed by users and families
☐ Do not know

B.6.1. Has the **main destination** of **agricultural production changed** since the **1980s**?
☐ No, it has remained the same over time
☐ Yes, in the past was sold in local market(s)
☐ Yes, in the past was old in external market(s)
☐ Yes, in the past was sold to intermediaries
☐ Yes, in the past was not sold, it was used to produce other units
☐ Yes, in the past was not sold, it was consumed by users and families
☐ Do not know

B.6.2. If, the **main destination** of **agricultural production changed** since the **1980s**, please describe why:

B.7. In the case of **livestock**, what is the **main destination** of livestock production?
[*Mark ALL that apply*] [*If the local community practice agriculture and livestock (it is a mixed system), please, answer both the previous question and this one].*
☐ Sold in local market(s)
☐ Sold in external market(s)
☐ Sold to intermediaries
☐ Not sold, used to produce other units
☐ Not sold, consumed by users and families
☐ Do not know

B.7.1. Has the **main destination of livestock** production **changed** since the **1980s**?
☐ No, it has remained the same over time
☐ Yes, in the past was sold in local market(s)
☐ Yes, in the past was old in external market(s)
☐ Yes, in the past was sold to intermediaries
☐ Yes, in the past was not sold, it was used to produce other units
☐ Yes, in the past was not sold, it was consumed by users and families
☐ Do not know

B.7.2. If the **main destination** of **livestock production** changed **since the 1980s**, please describe why.

B.8. Has any **new technology** (i.e., knowledge, seeds, practices, machinery…) been **introduced** since the 1980s?

☐ No, it has remained the same over time
☐ Yes, an enhancement of physical capabilities to withdraw resource units (e.g., pumping wells)
☐ Yes, and it enhances efficiency in using resource units (e.g., local breeds)
☐ Do not know

B.8.1. In case any **new technology has been introduced** since the 1980s, please, describe:

B.9. How **dependent** are resource **users** on the **resource** for their **livelihoods**?
☐ Not dependent at all (their livelihood is unaffected by changes or availability of the resource)
☐ Minimally dependent (while the resource plays a role, alternative sources or activities can compensate for its absence or scarcity)
☐ Moderately dependent (resource availability has a noticeable impact on their livelihood, but they have some flexibility to adapt or diversify their income sources)
☐ Highly dependent (the availability of the resource significantly determines their ability to earn a living, there are limited alternatives)
☐ Completely dependent (the resource is indispensable for their survival, and they have no viable alternatives to sustain their livelihood in its absence).
☐ Do not know

B.9.1. Has the **degree to which users depend on the resource** for their livelihoods **changed** since the 1980s?
☐ No, it has remained the same over time
☐ Yes, in the past they were not dependent at all
☐ Yes, in the past they were minimally dependent
☐ Yes, in the past they were moderately dependent
☐ Yes, in the past they were highly dependent
☐ Yes, in the past they were completely dependent
☐ Do not know

B.9.2. If the **degree to which users depend on the resource** for their livelihoods changed since the **1980s**, please describe why.

B.9.3. Describe the **main characteristics** of the resource users.

In some cases, the users who are part of the community have different characteristics, for example, they could be small or large landowners, users with more or less livestock or cultivated land, they could be totally or partially dependent on the agricultural activity, they could have different types of livestock and livestock breed, or crops and crops varieties. If, based on your knowledge of the community, you think there are important differences among resource users that we should be aware of, please describe them below.

B.9.4. Gender perspective on community roles and activities.

In some communities, some roles within the community or activities are associated with one gender, for example, the making of handicrafts may be associated with women, while in some cases herding may be associated primarily with men. If there are different gender roles within the community, please specify the main gender roles, the difference between them, and the function or activities they perform for each other.

SECTION C – PUBLIC INFRASTRUCTURE PROVIDERS

C.1. Who are the **public infrastructure providers** in the studied community? [*Mark ALL that apply*]
☐ The resource users.
☐ A local agency (government and non-government)
☐ A regional agency (an intermediate government agency between the local and national levels)
☐ A national agency
☐ A non-governmental organization (NGO)
☐ Do not know
☐ Other. Please, describe:

C.1.1. Have the **public infrastructure providers changed** since the 1980s?
☐ No, it has remained the same over time
☐ Yes, in the past, they were... [*Mark ALL that apply*]
- ☐ The resource users
- ☐ A local agency
- ☐ A regional agency
- ☐ A national agency
- ☐ A non-governmental organization (NGO)
- ☐ Other. Please, describe:
- ☐ Do not know

C.1.2. If the **public infrastructure providers** changed since the 1980s, please describe why.

C.2. Which of the following best describes the **political or legal frameworks** for **creating and maintaining public infrastructure**? [*Mark ALL that apply*]
☐ Operational rules are created, changed, and enforced at the local level (*self-governance*)
☐ Operational rules are created, changed, and enforced at the regional level (*an intermediate government agency between the local and national levels*)
☐ Operational rules are created, changed, and enforced at the national level
☐ Other. Please, describe:
☐ Do not know

C.2.1. Have **the political or legal frameworks** for **creating and maintaining public infrastructure changed** since the 1980s? [*Mark ALL that apply*]
☐ No, it has remained the same over time
☐ Yes, in the past... [*Mark ALL that apply*]
- ☐ Operational rules are created, changed, and enforced at the local level (*self-governance*)
- ☐ Operational rules are created, changed, and enforced at the regional level (*an intermediate government agency between the local and national levels*)
- ☐ Operational rules are created, changed, and enforced at the national level
- ☐ Other. Please, describe:

☐ Do not know

SECTION Dp – PHYSICAL PUBLIC INFRASTRUCTURE

Dp.1. What **public infrastructure** is **associated** with the **use** of shared natural **resources**?
☐ Irrigation canals (and/or acequias)
☐ Drainage canals
☐ Irrigation ponds
☐ Dams
☐ Fences
☐ Roads
☐ Corrals
☐ Water points for livestock
☐ Barns or shelters for livestock
☐ Silos (for forages or grains)
☐ Processing plants (for agricultural or livestock products)
☐ Slaughterhouses
☐ Do not know
☐ Other. Please, describe:

Dp.1.1. How many **public infraestructure associated with** the shared natural **resources** currently exist in the community?

Dp.1.1.1. Has the **public infrastructure associated with** the shared natural **resources changed** since the 1980s?
☐ No, it has remained the same over time
☐ Yes, it has decreased
☐ Yes, it has increased
☐ Do not know

Dp.1.1.2. If yes, please, describe the change:

Dp.1.2. How **well-maintained** are the **public infrastructure** associated with the **shared natural resources**?
☐ Well-maintained
☐ Moderately well maintained
☐ Some resource deterioration occurs due to insufficient maintenance
☐ Considerable resource deterioration due to poor maintenance
☐ Considerable resource deterioration, but due to a natural disaster
☐ Do not know

Dp.1.2.1. Has the **state of** the **public infrastructure changed** since the **1980s**?
☐ No, it has maintained the same
☐ Has improved
☐ Has worsened
☐ Do not know

Dp.1.2.2. If the **state of maintenance of the** the **public infrastructure has changed** since the **1980s**, please, describe the main reason of the change.

Dp.1.2.3. If there are any **private infrastructures** owned by **community members**, please indicate which are the most relevant (e.g., fences, wells).

SECTION Ds – SOCIAL PUBLIC INFRASTRUCTURE

Ds.1. Which of the following best describes the **political or legal framework** for the **use and management** of the **shared natural resources**? [*Mark ALL that apply*].
☐ Operational rules are created, changed, and enforced at the local level (*self-governance*)
☐ Operational rules are created, changed, and enforced at the regional level (*an intermediate government agency between the local and national levels*)
☐ Operational rules are created, changed, and enforced at the national level
☐ Other. Please, describe:
☐ Do not know

Ds.1.1. Have **the political or legal frameworks** for **using and managing the shared natural resources changed** since the 1980s? [*Mark ALL that apply*]
☐ No, it has remained the same over time
☐ Yes, in the past... [*Mark ALL that apply*]
- ☐ Operational rules are created, changed, and enforced at the local level (*self-governance*).
- ☐ Operational rules are created, changed, and enforced at the regional level (*an intermediate government agency between the local and national levels*)
- ☐ Operational rules are created, changed, and enforced at the national level
- ☐ Other. Please, describe:

☐ Do not know

Ds.1.2. If **the political or legal frameworks** for using and **managing the shared natural resources** has changed since the **1980s**, please, describe the main reason of the change.

GENERAL INFORMATION – ENDOGENOUS FACTORS

G.1. How many people live in the **locality** (village or town) where the case study is located?

G.1.1. Has the population size **changed** since the 1980s?
☐ No. It has remained the same over time
☐ Yes, it has decreased
☐ Yes, it has increased
☐ Do not know

G.2. What type of population pyramid do you think best describes the **population's age structure**?
☐ Expansive (or triangular). Indicates a high birth rate, shorter life expectancy, and a relatively young population
☐ Stationary (or column-shaped). Suggests a near balance between birth and death rates, resulting in a stable population structure
☐ Constrictive (or inverted). Suggests a low birth rate, longer life expectancy, and an aging population.
☐ Unbalanced (or irregular). Indicates an event that has changed the demographic structure and created significant imbalances (e.g., wars, exoduses, or waves of migration)
☐ Do not know

G.2.1. Has there been a **transition** (change in age structure) **since the 1980s**?
☐ No, it has remained the same over time
☐ Yes, the population in the past had a structure of the type...
- ☐ Expansive (or progressive)
- ☐ Stationary (or stable)
- ☐ Constrictive (or regressive)
- ☐ Irregular (or unbalanced)
- ☐ Do not know

G.3. How would you describe the **local economy**?
☐ Subsistence economy
☐ Market-oriented economy but based on the primary sector
☐ Market-oriented and diversified economy (with secondary or tertiary sector activities)
☐ Other. Please, describe it:
☐ Do not know

G.3.1. Has there been a **change in the local economy since the 1980s**?
☐ No, it has remained the same over time
☐ Yes, the local economy in the past was...
    ☐ Subsistence economy
    ☐ Market-oriented economy but based on the primary sector
    ☐ Market-oriented and diversified economy (with secondary and tertiary sector activities)
    ☐ Other. Please, describe it:
☐ Do not know.

G.4. How would you describe the **degree of stability and autonomy** of the **local economy**?
☐ Stable and relatively autonomous with respect to other economic networks
☐ Stable and tied to other economic networks
☐ Changing and relatively autonomous with respect to other economic networks
☐ Changing and tied to other economic networks
☐ Do not know

G.4.a. Has the **degree of stability or autonomy** of the local economy **changed since the 1980s**?
☐ No, it has remained the same over time
☐ Yes, in the past was...
    ☐ Stable and relatively autonomous with respect to other economic networks
    ☐ Stable and tied to other economic networks
    ☐ Changing and relatively autonomous with respect to other economic networks
    ☐ Changing and tied to other economic networks
☐ Do not know

G.4.1. Has the **degree of stability or autonomy** of the **local economy** changed since the **1980s**?
☐ No, it has remained the same over time
☐ Yes, in the past was…
    ☐ Stable and relatively autonomous with respect to other economic networks
    ☐ Stable and tied to other economic networks
    ☐ Changing and relatively autonomous with respect to other economic networks
    ☐ Changing and tied to other economic networks
    stable and relatively autonomous with respect to other economic networks
☐ Do not know.

G.5. How far is this location from a major regional marketing center? (*in most cases, the population of the marketing center should be greater than 5000 people*).
In kilometers (as a crow flies) and time by (specify transport): _____

SECTION E – EXOGENOUS SHOCKS

E.1. List **what external disturbances have historically affected the studied community** (e.g., droughts, floods, freezes, pests, animal diseases, wildfires, market prices, policies, subsidies).

1_____
2_____
3_____
4_____
5_____
[*Add rows as needed*]

E.2. Have these **external disturbances** (or their impact on the community) **changed** since the 1980s (e.g., increased, decreased, intensified)? Please, **describe** any **changes** that have occurred.

_____

E.3. List **what external disturbances have surprisingly / unexpectedly / or recently affected the studied community** (e.g., changes in cultural values, policies, outbreaks, abrupt demographic changes, violent conflicts, introduction of GMOs, biopiracy).
1_____
2_____
3_____
4_____
5_____
[*Add rows as needed*]

E.4. Has any component of the system (resource, users, public infrastructure providers, physical public infrastructure, social public infrastructure) been **changed** (as an adaptive measure) **to cope with the changes on historical external disturbances**? (For example, to cope with more frequent or intense droughts or floods, or with the higher volatility of market prices). [*If yes, please describe it*].

E.5. Has any component of the system (resource, users, public infrastructure providers, physical public infrastructure, social public infrastructure) been **changed** (as an adaptive measure) **to cope with surprising / unexpected / or recent external disturbances**? [*If yes, please describe it*].

HISTORICAL AND PAST EVENTS

To better understand how the case study has changed over time, please use your knowledge and experience to **identify** major **milestones** or **events** that have **occurred in the case study over the past 40 years** (e.g., change in political regime, change in crops or livestock, crises, migratory flows, creation of cooperatives or associations...). Knowledge of specific events in the case study can help during fieldwork and data analysis to identify when changes have occurred in the rules used by the community. [*If there is something you don't know, please answer "Do not know"*].

Decade	**Milestones or events**
Before decade 1980	
1980	
1990	
2000	
2010	
2020	

SUBJECTIVE EVALUATION OF RESILIENCE SCALE (SERS)

We are interested in measuring the **resilience** of small-scale agricultural systems **to climate change**. With your experience and knowledge of the case study, **please complete the following questionnaire**.

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
The ***community*** can bounce back from any challenge the ***climate*** throws at it.	☐	☐	☐	☐	☐
During times of ***climate-related hardship***, the ***community*** can change its primary income or source of livelihood if needed.	☐	☐	☐	☐	☐
If ***climate threats*** to the community became more frequent and intense, the ***community*** would still find a way to get by.	☐	☐	☐	☐	☐
In times of ***climate-related hardship***, the ***community*** can access the financial support it needs.	☐	☐	☐	☐	☐
The ***community*** can rely on the support of its members when they need help with ***climate issues***.	☐	☐	☐	☐	☐
The ***community*** can rely on the support of politicians and the government when it needs help with ***climate issues***.	☐	☐	☐	☐	☐
The ***community*** has learned important lessons from past hardships that will help it better prepare for future ***climate threats***.	☐	☐	☐	☐	☐
The ***community*** is fully prepared for any future ***climate-related threats*** that may occur in the area.	☐	☐	☐	☐	☐
The ***community*** receives useful information that warns in advance of future ***climate-related risks***.	☐	☐	☐	☐	☐

DEGREE OF COMPLIANCE WITH OSTROM'S DESIGN PRINCIPLES

Elinor Ostrom's identified eight design principles (Ostrom 1990) associated with robust institutions that have successfully governed common-pool resources for generations. These design principles have been reviewed and reformulated by Cox et al. (2010). Please, **complete the following questionnaire** to characterize the **degree to which the studied community adheres to these design principles**. [*All questions use a Likert-scale (1-3) to characterize each design principle. Mark "0" if the principle does not exist or is not followed in the case study, and "DK/NO" if you don't know or have no opinion*].

Principle	**Description**	**Non-existent/Not followed (0)**	**Low (1)**	**Medium (2)**	**High (3)**	**DK/NO (4)**
1A User boundaries	Clear boundaries between legitimate users and nonusers must be clearly defined.	☐	☐	☐	☐	☐
1B Resource boundaries	Clear boundaries are present that define a resource system and separate it from the larger biophysical environment.	☐	☐	☐	☐	☐
2A Congruence with local conditions	Appropriation and provision rules are congruent with local social and environmental conditions.	☐	☐	☐	☐	☐
2B Appropriation and provision	The benefits obtained by users from a common-pool resource (CPR), as determined by appropriation rules, are proportional to the amount of inputs required in the form of labor, material, or money, as determined by provision rules.	☐	☐	☐	☐	☐
3 Collective-choice arrangements	Most individuals affected by the operational rules can participate in modifying the operational rules.	☐	☐	☐	☐	☐
4A Monitoring users	Monitors who are accountable to the users monitor the appropriation and provision levels of the users.	☐	☐	☐	☐	☐
4B Monitoring the resource	Monitors who are accountable to the users monitor the condition of the resource.	☐	☐	☐	☐	☐
5 Graduated sanctions	Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and the context of the offense) by other appropriators, by officials accountable to the appropriators, or by both.	☐	☐	☐	☐	☐
6 Conflict-resolution mechanisms	Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.	☐	☐	☐	☐	☐
7 Minimal recognition of rights to organize	The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.	☐	☐	☐	☐	☐
8 Nested enterprises	Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.	☐	☐	☐	☐	☐

9. Has the degree to which the studied community adheres to any of the design principles changed since the 1980s? [*If yes, please, describe it*].

SUCCESS IN GOVERNING THE COMMONS

Agricultural communities create and use institutional arrangements to manage natural resources. Some social and ecological outcomes can inform us as **indicators of success governing common pool resources**. Based on some indicators suggested by Ostrom (2005) and Barnett et al. (2020), we have prepared the following **questionnaire**. For each **indicator**, please indicate (based on your knowledge) whether you believe the indicator has **worsened, improved, or remained the same over time** in the community studied. If you think there has been a change over time, **indicate when the change occurred** (the time period, e.g., 10 years ago, the 1980s). [*If there is something you don't know, please answer "Do not know"*].

- **Trust** between the members of the community.

High level of trust means that members of your community are generally good, honest, and reliable, and will not harm you.

☐ It has worsened
☐ It has remained the same over time
☐ It has improved
☐ Do not know / No opinion
Period of change:

- **Reciprocity** between the members of the community (e.g., social support, labor exchange…)

High level of reciprocity means that members of your community generally act for mutual benefit (e.g., social support, labour exchange…)

☐ It has worsened
☐ It has remained the same over time
☐ It has improved
☐ Do not know / No opinion
Period of change:

- **Inequality** between the members of the community.

Inequality means that members of your community are not equal, especially in status, rights, and opportunities

☐ It has worsened
☐ It has remained the same over time
☐ It has improved
☐ Do not know / No opinion
Period of change:

- **Productivity** of the agricultural system (e.g. agricultural and livestock yields, units of agricultural or livestock products)

☐ It has worsened
☐ It has remained the same over time
☐ It has improved
☐ Do not know / No opinion
Period of change:

- **Participation/involvement** of the community members in political/management decision-making processes.

☐ It has worsened
☐ It has remained the same over time
☐ It has improved
☐ Do not know / No opinion

Period of change:

- **Social welfare** of the community members (e.g., health, education, wealth).

