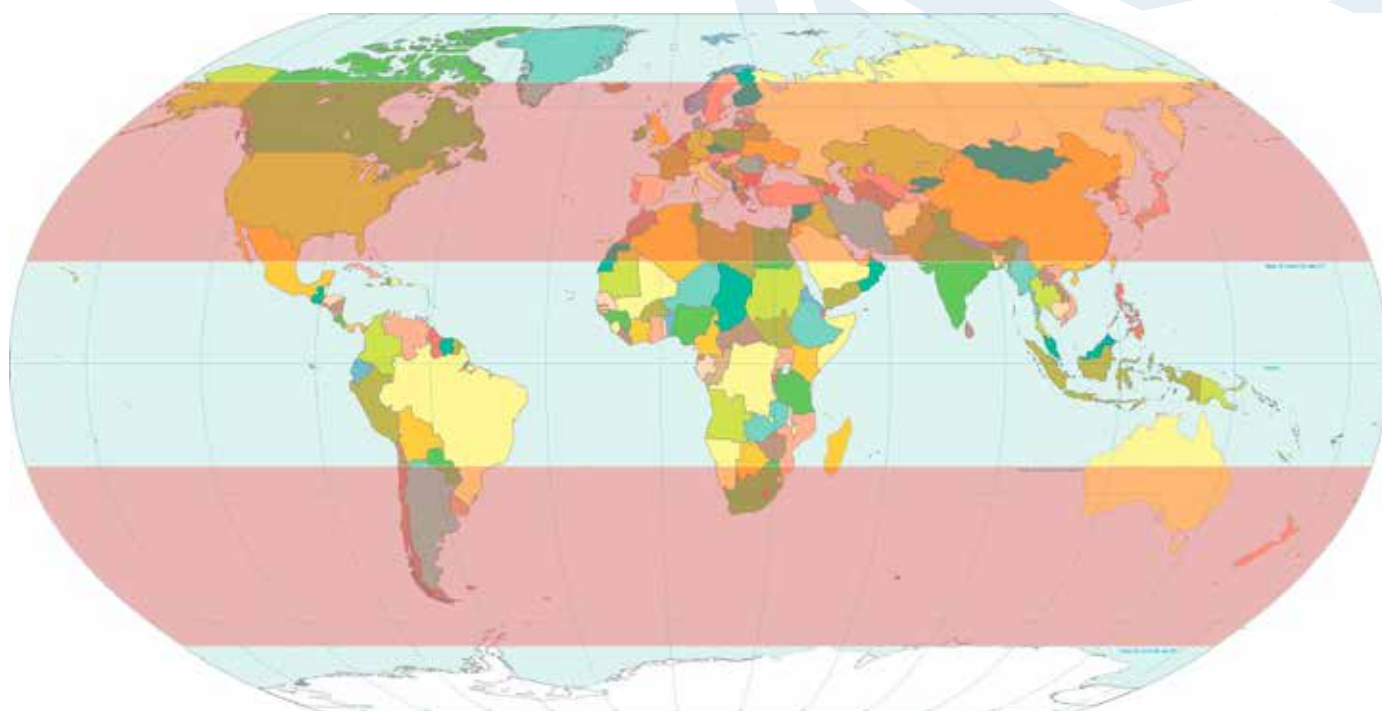




TempAg Foresight Workshop Report

Executive summary



Map highlighting world's temperate zones.

TempAg is an international research collaboration network established to increase the impact of agricultural research and inform policy making in the world's temperate regions.

Agriculture in temperate areas is highly productive with a significant proportion of global output originating from temperate (i.e. non tropical) countries. 21 % of global meat production and 20 % of global cereal production originates from Europe alone¹. This proportion is very likely to increase in light of climate change². Given the intense agricultural production and advanced agricultural practices performed in temperate areas, the need for more sustainable and resilient approaches as well as connection of national research & policy agendas in temperate countries is pressing.

To identify how TempAg can best help facilitate cross-country collaboration around sustainable agriculture, it held a Foresight workshop in October 2016. 40 delegates from academia, policy, industry and professionals in the science-policy interface across 14 temperate countries participated. During the workshop, participants reviewed current science and policy priorities in temperate countries, scoped what the future key issues for sustainable agriculture in these

regions will be and discussed what type of research will be needed to address them. Participants highlighted a range of areas where TempAg could add value by synthesising knowledge and translating scientific evidence to better inform agricultural policies across temperate countries. Suggested areas of action included:

- identifying factors that reduce farm resilience and examining ways to improve resilience across the whole temperate food system
- monitoring the performance of existing policies through integrative assessment tools and calculating the economic impact of agricultural production on natural resources and human health,
- connecting sustainable diets with sustainable production
- exploring what types of data policy and industry communities will need in order to advance sustainable agriculture as part of major policy agendas like the Sustainable Development Goals and the Paris COP21 agreement
- integrating and broadening TempAg's existing suite of activities whilst enhancing its visibility

¹ Olesen Foresight Climate Change for EU, Godfray 2011, PNAS, Foley et al 2011, Nature & West et al 2010, PNAS

² See FAO Corporate Document Repository: <http://www.fao.org/docrep/w5183e/w5183e0c.htm>, Olesen Foresight Climate Change for EU, Gornall et al 2010, Maracchi et al 2005 & Parry et al 2004

Foresighting issues and sketching TempAg's future path

Since its inception in April 2015, TempAg has developed a suite of activities under its priority themes. To read more on TempAg's mission and the work done by the network so far, visit **Annex 1** of this document.

