

Notes From The Field

The co-production of knowledge for adaptive governance: The case of the Colombian coffee sector

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Key Messages

- Agriculture is increasingly affected by climate change, and an understanding of how farmers are coping with it is vital to secure livelihoods and increase adaptive capacity.
- Analysis of the coffee sector in Colombia confirms that different narratives around climate change and its impact can lead to different coping strategies and to maladaptation.
- Stakeholders need space for deliberation and the co-production of knowledge to build adaptive capacity – a process aided by social networks that foster informal collaborations and the diffusion of information.
- In periods of uncertainty and change, adaptive governance can also enhance social and technical innovation and encourage institutional trust and collaboration.

Agricultural production in Colombia has suffered in past decades from natural climate variations such as El Niño and La Niña. The recent effects of extreme climate variability, however, are not only more complex, they also point to an uncertain future for farmers worldwide.

In times of increased uncertainty and change, the effective management of resources is crucial and can benefit from the co-production of knowledge and increased dialogue among stakeholders (Berkes, 2009). Evidence suggests that understanding how each actor makes sense of, defines, and adjusts to, the changing conditions around them is a central starting point in building adaptive capacity. In addition, existing management arrangements can facilitate this knowledge co-production through flexible learning and governance structures.

Colombia's coffee sector has implemented effective mechanisms to adapt to El Niño and La Niña fluctuations in the past. Today, however, coffee farmers face unpredictable seasons, erratic rainfall, temperature rises and increases in the prevalence of pests and diseases – all of these likely to be exacerbated by climate change (Jiménez, 2011). This, compounded by significant changes in the physical landscape, has translated into major reductions in coffee production.

This policy brief analyses the Colombian coffee sector, and argues that different narratives on climate change can compromise effective adaptation or even lead to maladaptation. The case study suggests that flexible governance arrangements are needed for knowledge co-production. Faced with uncertainty and change, farmers create informal arrangements, which are then diffused through social networks (farmers or other actors). These networks can complement existing institutional structures in the process of knowledge creation.

What is at stake?

Coffee production in Colombia is both culturally important and economically valuable. Today, coffee constitutes 5% of Colombia's total exports (DANE, 2011). With most coffee production carried out by smallholders, over half of a million families derive much of their income from this single crop. However, national production has declined drastically in the past few years. In 2011 production dropped to 7.8 million bags (Reuters, 2012) from 12.5 million in 2005-2007 (ICO, 2011) – the lowest figure since 1971 when only 7.3 million bags were produced (Asoexport, 2011).

According to industry experts, there are two main reasons for this drop: rising labour costs and geographic migration of crops as a result of climate change (Asoexport, 2011). Coffee farmers are also reporting that they are feeling the impact of increased climate variability and seeing their livelihoods undermined. They report a drop of approximately 60 to 80% in coffee production in the past two years as a result of climate change and its related effects (see Box 1).

Despite these observations, there is still considerable scientific uncertainty as to whether current climate variability and decreasing crop yields *to date* can be attributed to anthropogenic climate change. However, scientific models do predict *future* changes in the quality of coffee beans and in the altitude at which land is suitable for coffee production, as a result of climate change (Laderach et al., 2011).

Box 1: Climate change: Farmer's perceived changes and reported impact



In the past two to three years, farmers have noted the absence of the traditionally pre-determined harvests in May-July (*mitaca*) and September-November. Instead, small harvests throughout the year have become the norm. The perceived changes and their impact are outlined below.

Farmers and author discussing perceived changes in climate and its impacts on coffee production in the Colombian coffee region.

Perceived changes in climate	Reported impact
Extreme weather events	Increased diseases: Fungus Increase pest and plague incidence: Rust, coffee borer beetle
Undefined seasonal patterns	Plant loss Decreased harvests
Changes in <i>thermal floors</i>	Decreased coffee quality Decreased income
Altered cycles	New species of animals in region Crop losses
Increased rainfall	Increased stresses on coffee plants Decreased plant flowering
Unusually hot sun	Increased costs Unable to plan ahead
Gales	Physiological changes in plants Soil erosion
Hail	Food insecurity Landscape changes due to higher pressure on land
Source: Jiménez 2011.	

Climate change narratives in Colombia

An analysis of existing narratives around climate change helps to create dialogue (Leach et al., 2010) and promotes the co-production of knowledge. Knowledge co-production is the “iterative action, reflection, and deliberation of individuals and groups engaged in sharing experiences and ideas to resolve complex challenges collaboratively” (Armitage et al., 2011: p.995). Understanding diverse visions and proposals is critical to building responses and capacity to adapt to climate change.