☐ It has worsened
☐ It has remained the same over time
☐ It has improved
☐ Do not know / No opinion
Period of change:

- **Ecosystem health** (i.e., the conservation status or general condition of the ecosystems that support the community's agricultural activities and the surrounding environment that may be affected).

☐ It has worsened
☐ It has remained the same over time
☐ It has improved
☐ Do not know / No opinion
Period of change:

POLYCENTRISM

In situations where decisions are made collectively, different groups of people and different rules may come into play. For example, certain irrigation systems or rangelands may be managed exclusively by a government agency at the national level. The rules of operation are established, modified, and enforced by reference to laws passed by the national legislature or executive branch. On the other hand, in some communities, the decision-making authority lies with the members of the communities themselves (the users of the resource), who create and enforce their own rules of operation. There are also cases where a community of irrigators may be subject to multiple sets of rules, each set adopted by different decision-making bodies. To determine the **degree of polycentricity** in the case study, **please, complete the following questionnaire**.

- What **political or legal framework** for the **use of natural resources** must the community comply with at the local, regional, state, and international levels? (e.g., community bylaw, regional plans, national legislation, international agreements).

- How do the **rules of these agencies/entities affect the rules of the community**? (the relationship between the rules of the community and the legislation at higher levels: regional, national, international).
  ☐ Larger-scale political or legal frameworks do not affect the rules of the community
  ☐ Barely affected
  ☐ Moderately affected
  ☐ Largely affected
  ☐ Do not know / No opinion

- If the rules of the community are affected by the rules of agencies/entities from larger levels, **please, describe how:**

- **How often** does the **community interact** (e.g., exchange of information) **with these agencies/entities**?
  ☐ There is no communication with these agencies/entities
  ☐ Low frequency of communication (once per year or less)
  ☐ Medium frequency of communication (less than 12 times per year)
  ☐ High frequency of communication (at least once per month)
  ☐ Do not know / No opinion

- **To what extent** do **these agencies/entities monitor/control** compliance with their rules?
  ☐ There is no monitoring or control from these agencies/entities.
  ☐ Low monitoring or control (once per year or less).
  ☐ Moderate monitoring or control (less than 12 times per year).
  ☐ High monitoring or control (at least once per month).
  ☐ Do not know / No opinion.

GLOSSARY OF TERMS FOR UNDERSTANDING THE COMMUNITY UNDER STUDY
From our experience in local communities, it is common for communities to have certain words and terms to refer to the ways in which natural resources are managed and organized, or even to refer to public or shared infrastructures. Therefore, if this is the case in the community you are studying, we ask you to list these terms below with a translation or explanation of what they are. For example, in some parts of Mexico, rainwater harvesting infrastructure exists, and depending on the region, some are called "tinajas", "tajos", or "jagüeyes".

Based on your knowledge of the community, please **list below** the most important **local terms** that can help us to understand the information from the interviews.

GATHERING KNOWLEDGE ABOUT THE STUDY SYSTEM
Please, list below the **scientific literature** that supports this assessment:

COMMENTS:

REFERENCES
Barnett,A.J., Partelow, S., Frey, U., García-Lozano, A., Mancha-Cisneros, M., Oberlack, C., Ratajczyk, E., Smith, H., Villamayor-Tomás, S., Whitney, C.K. (2020). Defining success in the commons: Addressing problem orientations, multidimensionality, norms, and trade-offs. International Journal of the Commons, 14, 366-387. DOI: 10.5334/ijc.994

Cox, M., G. Arnold, and S. Villamayor Tomás. (2010). A review of design principles for community-based natural resource management. Ecology and Society, 15(4), 38. http://www.ecologyandsociety.org/vol15/iss4/art38/

Anderies, J. M. (2015). Understanding the dynamics of sustainable social-ecological systems: human behavior, institutions, and regulatory feedback networks. Bulletin of mathematical biology, 77, 259-280. DOI: 10.1007/s11538-014-0030-z

Anderies, J. M., Janssen, M. A., & Ostrom, E. (2004). A framework to analyze the robustness of social-ecological systems from an institutional perspective. Ecology and society, 9(1). https://www.ecologyandsociety.org/vol9/iss1/art18/

Janssen, M. A., & Anderies, J. M. (2023). Infrastructure for Sustainability. https://pressbooks.pub/cisi/

Ostrom, E. (1990). Governing the commons: The evolution of institutions for collective action. Cambridge university press. Cambridge, USA

Ostrom, E. (2005). Understanding institutional diversity. Princeton university press. Princeton, New Jersey, USA

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Resilient Rules

Finding solutions
in resilient agricultural systems

Appendix G

Safety protocol

ASSESSMENT OF THE RISKS FOR RESEARCHERS, AND RESEARCH PARTICIPANTS AND THEIR COMMUNITIES, SAFETY PROTOCOL AND PROCESS TO OBTAIN LOCAL ETHICAL APPROVAL

The success of a research fieldwork relies on proper preparation and risk management planning. Both the quality of the research and the safety of the researcher and research participants depend on how well the research is planned, taking into account the local context and risk environment. All the study sites selected for the RESILIENT RULES project are considered low risk areas for researchers, according to the recommendations and travel advice of the European Commission (https://ec.europa.eu/consularprotection/travel-advice_en) and the Spanish Ministry of Foreign Affairs (https://www.exteriores.gob.es/en/ServiciosAlCiudadano/Paginas/Recomendaciones-de-viaje.aspx).

However, a specific security plan and ethics assessment for each case study is essential since field research always carries a certain level of risk. Research collaborators have previous experience in developing ethnographic research in the study case and sufficient knowledge of the study case to make an initial assessment of the ecological and social contexts of the Study Case (**Appendix F**), as well as a risk assessment for themselves, the research participants and their communities. Their knowledge of the context will reduce the risks in general, and enables the development of appropriate safety protocols and local ethical approval procedures that incorporate the necessary specificities for the local cases.

A. Assessment of the risks to researchers

It is important for researchers to be aware and take appropriate precautions of personal health and wellbeing, personal threats, environmental threats and ethical considerations and to take appropriate precautions to minimise them and ensure their safety. Potential risks can be influenced by contextual factors (socio-political and environmental contexts and the availability of infrastructure) of the study cases (**Table 1**). Researchers need to assess the specific questions about socio-political and environmental contexts and infrastructure availability, as well as to take a number of general measures to reduce the likelihood of potential risks, as it is specified in **Table 1**, and specific measures for personal health and wellbeing, personal threats, and environmental threats.

Table 1. Contextual factors influencing the level of risk and general measures to reduce risk.

Factors	General measures
Socio-political context • Grade of stability • Nature of common crimes and economic situation of the country • Culturally sensitive behaviour • Legal system /authorities/ documents	• Proceed with caution, taking into account the socio-political and cultural context, the laws in force and the nature of the most common local and national crimes. • Keep your documents safe and make photocopies of your identity card, passport, visa, vaccination card and letter or card from the academic institution for which you are working. • Be aware of local conditions: climate and weather, likelihood of natural disasters and evacuation plans. • Identify a local contact and/or local partner institution and inform them of your detailed fieldwork plans.
Environmental context • The geography of the country and climate • Proneness to natural disasters	

Factors	General measures
Infrastructure availability • Communications • Travel, transport and accommodation • Banking infrastructure • Health care system	• Ensure the availability of communication channels: internet, telephone network, radio, etc. • Organise your return travel and accommodation in advance, as well as a contingency plan. • Obtain safe means of transport to move around the study area. • Arrange for medical care in case of emergency or illness. • Make sure you have the necessary medical insurance.

The potential risks for researchers and the general measures they need to take are:

Personal health and wellbeing. A health risk is the likelihood that something will harm or otherwise affect health or wellbeing. Most health-related risks are reduced by having adequate health insurance coverage, and therefore one of the requirements for participation in the project, set out in the Adhesion Agreement to the Study Protocol (Appendix D), is that research collaborators must be affiliated with an institution (e.g., university, research centre) that can provide health insurance during the development of fieldwork in the study case. In addition, the following measures should be taken prior to conducting fieldwork (adapted from Hilhorst et al., 2016):

- Obtain information on common diseases, preventive measures and symptoms.
- Identify trusted medical facilities in the vicinity of the research site and obtain contact details for the local or national emergency services.
- Ensure that appropriate health precautions have been taken, including: appropriate insurance, vaccinations, personal hygiene and prophylaxis, if necessary.
- It is advisable to have a medical and dental check-up before starting fieldwork.
- Remember to take any regular medication you may need and an up-to-date first aid kit with basic medicines.
- Always carry a card with your blood group, allergies, medications, vaccination card, insurance and emergency numbers and contact details, and make sure others know where to access this information if you are incapacitated.
- If you work in extreme climates (hot or cold), remember that the right clothing and equipment can significantly reduce health problems.
- Build and maintain resilience and stress management skills before, during, and after fieldwork, and try to prepare for and anticipate the social, emotional and psychological reactions you may experience.

Personal threats. Personal threats can take many forms and can pose a serious threat to an individual's personal integrity, safety and well-being. It is also important for individuals to be vigilant and proactive in protecting their personal information and reporting any suspicious activity to the appropriate authorities. The following measures can help reduce personal threats (adapted from Hilhorst et al., 2016):

- Familiarize yourself with locations, circumstances (e.g. mobs/riots/demonstrations) and times to avoid risk areas.
- Confirm a key contact in case of an emergency. Make sure this person has the contact details of your family, your coordinator or supervisor and your host organization and *vice versa*. Also provide the RESILIENT RULES team and your family with the necessary contact details, itinerary and information about your trip before you leave.
- In the event of an assault or theft of your belongings: remain calm and do not show anger, get to safety as quickly as possible and report the incident.
- Email scans of your passport, airline tickets and driving license to yourself and keep them on an accessible memory stick so that you can access them whenever you need to. Also email copies to key contacts.
- Make sure you have at least one emergency contact number memorized. Other key contacts should be programmed into your mobile phone and carried on paper in case the phone is lost/unavailable.
- If you intend to drive, make sure you have the appropriate driving license. Make sure that the vehicle you are travelling in is in good condition and that you take the necessary measures to drive safely (seat belts, tool kit, first aid kit, spare water, emergency rations).
- Have a contingency plan for evacuation or hibernation if you cannot leave the area safely.
- Find out about the availability of cash machines (ATMs).

Environmental threats. Environmental threats include natural disasters, adverse or extreme weather conditions, pollution and other environmental hazards. In order to respond effectively to an environmental problem, it is recommended that the following steps are taken:

- Pack clothing and equipment appropriate to the geography and climatic conditions of the study area.
- Be prepared for the types of natural hazards that are prevalent in your area, including an evacuation plan.

SECTION 1. SAFETY PROTOCOL FOR RESEARCHERS

Developing a specific safety protocol for researchers requires taking into account the local context of the research to assess the specific threats and risks of the study case. Please, fill out the form below to develop a case study safety protocol with specific measures to mitigate potential local risks.

"Risk refers to the possibility of an adverse outcome or event resulting from a given action, decision, or occurrence. It encompasses both the likelihood of an event occurring and the impact or severity of its consequences. In a safety context, risk is often assessed to identify potential hazards and to implement measures to mitigate or manage those hazards to an acceptable level."

a. Do you agree with this definition?
___Yes ___No ___

b. In the context of your case study, write an example of what could be a risk to you or the participants in this research.

1.1. Related to the socio-political context

a. Do you think that the social and political context of the country or region where the study case is located may affect your safety or the proper development of the fieldwork?
___Yes ___No ___Do not know

If yes,

b. Describe in detail the social and political issues that may affect your safety or the proper development of the fieldwork (e.g., common crimes, economic situation, socio-cultural aspects of the target community, legal system or authorities).
*If you believe there is no risk, please, justify your answer.

c. Describe any additional actions or measures that need to be taken to mitigate risks beyond those listed above (e.g. schedules, do not drive at night, respect cultural aspects, avoid conflict areas).

1.2. Related to the environmental context

a. Do you think that the environmental context of the country or region where the study case is located may affect your safety or the proper development of the fieldwork?
___Yes ___No ___Do not know

If yes,

b. Describe in detail the environmental issues, including topography, climate, and natural disasters, that may affect your safety or the proper development ofthe fieldwork: (e.g. earthquake risk, cyclones, rainy season, frequency of floods or other extreme weather events).

*If you believe there is no risk, please, justify your answer.

c. Describe any additional actions that need to be taken beyond those listed above (e.g. conduct fieldwork in a specific period of the year, to have an escape or evacuation plan).

1.3. Related to the health and prevalence of diseases

a. Are there any diseases prevalent in the area that may cause your health problems during fieldwork?
___Yes ___No ___Do not know

If yes,

b. Indicate which diseases are prevalent in the study area (e.g. Malaria, Rabies Virus (RABV), Influenza A (H5N1), African Swine Fever (PPA), Crimean-Congo Hahemorragic Fever (CCHFV), West-Nile virus (WNV), Bluetongue virus (strain BTV-3), Aphtose fever (SAT 2), etc.). (see: WAHIS).
*If you believe there is no risk, please, justify your answer.

c. Describe any additional actions or measures that need to be taken beyond those listed in these document to mitigate the risks (e.g. conduct fieldwork in a specific period of the year, get vaccinated, prophylaxis treatment, use physical barriers for disease vectors, use repellents for mosquitoes or other insects)

1.4. Related to the availability of infrastructures

It includes the **infrastructure adequate for your safety.** For example, this could be communication infrastructures (e.g., mobile phone network and internet), health infrastructures (e.g., hospitals, health center, local medical clinic) or transportation infrastructures (e.g. well-connected areas, adequate services available such as petrol stations, safe roads to access fieldwork, public transport on main roads, etc.) emergency and security infrastructures (e.g. fire and police stations).

a. Do you think that the availability of infrastructures in the country or region where the study case is located is adequate for your safety or for the proper development of the fieldwork? (e.g access to medicines, roads, vehicles)

___Yes ___No ___Do not know

If no,

b. Describe in detail any problems with communication infrastructure that may affect your safety or the proper development of the fieldwork.

*If you believe there is no risk, please, justify your answer.

c. Describe in detail any problems with the health infrastructure that may affect your safety or the proper development of the fieldwork:

*If you believe there is no risk, please, justify your answer.

d. Describe in detail any problems with the safety and reliability of the transportation infrastructure that may affect your safety or the proper development of the fieldwork:

*If you believe there is no risk, please, justify your answer.

e. Describe in detail any problems with other types of infrastructure:

f. Finally, describe any additional actions that need to be taken to address these issues beyond those listed above to mitigate the risks:

1.5. Unexpected risks

Safety protocols are put in place to mitigate risk and ensure the security of researchers, but unexpected risks can still occur. The research collaborator will respond to these unexpected risks by informing the Principal Investigator, and by discussing with her the seriousness of the risk and any action that may be required.

B. Assessment of the risks to research participants and their communities

1. Behavior of research collaborators at the community under study

The behavior of research collaborators in a community under study should be characterized by mutual respect, professionalism, and clear communication to the community. Communicating clearly and openly, sharing information, data and results in a timely and transparent manner is crucial to building positive and trusting relationships with members of the community. Research collaborators need to be sensitive to the local cultural norms and practices, and strive to ensure that the research benefits the community in a meaningful way.

Overall, the behaviour of research collaborators in a community under study should reflect a commitment to scientific rigor, ethical practice, and social responsibility.

SECTION 2. RISKS TO THE RESEARCH PARTICIPANTS AND THEIR COMMUNITIES AND SAFETY PROTOCOL

Participation in this study does not implies any major risks, either physical or psychological, to the research participants or the communities being studied. However, if during data collection, the participants' states that s/he or his/her community is at risk, researcher collaborators will facilitate the contact of local NGOs and institutions that the study subject could contact to help them to solve this risk and provide appropriate support and resources to participants. Potential risks for research participants include personal health or wellbeing issues, personal threats, or the environment (**Table 2**). For each of these potential risks, **Table 2** lists some of the best known international NGOs and institutions that can help to solve the threats.

Table 2. Threats, example of risk and NGOs or institutions to contact.

Threats	**Example**	**NGOs or institutions**
To the health and wellbeing of the study participants and their community	- Health emergency	- World Health Organization (WHO) - Doctors Without Borders (Médecins Sans Frontières) - International Committee of the Red Cross (ICRC) - International Rescue Committee (IRC)
To the properties, rights, and integrity of the study participants and their community	- Extreme poverty - Abuse and imminent threat to personal integrity - Political asylum seeker - Crimes against humanity - Street gangs - Criminal organisation - Project proposal - Land tenancy and use	- Amnesty International - United Nations (UN) - Human Rights Watch - Save the Children - CARE International - Transparency International - World Vision International - International Monetary Fund (IMF) - World Bank Group - International Labour Organization (ILO) - International Criminal Court (ICC) - Nation state, courts and others governance institutions
Environmental threats to the study participants and their community	- Natural disaster - Actions that undermine the conservation status of nature and natural resources	- Greenpeace International - World Wildlife Fund (WWF)

Research collaborators will develop the appropriate plan to minimize potential risks to research participants and their communities in each specific case study by answering the questions below.

2.1. Please, specify the potential risks to which the **individual research participants** may be exposed to:

a. To the health and wellbeing (e.g. duration of interviews for older participants).

b. To the properties, rights, and integrity (e.g. providing personal information about irregularity or insecurity in land tenure, being identified as a participant in the research).

c. To the environment:

d. Other:

2.2. Please, specify the potential risks to which the **communities** studied may be exposed to:

a. To the health and wellbeing (e.g. possibility of a conflict emerging among community members).

b. To the properties, rights, and integrity (e.g. sensitive community information such as a situation of insecurity or uncertainty in land tenure, possible loss of self-organization rights by a central or higher authority if community rules are discovered).

c. To the environment (e.g., presence of valuable natural resources that may be of interest to third parties, identification of irregular activities at the community level that can affect the state and quality of natural resources).

d. Other:

2.3. Considering **all identified risks** at both the **individual and community levels**, what **actions or measures** could be taken to mitigate each type of risk?

a. To the health and wellbeing (e.g. choosing a comfortable environment for the interview, pause the interview if necessary, explain the selection criteria for participants to avoid conflicts).

b. To the properties, rights, and integrity (e.g. creating a safe environment that builds trust and ensures the security of information; ask to remove sensitive information about community resources or land tenure that comes up during interviews, pause the recording at the request of the interviewee).

c. To the environment (e.g., ask to remove information about valuable resources that comes up during interviews, pause the recording at the request of the interviewee).

d. In case of other measures could be taken to mitigate each type of risk, please, describe it:

2.4. Which **NGOs**, **government agencies or institutions** (beyond those listed in these document) could be contacted for each type of risk at the local or regional level?

a. To the health and wellbeing (e.g. hospital, health center, emergency medical service, community health worker).

b. To the properties, rights, and integrity (e.g. police, public defenders' offices, women lawyers' association).

c. To the environment (e.g. environmental services/enterprises, agricultural and livestock services).

d. Others:

2.5. Please, make an **assessment of the risk** if the following data **gets into the hands of third parties**:

a. The geographical location of the community (e.g. exposing the community to third party interests).

b. The characteristics of the community and its resources (e.g.–presence of valuable natural resources that may be of interest to third parties).

c. The rules and norms they use to manage their common resources (e.g. possible loss of self-organization rights by a central or higher authority if community rules are discovered).

d. The identity of the people interviewed (e.g. level of trust in the community, possible discrimination).