TempAg held a Foresight workshop in London on 5-7 October 2016, where experts in agriculture reviewed current and prospective science and policy perspectives from different countries in temperate regions to determine TempAg's future work priorities.

40 delegates from academia, policy, industry and professionals in the science-policy interface across the 14 different countries in the temperate region along with the OECD took part. A list of the participants can be found in **Annex 2**.

Through a series of presentations and interactive sessions, participants were invited to consider what the current and future challenges are in temperate agriculture, taking into account the needs of policy makers & industry and how we can assist them in improving and implementing sustainable agricultural practices.

A series of themes arose, varying from addressing the socio-economic factors of sustainability, to valuing natural capital and identifying what type of existing knowledge can be used to build more effective agricultural policies with a long term effect.

Session 1: Key issues in sustainable agriculture in temperate areas.

Through a series of presentations by the TempAg Activity leads and professionals working in the science-policy interface in temperate zone countries, this session introduced TempAg's ongoing work and provided examples of research approaches to tackle issues of sustainable agriculture across the temperate regions.

Through a Break-Out group exercise, workshop participants were asked to consider and identify the key issues needing to be addressed for moving towards more sustainable agricultural systems in temperate areas.

Discussion Outputs:

The groups highlighted the following areas where action needs to be taken to tackle issues in sustainable agriculture across the temperate countries:

- Manage risks and stresses (biotic or abiotic) to temperate agriculture food production systems
- Manage the restoration of natural capital, ecosystem services and soils to sustain long term agri-food production
- Identify best practice and utilise diversity of approaches across different agricultural systems to improve sustainability

- Broaden agricultural sustainability to incorporate and emphasise socio-economic factors as well as environmental
- Identify who gets the financial reward from food commodity prices with a view to making value chains more equitable
- Identify optimum legal frameworks for data sharing

It was noted that in order to move towards more sustainable agriculture in temperate areas, there is a need to better manage risks and stresses (both biotic & abiotic) to agricultural food production systems and the key actors within them. This would go hand in hand with finding ways to manage the restoration of natural capital, ecosystem services and soils. The existing diversity within the different agricultural systems (eg organic vs conventional) in temperate areas was highlighted as an area that could be capitalised upon more. It was highlighted that identifying best practice approaches and the appropriate technological mix to use across different systems may be a way forward in making production systems more sustainable.

Participants stressed the importance of taking a holistic view of the sustainability agenda within agriculture, moving away from solely focusing on environmental aspects but also taking into consideration socio-economic factors. Identifying what socio-economic pathways need to be taken in order to materialise and deliver the provision of food systems that build on sustainable agricultural practises will be crucial moving forward. This would allow for agricultural sustainability to align more with the sustainable development agenda³.

Some socio-economic factors mentioned could make value chains more equitable. An analysis of who benefits more from food commodity prices was suggested as a first step towards tackling this. A need to identify the legal framework that will allow maximum benefit for different stakeholders through an optimum plan for sharing data was also mentioned.

Session 2: Prioritising key activity areas based on policy and industry needs for achieving sustainable agriculture in temperate areas.

The group also discussed sustainable agriculture issues from a policy and industry perspective. A series of presentations provided different country policy and industry perspectives into what constitutes sustainable agriculture and highlighted policy and industry needs for achieving sustainable agriculture in temperate areas. After these presentations, Break-Out groups moved to consider the most urgent objectives and priorities for policy and industry in order to transition towards more sustainable agricultural practices in temperate zones. Alongside this discussion, the groups also considered what type of research is needed in order to meet these objectives.

³ Brundtland Commission Report: Our common Future: <http://www.un-documents.net/our-common-future.pdf>



Discussion Outputs – Priorities for Policy & Industry:

The following issues were raised at the meeting to be addressed from a policy and industry perspective:

- Dealing with shocks (environmental/economic/social/political/technological) within the food production system
- Facilitating spread and diffusion of existing technologies to increase resilience (identify barriers to uptake through engagement with food system actors)
- Monitoring the impact of interventions and changes in policy and assessing performance
- Identifying real cost of food production across the value chain
- Integrating policy and industry goals through advocacy
- Incentivising improved environmental performance for industry through the right policy environment

Interestingly, dealing with shocks (environmental, socio-economic, and technological) featured highly in this discussion. It was suggested that increasing resilience in temperate agriculture and the capacity to manage these shocks, could be facilitated via a widespread diffusion of existing technologies. Throughout this process, engaging with key food system actors (farmers, policy makers, industries etc) at the same time was deemed necessary in order to identify the barriers to technology uptake.