While medium-term events (such as El Niño and La Niña) may require temporary changes in practices or minimal technological shifts, the long-term nature of climate change requires more permanent responses and a shift in management practices in coffee farming.

In the Colombian coffee sector, different narratives around climate change make it difficult to discuss strategies and mechanisms to address its impact effectively (Table 1). Diverse views, combined with the lack of a space for deliberation, has proved a critical barrier to any attempts to build adaptive capacity efficiently – that is, to implement strategies that manage knowledge and resources to minimise the effects of climate change.

Unless efforts are made to strengthen adaptive capacity today, there are likely to be heavy economic and cultural losses in the future, as well as continued damage to landscapes and the loss of ecosystems. Dialogue is crucial to define both the issues and the possible tools to help communities cope. This dialogue is more likely to be fruitful if the best available information is accessible to all and if all actors have equal opportunities to engage in the debate.

Stakeholder	Climate change narratives	Efforts / tools
Government	<ul style="list-style-type: none"> - Recognition of the nature and magnitude of possible implications for the agricultural sector. - Awareness of the need for more localised sectoral research, as well as a national adaptation strategy. - Institutional fragmentation seen as a major setback to knowledge sharing and collaboration. 	<ul style="list-style-type: none"> - Inter and intra-institutional collaborations to advance research on climate change impacts on the Colombian agricultural sector are in their infancy, while mitigation strategies are more developed. - Discussions on initial steps to create a National Adaptation Programme of Action to Climate Change (NAPA). - United Nations Framework Convention on Climate Change (UNFCCC) participation and communications.
Science	<ul style="list-style-type: none"> - Focus on ‘temporary’ climatic variability: El Niño and La Niña events, (vs. longer-term climate change events). - Reluctance to acknowledge climate change as a current stressor in coffee production, though initial efforts on climate change research have begun. - Some institutional confusion on leadership of climate change research and programmes. 	<ul style="list-style-type: none"> - Climate change programme launch at Cenicafé (Colombia’s National Centre for Coffee Research). - Research on more resistant coffee strains (mostly to deal with climate variability). - Methods for landscape management.
Extension Agents	<ul style="list-style-type: none"> - Seeing unprecedented changes in climate. - Acknowledge that farmers are suffering the consequences of climate change. 	<ul style="list-style-type: none"> - Unsure how to reconcile top-down approach and farmer experience. - Play a bridging role between science, Federación Nacional de Cafeteros (FNC) and farmers. - Training and knowledge transfer to farmers.
Farmers	<ul style="list-style-type: none"> - Confusion on nature of changing climate. - Belief in the need for more discussion on this issue. - Perceiving ‘unprecedented’ changes in climate patterns. - Highlight the need for environmental conservation and better landscape management. 	<ul style="list-style-type: none"> - Crop diversification. - Some shifts in farming practices. - Creation of farmer cooperatives to produce alternative crops. - Request for more training and information from FNC.

Table 1: Stakeholder narratives around climate change in the coffee region of Colombia . Source: author’s own assessment

Local adaptation

Positive, yet paternalistic:

In 1927 Colombian coffee growers created the Federación Nacional de Cafeteros (FNC), or national federation of coffee growers, a non-profit organisation to represent them and to ensure their welfare and quality of life (FNC, 2011). This model has been a positive example for similar smallholder organisations around the world, given its financially successful programmes and its goal of representing farmer interests. FNC has played a definitive role in the path of coffee production in the country: it has provided technical training and financial resources to farmers, promoted Colombia's coffee internationally, and carried out important scientific research. However, its role continues to be paternalistic in nature, with science-based expertise taking precedence over traditional and local knowledge.

Guided knowledge:

While large-scale investments are necessary to manage climate change impacts, research confirms that adaptation happens primarily at a local level (see Armitage et al., 2011; Laderach et al., 2011; Berkes and Jolly, 2002). In many areas the challenge is to reconcile large-scale government 'top-down' approaches with traditional 'bottom-up' approaches. This case study reveals that traditional knowledge is not static. Instead, farmers draw on almost a century of scientific best practices for coffee farming while continuing to learn the traditional ways developed by their ancestors. What exists today is a hybrid of science-based expertise and FNC management tools that influence traditional practices, combined with adaptations that serve local purposes (Table 2).

FNC-promoted tool	Local adaptations
Fertilizer and phosphorus management	<ul style="list-style-type: none"> - As prices of the commercial brands are increasing, farmers have begun to replace them with organic matter. - Farmers are looking beyond the FNC for more information on better management practices, but need more support in this.
Renovation of coffee crops to more climate resistant strains (mainly <i>Colombia</i> and <i>Castillo</i> strains)	<ul style="list-style-type: none"> - Many farmers are renovating their crops, but also diversifying to supplement lost income until initial harvests, with avocado, tomato, plantain, cassava and others increasingly popular. - Many farmers are experimenting with alternative strains, dividing their land into several plots to test better yields.
Landscape management / eco-system restoration	<ul style="list-style-type: none"> - As well as participating in trainings by extension agents, farmers are creating local groups and cooperatives to learn more about eco-system restoration and management tools. - Community groups in the form of cooperatives have been created to diversify farming activities (e.g. pig-farming, fish-farming, flowers and foliage).

Table 2: Examples of local adaptations of FNC-promoted tools. Source: Adapted from Jiménez, 2011: p.46.

Knowledge co-production for adaptive governance

Documenting local knowledge:

Understanding how farmers conceptualise observed changes to their environments is critical to furthering their adaptive capacity. As seen in Box 2, local variations to FNC agricultural initiatives are commonplace and are the result of the farmers' understanding of their context and years of personal, family and local experience. Documenting this knowledge may lead to a better understanding of local impacts and, given the uncertain conditions, these type of adaptations may prove more suitable than high-level or technological solutions. They are also more likely to be effective, as farmers are more likely to adopt them.

Social networks:

Unprecedented change has promoted the rise of informal collaborations among coffee farmers in Colombia. Experimental farming practices and crop diversification trends are first adopted by a few individuals and are then diffused among neighbouring farmers. Small groups adopt these practices as they are shared through networks.

Similarly, farmers are joining forces to create cooperatives to promote agricultural education and diversification. Existing networks seem to be the basis for these informal collaborations, at least in their infancy, because they require relationships of trust. Documenting and understanding these networks can increase successful outcomes in climate change adaptation.

Spaces for deliberation and flexible management:

This case study revealed that traditional adaptation tools and top-down approaches are not always at odds, but rather influence each other. Spaces for discussion between decision-makers and farmers to create strategies that include diversity of knowledge are needed. This *inclusion* goes beyond bringing diverse groups together, extending to consideration of alternative pathways for social, technological and environmental change. Exploring different narratives explicitly in discussions can facilitate negotiation and encourages reflection.

Adaptive governance must be enhanced to take advantage of the structures already in place. This implies multi-level stakeholder inclusion, but also better ways to manage uncertainty and change, promote social and technical innovation, and enhance institutional trust and collaboration.

Opportunities to strengthen adaptive capacity are being lost as a result of the paternalistic approach of the FNC. To help decision-makers explore optimal agricultural responses to climate change, the existing governance structure would benefit from feedback from local actors (farmers, extension agents, institutions/collaborations) for knowledge co-production. Similarly where flexible governance structures exist, understanding how social networks create and diffuse knowledge can maximise adaptation outcomes (Figure 1)

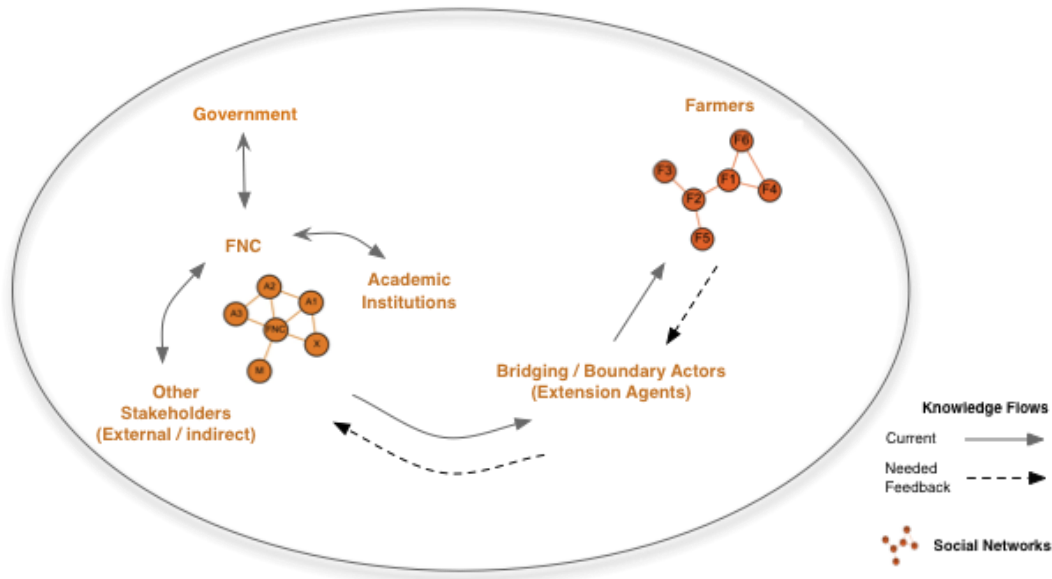


Figure 1: A model of adaptive governance for the Colombian coffee sector. Source: Author.

Extension agents bridge the gap between farmers and the FNC, and key stakeholders in knowledge co-production and adaptive governance. As employees of the Extension Service of the FNC they develop and deliver technical, social and environmental programmes to coffee farmers. Their role in capturing technology and information from both sides can be maximised to produce effective strategies to enhance adaptive capacity.

Recommendations

- Climate change adaptation policies and strategies must recognise the importance of documenting local 'on-the-ground' perceptions of climate change impacts and adaptation measures, and incorporate these into national plans.
- Different discourses on climate change lead to diverse solutions. Spaces and opportunities for deliberation are needed to allow complementary adaptation strategies and more effective outcomes. These spaces can take the form of multi-directional information flows between stakeholders.
- Understanding how information and collaboration emerges and how it is diffused through social networks can advance institutional management practices and adaptation strategies.
- It is vital to promote institutional trust and information sharing. For example, in Colombia the lack of collaborative work between Ministries, FNC, science institutions, academia and other interested institutions has prevented knowledge sharing even at the management level.
- Existing governance structures stand to benefit from an increased ability to deal flexibly with new situations. Adaptive governance requires a continual process of stakeholder inclusion, knowledge co-production and feedback mechanisms.

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References

Armitage, D., Berkes, F., Dale, A., Kocho-Schellenberg, E. and Patton, E. (2011). Co-management and the co-production of knowledge: Learning to adapt in Canada's Arctic. *Global Environmental Change*, 21(3), pp.995–1004.

Berkes, F. (2009). Evolution of co-management: Role of knowledge generation, bridging organizations and social learning. *Journal of Environmental Management*, 90(5), pp.1692–1702.

Berkes, F. and Jolly, D. (2002). Adapting to Climate Change: Social-Ecological Resilience in a Canadian Western Arctic Community. *Conservation Ecology*, 5(2):18.

Departamento Administrativo Nacional de Estadística (DANE) (2011). *Exportaciones*, Bogotá, viewed 15 August 2011, http://www.dane.gov.co/daneweb_V09/index.php?option=com_content&view=article&id=76&Itemid=56 DANE,

International Coffee Organization (ICO) (2011). *Production*, London, viewed 20 December 2011, http://www.ico.org/new_historical.asp.

Reuters (2012). 'Colombia se demorará 4 años en recuperar producción de café', *Portafolio*, viewed 20 January 2012, <http://www.portafolio.co/negocios/colombia-se-demorara-4-anos-recuperar-produccion-cafe>

Asoexport, A.C. (2011). *Memorias Asoexport 2010 ¿Hacia dónde va la caficultura colombiana?* Bogotá, pp. 1–116.

Jiménez, V. (2011). *Perceptions, Adaptability And Lessons From Climate Change Disruptions To Coffee Production: Aligning Local And National Visions In Colombia*. MSc. Dissertation. University of Oxford.

Laderach, P.; Lundy, M.; Jarvis, A.; Ramirez, J.; Prez-Portilla, E.; Schepp, K.; Fitzinger, A. (2011). Impact of climate change on coffee production and coffee-supply chains. pp.1–19, submitted to journal.

Federación Nacional de Cafeteros (FNC), 2011, *Historia*, viewed 12 October 2011, <http://www.federaciondefcafeteros.org>.

Leach, M., Scoones, I., & Stirling, A. (2010). *Dynamic sustainabilities: technology, environment, social justice*. London ; Washington: Earthscan.