2.6. Please, indicate in your opinion which aspects and information should not be publicly available. It may be helpful to consider risk in terms of likelihood of occurrence and impact or consequence and the factors that may be affect them (**Table 3**). To conduct this analysis, please rank each threat from 1 (very low) to 3 (very high). A Risk-Vulnerability Matrix will be used to calculate the risk (**Figure 1**).

a. Indicate the likelihood (L) and impact (I) scores of the risks related to the **geographical location of the community**.

a.1. If the level of Risk (L x I) * related to the geographical location of the community is equal or higher than 4, please indicate the specific measures that need to be taken to reduce it:

*level of Risk (1-9) = Likelihood score (1-3) x Impact score (1-3).

b. Indicate the likelihood (L) and impact (I) scores of the risks related to the **characteristics of the community and its resources**.

b.1. If the level of Risk (L x I) * related to the characteristics of the community and its resources is equal or higher than 4, please indicate the specific measures that need to be taken to reduce it:

*level of Risk (1-9) = Likelihood score (1-3) x Impact score (1-3).

c. Indicate the likelihood (L) and impact (I) scores of the risks related to the **rules and norms used to manage their common resources.**

c.1. If the level of Risk (L x I) * related to the rules and norms used to manage their common resources is equal or higher than 4, please indicate the specific measures that need to be taken to reduce it:

*level of Risk (1-9) = Likelihood score (1-3) x Impact score (1-3).

d. Indicate the likelihood (L) and impact (I) scores of the risks related to the **identification of the people interviewed.**

d.1. If the level of Risk (L x I) * related to the identification of the people interviewed is equal or higher than 4, please indicate the specific measures that need to be taken to reduce it:

*level of Risk (1-9) = Likelihood score (1-3) x Impact score (1-3).

Table 3. Factors that may affect to risk assessment.

Factors that may affect likelihood
• Level of exposure • Types of research being undertaken • Location of research • Value of property • Perceptions within the local context
Factors that may affect Impact
• Security provisions made prior to incident • Reactions to incident (contingency plans) • Ability to respond • Contacts and networks to support/assist

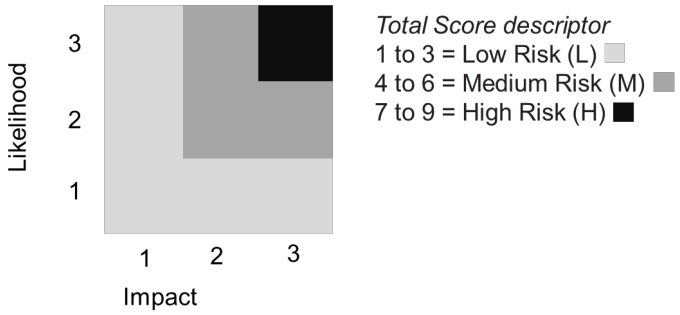

Figure 1. Risk-Vulnerability Matrix can be used to calculate the value obtained by multiplying each factor to give a total score descriptor (Hilhorst et al., 2016).

Having identified the factors that make the participants vulnerable, it is necessary to reduce exposure by employing appropriate security procedures and practice. Research collaborators will discuss with the Principal Investigation about the best measures to reduce risk following the sample shows in **Table 4**. It is appropriate update the risk assessment each time there is a significant change in the context.

Table 4. Sample risk assessment for a hypothetical threat "loss of land tenancy" for farmers and their communities (adapted from Hilhorst et al., 2016)

Threat	**Loss of land tenancy and use rights**
Likelihood (L)	Low Risk, score: 1
Impact (I)	High Risk, score: 3
Level of risk (LxI)	Low Risk, score 1x3 = 3
Measures to reduce Likelihood	• Know terms and conditions of the land tenancy and use rights are explicitly documented in a legally binding agreement • Stay Informed of agricultural policies, land use regulations changes at local and national level • Maintain channels of communication with the landowner or governing authorities, building a positive relationship • Complying with data protection laws • Seek legal advice if necessary
Measures to reduce Impact	• Advising farmers to keep thorough records of all transactions, agreements and activities related to land tenure and use rights. • Encourage farmers to maintain a strong network of industry professionals, agricultural organisations, and support services. • Encourage seeking financial or legal support at different levels of government
Final level of risk	Low Risk

a. Unexpected risks

If during data collection the research collaborator detects unexpected findings related to human rights, well-being, environmental and (or) health risks that may have been created by the research participant, the research collaborator must **inform the Principal Investigator**, and a videoconference needs to be scheduled as soon as possible must be arranged as soon as possible to discuss the seriousness of the risk. Any action that may be required will decide whether disclosure is required after consultation with the data protection unit of the Principal Investigator's host institution.

Disclosure may be required if there is a real, serious and imminent risk that the research participant intends to harm him/herself, others, or the community, or to engage in illegal activities that could endanger human rights, the environment, or the community. In such cases, the Principal Investigator will inform the local authorities or a local NGOs with sufficient national and/or international standing to take action in the country where the research community is located.

When conducting interviews with participants, it is important to consider the **gender perspective** to ensure inclusivity and fairness. The following general considerations should be taken into account: (1) strive for inclusivity, representation and balanced representation, including both men and women in the interviews; (2) avoid stereotyping;
(3) be sensitive to cultural gender norms; (4) use inclusive and accessible language that mitigates the gender biases; (5) provide a safe and comfortable environment; (6) address power imbalances.
In the context that the interviews of a certain gender can only be conducted by an interviewer of the same gender as the participant, the collaboration of a field assistant of the opposite gender can be requested.

3. Describe specific actions or solutions to be taken in the community studied from a **gender perspective**.

SECTION 3. PROCESS FOR OBTAINING APPROVAL FROM THE APPROPRIATE ETHICS COMMITTEE

Process to obtain approval from the appropriate ethics committee RESILIENT RULES and research collaborators follow the General Data Protection Regulation of the European Union (EU 2016/679) and that of the Spanish Law (Ley Orgánica 3/2018 de Protección de Datos y Garantías de los Derechos Digitales) to safeguard the rights and freedoms of the research participants, as it is specified in the study protocol. However, prior to the development of the fieldwork, it is necessary to obtain the approval of the local Ethics Committee to develop the fieldwork or, failing that, the approval of the head of the community for the cases located outside Spain. **Information for local ethical assessment (Appendix I)** provides the necessary information about the RESILIENT RULES project to request for the local ethical approval. Please, respond to the following questions in order to design the best protocol to obtain ethical approval:

Please, respond to the following questions in order to design the best protocol to obtain ethical approval:

3.1. Does your institution, region or country have an Ethics Committee?
___Yes ___No
If you do not know, please ask your institution for this information before you complete this form.
If yes,
Provide the name and contact details of the Ethics Committee as follows:
a. Name of the local Ethics Committees:
b. Region/Country of the local Ethics Committees:
c. Local Ethics Committees contact information:
d. Web page of the local Ethics Committees:
e. Describe the process to request approval.

With regarding to the scientific ethics and data protection measures specified in the study protocol:
f. Do you detect any aspect that is not included and/or important to consider?
___Yes ___No

If yes,
g. Describe which one and how it could be included.

In the case of the **absence of an Ethics Committee,** permission can be asked to the community under study (e.g. the head of the community) (see **Appendix J- Community leader permission request** of the study protocol).
h. Describe the best procedure for obtaining approval and the person or organisation to whom approval should be sought.
With regarding to the scientific ethics and data protection measures specified in the study protocol;
i. Do you detect any aspect that is not included and/or important to consider?
j. If yes, describe which one and how it could be included.

SECTION 4. CONTACT DETAILS

Please provide the contact details of a person who can be contacted during the course of your fieldwork, if necessary.

4.1. Phone number:

4.2. Email:

References

Allmark, P., Boote, J., Chambers, E., Clarke, A., McDonnell, A., Thompson, A., & Tod, A. M. (2009). Ethical issues in the use of in-depth interviews: literature review and discussion. *Research Ethics*, *5*(2), 48-54.

Alshenqeeti, H. (2014). Interviewing as a data collection method: A critical review. English linguistics research, 3(1), 39-45.

Bucerius, S. M. (2013). Becoming a "Trusted Outsider" gender, ethnicity, and inequality in ethnographic research. Journal of Contemporary Ethnography, 42(6), 690-721.

Hilhorst, D. J. M., Hodgson, L., Jansen, B., & Mena, R. (2016). *Security guidelines for field researchers in complex, remote and hazardous places*. International Institute of Social Studies.

AAA (American Anthropological Association) Statements on Ethics. https://www.americananthro.org/ParticipateAndAdvocate/Content.aspx?ItemNumber=1911&RDtoken=3371&userID=6944

Organización Panamericana de la Salud y Consejo de Organizaciones Internacionales de las Ciencias Médica. Pautas éticas internacionales para la investigación relacionada con la salud con seres humanos, Cuarta Edición. Ginebra: Consejo de Organizaciones Internacionales de las Ciencias Médicas (CIOMS); 2016.

Pennington, G. (2018). Global code of conduct-for research in resource-poor settings. www. globalcodeofconduct.org.

WAHIS: World Animal Health Information System. https://wahis.woah.org/#/home

Resilient Rules

Finding solutions
in resilient agricultural systems

Appendix H

Description of the interview guide

DESCRIPTION OF INTERVIEW GUIDE

PREVIOUS PRESENTATION AND CONSENT
The interviewer applies the "Oral consent script" and starts recording if the participant has agreed to be interviewed and to have their voice recorded. The interviewer provides their name, institution, and position, identifying themselves as a collaborator of the RESILIENT RULES, project funded by the European Research Council. They state the date and time of the interview, the name and location of the community, and mention that is speaking with a person of this community to know about the rules and norms used in their community to manage natural resources for agriculture and livestock. Next, the interviewer confirms with the participant (using yes/no questions) that the project objectives have been explained and that they agree to participate.

SECTION 1. DESCRIPTION OF THE SOCIO-ECOLOGICAL SYSTEM
The description of the social-ecological system of the community is the focus of Section 1. It includes open-ended questions about the number of community members, organizational structure, the existence of written rules or by-laws, and the current and past role of the participant within the community. Other questions ask about the agricultural and livestock activities undertaken in the community, the area (total and *per capita*) used for these activities and land tenure. Further items seek to identify and estimate the size of the natural resources and public infrastructure that the members share to carry out such activities, as well as the level of economic dependence of the community on agricultural activities. Additional open-ended questions address the predominant ethnic group and religion in the community.

SECTION 2. RULES
This section focuses on identifying the rules, norms, and strategies used to manage shared natural resources and public infrastructure. To this end, this section includes open-ended questions about: - Position rules: Create the positions that participants can take in managing natural resources (e.g., *what roles can members of this community have?*). - Boundary rules: Regulate the entry and exit of participants into positions (e.g., *what characteristics must members have to be eligible to hold a given position?*). - Choice rules: Specify what a participant occupying a position should(not), may(not), will(not), must(not), shall(not) do at a given point in the decision-making process (e.g., *how are natural resources distributed among community members in quantity, quality, and time?*). - Aggregation rules: Determine whether a decision is required from single or multiple participants before an action is performed at a node in the decision process (i.e., *what are the decision processes in your community like?*). - Information rules: Determine the amount of information available to participants based on their position; the channels through which it flows, and the frequency, accuracy, language, and form in which communication takes place (i.e., how is information about the rules communicated?). - Scope rules: Define whether the outcome of a situation should, should not, or may be affected by the actions taken within the situation (i.e., *what mechanisms are used to achieve these goals*). For each of the rules identified, questions are included about the potential payments or consequences for compliance or noncompliance (sanctions or rewards), the mechanisms used to monitor compliance with these rules, how and why these rules have changed over the past 40 years (or since the participant can remember), and the availability of written documents. The interviewer should also confirm the components of institutional grammar for each of the rules identified: - Attribute: Who specifically? - Context: What? Where? How? When? - Deontic: should(not), may(not), will(not), must(not), shall(not) Additional open-ended questions delve into the general emotional consequences associated with (non-) compliance with the rules.

SECTION 3. POLYCENTRICITY

Section 3 includes open-ended questions about the community's relationship with local, regional, national, and international public agencies or with other types of organizations (trade unions, agrarian organizations, NGOs) that play a role in the rules that define the use of natural resources in the community. The questions aim to identify the possible organizations, the rules generated by these organizations related to the management of local resources, the forms of communication of these rules, the existing mechanisms for monitoring compliance with these rules, and the consequences derived from their compliance or non-compliance.

SECTION 4. OUTCOMES AND CHANGES

In Section 4, the evolution of the following aspects is explored through open-ended questions: the number of community members; the quality and quantity of shared natural resources and public infrastructure; agricultural productivity; levels of trust, reciprocity, and inequality among members; the level of well-being; and the level of compliance with rules. Additional questions elaborate on the introduction, modification, or removal of rules. In all cases, the study also examines the reasons behind these changes, their timing, and the associated decision-making processes.

SECTION 5. RESILIENCE

This section explores the climate variation in the community's territory (extreme weather events, increase in temperature, etc.) through close-ended questions (yes/no). A scale of 1 to 10 was used to explore (i) How significantly the climate change is impacting the community (0 = no impact whatsoever, 1= the changes are occurring but impacts are not serious, 10= very serious effects) and (ii) the usefulness of the organization and rules used by the community to assist in coping with potential adverse effects of climate (0=no assistance at all, 1=minimal assistance, 10=they are indispensable).

The Subjectively-Evaluated Resilience Score (SERS) is then used to measure the community's resilience to climate change. The respondent indicates, on a five-point Likert scale (1=strongly disagree to 5=strongly agree), how much they agree with a series of statements about the community's ability to cope with the challenges posed by climate-related challenges and risks.

SECTION 6. SOCIODEMOGRAPHIC AND PSYCHOGRAPHIC CHARACTERISTICS

In section 6 the respondent's level of optimism is assessed using the Life Orientation Test-Revised (LOT-R), which consists of assessing the level of agreement with a series of statements using a five-point Likert scale (1=strongly disagree to 5=strongly agree). Next, a closed-ended multiple-choice question is used to assess the respondent's risk aversion, and a 10-point scale is used to measure their mood (level of happiness, optimism, satisfaction with life).

CASE DESCRIPTION CONFIRMATION AND CONSENT

After completing the interview questions, participants are asked to review and confirm the accuracy of the community description prepared by the interviewer prior to the interview. Participants are also asked to provide consent for the following purposes: (i) publishing the general description and location of the community, along with photographs of the interviewee, on the project website and other media; (ii) retaining a copy of the audiovisual information and the interview transcript for future disclosure and documentation; (iii) keeping the contact information to reach out to the interviewee for future research or documentation projects; and (iv) sharing the collected and anonymized information from the interview with the scientific community for future research purposes.

Interview guide

***Interviewer**, use the "Mental capacity and oral consent script". If the person agrees to be interviewed and have their voice recorded, **start the recording** and follow the script below.*

Hello, my name is [*name of interviewer*] and I am [position of interviewer] at [name of interviewer's institution]. I am also a collaborator in the RESILIENT RULES project, which is funded by the European Research Council. Today's date is [*insert date*], and the current time is [*insert time*]. I am in the community [*insert name of the community*], which is located in [*insert region*], [*insert country*]. My purpose here is to interview a member of this community and gain insight into the rules and norms they utilize in the management of natural resources for agriculture and livestock.

Before we begin, please answer YES or NO to the following questions to confirm your consent:

- Do you confirm that I have explained the project in detail and what your participation will entail?
- Do you agree to participate in this study?
- Do you agree to be interviewed and have your voice recorded?
- Do you give us permission to take pictures of you and publish them for the dissemination of the project?
- Do you permit us to contact you in the future if we need to clarify any aspect of your answers or verify the information you provided today?

Thank you, let's start.

SECTION 1. DESCRIPTION AND SCOPE OF THE SOCIAL-ECOLOGICAL SYSTEM

First, I want to talk about the agricultural activity within your community. By community, I refer to the collective of individuals utilizing the same natural resources and public infrastructure for their agricultural endeavors. They also adhere to a common set of rules for the use of natural resources.

INSTRUCTIONS*:* Fill the section "Description of the community" of the Study Case Log when indicated.

1.1. Could you explain in your own words what agricultural activities take place in your community? *[fill Q.1.1 in the study case log]*

From what you say, I understand that your community is… *[read Q.1.1, and confirm the information recorded in the case study log (Q.1.1)].*
Do you agree with this description? [*if the answer is "no", change the study case log and confirm again*].

1.2. Which are the main crop varieties/animal breeds used in the community?

1.3. Approximately how many people are part of your community? *[fill numeral Q.1.3 of the study case log]*

1.4. How much land does your community use in total for the development of agricultural activities (including crop and livestock farming)? *[fill Q.1.4 of the study case log]*

1.5. What is the average amount of land used by each member of the community? What is the maximum and minimum amount? *[fill Q.1.5 of the study case log]*

1.6. What are the ownership rights to this land? *[fill Q.1.6 of the study case log]*

1.7. What natural resources such as water, soil, pasture... do the members of your community share in order to carry out these agricultural activities? *[fill Q.1.7 of the study case log].*

1.8. What is the size of these natural resources? *This can be extent in the case of soil/pasture or volume/flow/ length in the case of water bodies/watercourses [fill Q.1.8 of the study case log].*

1.9. What are the property rights to these natural resources?

1.10. What infrastructures created or maintained collectively by the members of your community are used to carry out these agricultural activities? E.g. irrigation canals, ponds, livestock trails... *[fill Q.1.10 of the study case log]*

1.11. What is the approximate amount of such infrastructure shared by the community (e.g. number of ponds, distance of cattle tracks)? *[fill Q.1.11 of the study case log]*

1.12. Are there any private infrastructures owned by community members?

1.13. Are the members of this community organized in a board, committee, or association? How is it called? *[Q.1.13 of the study case log]* When and how was it created?

1.14. How long have you been a member of this community? Were your parents, grandparents... members of this community?

1.15. What is your role in this community? Have you always had this role? If not, how long have you had it, and what other roles have you had?

1.16. Does this board/committee/association have written rules or bylaws? *[fill Q.1.16 of the study case log]* When were they drafted, have they been amended, how often are they amended, when were they last amended, what is the process of amending the written rules of procedure?