Further areas highlighted here included the need for monitoring the impact of policy interventions and assessing their performance. Identifying the real cost of food production across the whole value chain, taking into account costs on land use, provision of incentives, and on health care services were stressed as key, in terms of delivering interventions that would enhance sustainability. Finally,

the need for better integration of policy and industry goals through better advocacy was mentioned. For example, an improvement of industry's environmental performance should go hand in hand with an optimised policy environment.

Discussion Outputs – Research needed to address priorities

Undertaking more research in the following areas was understood to be necessary in order to help build the capacity needed to respond to the policy and industry needs highlighted above:

- Develop tools to assess performance and monitor the impact of policies and the environmental cost of interventions
- Ways to predict and manage shocks:
 - Develop sustainability metrics that capture shocks and identify ways to mitigate them
 - Identify the potential shocks to temperate agriculture food production systems and estimate their impacts
- Ways to measure resilience: develop models that assess the flexibility of the agricultural food production system in temperate areas
- Examine different scenarios from past events or different sectors where parallels can be drawn and identify the data used to assess performance
- Use back-casting for stakeholders to envision desirable future and work backwards to identify action
- Develop economic tools to measure the actual costs of production/land use/health/natural resources
- Work with social scientists to identify the power distribution within food value chains in more detail and the leverage points by which change can be brought about

Suggested areas of future focus for TempAg

Session 3: What should TempAg's future activity be, in policy and industry relevant areas?

The aim of the final session was for participants to consider and identify TempAg's future activities in the areas identified to be relevant to policy and industry. TempAg's activity will be geared towards facilitating delivery of sustainable, productive and nutritious food systems in temperate regions. The group considered different areas of action and prioritised their top suggestions based on their relevance to policy and industry and the highest potential impact in terms of achieving this goal.

1. Identify factors that may reduce farm resilience in temperate areas, and the ways they may interact:

Future-proofing agricultural resilience and enhancing the capacity to respond to shocks was deemed an urgent priority, it was suggested that the development of a comprehensive map identifying the multiple shocks that could impact on farm resilience in temperate zones could be a future work stream for TempAg. Work in this area, could involve considering the existing sustainability metrics that capture these shocks and whether there are currently ways to mitigate them. This stream of work would take into account the different climate change attributes for modelling the impacts of climate change (e.g. hours of sunshine). This could be taken forward via the creation of a platform or working group focused on advising and informing farmers on dealing with potential shocks rather than work on the identification and mitigation practices across the whole food system. The above will help develop models to assess the flexibility within an agricultural production system.



2. Examine the resilience of the food supply chains and the shocks and risks to Ecosystem Services (ES):

This activity would follow up from the mapping exercise suggested under area 1 above. Having considered the risk factors and shocks that impact on food production system's resilience, more consideration can be given into what are the ways to build better resilience of the system (from farm to fork) or utilise these shocks to shift systems into the right way. A socio-economic angle could be brought into TempAg's current Theme 2 by associating food supply chain shocks with ES by linking land use with demand. How could temperate regions respond to shifting demands and rebound from shocks?

3. Development of integrated assessment tools for monitoring the performance and impact (environmental cost) of existing policies and interventions:

This activity could be taken forward by combining the work taking place under the network's current Pilot Activities and could feed into existing data on yield gap analyses, sustainability performance indicators and ES to develop assessment tools. In doing so, the long term effects of policies could be factored in and examined. This work could feed into discussions with policy makers to enable more effective policies with a long-term vision and help develop models for policy.

4. Develop economic tools for calculating the true cost of food production:

This activity could focus on measuring the actual costs of agricultural production in temperate areas. In doing so it is important to incorporate environmental externalities. Economic tools could be developed to help estimate agriculture's economic impact on both human health and natural resources around the land, water, energy nexus. This information could be used to help transition to sustainable landscapes in temperate areas in future.

5. Examine what type of existing data policy and industry would need to advance sustainable agriculture in light of the SDGs and the Paris COP21 agreement:

Since TempAg's initiation, two major global policy agendas have been adopted by the international community, the Sustainable Development Goals and the Paris COP21 agreement. Identifying the types of data and scientific evidence policy makers will need to achieve the agriculture relevant targets laid out in these agendas is another area where TempAg could focus its activity. In this regard, providing sustainability metrics to assess the relevance of backcasting scenarios could be a potential future avenue.

Parallels could be drawn from other sectors, industries and across different countries where regulatory frameworks have successfully incentivised industry. It is worth considering what data have been previously used to evaluate performance against sustainable production whilst taking into account the changes caused by the SDGs and Paris Agreement agendas. Reviewing TempAg Pilot Activities' outputs in light of the SDGs and Paris COP21 agendas, could further help inform policy makers with identifying gaps in scientific evidence in terms of delivering these agendas.

