How to find pathways towards climate-smart agriculture – Views of farmers, educators and advisers in Finland

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**Implications**

Pursuing climate-smart solutions at farms can be thought of as being part of strategic farm management in the context of sustainability and adapting to the future. When preparing for climate change, not only the environmental dimensions matter but all aspects of sustainability (ecological, economic, social and cultural) should be considered in tailoring climate-smart solutions for one’s own farm. Knowledge sharing, co-operation and long-term strategic thinking skills can support developing more sustainable and resilient agriculture and help farmers find and develop their own optimal climate-smart solutions that fit their development targets and pathways. Also many common practices of organic agriculture such as nutrient cycling and biological nitrogen fixation can help to develop climate-smart agriculture.

**Background and objectives**

Climate change is one of the most important drivers of change in agriculture (Lacey et al. 2015). In the global context, climate change is already threatening food security and causing major changes in e.g. the availability of water and tillable soil (IPCC 2014). Climate-smart agriculture can be defined as an approach for transforming and reorienting agricultural systems to support food security under the new realities of climate change, it aims to increase the adaptive capacity of farmers as well as increase resilience and resource use efficiency in agricultural production systems (Lipper et al. 2014).

Agriculture has also many different roles in relation to climate change: it is a victim of the impacts, on the other hand it is also causing greenhouse gas emissions and thirdly, agriculture has a role as climate change problemsolver, because it creates soil carbon sinks and has possibilities to produce renewable energy (Ollikainen et al. 2014). Farmers know the importance of climate and weather for their work and livelihood and already see a need for more climate-smart solutions, but they may lack information on the practical solutions suitable for their own farms (Ollikainen et al. 2014).

Climate change can be defined as wicked problem, concept used in social sciences for situations characterised by combination of high complexity, uncertainty and divergence (Head 2008). Wicked problems are series of interlinked problems and they have many stakeholders (Head 2008; Collins & Ison 2009). Solving of wicked problems needs social learning, which is based on the idea that knowledge is composed by sharing and doing with others and knowledge has contextual character, it is depended on situation, time and place (Collins & Ison 2009). To combat climate change, not only knowledge and technical solutions but also future-oriented strategic thinking skills, skills to cope with uncertainties and building of adaptive capacity are needed (Folke et al. 2010).

The objective of this work was to describe how actors (farmers, advisers and other rural stakeholders) jointly see the pathways and solutions to prepare for climate change in Finnish farms. The enabling and obstructing issues important for finding and taking climate-smart actions into practice were gathered based on views of workshops participants.

**Key results and discussion**

Developing climate-smart solutions at farms was found to be an integrated part of farm development, rather than a separate issue to deal with or a requirement for a technical investment. Research-based and experience-based information about practical solutions (not just information about climate change impacts), examples of good practices, excursions, and collaboration and discussion forums with colleagues were considered to be important means for capacity building on developing climate-smart solutions at farms.

The main obstructing factors recognized were the current low profitability of farming, farmers’ feeling of inferiority in society, lack of smooth farmer co-operation, regionally divided location of cereal and domestic animal farms in Finland, and short-term and inconsistent farming and energy policies. According to participants, the current high workload and lack of time, lack of financial resources for investments and fears for increasing bureaucracy limit proactive climate work. However, methods creating multiple benefits for farmers, such as increasing carbon sinks while simultaneously improving soil quality, ensuring yields by utilizing high quality research and knowhow, and producing on-farm renewable energy, were seen as concrete and inspiring means towards climate-smart agriculture.

Based on our workshops, farmers value that also familiar agricultural practices and management choices, can support preparing for climate change. These include e.g. taking care of soil organic matter and soil structure, enhancing biodiversity on fields, using crop rotation and growing nitrogen-fixing-plants. In win-win-situations, farmers can find climate-smart solutions as economically and ecolocigally beneficial but also motivating factors for their work and work identity. E.g. soil conservation, crop rotation and enhancing biodiversity on fields were seen to be based on honouring the value of agricultural field and soil, traditionally seen as the most important basis for whole agriculture.

**How work was carried out?**

The Climate Change and Countryside-project ([www.ilmase.fi](http://www.ilmase.fi)) organised 12 workshops for farmers, educators of farmer students, rural developers, decision-makers and researchers around Finland during the years 2012-2014. Workshops had altogether app. 300 participants, of which 120 were farmers. Workshops lasted 7 hours each, including presentations by researchers, rural developers, farming advisors and forerunner farmers to provide information followed by facilitated group discussion using”me-we-us” method and applied SWOT-analysis on the main theme of the workshop (for methods see Himanen et al. 2016; Hogan 2003; Knierim & Nowicki 2010). In each workshop, there was also a written questionnaire to gather the views of the participants on possibilities and challenges of climate change mitigation and adaptation. Results are based on qualitative analysis of these group discussions and questionnaires. The Climate Change and Countryside–project was run by MTT Agrifood Research Finland and funded by EAFRD and Finnish Ministry of Agriculture and Forestry.

**References**

Collins K & Ison R 2009. Jumping off Arnstein’s Ladder: Social Learning as s New Policy Paradigm for Climate Change Adaptation. Environmental Policy and Governance 19:6, 358-373.

Folke C, Carpenter SR, Walker B, Scheffer M, Chapin T & Rockström J 2010. Resilience thinking: integrating resilience, adaptability and transformability. Ecology and Society 15:4, 20.

Head BW 2008. Wicked problems in public policy. Public Policy 3:2, 101–118.

Himanen SJ, Mäkinen H, Rimhanen K & Savikko R 2016. Engaging Farmers in Climate Change Adaptation Planning: Assessing Intercropping as a Means to Support Farm Adaptive Capacity. Agriculture 6:3, 34.

Hogan C 2003. Practical Facilitation: A Toolkit of Techniques, 1st edition. Kogan Page, London, UK; Sterling, VA, USA, pp. 265–273.

IPCC 2014. Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field CB, Barros VR, Dokken DJ, Mach KJ, Mastrandrea MD, Bilir TE, Chatterjee M, Ebi KL, Estrada YO, Genova RC, Girma B, Kissel ES, Levy AN, MacCracken S, Mastrandrea PR & White LL (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1‐32.

Knierim A & Nowicki P 2010. SWOT Analysis: Appraisal of a New Tool in European Rural Development Policies. Outlook on Agriculture 39:1, 65-72.

Lacey J, Howden M, Cvitanovic C & Dowd A 2015. Informed adaptation: Ethical considerations for adaptation researchers and decision-makers. Global Environmental Change 32:200-210.

Lipper L, Thornton P, Campbell B, Baedeker T, Braimoh A, Bwalya M, Caron P, Cattaneo A, Garrity D, Henry K, Hottle R, Jackson L, Jarvis A, Kossam F, Mann W, McCarthy N, Meybeck A, Neufeldt H, Remington T, Thi Sen P, Sessa R, Shula R, Tibu A & Torquebiau E 2014. Climate-smart agriculture for food security. Nature Climate Change 4: 1068–1072.

Ollikainen M, Järvelä M, Peltonen-Sainio P, Grönroos J, Lötjönen S, Kortetmäki T, Regina K, Hakala K & Palosuo T 2014. Ympäristöllisesti ja sosiaalisesti kestävä ilmastopolitiikka maataloudessa. Suomen ilmastopaneeli. Raportti 1/2014.