1.17. What is the predominant religion in your community? What is the next largest religion? [*fill Q.1.17 of the study case log]*

1.18. What is the majority ethnicity or culture in your community? What is the next largest? [*fill Q. 1.18 of the study case log]*

1.19. What is the level of economic dependence of your community on agricultural activities? If it's not 100%, what other economic activities do they depend on?

SECTION 2. RULES

Now I will ask you about the rules in your community.

INSTRUCTIONS*:*

- **Institutional grammar:** Confirm the elements:
  Attribute: *Who specifically?*
  Context: *Under what conditions and restrictions (where? how? when?)*
  Deontic: *should(not), may(not), will(not), must(not), shall(not) (May not be deontic in strategy descriptions).*
- **Individual vs collective strategies:** confirm when strategies are shared among the members of the community.
- **Written rules:** Ask about the presence of each rule in written regulations if they exist.
- **Evolution** (process of change of the rule in question): *Has this always been the case? If not: How did it change? When did it change? Why did it change? Who made the change? What was the process of deciding on this change (e.g. how was it voted on)?*
- **Decision** (how are decisions related to each rule made) *Who decides and how are these issues decided? How often are these issues decided? When was the last time they were decided?*
- **Goal:** *What is the level or target to be achieved in relation to these issues?*
- **Exemptions:** *Who might be exempt from complying with each rule? Under what circumstances/conditions?*
- **Monitoring:** *Who carries out and how (*what, who, where, how and when) *is the monitoring of (in)compliance with each rule done? [Monitoring questions are recommended to be asked per section of rule type, not rule by rule].*
- **Consequences** (sanctions or rewards associated with rule compliance): *what are the consequences of (in)compliance with these rules? How often are they broken? When was the last time they were broken? If it has never happened, what could be the consequences?*
  Consequences can be:

  Warning
  Material (e.g. losing animals),
  Financial (e.g. fine),
  Action (e.g. banning an activity),
  Administrative (e.g. legal action),
  Physical (e.g. suffering physical harm),
  Emotional (e.g. guilt, shame, pride),
  Positional (e.g. affecting status)
  Spiritual (e.g. punished or rewarded by gods)
- **Emotional, internal and external consequences:** *If someone were to (in)comply with these rules, how do you think it would affect the opinion other members have of that person? (level of trust, reputation, leadership…) If so, how do you think you would feel if you did not comply with these rules? (negative: guilty, ashamed, angry, sad, scared...; positive: proud, happy, optimistic, satisfied, indifferent….)*
- **Information:** In relation to these rules, *what information is shared and what is not, between whom is it shared, when and how often is it shared, what channels and formats (written, oral, place, duration, language...) are used?*

A. POSITION rules and links to PAYOFF, INFORMATION, AGGREGATION and SCOPE rules

2.A.1. What are the different positions (roles) that members of this community can play? *[fill numeral Q.2.A.1 of the study case log]*

2.A.2. What are the specific functions of each of these positions? Do women and men have different functions in your community?

2.A.3. Is there a limit to the number of people who can be assigned to each of these positions? If so, what is the lower and upper limit for each?

B. BOUNDARY rules (entry and exit) and links to PAYOFF, INFORMATION, AGGREGATION and SCOPE rules

2.B.1. What characteristics must(not)/can(not) a person have to be allowed to be part of the community? And to occupy the different positions? *[ascribed personal characteristics (age, gender, race, ethnicity...) or acquired (by meritocracy or social recognition…), membership, residence, relationship with the resource]*

2.B.2. How is the process of eligible participants to enter a position (e.g., invitation, open) and what specific actions are required to hold each position? *[e.g. fees, paperwork, behavior, appeal]*

2.B.3. Can members have more than one position (role) at the same time?

2.B.4. Once a member starts a position, what is the process for beginning their duties?

2.B.5. How is the process to exit each position and what specific actions are required to do before exiting? *[e.g. time spent, payment of fees, reporting, procedure, appeal].*

2.B.6. After having occupied a role/position and having left it, how long must it take for the same person to occupy that position again? What conditions must be met?

2.B.7. In particular, how do successions work? *[e.g., inheritance of land rights, membership]?*

C. CHOICE rules and links to PAYOFF, INFORMATION, AGGREGATION and SCOPE rules

Now, I will ask you about the rules your community follows for sharing NATURAL RESOURCES:

2.C.1. What activities are allowed and prohibited in your community regarding the use of natural resources? What are the specific conditions? *[e.g. time, duration, place or location, status of the resource…]*

2.C.2. How do members of your community share natural resources?

2.C.3. How are natural resources allocated among community members in relation to quantity, quality, and time *[duration, seasonality, periodicity]*?

2.C.4. What tools and technologies are permitted or prohibited for use? *[e.g. pesticides, ploughing the land…]*

2.C.5. How do community members contribute to the maintenance of natural resources? *[e.g., money, time, labour, material]*

Now, I will ask you about the rules your community follows to create, use, and maintain the PUBLIC INFRASTRUCTURES associated with the agricultural activity:

2.C.6. How do members of your community share public infrastructures?

2.C.7. How do community members contribute to the creation and maintenance of public infrastructures? *[e.g., money, time, labour, material]*

Now, in general,

2.C.8. What behaviours are required or prohibited by community members?

2.C.9. How are the benefits generated by the community shared? *[e.g., fees, rental benefits].*

2.C.10. Are meetings held in your community, and if yes, what types *[e.g. ordinary assemblies, extraordinary assemblies, governing boards...]* When and how often are they held? Who can or should participate, and is there a maximum or minimum attendance limit? What topics are discussed, and how far in advance should these meetings be announced?

2.C.11. Are there conflicts between community members over the use and maintenance of natural resources or infrastructure? If so, what are they? How frequently do they arise? When was the most recent conflict? And how are these conflicts resolved?

D. AGGREGATION rules and links to PAYOFF, INFORMATION and SCOPE rules

In relation to how decisions are made in your community:

2.D.1. In addition to the decisions already discussed, what other decisions are made collectively by the members of your community regarding to...? Use of natural resources

- Creation, maintenance, and use of public infrastructure
- Sanctions and rewards
- Type of roles and entry and exit rules.
- Shared information
- Community goals

2.D.2. What are the decision-making processes like in your community *[e.g. secret ballot, show of hands]*? How are decisions made *[e.g. majority, consensus...]*? Are there any specific minimum/maximum requirements regarding the number of participants in decision-making processes?

2.D.3. What is the procedure if no agreement is reached?

2.D.4. Which positions(roles) hold decision-making authority? What level of influence does each position have in the decision-making process?

2.D.5. Are there any specific conditions or requirements that must be met in the decision-making process *[e.g. presence of observers]*?

E. SCOPE rules and links to PAYOFF, INFORMATION and AGGREGATION rules

Now I would like you to tell me what rules are in place to, on the one hand, delimit your community and its activities, and on the other hand, to achieve the goals that the community sets for itself.

2.E.1. What are the spatial and temporal boundaries within which the community's rules are applicable, and over which natural resources and public infrastructure? Are there any areas, resources, or species exempt from the community's management?

2.E.2. What is the legal framework governing the community's current management of shared resources? How has it changed over time? *[e.g., laws, ordinances]*

2.E.3. Does the community have goals to achieve, or objectives to meet regarding:

- Level and state of the resource (quantity and quality)
- Level and state of public infrastructure (creation, quantity, maintenance, state of upkeep)
- Membership (number, type)
- Member well-being (trust, inequality)
- Participation levels
- Information shared and generated
- Compliance with community rules
- Member behaviour regarding the use of natural resources

F. INFORMATION rules and links to PAYOFF and SCOPE rules

Now I will ask you about how information is shared and how communication takes place among the members of your community:

2.F.1. Apart from previously discussed information topics, what other information is shared within the community? *[e.g., behaviors, conflicts, resources, boundaries, meetings, decisions, sanctions, warnings].*

2.F.2. When and how often are such communications made?

2.F.3. Among which members is it shared?

2.F.4. How is it done? *[Medium (oral, written), context (meetings, newsletters), language...]*

2.F.5. Specifically, how is the information about rules *(e.g. rules modification)* transmitted? *[e.g. publication of regulations].*

2.F.6. How is the transmission of information controlled? *(e.g. role responsible, access, procedure, prohibited topics, mandatory nature of the transmission…)*

2.F.7. Must decisions made within the community have to be communicated to any Agency/Secretariat/Government or Department? Who oversees this communication? Are there set time limits for such communication?

SECTION 3. POLYCENTRICITY

Now I will ask you about your community's connection to other local, regional, state, and international organizations.

INSTRUCTIONS: The questions in this section should only be asked to community members in higher hierarchical positions or with very good knowledge of the institutional structure of the system.

3.1. What existing regulations concerning the use of natural resources must the community adhere to at the local, regional, state, and international levels?

3.2. How do the regulations of these external agencies influence the rules of the community? Specifically, how do the community's rules interact with legislation at higher levels?

3.3. How frequently does communication occur between the community and these external agencies? What are the typical reasons for communication between the community and these agencies?

3.4. How is compliance with these regulations monitored and enforced?

SECTION 4. OUTCOMES AND CHANGES

Now, I will ask you a series of questions to confirm the changes that have occurred in your community and its rules.

INSTRUCTIONS: For each of the questions regarding the changes in outcomes, the following should be asked:
- When did these changes occur?
- What are the main causes of these changes?
- Do you think the organisation of your community and the rules it employs may have influenced these changes? If so, how?

4.1. How has the **number of members** in your community changed over the past few decades?

4.2. How have the quality and quantity of the **shared natural resources** changed over the past few decades?

4.3. How have the quality and quantity of the **shared public infrastructures** changed over the past few decades?

4.4. How have interpersonal dynamics evolved within your community over the past few decades regarding:

- **Level of trust** (High level of trust means that members of your community are generally good, honest, and reliable, and will not harm you)
- **Level of reciprocity** (High level of reciprocity means that members of your community generally act for mutual benefit (e.g., social support, labour exchange…)
- **Level of inequality** (Inequality means that members of your community are not equal, especially in status, rights, and opportunities)
  Level of well-being (Wellbeing means that members of your community are, in general, happy and content, with low levels of distress, overall good physical and mental health and outlook, or good quality of life, e.g. life expectancy/health, access to education, wealth/average income)
- **Level of rule compliance**

4.5. How has the **level of agricultural productivity** (e.g. agricultural and livestock yields, units of agricultural or livestock products) in your community changed over the last decades?

4.6. During your time in the community, have any new rules been introduced/changed/removed that haven't been mentioned before? If so, please specify. When and why was it introduced/changed/removed, and what was the process involved in its creation/change/elimination?

SECTION 5. RESILIENCE

Now, I would like to hear your views on the ability of your community to cope with the difficulties that may arise from the climatic conditions in this region.

INSTRUCTIONS: *For questions 5.2 to 5.5 use the graphic tools to help the interviewee to choose an answer. Fill Q.5.1 to Q.5.4 of the Study Case Log.*

5.1. I am going to read you a series of statements about some climatic changes that are occurring in other areas of the world, and I want you to tell me whether you think this is happening in your area, based on the last 20-30 years *[fill Q.5.1. of the study Case Log]*

Change perceived	Yes	No	DK/DA
General increase in temperature			
General increase in precipitation (rain or snow)			
General reduction in precipitation (rain or snow)			
The climate is much more extreme (e.g. more frequent extreme weather events such as floods, droughts, hurricanes, cold/heat waves, frost)			
The climate is much more variable and unpredictable			
Changes in the length of the seasons: longer summers			
Changes in the length of the seasons: longer winters			
Changes in rainfall patterns within a year (e.g. rainfall becomes less spread out over time, shifting rainy seasons)			
Have you noticed any other changes in your area's climate over the past 20-30 years? If so, what are they?			

5.2. If so, can you describe the changes that have occurred regarding extreme events or climate variability?

5.3. How significantly do you believe climate change is impacting your community? Please rate on a scale of 0 to 10, where 0 indicates no impact whatsoever, 1 signifies that changes are occurring but the effects are not serious, and 10 indicates very serious effects *[fill Q.5.3. of the study Case Log].*

5.4. To what extent do you think that the organization of your community and the rules you apply assist in coping with potential adverse effects of climate? 0 means no assistance at all, 1 indicates minimal assistance, and 10 indicates that they are indispensable. *[fill Q.5.4. of the study Case Log].*

5.5. Using a scale of 1 (strongly disagree) to 5 (strongly agree), indicate your level of agreement or disagreement with the following statements. Give reasons for your answer, if applicable. *[fill Q.5.5 of the Study Case Log]*

	1	2	3	4	5
Your *community* can bounce back from any challenge the ***climate*** throws at it	☐	☐	☐	☐	☐
During times of ***climate-related hardship***, your *community* can change its primary income or source of livelihood if needed	☐	☐	☐	☐	☐
If ***climate*** threats to your *community* became more frequent and intense, you will still find a way to get by	☐	☐	☐	☐	☐
In times of **climate-related hardship**, your **community** can access the financial support you need	☐	☐	☐	☐	☐
Your *community* can count on the support of its members when they need help with ***climate issues***	☐	☐	☐	☐	☐
Your *community* can count on the support of politicians and the government when it needs help with ***climate issues***	☐	☐	☐	☐	☐
Your *community* has learned important lessons from past hardships that will help you better prepare for future ***climate threats***	☐	☐	☐	☐	☐
Your *community* is fully prepared for any future ***climate-related*** natural threat that may occur in your area	☐	☐	☐	☐	☐
Your *community* receives useful information that warns you in advance of future ***climate-related risks***	☐	☐	☐	☐	☐

SECTION 6. SOCIODEMOGRAPHIC AND PSYCHOGRAPHIC CHARACTERISTICS

To conclude, I would like to know something about you and your community.

INSTRUCTIONS: *For questions 6.1 to 6.4 use the graphic tools to help the interviewee to choose an answer. Fill Q.6.1 to Q.6.4 in the Study Case Log.*

6.1. Using a scale of 1 (strongly disagree) to 5 (strongly agree), indicate your level of agreement or disagreement with the following statements.

	1	2	3	4	5
If anything bad can happen to me, I am sure it will happen	☐	☐	☐	☐	☐
I rarely expect things to go my way	☐	☐	☐	☐	☐
I don't expect good things to happen to me	☐	☐	☐	☐	☐
In times of uncertainty, I tend to think that the best is going to happen to me	☐	☐	☐	☐	☐
I am always optimistic about the future	☐	☐	☐	☐	☐
In general, I think more good things will happen to me than bad things	☐	☐	☐	☐	☐
In general, I consider myself a happy person	☐	☐	☐	☐	☐
I am usually relaxed	☐	☐	☐	☐	☐
Most people in my community are honest and trustworthy	☐	☐	☐	☐	☐
I feel that there is a strong social support network in my community (that can support me when I need it)	☐	☐	☐	☐	☐
In .general, I consider myself a risk-taker	☐	☐	☐	☐	☐

6.2. Now, imagine you can choose between the following games that involve flipping a coin to receive different prizes with an equal chance of winning based on whether heads or tails are flipped. Which game would you choose?

A ☐ 33€ | 33€ **B** ☐ 25€ | 50€ **C** ☐ 10€ | 80€ **D** ☐ 0€ | 100€

6.3. On a scale of 1 to 10, how do you feel right now?

	1	2	3	4	5	6	7	8	9	10	
Very sad	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very happy
Very pessimistic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very optimistic

6.4. Overall, on a scale of 1 (very unsatisfied) to 10 (very satisfied), how satisfied are you with your life?

	1	2	3	4	5	6	7	8	9	10	
Very unsatisfied	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very satisfied

SECTION 7. CONFIRMATION OF CASE STUDY DESCRIPTION AND CONSENTS

Thank you very much for your participation. Before I leave, I would like to confirm some information with you and ensure that I have your consent to store and access the information you have shared today.

INSTRUCTIONS: *Fill Q.7.1 of the Study Case Log.*

7.1. First, I would like to confirm with you that the information we have about your community is correct. The information is as follows *[read the description of the community based on the initial social-ecological assessment of the case study].*

- Do you agree? If not, please tell me what isn't right or what you would like me to change.

7.2. I also want to ask for your permission to publish some of the information you shared today on the project website and other media.

- Do you give permission to publish this information about your community on the project website and other media?
- Do you give permission to use the geographical location of your community in publications and on the project website?
- Do you give permission to publish photographs of you on the project website and other media? Please be assured that we will not manipulate those pictures unless you prefer us not to show your face

7.3. We appreciate the valuable information you shared about traditional natural resource management in your community. To preserve the historical significance of our conversation, we would like to keep a copy of your voice recording, interview transcript, and photographs taken during our meeting. These may be used for future documentation purposes such as scientific and outreach presentations, documentaries, websites, and research. Please let us know if you agree by answering YES or NO to the following questions:

- Do you agree to allow us to retain a copy of your voice recording and interview transcript for future dissemination and documentation purposes, including potential use on websites or in documentaries?
- Do you agree to allow us to retain a copy of the photographs taken today for future disclosure and documentation purposes?

7.4. It is also possible that we or other researchers may want to contact you in the future, for example, to learn how the situation in your community or its rules have changed. Please answer YES or NO:

- Do you agree to allow us to keep your contact information on file so that we may contact you in the future for other research or documentation projects? If applicable, please provide your address, telephone number, and/or email address.

7.5. Finally, do you give permission to make the information you provide today, once encoded and anonymized, available to the scientific community? This means that the geographic location of your community, the characteristics you have provided, and a description and codification of the rules and standards you use can be made available.

- Do you agree?
- Are there any aspects that should not be shared because they may pose a risk to you or your community as a whole? If so, please specify.

Thank you very much for your participation!

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Appendix I

Information for institutional review board

INFORMATION TO REQUEST APPROVAL BY INSTITUTIONAL REVIEW BOARD

Research collaborators must obtain approval from the ethics committee of the study region, country, or institution before conducting the fieldwork. In the absence of an ethics committee, permission must be obtained from the head of the community (e.g., the village mayor or community president). Copies of approvals from local ethics committees and/or competent authorities should be kept on file. A detailed justification should be provided if it is not possible to obtain local ethics approval.

This document contains the most important information about the project in order to request an assessment from the local ethics committee. This information describes the ethical and data protection aspects of the project that have been approved by both the Research Ethics Committee of the Autonomous Community of Aragon (CEICA, https://www.iacs.es/investigacion/comite-de-etica-de-la-investigacion-de-aragon-ceica/) (code PI22/381) and the Data Protection Unit of the University of Zaragoza (UPD, https://protecciondatos.unizar.es/) (code 2023-154, RAT code 22-92, self-declaration identifier 100281) in Spain and complies with the European (General Data Protection Regulation; EU 2016/679) and Spanish (Organic Law 3/2018 Protección de Datos y Garantías de los Derechos Digitales) legislation on data protection.

