European Commission

Science for Environment Policy

15 April 2016
Issue 453

Subscribe to free weekly News Alert

Source: Long, T., Blok, V. & Coninx, I. (2016). Barriers to the adoption and diffusion of technological innovations for climate-smart agriculture in Europe: evidence from the Netherlands, France, Switzerland and Italy. *Journal of Cleaner Production*, 112, pp.9––21. DOI: 10.1016/j.jclepro.2015.06.044

Contact:
tomblong9@aol.com

Read more about:
Agriculture, Climate change and energy, Environmental technologies

Climate-smart agri-technology innovations: how to increase uptake

'Climate-smart agriculture' aims to sustainably increase agricultural production and increase resilience to climate change. One aspect focuses on climate-smart technologies. TThis study interviewed users and producers of these technologies, highlighting barriers to adoption and possible means of overcoming them, including increasing awareness, user-focused design and changes to policy.

Agriculture both contributes to and is affected by climate change. The agricultural sector contributes around 12% of anthropogenic greenhouse gas (GHG) emissions according to some estimates[1]. The sector, like all sectors, is facing growing pressure to reduce its emissions to mitigate climate change. Agriculture is also increasingly impacted on by climate change via changes to weather patterns and more frequent extreme weather events such as floods, storms and droughts. Agriculture is also confronted with the challenge of feeding a growing population. Current projections estimate that to feed the global population by 2050 food production needs to increase by 60%.

An approach developed by the Food and Agriculture Organization of the United Nations (FAO) to respond to these combined challenges is 'climate-smart agriculture' (CSA)[2], which aims to enhance agricultural productivity while reducing GHG emissions. According to the FAOFAO, it has three main objectives: the sustainable increase of agricultural productivity, the adaptation and building of resilience to climate change, and reduction of GHG emissions. Above and beyond technological solutions, there are also many practices which are both cost-effective and have a positive climatic impact, such as better manure management, integrated crop-livestock management, use of renewable energy, use of legumes or cover crops, improved animal feeding, and practices which increase soil carbon. This research particularly focuses on how technological innovations could solve climate-mediated problems in agriculture.

Although some new CSA technologies are already been implemented (such as software to optimise yields, remote-sensing technologies for precision farming and life-cycle assessment tools) adoption has been slow and diffusion rates pose a problem. This study, which received funding from the European initiative Climate-KIC[3], identified the barriers to adoption of such technologies in the EU.

The authors first conducted a literature review to identify barriers to the adoption of environmental technological innovations, both generally and specific to agriculture. The major barrier to agriculture-specific technology adoption was financial cost; but conflicts with traditional methods, use of scientific jargon and lack of understanding of farmers' reality by technology producers were also highlighted.

The researchers also conducted interviews with technology providers and end users, including farmers' associations and consumer goods producers. They held 26 interviews in France, Italy, the Netherlands and Switzerland to identify the barriers from both sides of the chain (supply and demand).

Continued on next page.

1. IPCC Fifth Assessment Report. http://ipcc.ch/report/ar5/syr/
2. http://www.fao.org/climate-smart-agriculture/en/
3. Data for the study was collected as part of the European project 'CSA Booster'

European Commission

Science for Environment Policy

15 April 2016
Issue 453

Subscribe to free weekly News Alert

Climate-smart agri-technology innovations: how to increase uptake *(continued)*

The major barriers experienced by providers of technological solutions were: difficulty in demonstrating value, access to investment, an 'unsympathetic' regulatory landscape and difficulty reaching customers. By contrast, users identified lack of awareness, high costs, long return on investment periods, lack of verified impact and regulatory issues.

The researchers describe interventions to tackle these obstacles. They say many of the demand-side barriers can be traced back to limitedlimited understanding of user needs by those who design innovations. On the supply side, providers struggle to access customers and demonstrate the impact of their technologies. The researchers say greater engagement with users early on in the design process ('co-creation') could alleviate both problems.

Policymakers also have a role to play in climate-smart agri-technological innovation; the researchers suggest traditional supply-side measures (such as state support for start-ups) and equivalent demand-side measures (such as tax breaks) could reduce cost and increase return on investment for users. Finally, the researchers say providers should be helped to develop business models and demonstrate the benefits of their technologies, potentially with a labelling scheme, to provide reassurance to end-users.

Although this study did not explicitly address wider CSA practices, such as improved animal feeding (which can have positive effects for both farmers and the climate), the researchers do support increasing compatibility between CSA objectives and regional, national and Europe-wide policies. They also say awareness of CSA should be improved through education programmes and campaigns.

Source: Long, T., Blok, V. & Coninx, I. (2016). Barriers to the adoption and diffusion of technological innovations for climate-smart agriculture in Europe: evidence from the Netherlands, France, Switzerland and Italy. *Journal of Cleaner Production*, 112, pp.9–21. DOI: 10.1016/j.jclepro.2015.06.044

Contact:
tomblong9@aol.com

Read more about:
Agriculture, Climate change and energy, Environmental technologies