6. Take an integrated food systems view to map healthy, sustainable diets to sustainable production:

What we eat is largely based on the type of food we produce so that healthy diets are intrinsically linked with our production systems. It was suggested to explore how to connect healthy diets with temperate production systems. An area of interest for TempAg could be exploring what should be the nutritional value of crops for a healthier and more nutritious diet in the context of sustainable temperate agriculture. Developing frameworks in this area, could further inform farming practices in temperate areas in the future.

7. Integrate and broaden TempAg's existing pilot activities:

Based on the areas highlighted above, TempAg should come up with ways of integrating the outcomes from the existing pilot activities and combine them in smart ways in order to move them towards policy. Pilot Activities 2 and 3 could feed into Pilot Activity 1 through, for example, the development of integrated assessment tools (as per area 3 above). In addition, the Pilot Activities will be expected to grow, broaden and become themes, bigger in scope than the network's existing work plans.

8. Enhance the network's visibility and communication:

Organisations such as OECD and G20MACs could operate as vehicles to increase visibility. TempAg could feed into their activities and seminars, via developing and highlighting policy briefs and Foresight reports with TempAg's stamp. Stronger connections and alignment across the network's partner countries could be built, as well as existing initiatives already in place via joint projects and activities (e.g. annual assessment of environmental reviews). These activities could be supported utilising external funding resources. Also TempAg's website could be expanded to incorporate videos to translate TempAg's activities to a broader public.

Next steps

The TempAg Governing Board will discuss the network's future activities and next steps. This document is intended to inform the Governing Board decision making process.

It is important for TempAg's future activity to remain relevant to policy and industry bodies who can be carriers of change in order to help achieve the ambitious goal of delivering sustainable, productive and nutritious food systems in temperate regions.

At the same time, it is equally vital that any new activity that will arise will not compete with ongoing work that is taken forward by other existing initiatives and that the uniqueness of TempAg activities will be maintained.



TempAg's current themes and activities prior the Foresight Workshop

Since its official inauguration in Paris on April 2015, TempAg has been leading a series of work streams around its scientific themes:

1. delivering resilience of agricultural production systems at multiple scales and levels;
2. optimising land management for Ecosystem Services (ES) and food production and
3. improving sustainability of food productivity at the farms and enterprise level

Each of the three TempAg themes integrates a set of scientific questions:

Theme 1: Delivering resilient agricultural production systems at multiple spatial and temporal Levels. Scientific questions explored under this theme include:

- How can conceptual frameworks be developed for defining agricultural sustainability at multiple levels?
- How can temporal variability in production be reduced, and how can this be managed as one of the causative agents of price volatility?
- What are the implications of change in multiple socio-economic and environmental drivers for delivering sustainable intensification?
- How can policies and strategies be optimised to promote agricultural systems that are resilient and that can adapt to climate change, economic and environmental shocks?
- What are the limits to and trade-offs within sustainable production systems, and how are they best governed?

The network's so far activity under this theme focuses on:

1. Enhancing metrics, frameworks and tools for future-proofing agricultural decision making at multiple levels and scales.

This work has delivered a report assessing sustainability frameworks within agriculture and a journal publication⁴ weighting criteria for selecting temperate agriculture sustainability indicators. Moving forward it will seek to determine what are the thresholds of external drivers influencing sustainability indicators and whether these can be expressed in a form of a lowest common denominator to normalise sustainability indicators across groups and scales.



⁴ de'Olde et al, 2016

Theme 2: Optimising land management to produce food and other ecosystem services at landscape level. Scientific questions explored under this theme include:

- How can tensions between competing land uses be resolved? (includes existing and changing land use and natural resources; across temporal levels)
- How can land use systems be designed to optimise synergies which satisfy social, economic and environmental goals, and the provision of ecosystem services?
- How can scale, location, diversity and complementarity of rural enterprises be optimized to enhance the provision of complementary activities within a landscape?
- What are the limits to and trade-offs within sustainable production systems, and how are they best governed?

The network's so far activity under this theme focuses on:

2. Optimising synergies between agricultural production and ecosystem services via an overview of the research landscape.

This activity aims to identify the research gaps concerning agricultural ecosystem services (ES) –including production - by listing and recording ongoing national and international activities on agricultural ES. The work done so far indicates only a small number of mechanistic studies on ES in agriculture and a lack of linkage between ecology, agronomy, soil and social sciences.



Theme 3: Sustainably Improving Food Productivity at Farm/Enterprise Level. Scientific questions explored under this theme include:

- What practices (including uptake of existing and novel technologies) can be developed and adopted to maximise resource-use efficiency in different contexts (space and time)
- What knowledge and information can be delivered to sustainably improve the quality of crops at the farm/enterprise level (what/where/how)?
- What knowledge and information can be developed to sustainably deliver improved quality of livestock products (what where how) and welfare considerations and feed issues?
- How can interactions between genetic resources, environment and management (GxExM) in different locations be optimised?
- What strategic and tactical tools and practices can be developed and adopted to adapt to and mitigate consequences of extreme events/increasing volatility including those related to climate variability and other changes?