Project title

Evolution of institutional diversity in a changing world: Finding solutions in resilient agricultural systems (RESILIENT RULES)

Principal investigator

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http://www.unizar.es/departamentos/agric_econ_agraria/

General Project Characteristics

- Geographic scope: International
- Project Funding by European Research Council (ERC: https://erc.europa.eu/). ERC-2021-CoG (HORIZON), Consolidator Grant 2021, Code 101044225.
- It is not research with drugs, medical devices or invasive procedures.
- No biological samples of any kind are used, and no genetic analysis is performed.
- The research does not involve minors or persons not capable of giving consent.

Project description

RESILIENT RULES is an interdisciplinary research project focused on studying the variety of rules and norms (i.e., institutional diversity) that agricultural communities use to govern shared resources (e.g., grazing land, irrigation waters). It aims to study the

spatial and temporal patterns of such diversity and to understand its contribution to long-term resilience under global changes.

Around 50 agricultural pastoral communities will be studied, using semi-structured interviews with key stakeholders and recompilation of institutional documentation (i.e., written regulations shared by actors of the community). In each of the farming communities around the world, five people (both men and women) involved in livestock and agriculture will be interviewed. Factors such as isolation, net primary production, political regimes, or world biomes were used to select case studies.

Project aims

1. To study global patterns of institutional diversity.
2. To analyze the evolution of agricultural institutions.
3. To assess the contribution of institutional diversity to long-term resilience to global change.

Timeline

- Project start: September 1, 2022
- End of project: August 31, 2027
- Start of fieldwork: October 1, 2023
- End of fieldwork: August 31, 2025

Participants selection

Fifty-two small-scale farming communities in a variety of biogeographical and cultural regions around the world will be studied through semi-structured interviews with pastoralists and farmers and the collection of institutional documents (i.e. written regulations governing the use of natural resources). The case studies were selected from a pool of 689 local communities drawn from 268 academic articles on commons management. Communities were selected by stratifying the pool of 689 communities by global biome (boreal, desert, Mediterranean, temperate, tropical, tundra) and selecting 26 agricultural and 26 pastoral communities from a variety of policy regimes along a gradient of ecological risk and isolation. Ecological risk was measured on the basis of net primary productivity and isolation on the basis of the human footprint. In addition, using the same set of potential cases and the same sampling method, an alternative subset of communities was selected to be studied in case any of the pre-selected cases could not be studied.

In each community, five farmers (both adult women and men) will be interviewed. As we want to collect information on current resource management arrangements as well as changes over the last four decades, priority will be given to selecting active adults between the ages of 50 and 70 to ensure that they know/are involved in current institutions and remember past institutions.

The interviews will be conducted by a team of external collaborators, consisting of PhD students or researchers, who will be recruited by contacting the first and last author of the publications from which the case studies were selected. The collaborators will be trained and paid to interview the case study actors and collect written regulatory documents. Given their prior knowledge of the communities to be studied, these collaborators will be able to select interviewees with extensive knowledge of the community's operating rules and who are able to give informed consent.

The collaborators will be researchers from the countries under study, will be financially compensated through the formalization of a contract and will receive appropriate certificates for their work. They will also receive a five-day workshop at the University of Zaragoza to familiarize them with the RESILIENT RULES study protocol and methodology and will be invited to co-author a resulting paper. Researcher Collaborators must meet the following requirements: (1) researcher must be affiliated with an institution (e.g., university, research center) that can properly invoice payments and provide health insurance during the development of the fieldwork in the Study Case; (2) the Researcher must hold a visa, work permit, certificate, license, or other approval required to carry out the fieldwork in the country where the Study Case is located and (3) the Researcher should have previous experience in developing ethnographic research in the Study Case, and enough knowledge about the Study Case to do an initial assessment of the ecological and social contexts of the Study Case, as well as a risk assessment for him/herself and research participants.

Data collection procedure

Semi-structured in-depth face-to-face interview. Interviews will be conducted in the native language of the interviewees by the research collaborator.

Consent, risk and benefits

Oral consent will be obtained from participants in the presence of a witness who is trusted by the participant, but with whom the interviewee does not have a close family relationship. Such consent will be documented in writing and audio recorded. The participant will be asked to consent to being interviewed, photographed, and having his/her voice recorded. The interviewer will follow a script to inform the participant of his/her rights and responsibilities, and to assess the participant's ability to understand the purpose of the study, his/her rights, and to give consent. If necessary, consent will be obtained from an appropriate family member for the study subject to participate in the study.

Participants will not receive financial compensation for their participation.

This research will help science learn more about how people who work in agriculture use natural resources.

Nature of the personal data

Categories to which the collected data belongs:

- ✓ Identifying data (Name, geolocation, image/voice)
- ✓ Personal data (date of birth, place of work, gender, academic qualifications)
- ✓ Opinion data
- ☒ No particularly sensitive data are collected: health, ethnicity, religion, political opinion, sexual life or orientation, trade union membership, special educational needs.

Data privacy

Data privacy is ensured through pseudonymization (direct identifiers are replaced by a code known only to the research team).

The principal investigator and a post-doctoral researcher hired in the framework of the project will be responsible for pseudonymising the transcribed interviews for further analysis.

Data retention period

25 years.

Persons who will process the data collected, and have access to the identifying data

- The Principal Investigator (Irene Pérez Ibarra), the Scientific Coordinator (Alicia Tenza Peral) and the Project Manager (Rocío de Torre Ceijas) will have access to the identifying data.
- The rest of the research team (predoctoral and postodoctoral researchers and research assistants) will have access to the pseudonomyzed data.

Disclosure of data to third parties

- No, in general.
  In accordance of the FAIR principles of open science, anonymized results will be available. Identifiable data will only be made available to other scientists if participants have consented to the sharing of their data, if the sharing of the data is considered low risk, and if the scientists requesting such information have the approval of an Institutional Review Board.

System on which the data is to be stored

The only document in paper format is the record of the consent form to be filled out by the field researchers. The collaborators will scan and upload to the project's OwnCloud the oral consent record. Once the Principal Investigator acknowledges receipt of the documents, the collaborators agree to securely destroy this information.

The data will be stored on the computer and on an external hard disk with a password belonging to the principal investigator at the Department of Agricultural Sciences and the Environment, School of Vet, University of Zaragoza, Spain in a locked personal office.

Applications to be used for data processing

Excel, MaxQDA (interview analysis software licensed for this project), Word, R (free software for statistical data analysis and graphical representation).

Use of removable devices

Backup copies will be kept on a password-encrypted hard drive in the Principal Investigator's office under lock and key.

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Appendix J

Permission request to conduct research

PERMISSION REQUEST TO CONDUCT RESEARCH

Title: "*Evolution of institutional diversity in a changing world: Finding solutions in resilient agricultural systems"*
Principal investigator: Irene Pérez Ibarra **Email:** perezibarra@unizar.es
Institution: University of Zaragoza, Spain
Funding: European Research Council (RESILIENT RULES, ERC-2021-CoG, Grant 101044225)
Website: resilientrules.com

Research collaborator: **Email:**
Institution:

Permission request to conduct research in: *[NAME OF THE COMMUNITY]*

Permission requested by: *[FULL NAME]*

Permission requested to: *[FULL NAME]*

I, *(FULL NAME)* _____ as *(POSITION)* _____ in *(INSTITUTION'S FULL NAME)* _____ and research collaborator of the European Research Council, the European Union, project RESILIENT RULES, lead at University of Zaragoza, Spain, request permission to conduct fieldwork consisting of interviewing five farmers from the community *(NAME OF THE COMMUNITY)* _____ located in *(COUNTRY AND STATE/REGION/COUNTY)* _____

Signature:

Full name:

Place, date:

PERMISSION FORM TO CONDUCT RESEARCH

Title: "*Evolution of institutional diversity in a changing world: Finding solutions in resilient agricultural systems"*
Principal investigator: Irene Pérez Ibarra **Email:** perezibarra@unizar.es
Institution: University of Zaragoza, Spain
Funding: European Research Council (RESILIENT RULES, ERC-2021-CoG, Grant 101044225)
Website: resilientrules.com

Research collaborator: **Email:**
Institution:

I, *(FULL NAME)* _____ as *(POSITION)*

_____

give my consent for the researcher (FULL NAME) _____ to conduct fieldwork for the RESILENT RULES project consisting of interviewing five farmers from the community *(NAME OF THE COMMUNITY)* _____

located in *(COUNTRY AND STATE/REGION/COUNTY)* _____

_____

Signature:

Full name:

Place, date:

Funded by the European Union

European Research Council

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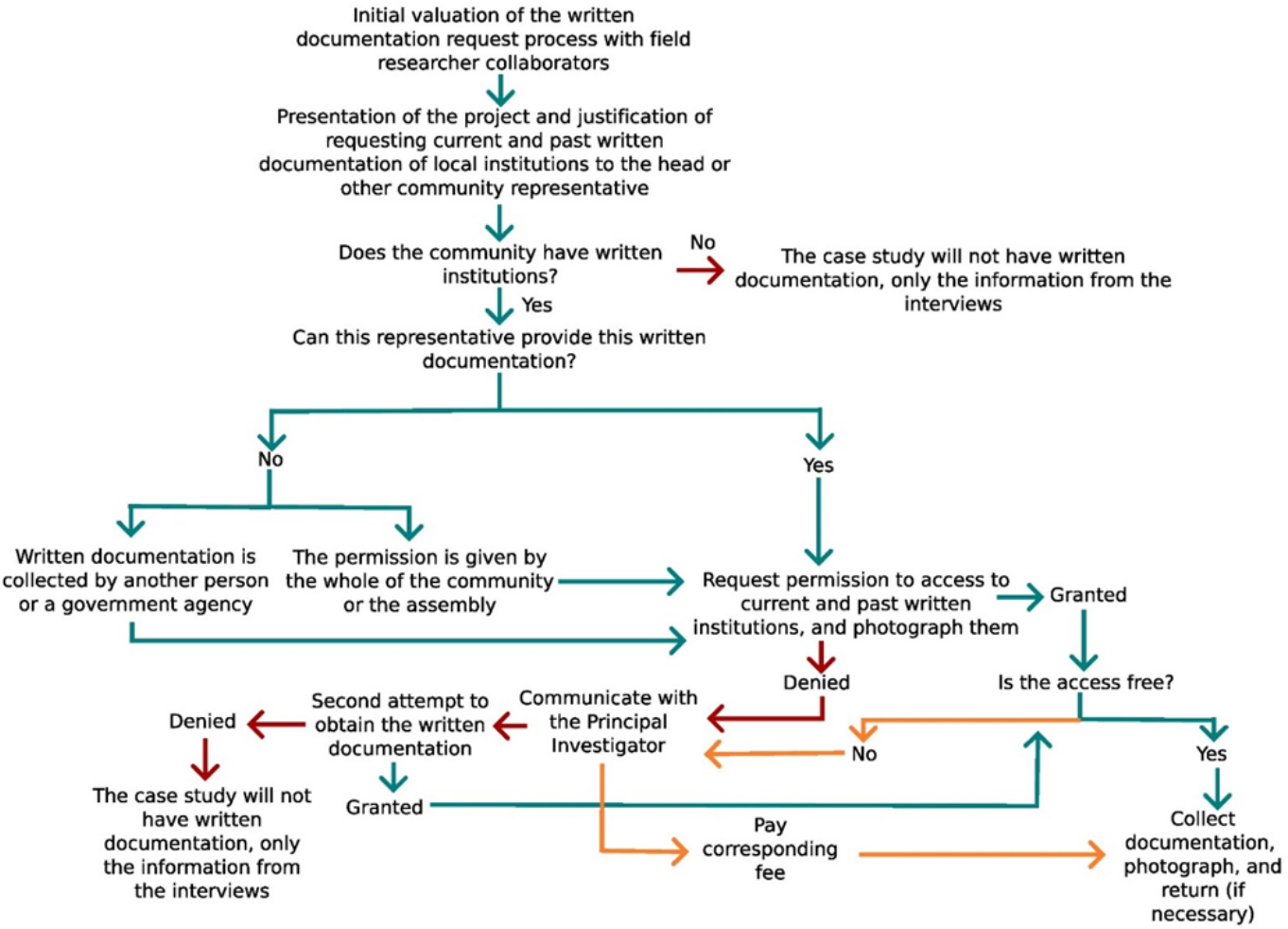
Appendix K

Request written regulations and consent

SCRIPT TO REQUEST WRITTEN REGULATIONS

Figure M.1. summarizes the process of requesting written documentation from local communities. This process varies depending on whether the community representative can provide the current and past written documentation of the local community, whether he/she must request it from an assembly or the whole community, or whether it should be provided by another person or organization. This decision tree tries to anticipate a wide range of situations, but it is difficult to address all possibilities. If the field researcher is faced with an unexpected situation, he or she will contact the principal investigator. The research team will discuss with the field researcher the best way to approach the community to obtain the written institutions.

Figure M.1. Decision tree for requesting written documentation from local communities.



Script to request written regulations

In the RESILIENT RULES project, we are studying how agriculture and livestock farmers around the world use natural resources to work in the field, what tools they use, and what rules and norms they follow to share the natural resources and tools they have. We do this through interviews. However, communities often have written rules (in ordinances, bylaws, or meeting/assembly minutes). Studying these types of documents is very important to know what rules are used and how they have changed over time.

Request. We would like to speak with you as a representative of your community to formally request this type of written documentation (ordinances, bylaws, meeting/assembly minutes...), both current and those used in the last four decades (if they exist and are available). We would like to know if you can provide us with this documentation directly or, if not, what is the process we must follow to obtain it. We will only make a copy of this documentation (by photograph). This copy will be made here, so your documents will not leave the community and will be returned to you immediately. With this documentation, we will study the rules it contains, and any personal information about the people of this community that this written documentation may contain will be excluded from our study. [***If he/she provide them, go to the Consent***].

[If he/she does not provide it directly, he/she needs to consult the assembly/community]. Can you please let me know when you will be able to make this request? [*note date in field notebook*]. I will leave my contact [*contact phone number*] so that you can inform me of your decision after you have consulted and discussed with your assembly/community. Could you please give me a phone number where I can contact you to find out the status of this request? [*Write phone number in field notebook*]. [***Go to End***].

[If he/she does not provide it directly, we should talk to someone else in the community]. Could you please tell me who I should contact and their phone number, address, or method of contact? [*Write contact in field notebook*]. [***Go to End***].

[*If he/she does not provide it directly - this information is held by a government agency].* Could you please indicate which government agency holds these documents and what the process is for obtaining them (are they available for public consultation or is a formal process required)? [*Note agency and process for obtaining in field notebook*]. [***Go to End***].

[If the representative or community DENIES permission to obtain the written documentation] Well, that's okay. I completely understand your reasons. This research is completely voluntary and you do not have to participate if you do not want to. Thank you for your time. If you change your mind or have any questions, please feel free to contact me at [*contact phone number*] or the principal investigator of the project, whose contact information is [*provide project information sheet if contact is in person, or phone and e-mail if contact is not in person*]. Goodbye and have a nice day. [***End of conversation***].

[Consent] Good. Then I need to confirm that you agree, on behalf of your community, to give us permission to do this:

- Consult current or past written documents (bylaws, ordinances, assembly/meeting minutes) related to your community's natural resource management.
- Make a copy of this written documentation for analysis as part of this research project.

To do this, please read the document I am giving you carefully, which contains all the information I have just explained, and if you agree, please sign your name and this consent form. I will keep one copy and you will keep another.

[*End*]. Well, thank you very much for your time. It has been a pleasure talking to you today, and I thank you for your interest and collaboration in our project. [***End of conversation***].

PERMISSION REQUEST TO OBTAIN A COPY OF THE WRITTEN REGULATIONS (PAST AND PRESENT) OF THE COMMUNITY AND USE IT FOR RESEARCH PURPOSES

Title: "*Evolution of institutional diversity in a changing world: Finding solutions in resilient agricultural systems***"**
Principal investigator: Irene Pérez Ibarra **Email:** perezibarra@unizar.es
Institution: University of Zaragoza, Spain
Funding: European Research Council (RESILIENT RULES, ERC-2021-CoG, Grant 101044225)
Website: resilientrules.com

Research collaborator: **Email:**
Institution:

This document requests your consent to provide past and/or present written regulations regarding the use of natural resources for agriculture in your community for analysis in the RESILIENT RULES project for research purposes.

This research project has been approved by both the Research Ethics Committee of the Autonomous Community of Aragon (CEICA, https://www.iacs.es/investigacion/comite-de-etica-de-la-investigacion-de-aragon-ceica/) (code PI22/381) and the Data Protection Unit of the University of Zaragoza (UPD, https://protecciondatos.unizar.es/) (code 2023-154, RAT code 22-92, self-declaration identifier 100281) in Spain and complies with the European (General Data Protection Regulation; EU 2016/679) and Spanish (Organic Law 3/2018 Protección de Datos y Garantías de los Derechos Digitales) legislation on data protection.

The written regulations of your community will help study the diversity and changes in the rules and norms found in agricultural systems. The results of the research will be used to inform society and in scientific activities such as conferences and journals. These results and written regulations will be stored for an extended period and may be shared with other scientists for further research or documentary purposes.

Signature:

Full name:

Place, date:

PERMISSION FORM TO USE THE WRITTEN REGULATIONS (PAST AND PRESENT) OF THE COMMUNITY FOR RESEARCH PURPOSES

Title: "*Evolution of institutional diversity in a changing world: Finding solutions in resilient agricultural systems***"**
Principal investigator: Irene Pérez Ibarra **Email:** perezibarra@unizar.es
Institution: University of Zaragoza, Spain

Funding: European Research Council (RESILIENT RULES, ERC-2021-CoG, Grant 101044225)
Website: resilientrules.com

Research collaborator: **Email:**
Institution:

I, (FULL NAME) _____

as (POSITION) _____

in the community (NAME) _____

located in (REGION, COUNTRY) _____

authorize the use of the written regulations of the community that I am representing for scientific and dissemination purposes*.

Signature:

Full name:

Place, date:

*Please, indicate any information contained in the written regulations that should not be uses or shared:

Resilient Rules

Finding solutions
in resilient agricultural systems

Appendix L

Written consent

APPENDIX L

INFORMATION DOCUMENT FOR PARTICIPANTS

Title of the research: "*Evolution of institutional diversity in a changing world: Finding solutions in resilient agricultural systems (RESILIENT RULES)*"

Responsible: University of Zaragoza
Data Protection Officer of the University of Zaragoza (dpd@unizar.es).

Principal investigator: Irene Pérez Ibarra **Phone:** +34 976761598 **email:** perezibarra@unizar.es
Centre:
AgriFood Institute of Aragon (IA2)
Agricultural Sciences and the Natural Environment
University of Zaragoza, Spain

Funding: European Research Council

This document explains how this research works and the rules it has.
This document also contains the contact information related with this research.

