



Project acronym: SURE-Farm
Project no.: 727520

Start date of project: June 2017
Duration: 4 years

D7.6. Project's edited volume

Work Performed by Partner 1, WUR

(Contact: Miranda Meuwissen and Alberto Garrido)

Due date	31th May 2021
Version/Date	28 th May 2021
Work Package	WP7
Task	T 7.6
Task lead	P1 in cooperation with P9
Dissemination level	Public

INDEX

1	Title and overview	4
2	Reasons for writing, proposed length and amount of illustration.....	4
3	Intended completion date.....	5
4	General overall account of content of book, list of chapters and indication of content of each chapter	5
5	Brief credentials of author(s).....	7
6	Level of presentation.....	16
7	The readership and market for the book	16
1.	Comparison with competing books	17
8	Annex 1.....	19
8.1	CH 1: SURE-Farm approach to assess resilience of European farming systems.....	19
8.2	CH 2: The importance of risk management in European agriculture.....	20
8.3	CH 3: Demographic dimensions of sustainable and resilient farming systems.....	21
8.4	CH 4: Policies and farming system resilience	22
8.5	CH 5: The Role of Agricultural Practices for Resilience	27
8.6	CH 6: Dairy Farming in Flanders	28
8.7	CH 7: Resilience of Arable Farming in North-East Bulgaria	31
8.8	CH 8: German case study	32
8.9	CH 9: The extensive sheep farming system in Spain	35
8.10	CH 10: French case study	36
8.11	CH 11: The hazelnut farming system	38
8.12	CH 12: Dutch case study	40
8.13	CH 13: Resilience of family, fruit and vegetable farming system in Central-Eastern Poland 42	
8.14	CH 14: The small mixed farms in Nord-Est Romania.....	45
8.15	CH 15: High-value egg and broiler production in Sweden	46
8.16	CH 16 Managing risks to improve the resilience of the East of England’s arable farming sector 48	



8.17	CH 17: Integrated assessment of the resilience of farming systems and their delivery of private and public goods.....	49
8.18	CH 18: A resilience-enabling environment: principles, strategies and roadmaps.....	51
8.19	CH 19: Lessons learned from a co-creation approach: Virtual co-creation platform and face-to-face focus groups.	53
8.20	CH 20: Understanding and addressing the resilience crisis of Europe’s farming systems. A synthesis of the findings from the SURE-Farm project	55



1 Title and overview

	Resilient and sustainable EU-farming systems; exploring diversity and pathways
	250 pages
Publisher	Cambridge University Press
Editors	<ul style="list-style-type: none"> • Miranda M.P. Meuwissen, Wageningen University & Research, Netherlands • Peter H. Feindt, Humboldt-Universität zu Berlin, Germany • Alberto Garrido, Universidad Politécnica de Madrid, Spain • Erik Mathijs, KU Leuven, Belgium • Bárbara Soriano, Universidad Politécnica de Madrid, Spain • Julie Urquhart, CCRI, UK • Alisa Spiegel, Wageningen University & Research, Netherlands

2 Reasons for writing, proposed length and amount of illustration

By the time the edited book will be ready for submission, more than 40 researchers from 17 European Academic, Research and Consulting institutions will have collected a rich collection of data, information and facts about the future of European farming systems during 42 months of intensive work. The consortium filled the existing gaps in resilience of farming systems, namely its definition, components, as well as resilience-enhancing and -constraining attributes. Considering the challenges threatening the functioning of farms and farming systems, it is relevant to ask what factors hinder their resilience and how can policies and business' transformations improve their chances of survival. These resilience concerns need to be addressed with a focus on the regional context, in which farming systems operate because farms, service suppliers and many other supply chain actors are embedded in local environments and functions of agriculture. Lastly, the EU is discussing its future Common Agricultural Policy in a completely new environment caused by Brexit and budgetary tensions caused by COVID19. The volume should help inform policy-makers, farmers' associations, MPs in the EU and National Parliaments, and agents and stakeholders upstream and downstream the agri-food value chain.



The volume puts together a collection of coordinated essays on farming systems resilience, distinguishing between the three resilience capacities — robustness, adaptability, and transformability — with a special focus on risk management strategies, farm demographics, governance, and agricultural practices. Building on a diversity of methods, questions and case studies considered in the SURE-Farm EU project, the volume’s goal is to provide the state of art of resilience assessment in context of European farming systems, including major challenges, future scenarios, and potential pathways towards more resilient farming systems in Europe. The policy and business perspective includes the roles and strategies of stakeholders in enhancing the three resilience capacities i.a. developed via unique co-creation research..

The book will have 250 pages and 20 chapters: 9 chapters of about 15 pages each, and 11 chapters of about 10 pages each. The book will contain a maximum of 50 tables and 50 figures.

3 Intended completion date

March 31st, 2020

4 General overall account of content of book, list of chapters and indication of content of each chapter

The table summarises the structure of the book, and Annex 1 contains the list of abstracts of chapters 1-5, and 17-20. Chapters 6-16 are devoted to each of the 11 case studies, and will all have a similar structure and goals.

		Leading author and co-authors
Ch1	SURE-Farm approach to assess resilience of European farming systems	Miranda Meuwissen , Peter Feindt, Erik Mathijs, Alfons Balmann, Ilkay Unay, Birgit Kopainsky, Sina Nitzko, Pytrik Reidsma
<i>Part I. Findings with regard to the key processes underlying resilience</i>		
Ch2	The importance of risk management in European agriculture	Robert Finger , Willemijn Vroege, Alisa Spiegel, Yann de Mey, Thomas Slijper, Marijn Poortvliet, Julie Urquhart, Mauro Vigani, Pip Nicholas-Davies, Bárbara Soriano, Alberto Garrido, Miranda Meuwissen, Simone Severini

Ch3	Demographic dimensions of sustainable and resilient farming systems	Alfons Balmann , Jo Bijttebier, Franziska Appel, Christine Pitson, Isabeau Coopmans, Erwin Wauters
Ch4	Policies and farming system resilience	Yannick Buitenhuis , Jeroen Candel, Katrien Termeer, Peter Feindt, Isabel Bardají, Isabeau Coopmans, Eewoud Lievens, Anna Martikainen, Erik Mathijs, Julie Urquhart, and Erwin Wauters
Ch5	The role of agricultural practices for resilience	Jasmine Black , Pytrik Reidsma , Julie Urquhart, Mauro Vigani, Wim Paas, Paul Courtney, Damian Maye, Franziska Appel, Camelia Gavrilescu, Vitaliy Krupin, Christèle Pineau, Saverio Senni, Bárbara Soriano, Gordana Tasevska, Erwin Wauters, Mariya Peneva
Part II. Case studies		
Ch6	Belgium	Isabeau Coopmans , Erik Mathijs, Jo Bijttebier, Erwin Wauters
Ch7	Bulgaria	Mariya Peneva
Ch8	Germany	Franziska Appel, Franziska Ollendorf
Ch9	Spain	Bárbara Soriano , Alberto Garrido, Daniele Bertolozzi-Caredio, Carolina San Martín, Isabel Bardají
Ch10	France	Francesco Accatino , Christèle Pineau, Corentin Pinsard, Delphine Neumeister, François Léger
Ch11	Italy	Simone Severini , Saverio Senni, Alessandro Sorrentino, Cinzia Zinnanti, Federico Antonioli
Ch12	Netherlands	Alisa Spiegel , Pytrik Reidsma, Yannick Buitenhuis, Thomas Slijper, Wim Paas, Yann de Mey, Peter Feindt, Jeroen Candel, Katrien Termeer, P. Marijn Poortvliet, Miranda Meuwissen
Ch13	Poland	Katarzyna Zawalińska , Piotr Gradziuk



Ch14	Romania	Camelia Gavrilesu , Monica Tudor
Ch15	Sweden	Gordana Manevska-Tasevska , Jens Rommel , Helena Hansson
Ch16	UK	Mauro Vigani , Julie Urquhart, Damian Maye, Pip Nicholas-Davies, Jasmine Black, Amr Khafagy, Robert Berry, Paul Courtney
<i>Part III. Impact evaluation and defining roadmaps to promote farming system resilience</i>		
Ch17	Integrated assessment of the resilience of farming systems and their delivery of private and public goods	Francesco Accatino , Wim Paas, Hugo Herrera, Corentin Pinsard, Simone Severini, Franziska Appel, Birgit Kopainsky, Katarzyna Bankowska, Jo Bijttebier, Camelia Gavrilesu, Amr Khafagy, Mariya Peneva, Gordana Manevska Tasevska, Franziska Ollendorf, Carolina San Martín Hernandez, Pytrik Reidsma
Ch18	A resilience-enabling environment: principles, strategies and roadmaps	Erwin Wauters , Jo Bijttebier, Miranda Meuwissen, Peter Feindt, Erik Mathijs
Ch19	Lessons learned from a co-creation approach: virtual co-creation platform and face-to-face focus groups	Bárbara Soriano , Isabel Bardají, Daniele Bertolozzi-Caredio, Yannick Buitenhuis, Jeroen Candell, Peter Feindt, Miranda Meuwissen, Wim Paas, Pytrik Reidsma, Carolina San Martín, Thomas Slijper, Alisa Spiegel, Alberto Garrido
Ch20	Synthesis	Peter F.

5 Brief credentials of author(s)

Editors:

Miranda M.P. **Meuwissen**, Wageningen University & Research, Netherlands

Miranda Meuwissen is professor of cost-effective risk management in food supply chains at the Business Economics group of Wageningen University and Research. Further details: <https://www.wur.nl/en/Persons/Miranda-prof.dr.ir.-MPM-Miranda-Meuwissen.htm>



Peter H. **Feindt**, Humboldt-Universität zu Berlin, Germany

Prof. Dr. Peter H. Feindt is head of the Agricultural and Food Policy Group at the Thuer-Institute for Agricultural and Horticultural Sciences, Humboldt-Universität zu Berlin, Germany. His research addresses a broad range of questions in agricultural and food policy, in particular links to environmental policy, sustainability transitions, the bioeconomy and the resilience of farming systems.

Alberto **Garrido**, Universidad Politécnica de Madrid, Spain

is professor of Agricultural Economics at the UPM and Vice-rector for Quality and Efficiency at UPM. His area of research focuses on the economic analysis of water resource management, including risk analysis and management, and the use of market mechanisms.

Erik **Mathijs**, KU Leuven, Belgium

Erik Mathijs is Professor of Agricultural and Resource Economics at KU Leuven. His research focuses on the practices, metrics and policies underpinning the transformation of the European agricultural and food system towards sustainability and resilience. He coordinated the FP7 project TRANSMANGO and the H2020 project SUFISA.