The network's so far activity under this theme focuses on:

3. Addressing yield gaps, resource use efficiencies and environmental impact

Through quantification of yield & water productivity gaps for major crops in temperate countries (using the Global Yield Gap Atlas) this work has now delivered preliminary data identifying some of the underlying root causes of yield gaps in the temperate region⁵. Moving forward this activity will seek to address whether it is possible to define 'sustainable' crop yield levels which strike an acceptable compromise between production, resource use efficiency & environmental impact. This will be considered by expanding the estimation of resource use efficiencies taking into account factors like nutrients, greenhouse gasses, energy, labour etc and analysing the trade-offs between these factors.

For more information around the network's ongoing work, visit the TempAg website.



⁵ López Porrero, E.J. (2016). *Explaining yield gaps of cereals in temperate regions using an expert-based survey*. MSc Thesis, Wageningen University

ANNEX TWO – list of delegates

Name	Country	Research/Work Area
Dr Baltazar A. Antonio National Agriculture and Food Research Organization Senior Principal Researcher <i>antonio@affrc.go.jp</i>	Japan	Currently, I am a staff of the International Relations Office of the National Agriculture and Food Research Organization (NARO). Before assuming this position, I have been in research on rice genomics.
Prof David Barling University of Hertfordshire Director of the Centre for Agriculture, Food & Environmental Management (CAFEM) <i>d.barling@herts.ac.uk</i>	United Kingdom	Research focuses on food policy, food security and sustainability, and the governance of the agri-food sector. with particular reference to UK, EU and global levels.
Prof Jan Bengtsson Swedish University of Agricultural Sciences (SLU) Professor in ecology and environmental research <i>jan.bengtsson@slu.se</i>	Sweden	Ecosystem services and biodiversity in production ecosystems (agricultural and forest landscapes). Co-production of ecosystem services in social-ecological systems. Future agriculture and sustainability. Soil ecology and biodiversity.
Prof Tim Benton GFS/BBSRC UK Champion for Global Food Security <i>tim.benton@foodsecurity.ac.uk</i>	United Kingdom	Professor Tim Benton was until very recently the “Champion” for the UK’s Global Food Security (GFS) programme, leading, facilitating and coordinating its activities. Tim is a leading researcher, based at the University of Leeds, on agri-environment interactions and finding ways to make agricultural production more sustainable. Tim facilitates knowledge exchange between research and stakeholders in government, industry and society. He worked in the University of East Anglia, then the Universities of Stirling and Aberdeen before moving to Leeds in 2005. At Leeds, he has been head of his department and Pro-Dean for Research in the Faculty of Biological Sciences, and the Chair of Africa College, a University partnership with the International Institute for Tropical Agriculture in Africa. He has published over 100 papers, most tackling the core themes of agriculture’s environmental impact and more generally how ecological systems respond to environmental change. Tim is also a vocal advocate for the issues of how to manage increasing demand for food in a way that is sustainable.
Dr Christoph Carlen Agroscope Executive Board, Head of a Research Unit <i>christoph.carlen@agroscope.admin.ch</i>	Switzerland	Development of resilient farming systems that employ innovative technologies and diverse approaches to plant production in changing socio-economic conditions and environmental constraints, such as increasing temperatures and climatic injuries, along with threats from weeds, pests and disease. Understanding how plants (field and horticultural crops) function and respond to management and environmental factors under Swiss conditions. Development of effective and efficient use of finite resources by plant production procedures by considering the whole farm systems.
Prof Dave Chadwick Bangor University Prof of Sustainable Land Use Systems <i>d.chadwick@bangor.ac.uk</i>	United Kingdom	Optimising nutrient use efficiency in farming systems; quantifying and mitigating diffuse pollutant losses to water and air.