We are writing to ask you to participate in a research project of the University of Zaragoza in Spain. Your participation is voluntary, but it is important to obtain your consent to participate. This project has been approved by the Research Ethics Committee of the Autonomous Community of Aragon (CEICA) and before you make a decision to participate, it is necessary that you:

- Read this entire document
- Understand the information contained in this document
- Ask any questions you may have
- Make an informed decision.
- If you agree to participate, you will receive a copy of this document, a signed consent form, and a summary of the information described in this document in your language.
- Please keep this document in case you need it in the future. You can use it if you have any questions or if you change your mind and decide not to participate in the study.

1. What are we trying to find out in this study?

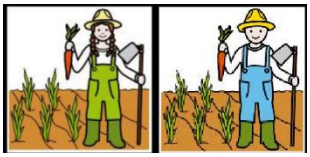
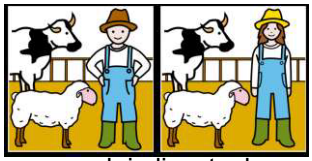
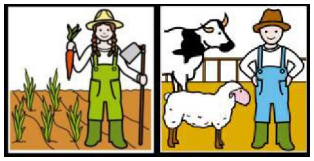
This study wants to know two things:

1. How natural resources are used for farming. For example, water, land, and pasture.
2. The tools and systems that you use to farm. For example, irrigation systems or fences for animals.

To find out these two things, the researchers will interview people who work in the agricultural and pastoral systems ina range of communities around the world. You are one of these people. So, they want to ask you how you do your work on the farm in the field and how you use the tools you have or the tools in your community.
They also want to know how you have changed the way you do things over the years.

2. What do you need to do to participate?

We will ask you to answer some questions in an interview with a member of the team.
The interview will last one and a half to two hours. The questions will be different depending on your profession (mark with an x where appropriate):

☐ **I am a crop farmer**	☐ **I am a livestock farmer**	☐ **I am a crop and livestock farmer**
		
Since you work in agriculture, we will ask you questions about how you distribute water for irrigation, how you organize your work, and what tools or resources you use in your community.	Since you work in livestock farming and have animals, we will ask you questions about what you feed your animals, such as pasture and feed. For example, we will ask you how you maintain the paths to move your animals.	Since in agriculture and livestock farming, we will ask you questions about how you distribute water for irrigation, how you organize your work, and what tools or natural resources you use. We will also ask you some questions about what you feed the animals or how you maintain the paths to move your animals.

You can choose which questions you want to answer. Also, if you change your mind during the interview and decide that you do not want to participate in the study, just tell the study managers and they will not include your participation.

3. What information from you will we use?

We will record your voice during the interview. We will also ask you for some personal information. For example, how old you are, whether you are male or female, and how many years of schooling you have had. You can choose if you want us to take some photographs that we will use to publish the results of the research. Please be assured that we will not manipulate those pictures unless you prefer us not to show your face.
You can also choose if we can call you later in case we have any questions about the things you tell us.

4. Will there be any problem if I take part in this study?

You will not have any problems by participating in this research. The only inconvenience will be the time you will need to spend answering the interview questions.
Participation in the interview is voluntary and you do not have to answer all the questions if you do not like them or do not want to.

5. Will I benefit from participating in this study?

This research will help science learn more about how people who work in agriculture use natural resources.
You will not be paid for your participation in the research.
We believe that participating in this research is good for two reasons:

1. People who work in farms can learn about the way other people work in their community.
2. Society will learn more about the work that these people do when they see the results of the research.

6. How will your information be used?

The personal data you provide when you participate in this study will be used and protected in accordance with Spanish and European legislation on the protection of personal data. The research in Spain will be organized by the University of Zaragoza, which will also be responsible for the use of your data*. The principal investigator of this research will also be responsible for the use of your data.
We will only use your personal data for purposes related to this research. We will not use your name or contact information. This information will only be included on the consent form. We will not ask you about your religion, political views, or ethnicity.
We will use some personal information to analyze with the other participants' information, such as your age or gender. For example, to find out how many women and how many men participated in the research, or to find out the age of the respondents. These records without individual names are stored as participation data.
The personal data will be destroyed at the end of the research and the legally required retention period.
The results of the research will be used to inform society and in scientific activities such as conferences and journals.
These results and participation data will be stored for a longer period of time and may be shared with other universities and scientists for further research.
There is one exception to this data protection: when there is a risk of harm to the participant, to people around them, to nature, or to society. In this case, the principal investigator and others involved in the project may decide to share this information with the authorities, such as the police or the mayor's office, in order to prevent harm to people.

* Data protection legislation: European Union General Data Protection Regulation (EU 2016/679) and Spanish Organic Law 3/2018 (Protección de Datos y Garantías de los Derechos Digitales).

7. What rights do you have in relation to your personal data?

Under European law, you have the following rights in relation to the personal data we collect about you:

- The right to know what data has been collected about you.
- The right to have the information changed if it is inaccurate.
- The right not to have the information we hold about you used.
- The right to stop the use of the information held about you.
- Researchers are not required to delete data that has already been used.
- The right to have your personal information deleted.
- You also have the right to know the results of the research.

To request any of these things, simply contact the person who is interviewing you by phone or email. You can also contact the Principal Investigator. Her name is Irene Perez Ibarra, her phone number is +34 976 76 15 98 and her email is perezibarra@unizar.es.

These people must get back to you within 30 days at the latest.
If 30 days have passed since your request and you have not received a response, you may file a complaint with the Spanish Data Protection Agency. The contact information for the Spanish Data Protection Agency office closest to you can be found at the following website: www.aepd.es. You can also find out where the University of Zaragoza stores your personal data on its website: https://protecciondatos.unizar.es/registro-actividades-de-tratamiento.

Thank you for your time.
If you decide to participate, please sign the attached written consent form.

WRITTEN CONSENT FORM

PROJECT TITLE: ***"Evolution of institutional diversity in a changing world: Finding solutions in resilient agricultural systems (RESILIENT RULES)"***

I,_____

(Please, enter your first and last name in this line)

YES	NO	
☐	☐	I have read the information sheet I was given.
☐	☐	I asked the questions I needed to ask and all my questions were answered correctly.
☐	☐	The person who informed me about this study is: **[researcher's first and last name].**
☐	☐	I understand that participation is voluntary.
☐	☐	I know that I can stop participating in this study: - At any time. - Without giving explanations. - Without getting in trouble for it.
☐	☐	I agree to have my voice recorded during the interview.
☐	☐	I agree to have my picture taken and used for publication with the research results.
☐	☐	I agree to be contacted after the research to answer questions about my interview or data.

For these reasons, I agree to participate in this research, and consent to the use of my information as described in this document.

YES	NO	
☐	☐	I would like to receive information about the results of this research.

My email or telephone number is: _____

YES	NO	
☐	☐	I have received a copy of this consent form.

_____ Date: _____

(Signature of the person who will participate in the study)

YES	NO	
☐	☐	I have informed the person who will participate about the research.

_____ Date: _____

(Signature of the person who will conduct the research)

Researcher contact information:

Name:
Phone:
Mailing address:
Email:

Appendix M

Oral consent script

ORAL CONSENT SCRIPT

Introduction. Good morning/afternoon, [*name of interviewee*]. My name is [*name of interviewer*], and my job is [*researcher/professor/lecturer*] at the [*university/college*]. I am here to talk to you because we are doing a research project funded by the European Research Council and we need to talk to people who work in farms. For example, crop farmers and livestock farmers.

In this first conversation I will explain to you how the research will work and what we will ask you if you want to take part in the research. I will also ask you some questions to find out about your daily life and to see if you are eligible for the study.

In addition to this conversation, I will give you an information sheet about the research. This document also contains the contact information for this research. For example, the phone number and email address of the person leading this research. Also the contact details of the University of Zaragoza, which is responsible for this research. You can use them if you have any questions or if you change your mind and do not want to participate in the study.

If you agree and want to take part in this research, you will need to find someone you trust who is 18 years or older. This person will act as your witness, give us their contact details and sign a document saying that we have explained how the research works and that you agree to take part of this study.

1. What are we trying to find out in this study?

This study wants to know two things:

1. How natural resources are used for farming. For example, water, land, and pasture.
2. The tools and systems that you use to farm. For example, irrigation systems or fences for animals.

To find out these two things, we will interview people who work in the agricultural and pastoral systems in a range of communities around the world. You are one of these people. So, we want to ask you how you do your work on the farm and field and how you use the tools you have or the tools in your community.
We also want to know how you have changed the way you do things over the years.

2. What do you need to do to participate?

We will ask you to answer some questions in an interview with a member of the team.
The interview will last one and a half to two hours.

Options for types of participants:

a) *(The person is a crop farmer)*

Since you work in agriculture, we will ask you questions about how you distribute water for irrigation, how you organize your work, and what tools or resources you use in your community.

b) *(The person is a livestock farmer)*

Since you work in livestock farming and have animals, we will ask you questions about what you feed your animals or how you maintain the paths to move your animals.

c) *(The person is a crop farmer and livestock farmer)*

Since you work in agriculture and livestock, we will ask you questions about how you distribute water for irrigation, how you organize your work, and what tools or natural resources you use. We will also ask you some questions about what you feed the animals or how you maintain the paths to move your animals.

You can choose which questions you want to answer. Also, if you change your mind during the interview and decide that you do not want to participate in the study, just tell me and we will not include your participation.

3. What information from you will we use?

I will ask for your permission to record your voice during the interview. I will also ask for your permission to take some photographs that we will use to publish the results of the research, but please be assured that we will not manipulate those pictures unless you prefer us not to show your face.
I will also ask you for some personal information. For example, how old you are, whether you are male or female, and how many years of schooling you have had.
I will ask your permission to write to you or call you if we have any questions about the things you tell us.

Mental capacity assessment I.

- *Do you have any questions about the things I have explained?*
  (The researcher answers the questions)

- Now I need to confirm that I have explained the research well. Can you tell me what the purpose of the research is?
  (*The interviewer can explain the information in other words, makes the mental capacity assessment and fill the Mental Capacity Assessment and Oral Consent form*)

4. What is this research good for?

This research will help science learn more about how people who work in agriculture use natural resources. They also want to know how you have changed the way you do things over the years.
You will not be paid for your participation in this research.
We believe that participating in this research is good for two reasons:

1.People who work in farms can learn about the way other people work in their community.
2.Society will learn more about the work that these people do when they see the results of the research.

5. Is there any problem if I take part in this study?

You will not have any problems participating in this research. The only inconvenience will be the time you will need to spend answering the interview questions.
Participation in the interview is voluntary and you do not have to answer all questions if you do not like them or do not want to.

Mental capacity assessment II.

- *Do you have any questions about the things I have explained?*
  (The researcher answers the questions)

- Now I need to confirm that I have explained the benefits and risks of this research well. Can you tell me what the benefits of the research are? And what are the risks?
  (*The interviewer can explain the information in other words, makes the mental capacity assessment and fill the Mental Capacity Assessment and Oral Consent form*)

6. How will your information be used?

The personal data you provide when you participate in the study will be used and protected in accordance with Spanish and European legislation on the protection of personal data. The research in Spain will be organized by the University of Zaragoza, which will also be responsible for the use of your data. The principal investigator of this research will also be responsible for the use of your data.
We will only use your personal data for purposes related to this research. We will not use your name or contact information. This information will only be included on the consent form. We will not ask you about your religion, political views, or ethnicity.
We will use some personal information to analyze with the other participants' information, such as your age or gender. For example, to find out how many women and how many men participated in the research, or to find out the age of the participants. These records without individual names are stored as participation data.
The personal data will be destroyed at the end of the research and the legally required retention period.
The results of the research will be used to make them known to individuals and in scientific activities such as congresses or journals.
These results and participation data will be stored for a longer period of time and may be shared with other universities and scientist for further research.
There is one exception to this data protection: when there is a risk of harm to the participant, to people around them, to nature, or to society. In this case, the principal investigator and others involved in the project may decide to share this information with the authorities, such as the police or the mayor's office, in order to prevent harm to people.

7. What rights do I have in relation to personal data?

Under the European law, you have the following rights in relation to the personal data we collect about you:

a) The right to know what data has been collected about you.
b) The right to have the data information changed if it is inaccurate been collected incorrectly.
c) The right not to have the information we hold data held about you used.
d) The right to stop the use of the data we hold about you. Researchers are not required to delete data that has already been used.
e) The right to have your personal data information deleted.
f) You also have the right to know the results of the research.

To request any of these things, simply contact the person who is interviewing you by phone or email. You can also contact the Principal Investigator. Her name is Irene Pérez Ibarra, her telephone number is +34 976 76 15 98 and her e-mail address is perezibarra@unizar.es.

We must get back to you within 30 days.
If 30 days have passed since your request and you have not received a response, you may file a complaint with the Spanish Data Protection Agency. The contact information for the Spanish Data Protection Agency office closest to you can be found at the following website: www.aepd.es.
You can also find out where the University of Zaragoza stores your personal data on its website: https://protecciondatos.unizar.es/registro-actividades-de-tratamiento.

Mental capacity assessment III.

- *Do you have any questions about the things I have explained?*
  (The researcher answers the questions)

- Is it a problem for you to participate in the study, for example, because of your personal values? (*The interviewer makes the mental capacity assessment and fill the Mental Capacity Assessment and Oral Consent form*)

- Does your mood or emotional state make it difficult for you to participate in this study? (*The interviewer makes the mental capacity assessment and fill the Mental Capacity Assessment and Oral Consent form*)

Questions

Do you have any other questions?
(Interviewer reviews Mental Capacity Assessment. If positive, go to "Consent", if negative, go to "Negative ending 2")

Consent. Perfect. Now I'm going to write down that you agree to participate in the research.
I'm going to ask you a series of questions and you have to answer yes or no. I will ask you the questions in front of (*name of witness*), who is (*position of witness*) and will be a witness to this procedure.

a. Have I explained in detail what this investigation is about? □ Yes □ No
b. Do you agree to participate in this investigation? □ Yes □ No
c. Would you like to be interviewed? □ Yes □ No
d. Do you agree to have your voice recorded during the interview? □ Yes □ No
e. May we take pictures of you for publication with the research results? □ Yes □ No
f. May we contact you after the research if we have any questions about your interview or data? □ Yes □ No
g. May I have your personal information to add to the consent document? □ Yes □ No

First and last name:
DOB:
Gender: (provide options if not a spontaneous response).
Education: (*give options if there is no spontaneous answer: consider age at which you left school, degree or last course completed*)

(Interviewer, if you answered yes to questions a, b, c, d, and g, go to "**Positive ending**". Otherwise go to "**Negative ending 1**").

[Positive ending]
Perfect, thank you for your participation. I'm going to start recording and we'll begin the interview.

[Negative ending 1]
Thank you for your time, but we can't interview you if you don't agree to the terms or don't want to be recorded. Participation in the research is voluntary, so there is no problem if you choose not to participate. Thank you for your time. If you have any questions about the research or change your mind about participating, please feel free to call or email us. Goodbye and have a nice day.

[Negative ending 2]
Thank you very much for your time and interest. The characteristics of the people we need to interview are different from yours. Therefore, we will not be interviewing you for the research.
However, we thank you for your time. Goodbye and have a nice day.

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Appendix N

Information sheet

Who are we?	We are researchers from a range of countries around the world collaborating on a study funded by the European Research Council and developed by the University of Zaragoza, Spain.
What are we trying to find out in this study?	This study aims to know two main aspects: 1. The utilization of natural resources in agriculture, such as water, land, and pasture. 2. The tools and systems employed in farming practices, including irrigation systems or animal fencing. To gather this information, the researchers will conduct interviews with individuals involved in agricultural and pastoral activities across various communities worldwide.
What do you need to do to participate?	You are one of the individuals we are interested in interviewing. We would like to inquire about your work in the farm and how you utilize the available tools, either personally or within your community. Additionally, we are interested in learning about any changes you have implemented in your practices over the years. The interview typically last between one and a half to two hours.
Can you change your mind?	Absolutely. You have the freedom to select which questions you feel comfortable answering. Moreover, if at any point during the interview you decide that you no longer wish to participate in the study, simply inform us, and we will respect your decision by excluding your participation.
How will your information be used?	Your personal data, such as age or gender, will be utilized alongside information from other participants for analysis purposes. This data, devoid of individual identifiers, will be stored as participation data. At the conclusion of the research and within the legally mandated retention period, all personal data will be securely disposed of. The personal data you provide during your participation will be handled and safeguarded in compliance with Spanish and European regulations governing personal data protection*. The University of Zaragoza will oversee the organization of research activities in Spain and will bear responsibility for the utilization of your data. The principal investigator of this research project also holds accountability for data usage. Your personal data will be exclusively used for purposes directly related to this research. We will not collect your name or contact information, and we will refrain from inquiring about your religious beliefs, political affiliations, or ethnicity. The outcomes of the research will be disseminated to individuals and within scientific spheres, such as conferences or academic journals. However, there is one exception to this privacy policy: in instances where harm to participants, those in their vicinity, the environment, or society at large is identified. In such cases, the principal investigator and other project managers may elect to share this information with relevant authorities, such as law enforcement or municipal bodies, to mitigate potential harm.
What are your rights as a research participant?	As research participant and according to European law, you have the following rights: 1. The right to be informed about the information we have collected regarding you. 2. The right to rectify any inaccuracies in the information we have collected. 3. The right to opt-out of the use of your information. 4. The right to cease the use of your information. 5. The right to have your information erased from our records. Additionally, you have the right to be informed of the research results. To exercise any of these rights, you simply need to contact me or the principal investigator, whose contact details are provided at the end of this document. We are obligated to respond to your request within 30 days. If 30 days have elapsed since your request without a response from us, you have the option to lodge a complaint with the Spanish Data Protection Agency (www.aepd.es).