Bárbara **Soriano**, Universidad Politécnica de Madrid, Spain

Dr. Bárbara Soriano is an assistant professor at the agricultural economics, statistics and business administration group of Universidad Politécnica de Madrid. Her research focuses on agricultural risk management and resilience from a multi-stakeholder approach. She has expertise in empirical and quantitative methods in macroeconomic analysis of global food security.

Julie **Urquhart**, CCRI, UK

Dr Julie Urquhart is a Senior Research Fellow at the Countryside & Community Research Institute, University of Gloucestershire. She is an environmental social scientist with research interests in human-environment relationships, particularly relating to tree health, small-scale fisheries and farmer behaviour.

Alisa **Spiegel**, Wageningen University & Research, Netherlands

Dr. Alisa Spiegel is a postdoc at Business Economics Group of Wageningen University & Research, Netherlands. In her research, she focuses on risks and resilience in agriculture, risk management at farm and in farming systems, as well as decision making under uncertainty.



Chapter Authors:

Dr. Francesco **Accatino** is a researcher at the French National Institute for Agriculture, Food, and Environment. His main current research focuses on building models and indicator systems for analyzing trade-offs and synergies between agricultural production, ecosystem services and environmental impacts. His main background is modelling of social-ecological systems.

Dr. Federico **Antonioli** is a research assistant in the Department of Economics and Management at the University of Parma, Italy. His research is focused on agricultural economics and policy, particularly on the impact of policies on agricultural incomes, price transmission analysis, and technical efficiency of EU-farms.

Dr. Franziska **Appel** is research associate at the Leibniz Institute of Agricultural Development in Transition Economies (IAMO) in Halle (Saale), Germany. She is an expert in participatory agent-based modelling and analysis of agrarian structural change and agricultural policies. At IAMO she coordinates the further development of the agent-based model AgriPolIS.

Prof. Dr. Alfons **Balmann** is Director at the Leibniz Institute of Agricultural Development in Transition Economies (IAMO) in Halle (Saale), Germany and head of the department Structural Change. He is agricultural economist and works on agent-based modelling and analysis of structural change in agriculture and agricultural policies since 30 years.

Dr. Katarzyna **Bańkowska** is Assistant Professor at Department of Economic Modelling, Institute of Rural and Agriculture Development, Polish Academy of Sciences. Her fields are: Agri-environmental aspects of economic growth, Energy and climate policy, climate change and alternative energy sources, Food security and economic efficiency of farms, Greening of agricultural policy versus economics and organization of farms, Systems of biodiversity-friendly agricultural production, Rural development.

Isabel **Bardaj** is Professor of Agricultural Economics and Policy at the UPM and Director of CEIGRAM (Research Centre for the Management of Agricultural and Environmental Risks). She leads the Research Group of Agricultural Economics and Natural Resources Economics. Has more than 30 years of research experience focusing mostly on the analysis of Agricultural Policy and risk management.

Robert **Berry**, University of Gloucestershire, is an experienced GIS specialist and geodata scientist with a strong record of applying geographical information systems (GIS) in a wide range of environmental and social science research areas. His main research interests include the use of 3D landscape visualisation technology and participatory GIS in collaborative environmental



management, and the integration of qualitative data and quantitative data in GIS through the development of qualitative (QualGIS)/mixed-methods (MMGIS) approaches. Other interests relate to current projects at the CCRI and include measuring and mapping the regional economic resilience of farming in the UK, and developing GIS-based methods for valuing cultural ecosystems services.

Daniele **Bertolozzi Caredio** is a PhD student at Research Centre for the Management of Agricultural and Environmental Risk (CEIGRAM), Universidad Politécnica de Madrid. His research focuses on agricultural risk management and resilience of farming systems. He adopts mixed methodologies to carry on multidisciplinary investigation.

Dr. Ir. Jo **Bijttebier** (F) is a senior researcher at the research group Agricultural and Farm development within the Social Science Unit. She builds her expertise on learning processes with stakeholders striving for sustainable agriculture, including topics as knowledge exchange, co-creation of innovation and systems thinking.

Dr Jasmine **Black** is a Research Assistant at the Countryside & Community Research Institute, University of Gloucestershire. She has a background in soil carbon in the tropics (PhD) and now undertakes social science in farming, forestry and fisheries with the arts, including Socially-Engaged Arts and Practice. She has research interests in socio-ecological landscape management. She is also a theatrical storyteller and illustrator.

Yannick **Buitenhuis** is a PhD candidate at the Public Administration and Policy Group of Wageningen University, the Netherlands. His research focuses on expanding our understanding of how public policies, such as the EU's Common Agricultural Policy (CAP), influence the resilience and sustainability of farming systems. With his research, he aims to formulate suggestions for policy improvements that support complex system to deal with current and future resilience challenges.

Dr. Jeroen **Candel** is an assistant professor at the Public Administration and Policy group of Wageningen University, the Netherlands. His research deals with the question of how governments can develop more effective and legitimate responses to deal with the pressing challenges that characterize modern-day food systems. Beside his research, he frequently advises Dutch and EU policymakers about possibilities for improved food governance.

Isabeau **Coopmans** is conducting her PhD research on the resilience of the Flemish dairy sector at the Institute for Agricultural, Food and Fisheries Research (ILVO) in Flanders, Belgium. She is also associated with the Department of Bioeconomics at the University of Leuven, Belgium. Her main



research interests are farm generational renewal, risk and resilience in agriculture, farmer adaptive capacity, and human behaviour and decision-making.

Dr. Paul **Courtney** is Professor of Social Economy at the CCRI, University of Gloucestershire, UK. Paul's research coheres around Social Value, a lens through which he is currently exploring the relationship between health, well-being, inclusivity and socio-economic life in rural areas.

Robert **Finger** is professor of Agricultural Economics and Policy at ETH Zurich (Switzerland). He holds a PhD in Agricultural Economics from ETH Zurich. Further Details <https://sites.google.com/site/fingerrobert/home>

Dr. Camelia Gavrilescu is senior researcher and associate professor in agri-food economics and policies at the Institute of Agricultural Economics of the Romanian Academy. Her main areas of expertise include sustainable rural development, agricultural and rural development policies, farm economic and ecologic performance analysis, agri-food trade and competitiveness.

Dr. Piotr **Gradziuk** is an associate professor at the Institute of Rural and Agricultural Development Polish Academy of Sciences (IRWiR PAN), Poland. He specializes and has a practical experience in analyses on efficiency of using renewable energy sources, patterns of socio-economic and institutional transformations in rural areas, as well as in efficiency and productivity of farms and farming systems.

Dr Helena **Hansson** is a professor of Agricultural and Food Economics at SLU. She has so far focused on farm management, farmer decision-making and the economics of certain strategic choices, and production economic analyses related to the efficiency of farm production. She has worked extensively with interdisciplinary approaches where behavioral models have been used to explain decision-making, or to explain economic behavior and economic performance.

Dr. Hugo **Herrera** received a Msc. from the European Master in System Dynamics in 2015 He completed his PhD System Dynamics in the University of Bergen in 2018. Hugo is passionate about system dynamics and facilitated modelling approaches and applies them in a variety of contexts and projects from workforce planning in the UK to food systems in Europe, to wildlife conservation in Africa. Hugo is affiliated to The University of Bergen and is currently part of the SURE Farm project.

Dr. Amr **Khafagy** is a Research Assistant at the Countryside and Community Research Institute at the University of Gloucestershire, UK. He is an economist with research interests in applied econometrics, agricultural productivity, finance and development, and cooperative economics.



Dr. Birgit **Kopainsky** is Professor in System Dynamics at The University of Bergen, Norway, and the current president of the System Dynamics Society. In her research, Birgit explores the role that system dynamics analysis and modelling techniques play in facilitating transformation processes in social-ecological systems, such as the transition towards sustainable and resilient agri-food systems on local, national and international levels. Birgit works both in Europe and in several sub-Saharan African countries and is currently part of the SURE Farm project.

Dr Vitaliy **Krupin** is an assistant professor in the Economic Modelling Department at Institute of Rural and Agricultural Development, Polish Academy of Sciences (IRWiR PAN). Majoring in international economics and trade he is also involved in research concerning rural development, agricultural and environmental economics (in particular dealing with assessment of agricultural impact upon climate change through greenhouse gas emissions).

Dr. François **Léger** is professor at AgroParisTech, Paris. His research and teaching activities focus on the issue of socio-ecological transition of agricultural and food systems, with particular attention to the interactions between social, economic, and ecological dimensions. Its current work focuses on "radical" forms of ecologizing systems, combining technical, organizational, commercial and social dimensions.

Eewoud **Lievens** is a PhD Candidate at the Division of Bioeconomics, Department of Earth and Environmental Sciences, KU Leuven. His research focuses on institutional arrangements for the marketing of agricultural products, examining in particular how collective action and chain coordination are shaped by market and regulatory conditions.

Dr Gordana **Manevska-Tasevska** is a researcher and policy analyst at the Policy Analysis Unit of the Department of Economics at the Swedish University of Agricultural Sciences, Sweden. Her research field is the performance analysis of primary production in the agricultural sector including, economic/ecological/social performance in terms of efficiency, acceptance of agro-ecological approaches, sustainability- and resilience analysis, and its interplay with agricultural policy.

Anna **Martikainen** – PhD student at the Institute of Rural and Agricultural Development, Polish Academy of Sciences. She acquired master degrees in spatial development and in psychology at the University of Warsaw. Her current research interests concern mostly agricultural policy, particularly its relation with sustainability of farming, and regional innovation policy.

Dr. Damian **Maye** is Professor of Agri-Food Studies at the Countryside and Community Research Institute, University of Gloucestershire, UK. His research focuses on the sustainability, resilience, ethics and governance of global, European and UK agri-food systems.



Dr. Yann de **Mey** is assistant professor of agricultural risk analysis at the Business Economics group of Wageningen University & Research. He holds a PhD in Applied Business Economics from Hasselt University, Belgium. Further details: <https://scholar.google.be/citations?user=0ehbA54AAAAJ&hl=en>

Delphine **Neumeister** is a project manager with a Master in Agricultural Economy and Development. She is specialized in network management, advisory approaches and social approaches of farmers. She coordinated the Charter for Good Agricultural Practices in Cattle Production for 5 years. She contributed to applied research and innovation projects on the CAP reforms, on organic dairy farming and on the development of PDOs in France.

Dr Pip **Nicholas-Davies** is a Principle Investigator and Lecturer at the Institute of Biological Environmental and Rural Sciences at Aberystwyth University. Further details: <https://www.aber.ac.uk/en/ibers/staff-profiles/listing/profile/pkn/>

Franziska **Ollendorf** is a research associate at the Leibniz Institute of Agricultural Development in Transition Economies (IAMO), Germany, and a doctoral candidate at the universities of Giessen, Germany, and Toulouse, France. Her current research interests include CSR in global value chains, the political economy of cocoa, and rural change and livelihood systems.

Wim **Paas** is a PhD-candidate at the Plant Production Systems group and the Business Economics group of Wageningen University, the Netherlands. In his research, he studies the sustainability and resilience of agricultural systems through an interdisciplinary lens. He is keen on applying quantitative and qualitative research methods in complementary ways to adequately capture social, environmental and economic dimensions of system performance and dynamics.

Dr. Mariya **Peneva** is an associate professor in the Department of Natural Resource Economics, UNWE, Sofia, Bulgaria in the field of Agricultural Economics, Policy and Natural Resources. She is also involved in projects working on the major issues of present interest, namely the interlinkages between agriculture, ecosystems, innovations and possible solutions for more resilient farming systems.

Christèle **Pineau** is a project leader in the Department of agricultural economics of the French Livestock institute. She works at the Auvergne regional office in France (French suckling cradle of Charolaise, Aubrac and Salers breeds). Her research topic focuses on understanding beef livestock systems and business management of agricultural holdings. She also studied best practices strategies of mountain farming and income improvement tools for livestock farmers.



Corentin **Pinsard** is a PhD-candidate at the French National Institute for Agriculture, Food, and Environment. In his research, he models the resilience of agricultural systems to resource constraints through the analysis of nutrient fluxes on a regional scale. His main background is the modelling of mass and energy transport phenomena in physics.

Dr Marijn **Poortvliet** is associate professor of risk communication at Wageningen University, the Netherlands. He holds a PhD in Social & Organizational Psychology from the University of Groningen, the Netherlands. Further details: <https://www.wur.nl/en/Persons/Marijn-dr.-PM-Marijn-Poortvliet.htm>

Christine **Pitson** is a PhD Candidate at the Leibniz Institute of Agricultural Development in Transition Economies (IAMO) in Halle (Saale), Germany. She focuses on the economics of sustainable transitions. Within the SURE-Farm project she employs mixed-method approaches to analyze the effects of labour availability and related policies on European agricultural regions.

Dr. Pytrik **Reidsma** is an associate professor at the Plant Production group of Wageningen University, the Netherlands. Her research focuses on sustainability and resilience of farming systems. She has expertise in integrated assessment, using quantitative and qualitative methods to assess impacts of various drivers on all dimensions of sustainable development at multiple scales (from field to global).

Dr Jens **Rommel** is a researcher at the Department of Economics at SLU. His primary research fields are experimental economics, behavioural economics, economic psychology, and agricultural economics. He studies consumers' and farmers' decision-making in the context of agriculture and the environment.

Dr. Carolina **San Martín** is a postdoc researcher at Research Centre for the Management of Agricultural and Environmental Risk (CEIGRAM), Universidad Politécnica de Madrid. Her main current research focuses on the study of farming systems resilience. Her background is related to the weed ecology and the integrated management of weeds.

Dr. Saverio **Senni** is associate professor at the DAFNE Department of the University of Tuscia (Italy). His research is focused on rural development economics and policies, on multifunctional agriculture and on social farming.

Dr. Simone **Severini** is an associate professor at the Department DAFNE of the University of Tuscia, Italy. He has more than 25 years of experience in the field of agricultural economics and policy addressing questions related to the analyses of farm income, risk management, farming system resilience and agricultural policy evaluation at the EU level.



Thomas **Slijper** is a PhD candidate at the Business Economics group and the Strategic Communication group of Wageningen University, the Netherlands. He studies how European farmers deal with several interrelated risks and under which conditions risk management decisions have the potential to contribute to farm resilience.

Dr. Alessandro **Sorrentino** is full professor of “Agri-food System Economics” and Coordinator of the Doctoral Program in “Economics, Management and Quantitative Methods” at Tuscia University (Viterbo-Italy). He has published extensively in the field of the agricultural markets and income policies, food value chain analysis and quality promotion.

Dr. Katrien **Termeer** is full Professor of Public Administration and Policy at Wageningen University. Her research addresses the governance of wicked problems in the interrelated fields of food, agriculture, climate, water and energy. She focuses on transformational change through accumulating small wins.

Dr. Monica-Mihaela **Tudor** is senior researcher at the Institute of Agricultural Economics of the Romanian Academy. Her main fields of expertise are: socio-economic transformation of rural areas; rural entrepreneurship; farming systems analysis; research and support-action projects in the fields of rural development; development and monitoring of rural development strategies and regional plans; rural networking among farmers, public authorities and local actors.

Dr Mauro **Vigani** is Senior Research Fellow at the Countryside and Community Research Institute of the University of Gloucestershire, UK. He holds a PhD in Agricultural Economics from the University of Milan, Italy. Further Details: <http://www.ccri.ac.uk/mauro-vigani/>

Willemijn **Vroege** is doctoral student in the Agricultural Economics and Policy group at ETH Zurich (Switzerland).

Dr. Erwin **Wauters** is senior researcher at the Social Sciences Unit of the Flanders research institute for agriculture, fisheries and food, Belgium. He is an agricultural economist whose main aim is to understand how institutions, regulation, markets and social aspects determine farming systems and their performance, mainly in the livestock sectors.

Dr. Katarzyna **Zawalińska** is an associate professor at the Institute of Rural and Agricultural Development Polish Academy of Sciences (IRWiR PAN), Poland. Her research focuses on modelling the economic impact and evaluation of agricultural and rural development policies at the regional, national and EU level, using quantitative (CGE models, econometrics) and qualitative methods.



Cinzia **Zinnanti** is an assistant research at the Department DAFNE of the University of Tuscia, Italy. Her research is focused on agricultural economics and risk analysis and management in agriculture.

6 Level of presentation

All chapters build on various research methods and empirical settings stemming from the SURE-Farm project. Their style and level will target audience beyond academia. Keeping a scholar writing style, all chapters will aim at summarising the outstanding results from the project, offering the readers a complete understanding of used methods, collected data, outcomes and policy implications.

7 The readership and market for the book

The book aims to attract readers from the following disciplines:

- Agricultural economics and policy
- Natural resource economics and policy
- Business economics and management
- Livestock science
- Plant science
- Political science
- Geography
- Sociology
- System dynamics
- Co-creating experts

In terms of professional areas and positions, the book will be of interest to:

- Officers at EU, National and Regional administrations with competencies in agriculture and rural development
- EU and National Parliaments MPs interested in Agricultural and Rural Legislation



- NGOs focusing on agricultural and rural areas
- European farmers
- Other stakeholders in farming systems: rural banks, agricultural insurers, cooperatives, food processors and marketing agents, agricultural supply firms (seeds, services, chemical industry, technology firms...)

1. Comparison with competing books

To our knowledge, existing books on resilience in agriculture can be categorized as follows:

- **Focusing on resilience of a single farm**

e.g., Foley, M. (2019). *Farming for the Long Haul: Resilience and the Lost Art of Agricultural Inventiveness*. Chelsea Green Publishing.

- **Focusing on a particular challenge**

e.g., Bager, S. L., Dinesh, D., Olesen, A. S., Andersen, S. P., Eriksen, S. L., & Friis, A. (2017). *Scaling-Up Climate Action in Agriculture: Identifying Successes and Overcoming Challenges*. Nordic Council of Ministers.

Lengnick, L. (2014). *Resilient agriculture: Cultivating food systems for a changing climate*. New Society Publishers.

- **Considering resilience in agriculture from the perspective of ecosystems**

e.g., Gardner, S. M., Ramsden, S. J., & Hails, R. S. (Eds.). (2019). *Agricultural Resilience*. Cambridge University Press

- **Focusing on a single resilience capacity**

e.g., Dubey, P. K., Singh, G. S., & Abhilash, P. C. (2019). *Adaptive agricultural practices: Building resilience in a changing climate*. Springer.

- **Focusing on other regions than Europe**

e.g., Noble, K., Dennis, T., & Larkins, S. (2019). *Agriculture and Resilience in Australia's North: A Lived Experience*. Springer.

To this end, our book builds upon existing literature and provides a unique scope operating at the level of farming systems, considering multiple challenges, and distinguishing between the three resilience capacities.



8 Annex 1

8.1 CH 1: SURE-Farm approach to assess resilience of European farming systems

Miranda Meuwissen, Peter Feindt, Erik Mathijs, Alfons Balmann, Ilkay Unay, Birgit Kopainsky, Sina Nitzko, Pytrik Reidsma

Abstract

Due to a range of shocks and stresses, such as sudden changes in access to markets and increasing controversy about agricultural practices, there are increasing concerns about the resilience of farming systems in Europe. These resilience concerns need to be addressed with a focus on the regional context, in which farming systems operate because farms, service suppliers and many other supply chain actors are embedded in local environments and functions of agriculture. This chapter outlines the SURE-Farm approach to assess resilience of farming systems. We also use selected project outcomes to illustrate the added value of mixed methods to get a more comprehensive picture of resilience. The chapter also includes the outline and logic of the following chapters.

Outline of chapter

1. The SURE-Farm approach.
 - Three capacities are central: robustness, adaptability, transformability.
 - Local context matters: eleven case study farming systems.
 - Farming systems and a new farm typology.
 - Past trajectories and future scenarios.
2. The value of mixed methods to get a more comprehensive picture of resilience.
 - Quantitative analyses.
 - Qualitative analyses.
 - Added insights from a mixed approach.
3. Outline of this book.
 - Building blocks (agricultural practices, risk management, farm demographics, policy).



- Case study chapters.
- Towards a synthesis.
- Glossary of methods.

8.2 CH 2: The importance of risk management in European agriculture

Robert Finger, Willemijn Vroege, Alisa Spiegel, Yann de Mey, Thomas Slijper, Marijn Poortvliet, Julie Urquhart, Mauro Vigani, Pip Nicholas-Davies, Bárbara Soriano, Alberto Garrido

Abstract:

In this chapter, we aim to provide novel conceptual and empirical insights and reflections on risk management in European agriculture. Moreover, we aim to discuss future pathways for agricultural risk management and to provide policy and industry recommendations.

Based on a framework on farmers' risk management and its relevance for the European agricultural sector and present findings from various case studies. More specifically, results from a large-scale survey among European farmers on their risk perception and risk management decisions as well as qualitative work on pathways, limits and prospects of farm-level risk management are presented. Furthermore, we present findings for potential risk management improvements based on cooperation between farmers and farming system actors. Moreover, this chapter presents and discusses the role of innovative insurance solutions.

Finally, we present an outlook on the future pathways of risk management in European agriculture. We reflect on farm-level risk management with stakeholders perspectives obtained in co-creation platforms and focus groups. Moreover, we reflect on the implications of current and future risk management for the resilience of European agriculture and provide policy and industry recommendations.

Structure of the chapter

- Introduction
- A framework: farm-level risk management
- Insights in risk perception and current risk management in European agriculture
- Future pathways of improved risk management in European agriculture
- The contribution of risk management to resilience in European agriculture



- Conclusion

8.3 CH 3: Demographic dimensions of sustainable and resilient farming systems

Alfons Balmann, Jo Bijttebier, Franziska Appel, Christine Pitson, Isabeau Coopmans, Erwin Wauters

Abstract

Since a couple of decades, the agricultural sector in the EU countries declines in terms of contribution to the GDP and employment rate compared to other sectors. Nevertheless, in most EU member states the share of agricultural employment is still substantially higher than its share in GDP which implies rather low average incomes. Currently, the agricultural sector is affected by new demographic challenges. The inverse age pyramid of farmers as well as of society in general causes for many regions within the EU the situation that a high share of farmers and the working population are approaching retirement age while a rather small number of young people will enter the job market. Accordingly, the farming sector will have to compete in a much higher intensity with other sectors and regions, particularly urban areas, which offer often substantially better income and career perspectives as well as living conditions due to more attractive infrastructures. This overlaps with the digitalisation of agriculture and society. It can be expected that this process will particularly increase the demand for skilled labour.

Aside from the specific demographic and economic challenges, EU agriculture is confronted with changing societal expectations on the private and public goods which are provided. Indeed, it is not just expected that agriculture provides sufficient food of high quality but also ensures high environmental standards, mitigates greenhouse gases, protects biodiversity and landscapes, increases animal welfare, etc. These expectations led to increasing protests and criticisms of citizens, NGOs and media and caused a number of policy interventions. In recent time, these criticisms and political interventions raised increasing frustrations and concerns among farmers about their own acceptance as well as their economic perspectives. In some countries, this resulted in mass protests of farmers.

These demographic, economic, political and social trends raise the questions whether and how agricultural systems can provide adequate amounts and qualities of private and public goods. To answer these questions, this chapter will provide assessments on the general demographic trends and requirements of modern farming systems, the expectations and concerns of farmers and particularly the young generation, and moreover the adaptive capacities of the farming system through structural adjustments. The chapter concludes with recommendations for policy makers and farmers.



Keywords: Demography; Farm succession; Skilled hired labour; Structural change; Resilience; Farming systems; Common Agricultural Policy

Outline

1. Introduction

[p.1-2]

- Motivation and structure

2. Demographic and technological trends and challenges

[pp. 2-5]

- Demographic trends in agriculture and society
- Technological trends and implications for employment
- Starting point D3.1

3. Expectations and concerns of farmers and the young generation

[pp. 6-9]

- Expectations of farmers
- Expectations of the young generation
- Starting point D3.2

4. Adaptive capacities of structural change in selected regions

[p. 10-13]

- Comparisons of simulations with AgriPoliS for Flanders and Altmark
- Starting points and article for EuroChoices D3.5

5. Conclusions

[p. 14-15]

8.4 CH 4: Policies and farming system resilience

Yannick Buitenhuis, Jeroen Candell, Katrien Termeer, Peter Feindt, Isabel Bardají, Isabeau Coopmans, Eewoud Lievens, Anna Martikainen, Erik Mathijs, Julie Urquhart, and Erwin Wauters

Abstract



The European Commission considered improving the resilience of Europe's farming systems as one of the core ambitions of the Common Agricultural Policy (CAP) post-2020. Improving resilience is ought to help farming systems to manage and respond to challenges, while maintaining their essential functions, like producing food, providing employment and income, and preserving rural areas and biodiversity. Despite an increasing attention for the concept of resilience in (agricultural) policymaking circles, less is known about how public policies can effectively enable the resilience of farming systems. One way of determining a policy's effectiveness is through a top-down policy analysis, using specific policy outputs as a starting point and assessing the degree of goal attainment, i.e. the match between policy objectives and outcomes. However, even if a policy appears to support resilience, this does not automatically imply that the target population experiences it that way. Moreover, it is possible that multiple implemented policies interact and share interdependencies, leading to synergies or trade-offs that affect resilience at the level of the farming system. This indicates a need to understand too what degree intended outcomes of a policy for improving resilience correspond with perceived outcomes (and preferences) of involved farming system actors. This chapter, therefore, sets out a bottom-up approach for policy analysis to understand how farming system actors perceive whether and how policies enable or constrain the resilience of their respective farming system. The research approach is as follows. First, bottom-up analyses of the CAP and relevant adjacent policies in five European farming systems were conducted by using in-depth interviews with a broad range of regional policymakers and stakeholders (e.g. farmers and farmers' representatives, agricultural advisors, representatives of environmental NGOs). Subsequently, the findings of the preliminary analyses were reviewed in regional focus groups attended by policymakers and stakeholders. The chapter ends with a comparative analysis, revealing key lessons for public policy and practice on how to bridge the gap between policymaking and target population's perspective for improving public policies' effectiveness for supporting farming systems' resilience.

Structure

1. Introduction

[p.1]

- Resilience is increasingly getting more attention in both policy sciences and policy making circles (e.g. agricultural policy making, more particularly the European Commission's ambition that the post-2020 CAP should deliver on ensuring a more resilient agricultural sector in Europe).

- Despite an increasing attention for the concept of resilience in (agricultural) policymaking circles, less is known about how public policies can effectively enable the resilience of farming systems.
- Policies claim to be aiming at supporting the resilience of farming systems. However, the intention with which policies are designed, is not always how they work out in real life. This means that if a policy appears to enable resilience, this not automatically implies that the target population experience the policy to contribute to a resilience-enabling environment.
- Moreover, it is possible that multiple implemented policies interact and share interdependencies, leading to synergies or trade-offs that affect resilience at the level of the farming system.
- This indicates a need to understand too what degree intended outcomes of a policy for improving resilience correspond with perceived outcomes (and preferences) of involved farming system actors.
- **Research question:** How do target populations, i.e. farming system actors, experience and assess whether and how policies enable or constrain the resilience of their respective farming system?
- The **goal** of Chapter 4 is to set out a comparative analysis of five bottom-up policy analyses of EU farming systems. The bottom-up policy analyses are based on in-depth interviews with farming system actors and were validated through regional (farming system-specific) stakeholder checks.

2. Why a bottom-up approach to policy analysis?

[p. 2-3]

2.1. Explain the relevancy of a bottom-up approach to policy analysis.

- In contrast to a top-down policy analysis that takes specific policy outputs as a starting point and assesses the degree of goal attainment (i.e. the match between policy objectives and outcomes) and potentially other effects, **a bottom-up policy analysis** starts from the perspective of those who are affected by a range of different policies.
- Why is this important to understand? Such an analysis could reveal insights into possible ways of improving the effectiveness of the intended aims of policies. In our case: policies aiming at supporting resilience of farming systems.



- 2.2. Explain methodological steps to the bottom-up analyses
 - Identifying farming system cases.
 - Semi-structured, in-depth interviews – using interview guides organised along six topics.
 - Coding and analysis of interviews (using code book)
 - Regional stakeholder check for validating findings.
3. The five bottom-up analyses: main findings
[pp. 4-12]
 - 3.1. Dairy farming in Flanders (Belgium)
[pp. 4-5]
 - Short introduction farming system – main characteristics and challenges (*max. 1 paragraph*)
 - Presenting results interview analysis – focus on resilience-policy relation
 - Use quotes from interviews and stakeholder checks as evidence
 - 3.2. Intensive arable farming in De Veenkoloniën (the Netherlands)
[pp. 6-7]
 - Short introduction farming system - main characteristics and challenges (*max. 1 paragraph*)
 - Presenting results interview analysis – focus on resilience-policy relation
 - Use quotes from interviews and stakeholder checks as evidence
 - 3.3. Private fruit and vegetable farming in Mazovia and Podlasie (Poland)
[pp. 8-9]
 - Short introduction farming system - main characteristics and challenges (*max. 1 paragraph*)
 - Presenting results interview analysis – focus on resilience-policy relation

- Use quotes from interviews and stakeholder checks as evidence
- 3.4. Extensive sheep grazing in Hoya de Huesca (Spain)
[pp. 10-11]
 - Short introduction farming system - main characteristics and challenges (*max. 1 paragraph*)
 - Presenting results interview analysis – focus on resilience-policy relation
 - Use quotes from interviews and stakeholder checks as evidence
- 3.5. Arable farming in East Anglia (United Kingdom)
[pp. 12-13]
 - Short introduction farming system - main characteristics and challenges (*max. 1 paragraph*). Different approach due to Brexit.
 - Presenting results interview analysis – focus on resilience-policy relation
 - Use quotes from interviews and stakeholder checks as evidence
- 4. Synthesis and reflection on findings
[p. 14]
 - Discussion of the key findings with attention for similarities and differences.
- 5. Conclusion
[p. 15]
 - Restate research question and provide answer
 - Key summary of explorative analytical findings
 - Lessons learned for public policy and practice - how to bridge the gap between public policy making and the perspective of target populations, i.e. farming system actors.
 - For instance, policies provide an environment that can enable resilience, but it is then up to the farming system actors to use this improved capacity. Farming system actors can grasp opportunities or mess it up or succeed despite bad policies.



- Reflection on usefulness of resilience concept to engage stakeholders in bottom-up analysis

8.5 CH 5: The Role of Agricultural Practices for Resilience

Jasmine Black, Pytrik Reidsma, Julie Urquhart, Mauro Vigani, Wim Paas, Paul Courtney, Damian Maye, Franziska Appel, Camelia Gavrilescu, Vitaliy Krupin, Christèle Pineau, Saverio Senni, Bárbara Soriano, Gordana Tasevska, Erwin Wauters

Abstract

Current challenges affecting the resilience of agricultural practices encompass environmental, social, economic and institutional factors. These include climate change, access to knowledge exchange as well as input and equipment costs. Agricultural practices discussed in this chapter include various scales, from individual to whole farm system practices.

Agricultural practices have changed over time, perhaps most notably the increase in chemical inputs and mechanisation after WWII to improve labour efficiency and intensification of food production. Recognition of the environmental and ecological impacts of these farming practices has led to increased calls for developing new, smarter agricultural practices that lessen environmental impact. Various terminology is being used to assess the resulting diversity of agricultural practices and where they lie on the spectrum of sustainability, including organic, conventional, conservation and agroecological, to name a few. Therond et al. (2017) developed a useful framework which describes the relationships between bio-technical functioning of farms against their socio-economic contexts. This chapter adopts this framework in order to assess the SURE-Farm case studies along the sustainability spectrum to analyse the resilience of their practices. Therond et al.'s framework asserts that the sustainability of agricultural practices can build towards a farm's resilience through improving its environmental health (e.g. soil, water, biodiversity) and also has the potential to positively impact social and economic resilience.

The SURE-Farm project provides the opportunity to assess several different farming systems across Europe in relation to the role of their agricultural practices for resilience. Past and current agricultural practices of each case study have been assessed in terms of their resilience, and those which could increase resilience in the future have been considered. These are discussed within each case study and highlight how their farm types may move towards more sustainable practices environmentally, socially and economically. Whereas in the past the focus has been on improving the economics (production) of farming, the emphasis here is on environmental and social innovations to tackle the urgent issues of climate change, soil and biodiversity degradation. These



not only include the practices themselves, but also the access to them via knowledge exchange and an enabling context.

Keywords: Resilience, sustainability, agricultural practices, farm systems, environment

Outline

1. Introduction / literature review:
 - setting the scene - challenges affecting the resilience of agricultural practices,
 - framework adapted from literature to view / categorize SURE-Farm case study (CS) agricultural practices within
2. SURE-Farm case studies:
 - current agricultural practices (based on Fopia 1 and information provided for WP1 on farm typology),
 - where they lie within the above framework (potential for categorizing)
 - their challenges for resilience
3. Innovation in resilient agricultural practices:
 - Fopia 2 future strategies relating to agricultural practices from each CS
 - Discussion of innovations from further afield
4. Conclusions: Ways to move forward with agricultural practice resilience in light of the above

We will use the SURE-Farm CS's as a basis for the chapter, whilst referring to the literature and other EU Horizon 2020 projects which have looked more specifically at agricultural practices.

8.6 CH 6: Dairy Farming in Flanders

Jo Bijttebier, Erik Mathijs, Erwin Wauters, Isabeau Coopmans.

Abstract

Dairy farms account for about twelve percent of all farms in Flanders. Despite an ongoing decrease in number of dairy farms, the total milk produced has been rising at a rapid pace since the milk quota were abolished – with a production increase of 25 percent in 2018 compared to



2014. The sector is mostly intensifying as more and more dairy farmers make structural investments to expand, applying a strategy of economies of scale; while boosting their production efficiency e.g. by increasing stocking rates, more cows per worker or land area used, more units of milk per labour input and more milk per cow. This increase in capital intensity in practice often comes with higher financial risks. Indeed, most dairy farms are family farms under legal sole ownership. At the same time, the number of dairy farmers who convert to organic farm practices also showed a spectacular increase in the last couple of years, even though in absolute numbers, they are still a small minority. There is also a significant share of dairy farmers who broaden their business by e.g. providing holiday accommodation or selling their own produced dairy products directly to the consumer.

The biophysical and climatic conditions in Flanders are relatively beneficial for milk production. However, weather events elsewhere can impact milk and feed prices, thus making Flemish dairy farmers vulnerable to price volatility both on input as output side. Moreover, limitations regarding land availability and accessibility and stringent environmental and permit regulations hinder dairy farmers from fully taking advantage of a high global demand for dairy. Further, the essential role of milk in the human diet is increasingly being questioned by the public in the context of the notorious contribution of animal husbandry to climate change.

Based on the findings of a list of both quantitative and qualitative research activities conducted in the SURE-Farm project, this chapter elaborates on the above economic, institutional, environmental and social challenges and opportunities that the Flemish dairy sector has faced and will most likely face in the future, and what strategies it has applied and can apply in the future to prepare for withstanding or anticipating future disturbances. Building on the concepts of robustness, adaptability and transformability, the general resilience of the Flemish dairy sector is explored.

Outline

1. Introduction

= Short context description: agriculture in the region of Flanders (main characteristics)

- geographical location, biophysical and climatic conditions
- short historical context of agriculture in Flanders
- quick vision on current agriculture in Flanders (main agricultural sectors, employment in agriculture, etc.)



2. The Flemish dairy sector: a brief history

= description of structural and demographic development during the last decades; incl. a note on pre and post quotum dairy farming

3. The dairy sector in Flanders today (current situation)

the dairy farming system in Flanders: who are the most important actors

– Main challenges

- Farmers income: low margins, price volatility
- Farmers and farm household well-being: high labour pressure, contested life quality
- Low land availability, high competition for land
- changing societal concerns
- environmental challenges: low water quality, climate change: heat stress (cows suffer – link with societal concerns), droughts (less forage production, GHG emissions and loss of biodiversity)
- Complex regulations, that are mainly a consequence of other challenges (dairy farming puts pressure on the environment and because of this, regulations are put in place)

– Current strategies

- Strategies at farm level: (1) economies of scale/efficiency by volume; (2) economies of scope/efficiency by variety
- Resilience of the dairy farming system
- Collective strategies e.g. branch organisation
- Currently underdeveloped strategies?
- Role of other actors (outside the system): e.g. strategies of retail and processing industry impact the position of Belgian dairy in an international market



4. A look towards the future:

- Expected challenges in the future
 - Farm generational renewal: how will it further evolve?
 - Role of dairy in human diets taking into account the environmental impact of dairy products?
 - Role of plant-based milk alternatives in future ‘dairy’ consumption?
 - importance of the international context (lot of export, but import as well), while providing opportunities, also vulnerability of the sector (strongly dependent on shocks at the global level)
- Future strategies towards collective resilience

5. Conclusion

8.7 CH 7: Resilience of Arable Farming in North-East Bulgaria

Mariya Peneva

Abstract

This chapter focuses on the results and analyses concerning resilience of specialized arable farming system (based on the large-scale grain production) in North-East region of Bulgaria. The analyzed farming system consists mainly of large-scale grain producers (both corporate and family) and the other actors which affect and are affected by the grain farms. The study is based on the SUREFarm methodology and the data are collected via series of interviews, workshops, focus groups and surveys conducted with a range of stakeholders from the farming system.

Crop production is important and has a long tradition in Bulgaria. North-East Bulgaria is known as “the granary of country” and is of crucial importance. The arable farming capacity in the region results from the natural conditions and is defined by the historical developments and transformations which have taken place last decades. But there are many other challenges and opportunities recognized by all the stakeholders which affect the system as well.

Thus, the overall objective is to explore how the past, current and most probable future challenges (economic, institutional, environmental and social) and opportunities shaped, continue to influence and will define farming system resilience. The general resilience is studied based on the concepts of current and future capacities of the farming system, namely robustness, adaptability



and transformability, and factors enhancing each capacity as well as the applied and possible strategies achieving that.

The arable farming system in North-East Bulgaria operating under the current circumstances shows relatively high capacity to keep status quo and proved to be at a relatively low level of transformation. This results also from the current policy configurations, which foster robustness and neglect transformability, as adaptability receives stronger support through policy goals rather than policy instruments. But the single actor understands the need to adapt their decisions according to the new realities and demonstrates adaptability in their efforts to overcome challenges and utilize the opportunities which affects the overall system resilience.

Additionally, the findings show that the system current stage in the adaptive cycle is in the conservation phase, based on the past developments, present situation and the future expectations concerning the processes of risk management, governance, demographics and agricultural production.

The key lessons learnt and recommendations on the possibilities to ensure future resilience of the arable farming system in North-East Bulgaria are presented in concluding part of the chapter.

Outline

1. **Introduction:** description of main characteristics of the agriculture in the North-East region of Bulgaria and importance of arable farming (large-scale grain production) as well as historical developments led to its current state (structural and demographic developments).
2. **Current resilience of crop production in North-East Bulgaria:** characteristics of the current state (actors, challenges, resilience attributes and functions of the system) explaining the position on the adaptive cycle in the conservation phase.
3. **Strategies for crop production farming system resilience:** presents and discuss current and future strategies considering: 1) resilience capacities and 2) four dimensions of adaptive cycle: demographics, agricultural practices, risk management and policies.
4. **Conclusions:** lessons learnt and recommendations.

8.8 CH 8: German case study

Franziska Appel, Franziska Ollendorf



The aim of this chapter is to describe main factors that shape the farming system in the Altmark and how these affect the current and future resilience. This is done by integrating several methods of the SURE-Farm framework.

Description

The Altmark is located in the German Federal State of Saxony-Anhalt and captures important features of the large-scale agricultural structures of East German agriculture. The Altmark has a comparatively high proportion of grassland to arable land, at nearly 27%. The soil quality is rather poor, and the yield levels in arable farming are relatively low. The majority of the land is cultivated by farms with more than 200 ha. Farm types are heterogeneous but mixed and arable farms are most prevalent. In terms of numbers of farms, individual full and part-time farms as well as partnerships dominate the Altmark. Although legal persons (mainly limited companies and producer cooperatives) only account for some 10% of the farms, they use almost 45% of the agricultural land.

The overall resilience capacities in the Altmark are estimated to be low to moderate. Currently, adaptability is perceived as the strongest resilience capacity. Farms tend to adapt to their continuously changing environment. The farming system has proved its capacity to transform during the and after German reunification when the former East German state and system dissolved. Although currently, there is little evidence of the system utilizing its capacity to transform.

What shaped the farming system and its current and future resilience?

- The historic perspective

The current agricultural structure was shaped during the time of the former German Democratic Republic. In the 1950s and 1960s, farms were transformed from private family farms into state farms and collectives. Accordingly, land plots increased dramatically in size. During this time, the region saw a specialisation in arable farming as well as in livestock production. After German reunification only a small percentage of farmers decided to reclaim their land to start again as independent farmers. Most of the former collective farms became cooperative farms or limited liability companies.

While most of the Altmark's transformation happened almost overnight, other elements are a long-term process still being observed today. During the AgriPoliS focus group workshop, the discussion revealed the shortage of qualified labour and how it is putting pressure on farms and the whole farming system in the Altmark. Confirming the findings from the learning and the



demographic interviews, participants pointed to the unattractiveness of the whole region due to its poor infrastructure and the shortage of non-agricultural jobs. The region has seen a large exodus after the reunion which has contributed to its marginalization.

The effects of the long-term transformation can be mediated through adaptation. For example, a change in production is an adaptation strategy to the labour shortage. Many stakeholders believe that low wages are the strongest driver of the labour shortage, but claim that it would not be possible to increase wages due to competitive pressure and low profitability. Computer simulations with AgriPoliS show that farms would switch to less labour-intensive production if agricultural wages were to increase. This signals that the farming system can adapt to higher salaries though this causes some loss of jobs in the rural areas.

- The natural characteristics

The region has poor soils and low average annual rainfall. Historically, environmental challenges such as extreme weather events like floods and droughts have threatened agricultural production in the region. Many water canals and extraction rights for irrigation are from pre-unification time, resulting in unequally distributed water canals and limited access to water for some farms.

The simplified access to extraction rights could be combined with the establishment of centralised water reservoirs, which would be an important environmental opportunity in the region. In the FoPIA II workshop the participants said that if water in the Altmark were to become scarcer, not only would more efficient irrigation systems need to be considered but also the production would have to be adjusted to the new climate condition.

- The economic perspective

The Altmark region may be seen as more vulnerable as agricultural regions due to the weak capital base per hectare, the high share of rented land in large farms, the low proportion of high quality arable land, and the dominance of hired labour which has to be paid regularly. It is often argued that smaller family farms are less vulnerable as they can tighten their belts in times of crises (e.g. low agricultural prices) (see Weiss 1999).

In the FoPIA II workshop, as in all previous stakeholder discussions, there was a broad consensus that, generally, market prices remain low whilst costs are increasing. In this context, the augmentation of value-adding tactics were mentioned several times but no clear approaches were brought up. Direct marketing is regarded as a difficult undertaking in the Altmark because of the weak demand in the region and would only work for niche products. The farms only produce raw materials, so there is not a clear strategy to increase value-added through product



differentiation. For most forms of product differentiation, there is currently no downstream sector, which would have to be regionally developed. Generally, participants saw the urgent need for adaptation of the farming system to improve the market power of farmers.

- The perception and behaviour of farmers and stakeholders

Farmers' mental models of agriculture as well as the society's mental models of agriculture are prevalent. Through new experiences mental models can be changed. However, such changes take time since individuals tend to primarily accept what fits to their ideas and miss what seems alien and novel.

Participants of the AgriPoliS workshop stated that a bad image of agriculture, mostly transmitted by media, is perceived to contribute to the unattractiveness of agriculture. The sector is unattractive due to long and irregular working hours and low pay in comparison to non-agricultural jobs. A social opportunity would be to focus on engagement in partnerships with colleagues and institutions in the region. For instance, young generations have almost no interaction with agriculture yet have a negative perception about it. Cooperation with schools and the joint conduction of educational projects could fill this gap and help to adapt the societal perception of the farming sector.

One economic opportunity that has been discussed is to focus on matching production with market demand. Currently, the region produces what it always produced just because traditionally it was produced. This would require an adaptation of farmers' behaviour.

In the FoPIA II workshop, the effect of policies and regulations, and particularly when they are changing frequently, was generally seen as ambivalent. Some group members adhere to the ideals of the free market and its self-regulation and see the risk of overregulation for an efficient system. Others did not share this view and highlighted the protective and supportive roles of policies and regulations.

8.9 CH 9: The extensive sheep farming system in Spain

Bárbara Soriano, Alberto Garrido, Daniele Bertolozzi-Caredio, Carolina San Martín, Isabel Bardají

The aim of this chapter is the assessment of the current and future resilience of the extensive sheep farming system in Huesca, located in the region of Aragón, North East Spain. The region has an historical tradition and experience in ovine production. It comprises mainly medium-size, extensive and semi-extensive farms that are diversified in other productions such as almonds, olive trees, cereal crops and, in a few cases, vineyard. The sector is facing several challenges such



as declining farms profitability, the lack of sector attractiveness and limited workforce, and the lack of policies catering to the specificities of the sector and rural life.

The resilience assessment follows the SURE-Farm farming system resilience framework responding the following questions: i) Resilience of what?; ii) Resilience for what?; iii) Resilience to what?; iv) What resilience capacities? and v) Which resilience attributes? Multiple data collecting approaches were conducted in the case study region to answer these questions: surveys, interviews on earning capacity and demographics, in-depth interviews on policy instruments, workshops on participatory impact assessment and policy impacts on resilience and recommendations, and a focus group on risk management.

The resilience assessment is performed at farming system level considering the farming system functions- ensure enough farm income, deliver of high-quality food products, maintain natural resources and animal welfare- the farming systems actors- famers and farmers households, crop farmers, veterinarians, cooperatives, farmers' associations, distributors, local public services and research centres- and the local conditions.

The chapter is structured as follows:

1. Description of the farming systems. This section describes the main figures of the sector referred to the performance and current state of the indicators of the challenges, resilience attributes and functions of the sector.
2. Explaining the current resilience – Why the sector is in near-collapse phase? This section explains the current situation of collapse of the farming systems based on the adaptive cycles assessment and considering four dimensions: demographics, agricultural practices, risk management and policies.
3. Explaining the future resilience- Why is it time for transformability? This section explains the scenario, pathways and strategies towards extensive sheep transformation. The strategies and pathways should be oriented towards reinforcing the provision of public goods and promoting the innovation on sustainable and efficient natural resources management and forms of cooperation.
4. Conclusions- Description of conclusions based on what we learnt from the past to build the resilient future.

8.10 CH 10: French case study

Francesco Accatino, Christèle Pineau, Corentin Pinsard, Delphine Neumeister, François Léger

Abstract

The Bourbonnais is a region in the center of France characterized by an extensive beef farming system based on grasslands. The system produces high quality beef (mostly under label, e.g., “Label Rouge”) for the French domestic market but it is also a part of the great suckling basin Charolais, which weaners are produced for the foreign market (especially Italy). The rearing of beef cattle is coupled with the maintenance of the typical landscape (called Bocage Bourbonnais) made by grassland and hedges. The aim of this chapter is to present the outcomes of the activities done in the SURE-farm project consisting in participatory workshops, focus groups, and interviews with stakeholders, providing an overview of the system and on the factors enhancing robustness, adaptability, and transformability in the system. The main identified challenges were related to low profitability and high debt rate for farmers (economic), difficulty to find farm successors and public distrust of farming practices (social), recurrent droughts (environmental), and a poorly flexible policy (institutional). The strategies mostly put in place by actors were focused on enhancing the robustness (e.g., feed storage, insurance schemes), less strategies were dedicated to enhance adaptability (e.g., developing farmers associations and change practices to fulfill social expectation), and only a few strategies – poorly applied – were dedicated to transformability. Strategies suggested by stakeholders for the future of the region are more focused on enhancing adaptability (e.g., professionalize the workforce or improve the coordination of actors within the value chain). Among the possible transformations of the system, some are detrimental for the landscape (e.g., increased cultivation of cereal and of planted grassland), some valorize the landscape (e.g., grass fattening or special insurance schemes). Particular focus in the chapter will be done to the role of consumers’ expectation as well as on the possible transformations that would maintain the landscape properties of the region.

Outline

1. Introduction

This section gives an overview of the characteristics and history of the study area and its typical agricultural system, highlighting the importance of its trade relations with other regions (export of store cattle, especially to Italy).

2. Beef quality and quantity in a beautiful landscape: at what cost?

This section describes the functions performed by the farming system. We also highlight challenges (environmental, economic, social, institutional) as well as the opportunities.

3. Between maintaining the *status quo* and adapting



In this section we highlight the factors (among the practices, in the social system, in the policy) that maintain the *status quo* and those that drive to an adaptation of the system to the challenges

4. Pressure from society: a source of stress and a trigger for transformation

In this section, we explore the contradictions that arise from changes in society's views of the Bourbonnais landscape and agricultural system and the ways in which farmers, their organisations, and the whole territory are or are not dealing with these contradictions. We also discuss the influence of the COVID-19 pandemic on the society's view about the Bourbonnais.

5. Seeds of transformations for maintaining landscape and tradition

We present the strategies for facing the different challenges (both applied and proposed for the future) that bring to a transformation of the system. We then discuss more in depth those strategies that transform the system while maintaining the identity of the Bourbonnais based on the production of high quality beef in a context of a high-level landscape. Selected transformations are mostly on the social and institutional level.

6. Conclusions

In this section we draw conclusions and some policy implications. Among the policy implications, we highlight the importance of subsidies and measures for keeping beef prices competitive and for allowing farmers to be able to valorize and conserve the landscape.

8.11 CH 11: The hazelnut farming system

Simone Severini, Saverio Senni, Alessandro Sorrentino, Cinzia Zinnanti, Federico Antonioli

Abstract

Located in central Italy, the province of Viterbo hosts the hazelnut farming system. In the past decades, the system ensured a relatively high profitability level, leading to the expansion of hazelnut orchards in neighbouring areas - less suited for this particular cultivation. Local cooperatives (mostly organized in producer's organizations) represent the main form of collective socio-economic actor of the system. Nevertheless, downstream market power is blamed for having confined their ability to develop in situ processing phases for transforming the raw product and adding value locally.

This chapter aims to explore the current and future resilience of the system, describing present and future foreseen challenges. Regarding the current situation, stakeholders defined the system as close to a significant change, and the reasons for such situation are investigated. Looking at the



future, both the main challenges, and potential new configurations are identified according to the stakeholders' view. Results entail policy implications useful for identifying preferable configurations and possible strategies to ease the process.

Hinging on the SURE-Farm resilience framework, hence resilience capacities (robustness, adaptability and transformability), empirical participative approaches were carried out. These allowed to analyse the main function indicators and resilience-attributes' performance for both current and future states.

The main results are that a general positive economic performance describes the system, while its contribution to the conservation of natural resources appears moderate. The system is going towards the re-organisation of its supply chain.

The system proven its robustness, especially in economic terms, albeit, on the other hand, it also shows a high vulnerability resulting from its high specialization, the exposure to volatile international markets and the increasing pressure from civil society regarding its environmental impacts.

According to the resilience capacities and the opportunities provided by the agricultural policies, transformability proves not to be a viable option, while adaptability emerge as the main path to face with the current challenges. Technological innovation, eco-friendly practices and the development of local transformation processes through cooperatives are expected to inform new strategies for the future, enabling robustness and adaptability capacities, maintaining and improving the resilience of the system.

Outline

1. Introduction. This section introduces the case study farming system from different points of view.
2. Exploring the current state of resilience. This section identifies and frames the main functions of the system and the performance of indicators characterizing them. Furthermore, it explores which challenges the system face and how it deals with them.
3. Exploring the future state of resilience. This section presents boundary conditions, as policy environment, to reach future states of the systems.
4. Strategies towards the future. This section explores the main strategies the system could implement in the future due to changing boundary conditions.

5. Conclusion. This section describes how the likely new configurations of the system could contribute to its resilience.

8.12 CH 12: Dutch case study

Alisa Spiegel, Pytrik Reidsma, Yannick Buitenhuis, Thomas Slijper, Wim Paas, Yann de Mey, Peter Feindt, Jeroen Candel, Katrien Termeer, P. Marijn Poortvliet, Miranda Meuwissen

Abstract

De Veenkoloniën is a region located in the Northern provinces of the Netherlands characterized by fertile peat soils that contributed to the growth of the regional arable farming sector, allowing De Veenkoloniën to develop into a large-scale agricultural and agri-industrial production area during the twentieth century. Decline of the agro-industry during the 1960s/70s and abolishment of CAP support for starch potato production, which is the main arable crop in the region, contributed to discussions about the resilience of the region. However, the farming system has shown remarkable resilience in the last decade. Against this background, this chapter explores the farming system's sources of resilience and reflects on the current state of resilience. For this purpose, we first elaborate the historical development of arable farming in De Veenkoloniën, with special attention on the associated past and present challenges. This is followed by exploring how the farming system has dealt and deals with its challenges, identifying the farming system's sources of resilience. Consequently, we present our vision on the future resilience of the farming system by reflecting on remaining resilience challenges and opportunities on the medium to long term. The chapter ends with several key lessons on how the arable farming system in De Veenkoloniën can ensure its resilience in the future.

Outline

1. Introduction
 - Description of the case study region / farming system. Multiple challenges and developments in the past led to discussions about the resilience of the region at multiple occasions.
 - However, the farming system has shown remarkable resilience in the last decade (incl. short examples)
 - Motivation and structure of the chapter.
2. Overview of challenges, historical context



- Major challenges:
 - Institutional:
Constantly changing policies and regulations;
Loss of CAP support for starch potato production;
 - Environmental:
Extreme weather events;
Plant diseases, nematodes;
Soil quality and soil erosion;
 - Economic:
Low margins;
 - Social:
Public distrust.

3. Sources of resilience (=robustness) in the past

- The strong specialisation in De Veenkoloniën on starch potato, sugar beet and wheat led to a farming system that performs very well regarding (food) production and can continue to exist in its current form despite several shocks, i.e. is robust.
- System dynamics modelling showed that starch production has been robust in the past due to the strong interaction between farmers and the cooperative Avebe.

4. Robustness in the past is no guarantee for the future

- De Veenkoloniën's strong specialisation also limits its adaptive and, even more, the transformative capacity. Concerns about the resilience in the future remain (e.g. raising land prices, loss of soil quality, ability of successors to take over farms and to make investments).
- Even though the system seems to recover in the short-term, as Avebe will compensate for the yield decrease with higher prices, this will cause a decrease in reserves. In the

long-term, Avebe cannot pay farmers the price required to remain viable, and starch production will be abolished by farmers, leading to a system collapse.

- Also, some arable farmers do not acknowledge their mutual dependency with Avebe, criticize Avebe’s wait-and-see-attitude and perceive their own innovations (e.g., introducing new crops or precision agriculture) to help them during hard financial times.

5. Opportunities and strategies for more resilient system in the future

- To this end, although system performance and the system as a whole seems more robust, the system might approach critical thresholds as environmental issues (driven by production practices) put a high pressure on the system.
- Innovations and strategies that improve profitability are promising, but should be accompanied with adaptive strategies that release the pressure of starch potato production on the performance of the farming system.
- To improve the adaptive capacity of Veenkoloniën, dealing with risks and challenges is key. Here, networks and learning are essential and should be developed by all actors in the farming system.

6. Conclusion

- Lessons learnt for future resilience and related implications / recommendations.

8.13 CH 13: Resilience of family, fruit and vegetable farming system in Central-Eastern Poland

Katarzyna Zawalińska, Piotr Gradziuk

Abstract

Poland is the largest in the EU and fourth in the world producer of apples. It is also an important supplier of vegetables at the international markets worldwide. Therefore, this case study analyses resilience of family, fruit and vegetable farming system in Central-Eastern Poland – in two NUTS2 regions: Mazowieckie and Lubelskie, being the main producers of horticultural output in the country.

The system, however, faces the challenges which affect its current and future resilience. There were six particular problems identified in the case study area, hindering the resilience of the



farming system: a) succession problems, b) economic viability struggle, c) environmental risks and deficits, d) shortage of workforce, e) changes in consumer tastes, f) appropriateness of policy instruments.

In this chapter, we explain how the identified challenges are related with SUREFarm project's four adaptive cycles: 1) "risk management" with environmental risks, 2) "governance" with policy instruments, work regulations, succession law, environmental deficiencies 3) "farm demographics" with succession and workforce availability, 4) "agricultural production" with economic viability, changes in consumer tastes and policy instruments.

Based on the SURE-Farm project collected data (from in-depth interviews, mini-cases, surveys, learning workshops) and the applied SUREFarm methodology the chapter presents the lesson learnt on current and future resilience capacities of this farming system - robustness, adaptability and transformability - as well as the possible future strategies at farm and policy level.

Outline

1. INTRODUCTION:

- Description of the CS
 - General information on the CS
 - Characteristics of the farming system
 - Economic, environmental, social and institutional background
 - Historical context

2. IDENTIFIED RESILIENCE-RELATED CHALLENGES:

- Succession
 - Uncertainty on continuity of the farms
 - the emotional attachment to the farm of the older generation family reorientation
 - exit vs non-exit decisions
- Economic viability
 - low profitability,



- high price and income instability
- environmental risks and deficits
 - deficit of organic matter in the soil,
 - extreme weather events due to climate change
 - fragmentation of land hindering the implementation of irrigation systems
- shortage of workforce
 - emigration of rural labour abroad,
 - inappropriate Polish law on hiring foreign labour (administration process is very cumbersome and inefficient)
- changes in consumer tastes
 - demanding consumers
 - necessity to change the types of fruit trees
 - growing demands toward quality
- relevance of policy instruments
 - inadequate existing policy instruments
 - missing policy instruments focused on risk management and change in incentives

3. ADAPTIVE CYCLE and the CHALLENGES

- Risk management: environmental risks
- Governance: environmental deficiencies, policy instruments, work regulations, succession law, environmental deficiencies
- Farm demographics: succession process, workforce availability
- Agricultural production: economic viability, changes in consumer tastes, policy instruments



4. RESILIENCE CAPACITIES

- Past robustness crowded out by adaptability
- Forced transformability

5. LESSONS LEARNT

- Farm level strategies
- Policy strategies

6. CONCLUSIONS

7. APPENDIX:

- CS factsheet (*we will refer to it along the whole chapter*)

8.14 CH 14: The small mixed farms in Nord-Est Romania

Camelia Gavrilescu, Monica Tudor

The Romanian case study is devoted to small mixed farms in the Nord-Est region, with main production activities crops, livestock and grassland. An important characteristic is the high heterogeneity across farm types. The farming system, consisting of a large number of farms (more than half a million), of small size (as compared to European farms), and of poor efficiency and profitability, faces many challenges, such as reluctance to association and cooperation (due to bad memories from the communist past), poor insertion in the agricultural products supply chains. Pressure of more competitive imports, price volatility from the domestic and international markets and migration of labour are completing the picture.

The greatest opportunity in the sector came along with the country's accession to the EU, and the integration of common agricultural policies, which came with important financial support for investments, modernization and development of farms and other economic operators involved in the agri-food products supply chains.

The adaptive cycle shows a complicated dynamic within the farming system itself: agricultural production is on an upward growing phase; farm demographics is half-way between conservation and collapse; governance is close to conservation, and risk management is on its way to reorganization. Overall, the agricultural system seems to be on the path from reorganization to growth. The system responds using its resilience capacities.

The farming system seems more transformable than adaptable and robust, although the main strategies implemented in the past contributed to all capacities. Subsidies and land consolidation contributed mostly to transformability and adaptability.

The chapter presents the main findings on current resilience capacities of the farming system, explores future new configurations of the system and uses the lessons learnt to design possible new strategies and policies aiming at more resilience at farm and system level.

Outline:

1 Introduction

- Description of the CS region
- Historical context
- Background of the farming system: economic, environmental, social and institutional

2 Current state of resilience

- Main functions of the system and their indicators' performance
- Past and present challenges identified
- Past and present risk management strategies

3 Future state of resilience

- Future challenges
- Boundary conditions for future states of the system
- Strategies for more resilient system in the future

4 Conclusions

- Lessons learnt

5 Policy implications and recommendation

8.15 CH 15: High-value egg and broiler production in Sweden

Gordana Manevska-Tasevska, Jens Rommel and Helena Hansson

Abstract



The aim of this chapter is to assess the current and future resilience of the commercial egg and broiler sector in Sweden. The analysis is based on the resilience analytical framework as developed within the context of the SURE-farm project. An integrated data set composed of: i) survey and focus group on risk management; ii) in-depth interviews with farmers on farming narratives, learning capacity and demographics; iii) analysis of policy documents; and iv) workshops on participatory impact assessment was used.

Swedish egg and broiler farms produce high-value livestock products, for the domestic market. The sector faces a number of resilience-related challenges. Egg and broiler production are different, with own specifics, but for both, the main challenges are largely production-related. Since 2000, the poultry sector in Sweden is facing constant pressure from new requirements and regulation and changes in consumer's preferences for adopting to food- safety, -quality, animal-health and -welfare, all as prerequisites for sustainable production. Such changes require technological adaptations, which affect the production costs, and thereby the profitability as one of the key performance indicators for keeping the sector resilient.

Resilience of the farming system is moderate to high, driven by robustness and adaptability. The potential for transformability is low. Branch organization play a key role in catalysing the resilience. Tight networks among processors and farmers, facilitated by branch organizations, ensure a high degree of tightness of feedbacks, albeit market power imbalances are a real threat. Greater tightness of feedback between the research community, media, and consumers could help the sector to become more resilient. Greater modularity (independence from large slaughterhouses), diversity (in terms of production systems), and openness to new technology, and new knowledge and building networks enable the sector's primary production to cope with the current and the future resilience.

Outline

1. Introduction

This section will describe: the region, the production and market specifics, and regulations

2. Essential functions: high quality products, sufficient income, and ensure animal welfare

This section will elaborate the essential functions of the system, and the performance of indicators characterizing the functions.

3. Long-term stresses press the sector to develop



Focus on challenges. Explain the challenges, and their connection with essential function of the farming system.

4. Adaptability, an inevitable process?

This section will provide information on: the current performance of resilience; the resilience capacity will be in terms of robustness, adaptability and transformability; which attributes enable and restrain the resilience capacity if the system.

5. Strategies and boundaries for current and future resilience

In this section we are going to present: the stakeholder's perception for the need to change; the strategies that have been, and need to be applied to keep the system resilient; boundaries to desired changes.

6. Conclusion

8.16 CH 16 Managing risks to improve the resilience of the East of England's arable farming sector

Mauro Vigani, Julie Urquhart, Damian Maye, Pip Nicholas-Davies, Jasmine Black, Amr Khafagy, Robert Berry, Paul Courtney

Abstract:

East of England is considered the "bread basket" of the UK thanks to its fertile flat lands which grow high-yielding and high-quality staple crops exported all over the world and supplying the domestic food markets, such as wheat and potatoes.

However, currently this farming system is under considerable pressures both from the policy, economic and environmental challenges, with Brexit, market volatility and climate change impacting on its resilience and viability.

Based on the results of a variety of mixed-method research activities conducted within the SUREFARM project, this chapter studies the risks and challenges affecting the arable farming sector in the East of England, highlighting the impacts that they potentially have for national and international food security.

The chapter also describes what risk management and coping strategies are adopted by farmers and other actors involved in the farming system to deal with such challenges, distinguishing between strategies that can lead to the robustness, adaptability or transformation of the farming system. Moreover, the chapter provides a discussion of the role of institutional support and



knowledge networks for the resilience of this farming system in a fast-changing policy environment.

Finally, important lessons learnt during the duration of the SUREFARM project with respect to the efficacy and impact of risk management and coping strategies, in combination with the current and future institutional and policy settings, are derived and summarized in the conclusions of the chapter.

Outline:

1. INTRO:
 - a. Description of the CS
 - b. Importance of managing risks in the CS for:
 - i. National/International food security
 - ii. Provision of public goods and ecosystem services
2. RISKS, CHALLENGES AND THEIR MANAGEMENT:
 - a. Risks and challenges in the UK arable farming
 - b. Risk management tools
 - c. Coping strategies for resilience
3. INSTITUTIONAL SUPPORT AND KNOWLEDGE NETWORKS:
 - a. Policies available to the UK arable farming system: CAP and ELMS
 - b. Knowledge networks
4. CONCLUSIONS: LESSONS LEARNT

8.17 CH 17: Integrated assessment of the resilience of farming systems and their delivery of private and public goods

Francesco Accatino, Wim Paas, Hugo Herrera, Corentin Pinsard, Simone Severini, Franziska Appel, Birgit Kopainsky, Katarzyna Bankowska, Jo Bijttebier, Camelia Gavrilesu, Amr Khafagy, Mariya Peneva, Gordana Manevska Tasevska, Franziska Ollendorf, Carolina San Martín Hernandez, Pytrik Reidsma

Abstract:

The assessment of the resilience of farming systems is a complex process, requiring the evaluation of multiple aspects. As proposed in the resilience assessment framework, this starts with identifying the farming system, then the challenges that the farming system faces, and next the private and public goods that are provided and/or needed. When the 'of what', 'to what' and 'for what purpose' questions are clear, resilience capacities and resilience attributes can be assessed. To understand resilience, the past and present need to be evaluated, as well as the likely behavior of the system under future scenarios. The multitude of these aspects requires an integration of different tools, both qualitative (e.g., stakeholder involvement in participatory workshops) and quantitative (e.g., data analysis and models).

Many of these methods were applied systematically to all the SURE-farm case studies, and an integrated assessment of their results makes it possible to have (i) a systematic comparison of the outcomes of different methods and (ii) an overall consideration of the resilience of SURE-farm case studies. Therefore, in this chapter, our aim is to provide a comprehensive view of the aspects considered in SURE-farm for resilience assessment investigated with different methods across the 11 SURE-farm case studies. For this purpose, we first provide an overview of the diversity of the methods implemented, highlighting how they complement each other. We then proceed considering the different aspects of resilience and their quantification for the different case studies. For the past and current situation, these aspects consist of: i) challenges, including environmental, economic, social, and institutional; ii) essential functions for provision of public and private goods, including e.g., food production, economic viability, attractiveness of the area and ecosystem services; iii) resilience capacities, including robustness, adaptability and transformability, iv) resilience attributes, and v) strategies to face challenges. For the future, these include vi) scenarios conceived with stakeholders and vii) simulations of provision of future functions using ecosystem services modelling, system dynamics, and agent-based models.

Outline:

1. General introduction

We remind the steps of the resilience framework and we highlight that a diversity of methods is needed and an integrated assessment is necessary. In addition to the resilience framework, we also point out the relevance of future scenario and of models simulating future trajectories.

2. Contribution of quantitative and qualitative methods for resilience assessment

We explain the different methods considered for achieving the different steps of resilience and how they are meant to serve to the purpose of resilience assessment



3. Summary of the farming system aspects for resilience assessment

In this section the aim is to present a big summary table where each row is dedicated to a case study and each column is dedicated to each aspect, being it a challenge, a function, a resilience capacity, or a future scenario that was, in some way, quantified systematically for all case studies (or at least some). The remaining sections of the chapter are meant to explain different blocks of this table

4. Current challenges

This section presents the different challenges faced by the case studies, as assessed with FoPIA-surefarm 1.

5. Current functions

This session presents the different functions provided by the case studies, including those assessed with a participatory process (FoPIA-surefarm 1) and ecosystem services assessed with data.

6. Resilience capacities and resilience attributes

This section present the resilience capacities and resilience attributes in the case studies, as perceived based on different methods.

7. Future scenarios

This section presents the outcomes of scenarios and functions assessed with FoPIA-surefarm 2 as well as the outcomes of models (ecosystem service modelling, system dynamics, AgriPoliS)

8. Complementarity of methods

The aim is to discuss coherence (or lack of it) among different aspects of farming systems for resilience assessment

9. General considerations on resilience

In brief, case studies are classified according to considerations that can be done about their resilience. Relevant strategies to improve resilience and the delivery of private and public goods are discussed.

8.18 CH 18: A resilience-enabling environment: principles, strategies and roadmaps

Erwin Wauters, Jo Bijttebier, Miranda Meuwissen, Peter Feindt, Erik Mathijs

ABSTRACT

Farming systems are inherently linked with the biophysical, political, social, economic and cultural environment in which they operate. Since the environment is far from stable, farming systems experience frequently changing conditions that determine their performance, farm structure, technologies, degree of specialisation, etc. The dimension and direction of the changes of the environment is also uncertain and there are many unknown unknowns, i.e., events that cannot be imagined currently, let alone that their likelihood is known. To increase the resilience of EU agriculture, a resilience-enabling environment must be created that increases the capacity of the farming sector to face economic, social and environmental challenges and to adapt to rapidly changing circumstances that could disturb or undermine the delivery of its vital goods and services. The enabling environment is a set of interrelated conditions – legal, institutional, organisational, informational, infrastructural, political, economic and cultural – that enhance the farming sectors’ capacity to adapt, to cope with uncertainties and to avoid collapse.

However, what does a resilience-enabling environment for Europe’s farming systems look like? Resilience is the outcome of interactive and co-evolutionary processes in which a wide range of actors are engaged, including farmers, input suppliers, food processors, retailers, consumers, banks, researchers and advisers. An important analytical challenge is that resilience is a set of latent capacities of systems that can only be observed *ex post*, that is, when adverse events (either shocks or stresses) have occurred and responses can be observed. What’s more, these latent capacities could be present without ever being observed, i.e., when changes in the surrounding conditions are sufficiently narrow so that there is no need for each of these capacities to be used and hence manifested.

The objective of this chapter is twofold. First, to systematically describe which integrated combinations of enabling conditions effectively enhance the resilience of farms and farming systems, taking into account possible interactions among different elements of the enabling environment that might lead to synergetic or trade-off effects. This will result in principles for a resilience-enabling environment, based on a systemic integration of the findings from the empirical work in SURE-Farm. Second, to present strategies and roadmaps towards such a resilience-enabling environment.

Keywords: Resilience; strategies and roadmaps; enabling environment; systems thinking

OUTLINE

3.1 Introduction

[p.1-2]



- Motivation and structure

3.2 Principles for a resilience-enabling environment

[pp. 2-6]

- Description of approach
- Main findings

3.3 Strategies and ROADMAP towards a resilience-enabling environment

[pp. 7-13]

- Description of approach
- Strategies and ROADMAPS

3.4 Conclusions

[p. 14-15]

8.19 CH 19: Lessons learned from a co-creation approach: Virtual co-creation platform and face-to-face focus groups.

Bárbara Soriano, Isabel Bardají, Daniele Bertolozzi-Caredio, Yannick Buitenhuis, Jeroen Candell, Peter Feindt, Miranda Meuwissen, Wim Paas, Pytrik Reidsma, Carolina San Martín, Thomas Slijper, Alisa Spiegel, Alberto Garrido.

Abstract

Multi-stakeholder co-creation initiatives are rapidly gaining ground for identifying and developing solutions to deal with complex and multidimensional challenges. In SURE-Farm, we effectively engaged stakeholders in co-creation activities with the aim of assessing and improving the resilience of European agriculture. The resilience assessment was performed at farming system level; considering not only farmers but also the broader range of actors essential to a farming system's functioning, such as farmers associations, cooperatives, value chain actors, financial institutions, NGOs and policy makers.

The main novelty of our co-creation approach is that we followed a two-step approach, combining virtual and real-life stakeholder deliberations. Moreover, these steps were organized at two different spatial levels- farming system and European level. In the first step, a pan-European virtual co-creation platform was created to facilitate discussion among a broad range of stakeholders with an experience in European agriculture. 28 stakeholders from 11 European countries sectors actively participated in the co-creation platform activities. In the second step, face-to-face focus group and workshops were organized to involve local stakeholders discussing resilience from the perspective of the respective farming systems (333 stakeholders in eleven case



studies (CS). Both steps were organized along four substantive topics: 1) farmers and stakeholders' risk perception and risk management (RM); 2) current resilience assessment; 3) risk management improvement towards more resilient farming systems; 4) resilience enabling and constraining policies.

The structure of the chapter is as follows:

1. Introduction: Description of the aim of the chapter and brief explanation of merits of co-creation; Detail of performed activities: (i) the virtual co-creation platform, (ii) face-to-face workshops and focus groups in 11 CS; motivation for combining online and offline activities; stakeholders involved.
2. Farmers and stakeholders' risk perception and risk management: Description of the activities conducted and replicated to assess the risk perception and farmers' past and current risk management practices in the virtual co-creation platform and the RM focus groups in 11 CS. Comparison and discussion of the results.
3. Current resilience assessment: Description of the activities conducted and replicated to assess the current resilience related to the farming systems functions and resilience attributes, in the virtual co-creation platform and the Participatory Impact Assessment (FoPIA) workshops in 11 CS. Comparison and discussion of the results.
4. Risk management improvement towards more resilient farming systems: Description of the activities conducted and replicated to design improved RM and assess the contribution of RM to resilience in the virtual co-creation platform and the RM focus groups in 11 CS. Comparison and discussion of the results.
5. Resilience enabling and constraining policies: Description of the activities conducted and replicated to define resilience enabling and constraining policies in the virtual co-creation platform and the policy co-creation focus groups in 6 CS. Comparison and discussion of the results.
6. Conclusions- Highlight the main conclusions emerging from the different activities and the comparison of the stakeholders perspectives. Reflection on the merits of the dual cocreation approach employed in the project.

This chapter enriches resilience knowledge by combining the perspective of diverse groups of stakeholders at different regional levels. The differences between stakeholders groups and scales perspectives should be taken into consideration when defining solutions towards more resilient farming systems.



8.20 CH 20: Understanding and addressing the resilience crisis of Europe's farming systems. A synthesis of the findings from the SURE-Farm project

By Peter H. Feindt, Miranda P.M. Meuwissen, Alfons Balmann, Robert Finger, Erik Mathijs, Wim Paas, Bárbara Soriano, Alisa Spiegel, Julie Urquhart and Pytrik Reidsma

Abstract

This chapter aims to synthesise key findings from the SURE-Farm project. We first discuss possible amendments to the framework to assess the resilience of farming systems. We then review why many of Europe's farming systems face a formidable and structural resilience crisis. While emphasizing the diversity of resilience capacities, challenges and needs, we formulate cornerstones for possible resilience-enhancing strategies. The chapter concludes with critical reflections and suggestions for resilience-enhancing strategies that comprise the levels of farms, farming systems and enabling environments. We identify limitations of the research and suggest avenues for future research on the resilience of farming systems.