Name	Country	Research/Work Area
Ms Maja Clausen Federal Ministry of Food & Agriculture (BMEL) Research & Innovation Division <i>Maja.Clausen@bmel.bund.de</i>	Germany	<p>Since October 2015 Maja Clausen holds her current position within the Research and Innovation Division of the Federal Ministry of Food and Agriculture (BMEL), where she is in charge of the European and International Research Portfolio.</p> <p>In her previous assignment as the Research, Science and Innovation Counsellor at the German Embassy in Pretoria (South Africa), she was responsible for the facilitation of the German – South African collaboration in the areas of Research, Science and Innovation as well as Vocational and Higher Education.</p> <p>From 2002 to 2005, she worked at the Food and Agriculture Organization (FAO) of the United Nations (UN) in Rome (Italy) with a particular focus on „Alternative Livelihoods for Opium farmers in Afghanistan“ and „HIV/AIDS and Food Security in Complex Emergencies in Southern Africa“.</p> <p>She holds a Masters (M.Sc.agr.) degree in Agricultural Sciences of the Tropics and Subtropics from the University of Goettingen, as well as a B.Sc. in Human Nutrition and lives in Berlin (Germany), together with her husband and their two children.</p>
Dr J.M. (Jasper) Dalhuisen Department of European Agricultural and Fisheries Policy and Food Security - Ministry of Economic Affairs Senior Policy Advisor <i>j.m.dalhuisen@minez.nl</i>	Netherlands	<p>Working on the CAP (e.g. sustainable and competition in the food chain), OECD-working groups on agriculture and the environment. Cooperation is possible on new policy instruments.</p>
Dr Jesus Escudero INIA Scientific Programme Manager <i>jesus.escudero@inia.es</i>	Spain	<p>The National Institute for Agricultural and Food Research and Technology (INIA) is interested in broad sense in Agriculture, Food Technology, Forestry and Climate Change issues. It represents Spain in these areas concerning policy advice and international scientific relations.</p>
Mr Erik Fahlbeck SLU Pro Vice Chancellor <i>erik.fahlbeck@slu.se</i>	Sweden	<p>TempAg Governing Board member</p>
Dr Kazuhisa Goto National Agriculture and Food Research Organization Principal Researcher / Economist <i>gotok@affrc.go.jp</i>	Japan	<p>Research interests on open innovation and innovation management system for Food and Agribusiness fields.</p>
Prof Peter Gregory University of Reading Professor Emeritus <i>p.j.gregory@reading.ac.uk</i>	United Kingdom	<p>Global food security and root:soil interactions.</p>
Dr David Hughes Syngenta Global Head of Technology Scouting <i>dave.hughes@syngenta.com</i>	United Kingdom	<p>Creating relationships with external scientists and organisations, and leveraging those relationships to develop new science and technology for use in agriculture.</p>
Dr John Ingram Oxford University ECI Food Systems Programme Leader <i>john.ingram@eci.ox.ac.uk</i>	United Kingdom	<p>John Ingram's interests are in the conceptual framing of food systems, the interactions among the many actors involved and their varied activities, and the outcomes of their activities for food security, livelihoods and environment. He has designed and led regional projects around the world on the links between food security and environment through the analysis of food systems.</p>

Name	Country	Research/Work Area
Mr Franck Jesus Head of Natural Resources Policy Division OECD <i>franck.jesus@oecd.org</i>	International Organisation	<p>Mr. Franck Jésus is Head of the Natural Resources Policy Division of the Trade and Agriculture Directorate at OECD, a Division dealing with policies related to Agriculture and Environment, Trade and Environment, and Fisheries. He has more than 20 years of experience working on climate change, environmental and agricultural policies and projects. Prior to working at the OECD, he has worked at the Global Environment Facility (GEF) as Senior Climate Change specialist; at the French Treasury, as head of the Environment and Agriculture Department; and at the French Environment and Energy Management Agency as head of the Economics Department.</p> <p>Prior to that, Franck spent ten years in South-East Asia designing and implementing projects for agricultural development and natural resource management.</p> <p>Franck holds a Master's degree from Paris-Grignon National Agronomic Institute (INA-PG) and a Post Graduate degree from the National School of Rural, Forest and Water Management (ENGREF).</p>
Dr Stefan Lange Thünen Institute - Federal Research Institute for Rural Areas, Forestry and Fisheries Research Director <i>stefan.lange@thuenen.de</i>	Germany	<p>Responsible for strategic alignment of Thünen Institute incl. initiating appropriate interdisciplinary research approaches (e.g. efficient use of resources in agriculture, fisheries and forestry; societal expectations; options for policy framework & instruments) - consulting political decision-makers regarding respective research strategies and coherent funding tools - current personal research topics: adaptation of agriculture to CC; future of organic food & farming systems</p>
Prof Heikki Lehtonen Natural Resources Institute Finland (Luke) Professor <i>heikki.lehtonen@luke.fi</i>	Finland	<p>I have been working with several projects related to agricultural and agri-environmental policy, sustainable agriculture, economic and environmental effects of policy reforms and climate change. In recent years I have been participating FACCE MACSUR http://macsur.eu/; http://macsur.eu/index.php/regional/regional-case-studies/northern-savo based on outcomes of various research projects, considering especially adaptation to climate change in Northern Europe, including a case study based analysis how policy contributes to adaptation to climate change and mitigation of climate change across Europe.</p>
Prof Fleur Marchand ILVO Scientific Coordinator <i>fleur.marchand@ilvo.vlaanderen.be</i>	Belgium	<p>Prof. Dr. Fleur Marchand is coordinator of the research domain Agricultural and Farm Development within the Social Science Unit of ILVO. She is doctor in science (UA, 2006) and agricultural engineer (UGent, 2001). She builds her expertise mainly based on empirical case-studies of learning processes with stakeholders striving for sustainable agriculture and food chains. She uses mainly a transdisciplinary and system approach focusing on the following research topics: knowledge exchange, agroecology and transition of the food system. She is responsible for different national and international projects on these topics. Furthermore, she is professor at the University of Antwerp where she is responsible for courses on methodologies and techniques for interdisciplinary research. She is a member of the EIP Focus Group 'Benchmarking of Farm Productivity and Sustainability Performance'.</p>
Prof Phatu William Mashela University of Limpopo Senior Professor <i>phatu.mashela@ul.ac.za</i>	South Africa	<p>Climate smart agriculture with emphasis on green technologies.</p>
Mr Bruce McCallum Ministry of Business, Innovation and Employment Counsellor to the EU (Science and Innovation) <i>bruce.mccallum@mbie.govt.nz</i>	New Zealand	<p>Enhance science and innovation co-operation between NZ and the EU, with agriculture and food system research a key focus area.</p>

Name	Country	Research/Work Area
Dr Bram Moeskops TP Organics Senior Scientific Coordinator bram.moeskops@tporganics.eu	Belgium	European Technology Platform
Prof Bongani Ndimba Associate Professor, Department of Biotechnology Agriculture Research Council & University of Western Cape NdimbaB@arc.agric.za	South Africa	Senior Research Manager of the Infruitec-Nietvoorbij (Institute for Deciduous Fruit, Vines and Wine Research) of the Agricultural Research Council (ARC) in South Africa. The institute has >300 employees, 7 farms. Prof Ndimba worked as a Specialist Researcher heading ARC's Proteomics Research & Services Unit (2011-2014). He is an Extraordinary Professor at the University of the Western Cape (UWC). He completed his PhD studies at Durham University in England in 2001, and worked as a post-doctoral fellow until December 2005. He is a National Contact Point (NCP) for the H2020's Biotechnology and Food Security, Sustainable Agriculture, Marine and Maritime and Bio-economy Thematic Area. To date he has more than 40 internationally peer-reviewed publications supervised more than 30 Hons/MSc/PhD/Postdocs. He is co-investigator in a USAID funded consortium (worth \$5m – 2014-2019), themed: "Feed the Future Innovation Lab for Climate-Resilient Sorghum". The research team includes partners from ICRISAT-Mali-India, Jimma University (Ethiopia), The Land Institute-USA and Georgia University.
Prof Ajuruchukwu Obi University of Fort Hare Professor aobi@ufh.ac.za	South Africa	Research into smallholder development focusing on technical and institutional constraints, market access, collective action and entrepreneurial development in the small farming sector. I am currently carrying research to review and evaluate appropriate development paths for expansion from homestead food gardening to smallholder irrigation farming, increased water use productivity of crop production and improved livelihoods on selected smallholder irrigation schemes in South Africa. The research has involved the evaluation of natural, physical, financial, human and social assets, entrepreneurial spirit and management capabilities within incentives of secure land tenure, water use rights and leadership in organisational structures. The research is also seeking to determine sources of livelihoods and opportunities to improve contribution by farming within available food value chains. It is also trying to determine the aspirations and goals of farmers to expand irrigation crop production from homestead gardens to irrigation plots and/or from one to more than one irrigation plot.
Dr Lillian Øygarden NIBIO Research Manager lillian.oygarden@nibio.no	Norway	Research; Soil erosion during snowmelt and Winter conditions. Soil tillage and erosion. Monitoring of runoff, erosion and nutrient losses from Agricultural areas. Evaluation of Regional Environmental Monitoring Programmes in Agriculture. Project Coordinator for the Interdisciplinary Project AGROPRO-Agronomy for increased Food Production With focus on cereal Production, forage, soil quality, farm management Methods, economy and social science. Coordinator of the Norwegian consortium participating in MACSUR: Modelling European Agriculture With climate change for Food Security. Norwegian representative in the GRA - alliance for the Cropland Group. Member of secretariat, set by Ministry for Agriculture and Food for evaluating Agriculture and Climate change. Norwegian representative in TempAg governing Board.

Name	Country	Research/Work Area
Prof Pirjo Peltonen-Sainio Natural Resources Institute Finland (Luke) Professor <i>pirjo.peltonen-sainio@luke.fi</i>	Finland	Crop scientist and agronomist with wide experience in large-scale research programmes, and in leading multidisciplinary collaboration projects. My research focuses on the adaptation of crops - and production systems - to conditions at northern latitudes and to climate change. Issues of sustainable intensification of production systems, self-sufficiency in Nordic regions and food security, lie behind my work on the influence of environmental, climatic and genetic variation on field crop production. As an expert in crop production, I have wide connections to industries operating at all stages of the food production chain.
Mr Ivar Pettersen NIBIO / NMBU Associate Professor <i>ivar.pettersen@nibio.no</i>	Norway	Bio-industry, industrial convergence, industrial policy, climate policy, circular economy
Prof Simon Potts Director, Centre for Agri-Environmental Research <i>s.g.potts@reading.ac.uk</i>	United Kingdom	<p>Understanding the relationship between land use, biodiversity and ecosystem services.</p> <p>Food security: role of biodiversity and ecosystem services in food production</p> <p>Environmental drivers of biodiversity and ecosystem services, including: land use change, climate change, agrochemicals, invasive species and socio-economic factors Quantifying the economic and environmental value of pollination and other ecosystem services</p> <p>Developing evidence-based adaptation and mitigation options for policy and management applications Ecology and management of agro-ecosystems for the conservation of biodiversity.</p>
Dr Karl Richards Teagasc Head of Department <i>Karl.Richards@teagasc.ie</i>	Ireland	My main research focus is on fate and transport of contaminants from agriculture and the development of sustainable agricultural practices in the area of greenhouse gas emissions and water quality.
Dr Till Seehusen NIBIO Researcher <i>till.seehusen@nibio.no</i>	Norway	Cereal production, soil structure, soil tillage, soil compaction, yield gap.
Prof Jean-François Soussana INRA Scientific Director for Environment <i>jean-francois.soussana@inra.fr</i>	France	<p>Since 2010, Dr Jean-Francois Soussana has been scientific director for environment at INRA, Paris, France. He obtained his PhD in plant physiology at USTL Montpellier in 1986 after a degree in agronomy. After becoming a senior scientist he led an INRA research unit on grassland ecosystems and global change for 8 years. Since 1998, Dr. Soussana has been a member of the Working Group II of IPCC on Impacts, Adaptation and Vulnerability. He was Lead Author for the Third, Fourth and Fifth Assessment Reports in the field of agriculture, forests and ecosystems and shared with all authors of IPCC the Nobel Prize for Peace in 2007. He has contributed to international research programs (GCTE, Global Change and Terrestrial Ecosystems; GCP, Global Carbon Project) and to scientific expertise for FAO. He has coordinated research projects on climate change and agriculture and currently leads a large European (FP7) project on livestock and climate change involving four continents.</p>
Mrs Dorri te Boekhorst FACCE-JPI / Wageningen University & Research <i>dorri.teboekhorst@wur.nl</i>	Netherlands	Member of the FACCE-JPI Secretariat and support the development of the Knowledge Network on Sustainable Intensification.

Name	Country	Research/Work Area
Dr Lindsay Todman Rothamsted Research <i>lindsay.todman@rothamsted.ac.uk</i>	United Kingdom	Currently working on the TSARA (Towards Sustainable and Resilient Agriculture) project. We are looking at how countries - currently UK, The Netherlands, France and New Zealand - can meet the Sustainable Development Goals (SDGs) that relate to domestic agriculture, and how they could achieve more by working together to meet the global goals. We are using a backcasting methodology that combines modelling work to identify how the agricultural landscape might look to meet SDG targets with stakeholder workshops to identify pathways to reach feasible options.
Dr Gerrie van de Ven Wageningen University & Research Assistant Professor <i>Gerrie.vandeven@wur.nl</i>	Netherlands	Plant Production Systems. Modelling and optimization of agricultural production systems, strongly related to environmental and economic issues. I worked in both Europe and Africa Areas of expertise: farming system analysis, optimization of land use systems, nutrient cycling, crop growth modelling, crop/livestock systems modelling, sustainability and its indicators.
Dr Tony van der Weerden AgResearch Scientist <i>tony.vanderweerden@agresearch.co.nz</i>	New Zealand	My area of expertise relates to understanding the drivers and processes regulating gaseous N emissions, particularly nitrous oxide (N ₂ O) emissions, from soil that have been treated with excreta, effluent and fertiliser. I have led several national studies where emission factors have been developed, and mitigation options have been assessed. Some of this work is now included in the NZ national agricultural inventory. I am currently involved in field studies aiming to improve our estimates of N ₂ O emission factors, as well as comparing the greenhouse gas footprint of contrasting pasture-based temperate farming systems.
Dr Freija van Duijne Ministry of Economic Affairs Senior Policy Maker <i>f.h.vanduijne@minez.nl</i>	Netherlands	Strategic research and innovation agendas for Agricultural, food and nature.
Prof Martin van Ittersum Wageningen University & Research <i>martin.vanittersum@wur.nl</i>	Netherlands	Plant Production Systems, Agricultural systems, integrated assessment.
Prof Andrew Whitmore Rothamsted Research <i>andy.whitmore@rothamsted.ac.uk</i>	United Kingdom	Soil science, Sustainable Agricultural and ecological systems, resilience, mathematical modelling.
Prof Christine Watson SRUC Professor of Agricultural Systems <i>christine.watson@sruc.ac.uk</i>	United Kingdom	My research focuses on nutrient management in agricultural systems and I have worked in a wide range of farming systems including arable, mixed farming, outdoor pig production and dairy systems as well as agroforestry. I work at a variety of scales from process based studies of nutrient fluxes associated with root turnover to crop rotation and farm scale nutrient budgets. I have recently been involved in estimating nitrogen fixation at the continental scale in the EU Legume Futures project. I am particularly interested in how we can apply interdisciplinary approaches to address global problems.

Partners



For more information around the network's ongoing work,
or how to get involved visit the TempAg website or contact the TempAg Secretariat:

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