Contact details:

Research collaborator:

Phone:

Email:

Local data protection office:

Phone:

Email:

Address:

Principal investigator: Irene Pérez Ibarra
Phone: +34 976761598
Email: perezibarra@unizar.es
Address:
Departamento de Ciencias Agrarias y del Medio Natural
Facultad de Veterinaria, Universidad de Zaragoza
Calle Miguel de Servet, 177. Zaragoza, 50013. Spain
Webpage: resilientrules.com

Data Protection Delegate of the University of Zaragoza:
Phone: +34 876553612
Email: dpd@unizar.es

* Legislation related to data protection: European Union General Data Protection Regulation (EU 2016/679) and Spanish Organic Law 3/2018 (*Protección de Datos y Garantías de los Derechos Digitales*)

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Universidad Zaragoza
Instituto Universitario de Investigación Mixto Agroalimentario de Aragón Universidad Zaragoza

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Appendix O

Permission request to interview subject

PERMISSION REQUEST TO INTERVIEW SUBJECT

Title: "*Evolution of institutional diversity in a changing world: Finding solutions in resilient agricultural systems"*
Principal investigator: Irene Pérez Ibarra **Email:** perezibarra@unizar.es
Institution: University of Zaragoza, Spain
Funding: European Research Council (RESILIENT RULES, ERC-2021-CoG, Grant 101044225)
Website: resilientrules.com

Research collaborator: **Email:**
Institution:

Permission request to interview a member of the community: *[NAME OF THE COMMUNITY]*

Permission requested by: *[FULL NAME]*

Permission requested to: *[FULL NAME]*

I, (FULL NAME) _____

as (POSITION) _____

in (INSTITUTION'S FULL NAME) _____

and research collaborator of the RESILENT RULES project, funded by the European Research Council and lead at University of Zaragoza, Spain, request permission to interview FULL NAME):

_____

The interview will focus on the rules and norms used in your community to manage natural resources for agriculture. RESILIENT RULES understands and respects the cultural norms and sensitivities of your community, and is fully committed to conducting research in accordance with local customs, as well as adhering to high safety and ethical standards. Rest assured, the interview will be conducted with the utmost professionalism and respect. Please note that the interview will be witnessed by a trusted individual. Should you have any questions or require additional information, please do not hesitate to contact me at:

_____

Signature:

Full name:

Place, date:

PERMISSION FORM TO INTERVIEW SUBJECT

Title: "*Evolution of institutional diversity in a changing world: Finding solutions in resilient agricultural systems***"**
Principal investigator: Irene Pérez Ibarra **Email:** perezibarra@unizar.es
Institution: University of Zaragoza, Spain
Funding: European Research Council (RESILIENT RULES, ERC-2021-CoG, Grant 101044225)
Website: resilientrules.com

Research collaborator: **Email:**
Institution:

Permission request to interview a member of the community:

Permission requested by:

Permission given by:

I, (FULL NAME)

_____

as (RELATIONSHIP WITH PARTICIPANT)

_____

HERBY AUTHORISE (RESEARCHER'S NAME)

_____

to interview, for the RESILENT RULES project, (PARTICIPANT'S NAME):

_____

Signature:

Full name:

Place, date:

Funded by the European Union

European Research Council

Resilient Rules

Finding solutions
in resilient agricultural systems

Appendix P

Consent form

ID: _____Date: _____ Local time: _____ Country: _____

Region: _____ Village / Community: _____

Comments:

Assessment of participant's eligibility

	Score (0-2)
Related to the research goals	
Related to the benefits	
Related to the risks	
Related to personal values	
Related to the emotional dimension	
Final score (0-10)	
Final assessment	☐ Negative *(score 0 in any of the items)* ☐ Positive *(score > 0 in all items)*
Interviewer, justify the final assessment:	

Response Scale:
2: Reflects clear understanding of the information provided.
1: Reflects partial understanding
0: Reflects insufficient understanding

Oral consent record

Interviewer, please check all that apply:

- Have I explained in detail what this investigation is about? ☐Yes ☐No
- Do you agree to participate in this investigation? ☐Yes ☐No
- Would you like to be interviewed? ☐Yes ☐No
- Do you agree to have your voice recorded during the interview? ☐Yes ☐No
- May we take pictures of you for publication with the research results? ☐Yes ☐No
- May we contact you after the research if we have any questions about your interview or data? ☐Yes ☐ No
- May I have your personal information to add to the consent document? ☐Yes ☐No

First and last name:

Gender:

Date of birth:

Education: *(answer all that apply):*

Number of years you attended school:
Age at which you left school:
Last grade you attended school (no school, elementary school, middle school, high school, higher education):

(First and last name) _____as a witness, I confirm that the participant has been properly informed about the objectives of the project, the implications of his/her participation, and his/her rights as a participant. I also certify that the participant has demonstrated adequate capacity for understanding and decision-making capacity.

Researcher's name:

_____

Researcher's signature:

Witness signature:

_____

Place

_____

Witness position and relationship to interviewee:

_____

Date and time

_____

Witness contact details:

_____

Phone: _____

E-mail: _____

(Signed in the presence of the interviewee to confirm oral consent)

☐ **The interviewee refused to have a witness during the interview**

ADDENDA

Record of oral consent to access and archive of information

Interviewer, please check all that apply:

- The interviewee has given us consent:

  - To publish the information about the community on the project website and other media?

    ☐ **Yes** ☐ **No**

  - To use the geographical location of the community in publications and on the project website?

    ☐ **Yes** ☐ **No**

  - To publish photographs of the interviewee on the project website and other media?

    ☐ **Yes** ☐ **No**

  - To keep a copy of the voice recording and interview transcript for future use in documentary (e.g., scientific and outreach presentations, documentaries, websites) and research projects?

    ☐ **Yes** ☐ **No**

  - To keep a copy of the photographs taken for future use in documentary (e.g., scientific and outreach presentations, documentaries, websites) and research projects?

    ☐ **Yes** ☐ **No**

  - To keep his/her contact information so that he/she can be contacted in the future for other research or documentary projects?

    ☐ **Yes** ☐ **No**

    If yes, please provide your address, phone number, and/or e-mail address:

  - To make the information provided available to the scientific community?

    ☐ **Yes, all** ☐ **Yes, but not all** ☐ **No**

    If not all, specify the information that cannot be disclosed:

    If not, explain why below:

Funded by the European Union

European Research Council

Resilient Rules

Finding solutions
in resilient agricultural systems

Appendix Q

Case study log

Interviewer's name: _____

Coordinates: _____

Country: _____ Region: _____ Site: _____

Comments:

INTERVIEWS

Interview number: 1

Date:	Time:	Comments:
Criteria and process for selecting the interviewee:		

Interview number: 2

Date:	Time:	Comments:
Criteria and process for selecting the interviewee:		

Interview number: 3

Date:	Time:	Comments:
Criteria and process for selecting the interviewee:		

Interview number: 4

Date:	Time:	Comments:
Criteria and process for selecting the interviewee:		

Interview number: 5

Date:	Time:	Comments:
Criteria and process for selecting the interviewee:		

Interview number:

Date:	Time:	Comments:
Criteria and process for selecting the interviewee:		

Interview number:

Date:	Time:	Comments:
Criteria and process for selecting the interviewee:		

DESCRIPTION OF THE SOCIAL-ECOLOGICAL SYSTEM

Q. 1.1. Type of subsistence strategy *[Mark ALL that apply]*

Non irrigated arable land: [0] No [1] Yes

[a] Cereals	[d] Pulses	[g] Roots and tubers	[j] Cassava
[b] Rice	[e] Oil crops	[h] Fiber crops	[k] Vegetable
[c] Maize	[f] Fodder crops	[i] Tobacco	[l] Other:_____

Irrigated arable land: [0] No [1] Yes

[a] Cereals	[d] Pulses	[g] Roots and tubers	[j] Cassava
[b] Rice	[e] Oil crops	[h] Fiber crops	[k] Vegetable
[c] Maize	[f] Fodder crops	[i] Tobacco	[l] Other:_____

Permanent crops: [0] No [1] Yes

[a] Vineyards	[e] Oil Palm	[i] Cocoa
[b] Fruit trees and berry plantation	[f] Tea	[h] Other:_____
[c] Olive groves	[g] Sugarcane	
[d] Banana	[h] Coffee	

Pastoralism: [0] No [1] Yes

[a] Extensive	[b] Semi-extensive	[c] Intensive

Livestock specialization *[Mark ALL that apply]*

[a] Dairy cattle	[d] Meat sheep	[g] Poultry
[b] Beef cattle	[e] Goats	[h] Camels
[c] Dairy sheep	[f] Pigs	[i] Other:_____

Livestock mobility

[a] Sedentary	[b] Transhumant	[c] Nomadic

Type of System

[a] Agricultural	[c] Silvopastoral	[e] Agrosilvopastoral
[b] Pastoral	[d] Agropastoral	[f] Others:

Q.1.3. Num. of persons/households	Q.1.4. Size community's territory	Q.1.5. Average area used by each community member

Q.1.6. Land tenure *[Mark ALL that apply]*

[a] Common lands	[c] Private lands	[e] Leased lands
[b] Free access	[d] State-owned land	[f] Other:

Q.1.7. Natural resource

[a] Surface water	[c] Grassland	[e] Forest land
[b] Groundwater	[d] Agricultural land	[f] Farmland
[g] Others:	[h] Do not know	

Q.1.8. Shared natural resources

Name	**Dimensions** *[area, volume/flow rate, length, etc.]*

Q.1.10. Public infrastructures:

[a] Irrigation canals	[f] Roads	[i] Barns or shelters for livestock	[m] Do not know
[b] Drainage canals	[g] Corrals	[j] Silo	[n] Other:
[c] Irrigation ponds	[h] Water points for livestock	[k] Processing plants	
[d] Dams		[l] Slaughterhouse	
[e] Fences			

Q.1.11. Shared public infrastructures

Name	**Dimensions** *[area, volume, length, etc.]*

Q.1.13. Name of organization: _____

Q.1.16. Does the community have written rules (e.g., bylaws, ordinances…)?

☐ Yes* ☐ No

*** Written rules request status:**

☐ To be requested.
☐ In process of consultation in assembly.
☐ Already collected.
☐ Denied
☐ Other. Please, describe:

Q.1.17. Religion

Main religion _____

Second religion _____

Q.1.18. Ethnic group

Main ethnic group _____

Second ethnic group _____

Q.2.A.1. Positions (roles) of members in the community

- **Position:**
- **Position:**
- **Position:**
- **Position:**
- **Position:**
- **Position**

KEY TERMS. Please list here specific terms, concepts, names, etc., used by the interviewee that are necessary to aid the transcription and analysis phases:

Interview number: _____

SECTION 5. RESILIENCE

Q.5.1. Climate changes over the last 10-20 years

Perceived change	Yes	No	DK/NO
General increase in temperature			
General increase in precipitation (rain or snow)			
General reduction in precipitation (rain or snow)			
The climate is much more extreme (e.g., more frequent extreme weather events such as floods, droughts, hurricanes, cold/heat waves, frost)			
The climate is much more variable and unpredictable			
Changes in length of seasons: longer summers			
Changes in length of seasons: longer winters			
Changes in rainfall patterns within a year (e.g., rainfall becomes less spread out over time, shifting rainy seasons).			
Have you noticed any other changes in your area's climate over the past 20 – 30 years? If so, what are they?			

Q.5.3. Severity of climate changes

Not a problem	Not serious at all									Very serious
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q.5.4. Usefulness of community organization and rules to overcome the adverse effects of climate

Not assistance at all	Minimal assistance									They are indispensable
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q.5.5. Resilience to climate change

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
Your *community* can bounce back from any challenge the ***climate*** throws at it.	☐	☐	☐	☐	☐
During times of ***climate-related hardship***, your *community* can change its primary income or source of livelihood if needed.	☐	☐	☐	☐	☐
If ***climate*** threats to your *community* became more frequent and intense, your community would still find a way to get by.	☐	☐	☐	☐	☐
In times of ***climate-related hardship***, your community can access the financial support it needs.	☐	☐	☐	☐	☐
Your *community* can rely on the support of its members when they need help with ***climate issues***.	☐	☐	☐	☐	☐
Your *community* can rely on the support of politicians and the government when it needs help with ***climate issues***.	☐	☐	☐	☐	☐
Your *community* has learned important lessons from past hardships that will help it better prepare for future ***climate threats***.	☐	☐	☐	☐	☐
Your *community* is fully prepared for any future ***climate-related threats*** that may occur in your area.	☐	☐	☐	☐	☐
Your *community* receives useful information that warns you in advance of future ***climate-related risks***.	☐	☐	☐	☐	☐

SECTION 6. SOCIODEMOGRAPHIC AND PSYCHOGRAPHIC CHARACTERISTICS

Q.6.1. Level of agreement with statements

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
If anything bad can happen to me, I am sure it will happen.	☐	☐	☐	☐	☐
I rarely expect things to go my way.	☐	☐	☐	☐	☐
I don't expect good things to happen to me.	☐	☐	☐	☐	☐
In times of uncertainty, I tend to think that the best is going to happen to me.	☐	☐	☐	☐	☐
I am always optimistic about the future.	☐	☐	☐	☐	☐
In general, I think more good things will happen to me than bad things.	☐	☐	☐	☐	☐
In general, I consider myself a happy person.	☐	☐	☐	☐	☐
I am usually relaxed.	☐	☐	☐	☐	☐
Most people in my community are honest and trustworthy.	☐	☐	☐	☐	☐
I feel that there is a strong social support network in my community (that can support me when I need it).	☐	☐	☐	☐	☐
In general, I consider myself a risk-taker.	☐	☐	☐	☐	☐

Q.6.2. Risk aversion

A ☐ 33€ | 33€ **B** ☐ 25€ | 50€ **C** ☐ 10€ | 80€ **D** ☐ 0€ | 100€

Q.6.3. On a scale of 1 to 10, how do you feel right now?

	1	2	3	4	5	6	7	8	9	10	
Very sad	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very happy
Very pessimistic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very optimistic

Q.6.4. Satisfaction with life

	1	2	3	4	5	6	7	8	9	10	
Very unsatisfied	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very satisfied

SECTION 7. CONFIRMATION OF CASE STUDY DESCRIPTION AND CONSENTS

Q.7.1. Agreement with the general description of the community presented by the researcher

Yes ☐ No ☐ **7.1.** If not, description requires major changes ☐
description requires minor changes ☐

Please, list below the required changes:

Interview number: _____

SECTION 5. RESILIENCE

Q.5.1. Climate changes over the last 10-20 years

Perceived change	Yes	No	DK/NO
General increase in temperature			
General increase in precipitation (rain or snow)			
General reduction in precipitation (rain or snow)			
The climate is much more extreme (e.g., more frequent extreme weather events such as floods, droughts, hurricanes, cold/heat waves, frost)			
The climate is much more variable and unpredictable			
Changes in length of seasons: longer summers			
Changes in length of seasons: longer winters			
Changes in rainfall patterns within a year (e.g., rainfall becomes less spread out over time, shifting rainy seasons).			
Have you noticed any other changes in your area's climate over the past 20 – 30 years? If so, what are they?:			

Q.5.3. Severity of climate changes

Not a problem	Not serious at all									Very serious
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q.5.4. Usefulness of community organization and rules to overcome the adverse effects of climate

Not assistance at all	Minimal assistance									They are indispensable
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q.5.5. Resilience to climate change

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
Your *community* can bounce back from any challenge the ***climate*** throws at it.	☐	☐	☐	☐	☐
During times of ***climate-related hardship***, your *community* can change its primary income or source of livelihood if needed.	☐	☐	☐	☐	☐
If ***climate*** threats to your *community* became more frequent and intense, your community would still find a way to get by.	☐	☐	☐	☐	☐
In times of ***climate-related hardship***, your community can access the financial support it needs.	☐	☐	☐	☐	☐
Your *community* can rely on the support of its members when they need help with ***climate issues***.	☐	☐	☐	☐	☐
Your *community* can rely on the support of politicians and the government when it needs help with ***climate issues***.	☐	☐	☐	☐	☐
Your *community* has learned important lessons from past hardships that will help it better prepare for future ***climate threats***.	☐	☐	☐	☐	☐
Your *community* is fully prepared for any future ***climate-related threats*** that may occur in your area.	☐	☐	☐	☐	☐
Your *community* receives useful information that warns you in advance of future ***climate-related risks***.	☐	☐	☐	☐	☐

SECTION 6. SOCIODEMOGRAPHIC AND PSYCHOGRAPHIC CHARACTERISTICS

Q.6.1. Level of agreement with statements

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
If anything bad can happen to me, I am sure it will happen.	☐	☐	☐	☐	☐
I rarely expect things to go my way.	☐	☐	☐	☐	☐
I don't expect good things to happen to me.	☐	☐	☐	☐	☐
In times of uncertainty, I tend to think that the best is going to happen to me.	☐	☐	☐	☐	☐
I am always optimistic about the future.	☐	☐	☐	☐	☐
In general, I think more good things will happen to me than bad things.	☐	☐	☐	☐	☐
In general, I consider myself a happy person.	☐	☐	☐	☐	☐
I am usually relaxed.	☐	☐	☐	☐	☐
Most people in my community are honest and trustworthy.	☐	☐	☐	☐	☐
I feel that there is a strong social support network in my community (that can support me when I need it).	☐	☐	☐	☐	☐
In general, I consider myself a risk-taker.	☐	☐	☐	☐	☐

Q.6.2. Risk aversion

A ☐ 33€ | 33€ **B** ☐ 25€ | 50€ **C** ☐ 10€ | 80€ **D** ☐ 0€ | 100€

Q.6.3. On a scale of 1 to 10, how do you feel right now?

	1	2	3	4	5	6	7	8	9	10	
Very sad	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very happy
Very pessimistic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very optimistic

Q.6.4. Satisfaction with life

	1	2	3	4	5	6	7	8	9	10	
Very unsatisfied	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very satisfied

SECTION 7. CONFIRMATION OF CASE STUDY DESCRIPTION AND CONSENTS

Q.7.1. Agreement with the general description of the community presented by the researcher

Yes ☐ No ☐ **7.1.** If not, description requires major changes ☐
description requires minor changes ☐

Please, list below the required changes:

Interview number: _____

SECTION 5. RESILIENCE

Q.5.1. Climate changes over the last 10-20 years

Perceived change	Yes	No	DK/NO
General increase in temperature			
General increase in precipitation (rain or snow)			
General reduction in precipitation (rain or snow)			
The climate is much more extreme (e.g., more frequent extreme weather events such as floods, droughts, hurricanes, cold/heat waves, frost)			
The climate is much more variable and unpredictable			
Changes in length of seasons: longer summers			
Changes in length of seasons: longer winters			
Changes in rainfall patterns within a year (e.g., rainfall becomes less spread out over time, shifting rainy seasons).			
Have you noticed any other changes in your area's climate over the past 20 – 30 years? If so, what are they?			

Q.5.3. Severity of climate changes

Not a problem	Not serious at all									Very serious
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q.5.4. Usefulness of community organization and rules to overcome the adverse effects of climate

Not assistance at all	Minimal assistance									They are indispensable
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q.5.5. Resilience to climate change

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
Your *community* can bounce back from any challenge the ***climate*** throws at it.	☐	☐	☐	☐	☐
During times of ***climate-related hardship***, your *community* can change its primary income or source of livelihood if needed.	☐	☐	☐	☐	☐
If ***climate*** threats to your *community* became more frequent and intense, your community would still find a way to get by.	☐	☐	☐	☐	☐
In times of ***climate-related hardship***, your community can access the financial support it needs.	☐	☐	☐	☐	☐
Your *community* can rely on the support of its members when they need help with ***climate issues***.	☐	☐	☐	☐	☐
Your *community* can rely on the support of politicians and the government when it needs help with ***climate issues***.	☐	☐	☐	☐	☐
Your *community* has learned important lessons from past hardships that will help it better prepare for future ***climate threats***.	☐	☐	☐	☐	☐
Your *community* is fully prepared for any future ***climate-related threats*** that may occur in your area.	☐	☐	☐	☐	☐
Your *community* receives useful information that warns you in advance of future ***climate-related risks***.	☐	☐	☐	☐	☐

SECTION 6. SOCIODEMOGRAPHIC AND PSYCHOGRAPHIC CHARACTERISTICS

Q.6.1. Level of agreement with statements

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
If anything bad can happen to me, I am sure it will happen.	☐	☐	☐	☐	☐
I rarely expect things to go my way.	☐	☐	☐	☐	☐
I don't expect good things to happen to me.	☐	☐	☐	☐	☐
In times of uncertainty, I tend to think that the best is going to happen to me.	☐	☐	☐	☐	☐
I am always optimistic about the future.	☐	☐	☐	☐	☐
In general, I think more good things will happen to me than bad things.	☐	☐	☐	☐	☐
In general, I consider myself a happy person.	☐	☐	☐	☐	☐
I am usually relaxed.	☐	☐	☐	☐	☐
Most people in my community are honest and trustworthy.	☐	☐	☐	☐	☐
I feel that there is a strong social support network in my community (that can support me when I need it).	☐	☐	☐	☐	☐
In general, I consider myself a risk-taker.	☐	☐	☐	☐	☐

Q.6.2. Risk aversion

A ☐ 33€ | 33€ **B** ☐ 25€ | 50€ **C** ☐ 10€ | 80€ **D** ☐ 0€ | 100€

Q.6.3. On a scale of 1 to 10, how do you feel right now?

	1	2	3	4	5	6	7	8	9	10	
Very sad	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very happy
Very pessimistic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very optimistic

Q.6.4. Satisfaction with life

	1	2	3	4	5	6	7	8	9	10	
Very unsatisfied	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very satisfied

SECTION 7. CONFIRMATION OF CASE STUDY DESCRIPTION AND CONSENTS

Q.7.1. Agreement with the general description of the community presented by the researcher

Yes ☐ No ☐ **7.1.** If not, description requires major changes ☐
description requires minor changes ☐

Please, list below the required changes:

Interview number: _____

SECTION 5. RESILIENCE

Q.5.1. Climate changes over the last 10-20 years

Perceived change	Yes	No	DK/NO
General increase in temperature			
General increase in precipitation (rain or snow)			
General reduction in precipitation (rain or snow)			
The climate is much more extreme (e.g., more frequent extreme weather events such as floods, droughts, hurricanes, cold/heat waves, frost)			
The climate is much more variable and unpredictable			
Changes in length of seasons: longer summers			
Changes in length of seasons: longer winters			
Changes in rainfall patterns within a year (e.g., rainfall becomes less spread out over time, shifting rainy seasons).			
Have you noticed any other changes in your area's climate over the past 20 – 30 years? If so, what are they?			

Q.5.3. Severity of climate changes

Not a problem	Not serious at all									Very serious
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q.5.4. Usefulness of community organization and rules to overcome the adverse effects of climate

Not assistance at all	Minimal assistance									They are indispensable
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q.5.5. Resilience to climate change

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
Your *community* can bounce back from any challenge the ***climate*** throws at it.	☐	☐	☐	☐	☐
During times of ***climate-related hardship***, your *community* can change its primary income or source of livelihood if needed.	☐	☐	☐	☐	☐
If ***climate*** threats to your *community* became more frequent and intense, your community would still find a way to get by.	☐	☐	☐	☐	☐
In times of ***climate-related hardship***, your community can access the financial support it needs.	☐	☐	☐	☐	☐
Your *community* can rely on the support of its members when they need help with ***climate issues***.	☐	☐	☐	☐	☐
Your *community* can rely on the support of politicians and the government when it needs help with ***climate issues***.	☐	☐	☐	☐	☐
Your *community* has learned important lessons from past hardships that will help it better prepare for future ***climate threats***.	☐	☐	☐	☐	☐
Your *community* is fully prepared for any future ***climate-related threats*** that may occur in your area.	☐	☐	☐	☐	☐
Your *community* receives useful information that warns you in advance of future ***climate-related risks***.	☐	☐	☐	☐	☐

SECTION 6. SOCIODEMOGRAPHIC AND PSYCHOGRAPHIC CHARACTERISTICS

Q.6.1. Level of agreement with statements

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
If anything bad can happen to me, I am sure it will happen.	☐	☐	☐	☐	☐
I rarely expect things to go my way.	☐	☐	☐	☐	☐
I don't expect good things to happen to me.	☐	☐	☐	☐	☐
In times of uncertainty, I tend to think that the best is going to happen to me.	☐	☐	☐	☐	☐
I am always optimistic about the future.	☐	☐	☐	☐	☐
In general, I think more good things will happen to me than bad things.	☐	☐	☐	☐	☐
In general, I consider myself a happy person.	☐	☐	☐	☐	☐
I am usually relaxed.	☐	☐	☐	☐	☐
Most people in my community are honest and trustworthy.	☐	☐	☐	☐	☐
I feel that there is a strong social support network in my community (that can support me when I need it).	☐	☐	☐	☐	☐
In general, I consider myself a risk-taker.	☐	☐	☐	☐	☐

Q.6.2. Risk aversion

A ☐ 33€ | 33€ **B** ☐ 25€ | 50€ **C** ☐ 10€ | 80€ **D** ☐ 0€ | 100€

Q.6.3. On a scale of 1 to 10, how do you feel right now?

	1	2	3	4	5	6	7	8	9	10	
Very sad	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very happy
Very pessimistic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very optimistic

Q.6.4. Satisfaction with life

	1	2	3	4	5	6	7	8	9	10	
Very unsatisfied	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very satisfied

SECTION 7. CONFIRMATION OF CASE STUDY DESCRIPTION AND CONSENTS

Q.7.1. Agreement with the general description of the community presented by the researcher

Yes ☐ No ☐ **7.1.** If not, description requires major changes ☐
description requires minor changes ☐

Please, list below the required changes:

Interview number: _____

SECTION 5. RESILIENCE

Q.5.1. Climate changes over the last 10-20 years

Perceived change	Yes	No	DK/NO
General increase in temperature			
General increase in precipitation (rain or snow)			
General reduction in precipitation (rain or snow)			
The climate is much more extreme (e.g., more frequent extreme weather events such as floods, droughts, hurricanes, cold/heat waves, frost)			
The climate is much more variable and unpredictable			
Changes in length of seasons: longer summers			
Changes in length of seasons: longer winters			
Changes in rainfall patterns within a year (e.g., rainfall becomes less spread out over time, shifting rainy seasons).			
Have you noticed any other changes in your area's climate over the past 20 – 30 years? If so, what are they?			

Q.5.3. Severity of climate changes

Not a problem	Not serious at all									Very serious
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q.5.4. Usefulness of community organization and rules to overcome the adverse effects of climate

Not assistance at all	Minimal assistance									They are indispensable
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q.5.5. Resilience to climate change

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
Your *community* can bounce back from any challenge the ***climate*** throws at it.	☐	☐	☐	☐	☐
During times of ***climate-related hardship***, your *community* can change its primary income or source of livelihood if needed.	☐	☐	☐	☐	☐
If ***climate*** threats to your *community* became more frequent and intense, your community would still find a way to get by.	☐	☐	☐	☐	☐
In times of ***climate-related hardship***, your community can access the financial support it needs.	☐	☐	☐	☐	☐
Your *community* can rely on the support of its members when they need help with ***climate issues***.	☐	☐	☐	☐	☐
Your *community* can rely on the support of politicians and the government when it needs help with ***climate issues***.	☐	☐	☐	☐	☐
Your *community* has learned important lessons from past hardships that will help it better prepare for future ***climate threats***.	☐	☐	☐	☐	☐
Your *community* is fully prepared for any future ***climate-related threats*** that may occur in your area.	☐	☐	☐	☐	☐
Your *community* receives useful information that warns you in advance of future ***climate-related risks***.	☐	☐	☐	☐	☐

SECTION 6. SOCIODEMOGRAPHIC AND PSYCHOGRAPHIC CHARACTERISTICS

Q.6.1. Level of agreement with statements

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
If anything bad can happen to me, I am sure it will happen.	☐	☐	☐	☐	☐
I rarely expect things to go my way.	☐	☐	☐	☐	☐
I don't expect good things to happen to me.	☐	☐	☐	☐	☐
In times of uncertainty, I tend to think that the best is going to happen to me.	☐	☐	☐	☐	☐
I am always optimistic about the future.	☐	☐	☐	☐	☐
In general, I think more good things will happen to me than bad things.	☐	☐	☐	☐	☐
In general, I consider myself a happy person.	☐	☐	☐	☐	☐
I am usually relaxed.	☐	☐	☐	☐	☐
Most people in my community are honest and trustworthy.	☐	☐	☐	☐	☐
I feel that there is a strong social support network in my community (that can support me when I need it).	☐	☐	☐	☐	☐
In general, I consider myself a risk-taker.	☐	☐	☐	☐	☐

Q.6.2. Risk aversion

A ☐ 33€ | 33€ **B** ☐ 25€ | 50€ **C** ☐ 10€ | 80€ **D** ☐ 0€ | 100€

Q.6.3. On a scale of 1 to 10, how do you feel right now?

	1	2	3	4	5	6	7	8	9	10	
Very sad	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very happy
Very pessimistic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very optimistic

Q.6.4. Satisfaction with life

	1	2	3	4	5	6	7	8	9	10	
Very unsatisfied	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very satisfied

SECTION 7. CONFIRMATION OF CASE STUDY DESCRIPTION AND CONSENTS

Q.7.1. Agreement with the general description of the community presented by the researcher

Yes ☐ No ☐ **7.1.** If not, description requires major changes ☐
description requires minor changes ☐

Please, list below the required changes:

Interview number: _____

SECTION 5. RESILIENCE

Q.5.1. Climate changes over the last 10-20 years

Perceived change	Yes	No	DK/NO
General increase in temperature			
General increase in precipitation (rain or snow)			
General reduction in precipitation (rain or snow)			
The climate is much more extreme (e.g., more frequent extreme weather events such as floods, droughts, hurricanes, cold/heat waves, frost)			
The climate is much more variable and unpredictable			
Changes in length of seasons: longer summers			
Changes in length of seasons: longer winters			
Changes in rainfall patterns within a year (e.g., rainfall becomes less spread out over time, shifting rainy seasons).			
Have you noticed any other changes in your area's climate over the past 20 – 30 years? If so, what are they?:			

Q.5.3. Severity of climate changes

Not a problem	Not serious at all									Very serious
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q.5.4. Usefulness of community organization and rules to overcome the adverse effects of climate

Not assistance at all	Minimal assistance									They are indispensable
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q.5.5. Resilience to climate change

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
Your *community* can bounce back from any challenge the ***climate*** throws at it.	☐	☐	☐	☐	☐
During times of ***climate-related hardship***, your *community* can change its primary income or source of livelihood if needed.	☐	☐	☐	☐	☐
If ***climate*** threats to your *community* became more frequent and intense, your community would still find a way to get by.	☐	☐	☐	☐	☐
In times of ***climate-related hardship***, your community can access the financial support it needs.	☐	☐	☐	☐	☐
Your *community* can rely on the support of its members when they need help with ***climate issues***.	☐	☐	☐	☐	☐
Your *community* can rely on the support of politicians and the government when it needs help with ***climate issues***.	☐	☐	☐	☐	☐
Your *community* has learned important lessons from past hardships that will help it better prepare for future ***climate threats***.	☐	☐	☐	☐	☐
Your *community* is fully prepared for any future ***climate-related threats*** that may occur in your area.	☐	☐	☐	☐	☐
Your *community* receives useful information that warns you in advance of future ***climate-related risks***.	☐	☐	☐	☐	☐

SECTION 6. SOCIODEMOGRAPHIC AND PSYCHOGRAPHIC CHARACTERISTICS

Q.6.1. Level of agreement with statements

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
If anything bad can happen to me, I am sure it will happen.	☐	☐	☐	☐	☐
I rarely expect things to go my way.	☐	☐	☐	☐	☐
I don't expect good things to happen to me.	☐	☐	☐	☐	☐
In times of uncertainty, I tend to think that the best is going to happen to me.	☐	☐	☐	☐	☐
I am always optimistic about the future.	☐	☐	☐	☐	☐
In general, I think more good things will happen to me than bad things.	☐	☐	☐	☐	☐
In general, I consider myself a happy person.	☐	☐	☐	☐	☐
I am usually relaxed.	☐	☐	☐	☐	☐
Most people in my community are honest and trustworthy.	☐	☐	☐	☐	☐
I feel that there is a strong social support network in my community (that can support me when I need it).	☐	☐	☐	☐	☐
In general, I consider myself a risk-taker.	☐	☐	☐	☐	☐

Q.6.2. Risk aversion

A ☐ 33€ | 33€ **B** ☐ 25€ | 50€ **C** ☐ 10€ | 80€ **D** ☐ 0€ | 100€

Q.6.3. On a scale of 1 to 10, how do you feel right now?

	1	2	3	4	5	6	7	8	9	10	
Very sad	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very happy
Very pessimistic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very optimistic

Q.6.4. Satisfaction with life

	1	2	3	4	5	6	7	8	9	10	
Very unsatisfied	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very satisfied

SECTION 7. CONFIRMATION OF CASE STUDY DESCRIPTION AND CONSENTS

Q.7.1. Agreement with the general description of the community presented by the researcher

Yes ☐ No ☐ **7.1.** If not, description requires major changes ☐
description requires minor changes ☐

Please, list below the required changes:

Interview number: _____

SECTION 5. RESILIENCE

Q.5.1. Climate changes over the last 10-20 years

Perceived change	Yes	No	DK/NO
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Changes in rainfall patterns within a year (e.g., rainfall becomes less spread out over time, shifting rainy seasons).			
Have you noticed any other changes in your area's climate over the past 20 – 30 years? If so, what are they?:			

Q.5.3. Severity of climate changes

Not a problem	Not serious at all									Very serious
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q.5.4. Usefulness of community organization and rules to overcome the adverse effects of climate

Not assistance at all	Minimal assistance									They are indispensable
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q.5.5. Resilience to climate change

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
Your *community* can bounce back from any challenge the ***climate*** throws at it.	☐	☐	☐	☐	☐
During times of ***climate-related hardship***, your *community* can change its primary income or source of livelihood if needed.	☐	☐	☐	☐	☐
If ***climate*** threats to your *community* became more frequent and intense, your community would still find a way to get by.	☐	☐	☐	☐	☐
In times of ***climate-related hardship***, your community can access the financial support it needs.	☐	☐	☐	☐	☐
Your *community* can rely on the support of its members when they need help with ***climate issues***.	☐	☐	☐	☐	☐
Your *community* can rely on the support of politicians and the government when it needs help with ***climate issues***.	☐	☐	☐	☐	☐
Your *community* has learned important lessons from past hardships that will help it better prepare for future ***climate threats***.	☐	☐	☐	☐	☐
Your *community* is fully prepared for any future ***climate-related threats*** that may occur in your area.	☐	☐	☐	☐	☐
Your *community* receives useful information that warns you in advance of future ***climate-related risks***.	☐	☐	☐	☐	☐

SECTION 6. SOCIODEMOGRAPHIC AND PSYCHOGRAPHIC CHARACTERISTICS

Q.6.1. Level of agreement with statements

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
If anything bad can happen to me, I am sure it will happen.	☐	☐	☐	☐	☐
I rarely expect things to go my way.	☐	☐	☐	☐	☐
I don't expect good things to happen to me.	☐	☐	☐	☐	☐
In times of uncertainty, I tend to think that the best is going to happen to me.	☐	☐	☐	☐	☐
I am always optimistic about the future.	☐	☐	☐	☐	☐
In general, I think more good things will happen to me than bad things.	☐	☐	☐	☐	☐
In general, I consider myself a happy person.	☐	☐	☐	☐	☐
I am usually relaxed.	☐	☐	☐	☐	☐
Most people in my community are honest and trustworthy.	☐	☐	☐	☐	☐
I feel that there is a strong social support network in my community (that can support me when I need it).	☐	☐	☐	☐	☐
In general, I consider myself a risk-taker.	☐	☐	☐	☐	☐

Q.6.2. Risk aversion

A ☐ 33€ | 33€ **B** ☐ 25€ | 50€ **C** ☐ 10€ | 80€ **D** ☐ 0€ | 100€

Q.6.3. On a scale of 1 to 10, how do you feel right now?

	1	2	3	4	5	6	7	8	9	10	
Very sad	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very happy
Very pessimistic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very optimistic

Q.6.4. Satisfaction with life

	1	2	3	4	5	6	7	8	9	10	
Very unsatisfied	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very satisfied

SECTION 7. CONFIRMATION OF CASE STUDY DESCRIPTION AND CONSENTS

Q.7.1. Agreement with the general description of the community presented by the researcher

Yes ☐ No ☐ **7.1.** If not, description requires major changes ☐
description requires minor changes ☐

Please, list below the required changes:

Funded by the European Union

European Research Council

Resilient Rules

Finding solutions
in resilient agricultural systems

Appendix R

Request for access to identifiable information of participants

REQUEST FOR ACCESS TO IDENTIFIABLE INFORMATION OF PARTICIPANTS

In accordance with the ethical standards and legal requirements of the RESILIENT RULES project (ERC-2021-CoG, Grant 101044225), this form is designed to ensure compliance with data protection and privacy regulations according to the European Union General Data Protection Regulation (EU 2016/679), the Spanish Organic Law 3/2018 (*Protección de Datos y Garantías de los Derechos Digitales*) and the RESILIENT RULES Data Management Plan.

To access identifiable information of participants and studied communities of the RESILIENT RULES project, please, provide the following information:

A) Contact information of the person requesting the information:
Full name:
Affiliation:
Address:
City, State, ZIP:
Email Address:
Phone Number:
Date:

B) Information of the research study:
Title:
Objectives:
Funding agency:
Funding period:

C) List the data you are requesting:

D) Provide a brief description of the purpose of your research and how you will use the requested information:

E) Provide a brief description of how you plan to secure the requested information to reduce the risk to participants and study communities:

F) Complete the following information about the approval of your study by the Institutional Review Board of your country, region, or institution:

Name of the Institutional Review Board: **Email:** **Address:** **Website:** **Country:** **Processing code or identification number:** *Please, provide a copy of the Institutional Review Board approval of your research study.

Place, date:

Signature:

Applicant's full name: