

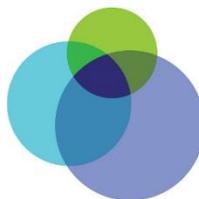
TRANSFORMATIVE INNOVATION LEARNING HISTORY: COLOMBIA

TRANSFORMATIVE INNOVATION POLICY IN/FOR SPECIALTY COFFEES

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**SPRU
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**TRANSFORMATIVE
INNOVATION
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Source: Photos from TIPC Case Study Workshop held in Neiva, Huila Department, 13 May 2017

I. INTRODUCTION

This Transformative Innovation Learning History (TILH) sought to explore transformative innovation policy in or for speciality coffee in Colombia, with a particular geographical focus on the subnational region of Huila department, leader in speciality coffees in the country. The case begins with a discussion of the transition to speciality coffee. We ask **to what extent policy has interacted with or generated transformative change**, and also **what policies (or parts of policies) have been, or have the potential to be, transformative** in the case of speciality coffee in Colombia.

The case is a multi-actor narrative which draws on a workshop held in Neiva (capital of Huila department) on 13 May 2017 with 36 stakeholders including coffee farmers, farmer association leaders, agronomists, representatives of cooperatives and small private companies, and researchers from a think-tank on regional development and coffee. We also use secondary material and interviews with key actors in the sector including representatives of the National Coffee Federation of Colombia (FNC), policy makers and policy practitioners.

II. KEY INSIGHTS

1. The shift to speciality coffee marks an industry transition that has altered practices, norms and routines of the industry, though this has not translated into benefits for all farmers.
2. New opportunities exist for a more sustainable and inclusive sector. Some are taking place in a piecemeal fashion, but more radical changes in relationships between producers and other value chain actors, including research and innovation institutions, require broader systemic support of policy makers.
3. There hasn't been a strategic directionality around STI policy and speciality coffee specifically in Colombia, per se. But there has been both bottom-up led change, which has transformative elements, and also some policy experiments that have transformative features.
4. Policy can learn from bottom-up initiatives.
5. There is a lot of expectation around speciality coffee, but to what extent will this actually *transform* lives? Speciality coffee in terms of price doesn't necessarily, but speciality coffee involves other horizontal changes that have a deeper transformative potential (for

example, changing people’s perceptions of themselves, what they produce, how they produce, their role and possibilities for experimentation).

III. DEFINING THE INNOVATION: WHAT IS SPECIALITY COFFEE?

Speciality coffee is generally described as any coffee with an added value above market prices (i.e. London and NY exchanges), given coffee is a globally traded commodity whose price rises and falls according to supply, demand, speculation, etc. This added value is defined by consumer willingness to pay a premium for either *process* or *product attributes*. *Process attributes* refer to coffee grown and processed under conditions that meet third-party sustainable certifications (e.g. Rainforest Alliance or Fairtrade) or industry codes of conduct (e.g. 4C, Starbucks Café Practices, Nespresso’s AAA sustainable line). These demand particular standards of social and environmental practice (addressing for example: labour conditions, water use and disposal, traceability and sanitary practices). *Product attributes* include any coffee with added value due to particular characteristics of origin (geographic, or specific farm or estate origin) or quality (taste, aroma, body, acidity, balance, etc.) that are appreciated by the consumer. While production of such quality coffee also demands particular care in cultivation and processing, in this latter case the value is placed on identifiable attributes in the product, rather than on verification of social or environmental practices during its production.

DOCUMENTATION QUOTE:

“In Colombia [speciality coffees] are those that are valued by consumers for their consistent, verifiable, and sustainable attributes, and for which they [consumers] are willing to pay higher prices which translate into a greater wellbeing for producers. These characteristics are given by the coffee’s origin (origin category), by its production in harmony with the environment (sustainable category), and by its commitment to social development of communities (social category).” Definition of speciality coffee from the National Federation of Coffee Growers of Colombia website.

THEORETICAL INSIGHTS:

While speciality coffees are a recognised niche or market segment in the business sense, it is debatable whether speciality coffees are technically a niche in the socio-technical transitions perspective, in the sense of whether they have the potential to disrupt the entire coffee regime. The answer may partly depend on how one defines speciality coffee; i.e. in terms of voluntary sustainability standards and industry codes of conduct (social and environmental conditions of production) or by origin and product quality (grown in particular locations with particular taste/aroma attributes). While third-party certifications are unlikely to become the norm in the entire market, these are arguably part of a global trend towards traceability, and linked to concerns of social and environmental sustainability, etc. This could be seen to involve a socio-technical transition. With the latter definition of speciality coffee (origin/quality), some argue that not all coffee (given particular ecological endowments) has the potential to improve quality to the point of gaining added value (or even meeting basic costs of production when commodity prices are low). One open question is whether those producers will be able to continue to produce coffee in the longer-term, given high input and labour costs and relatively low prices of conventional coffee, which sometimes fail to provide any profit margin at all (see reference), and in this case, what the appropriate policy measures should be.

III. DEFINING THE TRANSITION: WHAT WOULD A “TRANSITION” LOOK LIKE IN COFFEE IN COLOMBIA?

According to the literature on socio-technical transitions, a transition should provoke a broader system change – in other words, a change of the broader socio-technical regime – “affecting also user practices, policies, cultural meaning, etc.” (2007: 402). This transition requires a “conjuncture of multiple developments” or changes at both landscape and niche-levels (Geels and Schot 2007), also known as “selection pressures” (Smith et al 2005), which result in a shift in the socio-technical regime, including changing governance arrangements, institutions, standards, values, practices, policies, etc.

THEORETICAL INSIGHTS:

Transitions “do not only involve technological changes, but also changes in elements such as user practices, regulation, industrial networks, infrastructure, and symbolic meaning” (Geels 2002: 1257).

In the case of speciality coffee in Colombia, there is evidence of significant shifts in the socio-technical regime, made possible by landscape and niche changes, which provide critical selection pressures on the regime. While this is still in process, elements of a transition include:

- A very strong emphasis placed on social but particularly environmental sustainability in

production chains.

- A significant jump in *diversity* as an increasingly important cross-cutting theme in research on coffee (see social network analysis below).
- A redefining of the relationship between farmers and their crop, which we describe as de-alienation between small-scale farmers and the coffee they produce. The implications are a greater sense of ownership, empowerment and voice of small producers involved in the production of speciality coffee and possible further technical, commercial and social innovations.
- New collective relationships between actors at the levels of associative organisations of smallholders that provide greater voice and representation to producers.
- *In some cases* new more horizontal networks between producers, exporters, marketers, certifiers and consumers (speciality coffee enthusiasts), which have sometimes sidestepped the FNC (National Federation of Coffee Growers of Colombia - FNC for its acronym in Spanish). Nonetheless, in moving up the supply chain and partially replacing FNC's role, other private exporters and coffee companies hold significant power relative to (smallholder) producers.
- At least partial upgrading of smallholders, with access to new training opportunities, and a shift from a focus on productivity to new skills around tasting, experimenting for quality and climate adaptability, and exporting. This has led to opportunities for greater empowerment of producers through greater access to information (in prices etc.) and skills (for example ability to gauge value of their own coffee).
- There is a *potential* for power to shift from a small number of influential central agencies (such as the FNC and a small number of MNCs) towards more diverse actors involved in value chains (NGOs, other buyers, opportunities for peer-to-peer exchange, attempts to establish local distribution chains, women's groups).

However, whilst some policy efforts are beginning to support these directions, we would argue that sociotechnical transitions would require:

- A more thorough prioritisation of policy towards small producers.
- Improvement of local mechanisms to make small-scale farming socially sustainable, not to rely on national and foreign NGOs. This could be through a process of forging infrastructure that supports both stronger peri-urban producer-consumer networks in Colombia and peer-to-peer communication within the value chains.
- More substantive smallholder participation in experimentation, research and technology development as innovation agents, not just as passive beneficiaries of research.
- Greater input by smallholder producers in defining the criteria of certifications and regulations in order to problem-solve around potential obstacles to participation.
- Access by smallholders to training and education opportunities, finance and market trade shows/platforms.

- A stronger presence of organisations such as Colciencias in the field, given that the participants of the workshop did not seem to be informed about the functions of different governmental institutions or how to get access to their programmes. People within these institutions may also benefit from such engagement in order to enrich their thinking about research and innovation in service of rural development, particularly in the context of expectations around post-conflict Colombia.

At the landscape level, a broader change in emphasis that, at a more holistic level, addresses the potential for small-scale farming to encourage diversity of food production within a policy context of agroecology, agribusiness, food security and improved nutrition.

RESEARCHER REFLECTIONS:

“This case is about a socio-technical transition or transformation in relation to a globally traded agricultural commodity. For some, transformation means gaining more vertical control (value added) in a global value chain, while for others it might mean moving *out* of commodity production. In the context of Colombia, transformation can also refer to the rural transformation needed to address the tremendous inequity and violence that has plagued Colombia’s countryside especially over the last 60 years. What role can speciality coffee or similar models play in addressing this sort of transformation?”

DOCUMENTATION QUOTE:

“Colombia was an early adopter of certification/verification and has a higher share of certified/verified sales than other countries surveyed by IDH. In addition, large volumes are already double-certified. However, economic constraints may limit future growth. With farmers already facing high production costs, there is resistance to the creation of new costs in the supply chain. New environmental laws, particularly regarding wastewater disposal, are likely to make compliance more difficult and costly for individual small farms in the future.”
(Technoserve 2014)

PARTICIPANT REFLECTIONS:

“We are reforesting [...] and we have the challenge of defending peace and we hope that the context of the post-conflict will help us to improve the situation in the countryside. [...] We need the government to offer greater support to the rural areas.”

IV. THE CONTEXT OF SPECIALITY COFFEE IN COLOMBIA: COLOMBIA’S COFFEE HISTORY AND LEGACY OF INSTITUTIONS (THE COFFEE SOCIO-TECHNICAL REGIME)

Despite its global market share diminishing over much of the last 20 years, Colombia is currently the world’s third leading exporter of coffee and the leading producer of mild arabicas. Colombia was slow to adjust to changing political economic circumstances over the 1990s and early 2000s, but since 2002, Colombia’s speciality coffee production has grown significantly, from 2% of total coffee exports in 2000 to 28% in 2013 (Echevarria et al 2014).

DOCUMENTATION QUOTE:

“The 2002 Coffee Mission considered Colombia’s involvement in speciality coffees to be late, but in the last 14 years it has advanced quickly in this area” (Echevarria et al 2014: 17).

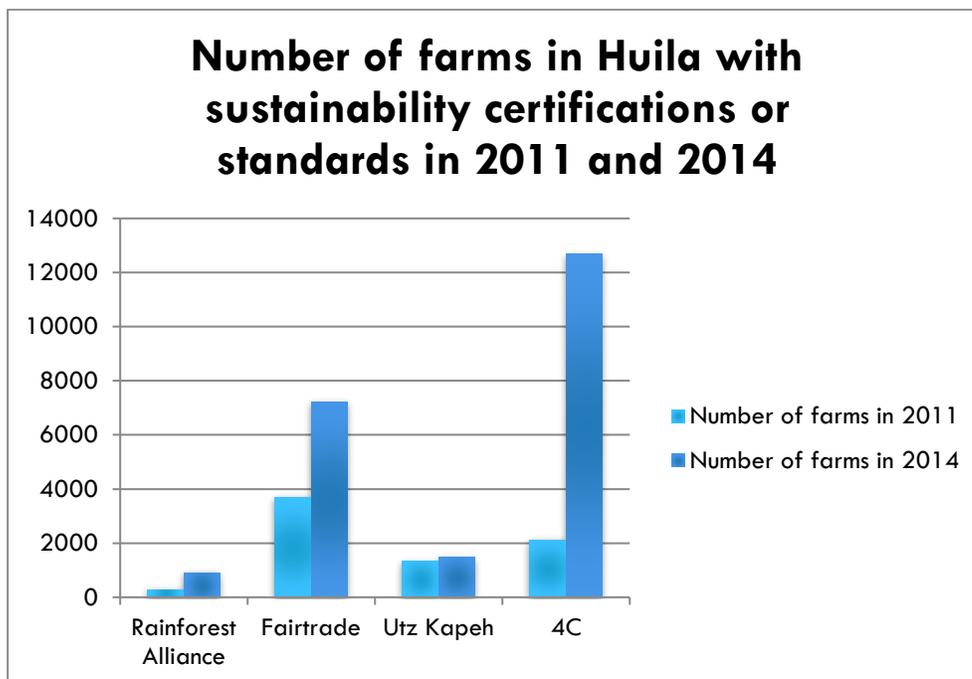


Figure 1. The graph shows the growth of speciality coffee in Huila department in terms of farms with third-party sustainability certifications (Rainforest Alliance, Fairtrade, and Utz Kapeh) and verified standards (4C Code of Conduct). Data from FNC (2011) and FNC (2014).

RESEARCHER REFLECTIONS:

In 2014, Huila reported a total of 101,000 coffee farms belonging to 81,560 farmers, representing 15% of all Colombia's coffee producers, and producing some 17.4% of the Colombian coffee harvest. Besides sustainability certifications, Huila's coffee is sold as speciality coffee by origin, including a select number as micro-lots. In 2015, Huila contributed nearly 90% of the micro-lots sold by the FNC to small speciality roasters internationally. (FNC 2014; FNC 2015)

This success can be seen as partly due to Colombia's long history of coffee production and its strong sector institutions, but also *in spite of* those institutions, which weren't always supportive of speciality coffee, and finally, also due to important market demand-led factors, as international consumer tastes changed, in combination with other environmental, technical and social changes described below.

In other words, a relatively stable socio-technical regime arose around coffee production over the 20th century, which helped sustain a unique position of Colombian coffee in world markets until landscape factors disrupted this production model. There was some resistance in the regime, but a relative alignment with niche innovation processes enabled openings to provoke a shift in the regime that allowed speciality coffee to grow as an important segment in Colombian coffee production. Only more recently has policy (one element of the socio-technical regime) begun to catch up and support this change.

Coffee exports are often credited with enabling the development of many important Colombian institutions during the 20th century, from banking to transport infrastructure. Yet the substantive influence and momentum of these institutions is also critiqued as being a basis for inflexibility in the face of a changing political economy, which centred on a strategy of unified export quality, and also made Colombia slow to adopt policies in support of speciality coffee. While coffee is far from the dominant export that it once was (now dwarfed by oil and coal), it remains the most valuable export crop and an important employment activity for over half a million people across much of Colombia's rural areas. Speciality coffees are seen as an important way to improve incomes, meet sustainability goals, and improve rural quality of life. Furthermore, the entrance of speciality coffees has shifted the relative importance of some actors.

THEORETICAL INSIGHTS:

This can be referred to as institutional lock-in, and contributes to the stabilization of a socio-technical regime: "While other countries experienced substantial changes in production harvesting and processing technologies; in their geographic composition and the organizational forms of coffee firms; and in the institutions and regulation of the industry, this didn't happen in Colombia. The country didn't adapt with agility to the new market conditions, and only in recent years has begun to do so in a slow and delayed way. The loss in dominance in international markets is the result of that difficulty in adapting, in great part explained by the rigidity of policies and institutions that also have not accommodated to the new reality with sufficient speed." (Echevarria et al 2014: 5)

was founded in 1938 in Caldas, the heart of the traditional coffee belt, along with its eight experimental research stations distributed across the three Andean mountain ranges. The model was (and largely remains) that the results of this research are delivered via technical assistance by extension agents of the FNC, working closely with subnational FNC committees (Departmental Committees), FNC cooperatives (founded in 1960), and with the help of the Manuel Mejía Foundation, founded in 1961 to offer extension and training courses to coffee producers, their families and rural communities. Research focused especially on increasing productivity through application of fertilisers, soil testing, and development of new varieties, on the premise that higher productivity brings higher incomes for farmers, which in turn translates into better quality of life. Since 1940, these institutions' programs are partly funded through a levy of US\$0.06 per pound on all coffee exports, which goes to a National Coffee Fund administered by the FNC, and also helps support the FNC's guaranteed purchasing commitment (since 1958) and guaranteed minimum price.

DOCUMENTATION QUOTE:

“A number of authors suggest that the FNC came to constitute ‘a state within a state’” (Echevarria et al 2014).

PARTICIPANT REFLECTIONS:

“I was born in a proud home of campesino coffee farmers. We started with conventional production, then we connected up with the Huila Coffee Committee [of the FNC]. We studied and became aware of the need to technify our production, and we began to produce caturra variety and Bourbon. We organized ourselves in a group of neighbouring producers. This improved the life of each family. We have technicians advising us and we improved not only because of a more technified production in coffee, but also in other crops, like plantain, cassava, guineo, etc. This enabled the unity of the community. The Cooperative [...] buys our coffee, sells us inputs [eg. fertilizers], helps us improve cultivation, processing of the coffee, improve the quality and defence of the environment. We want to improve the quality of life, improving housing, training our children, and the goal is to arrive at production of speciality coffees.”

For many years, the FNC's strategy toward added value – supported by its research and innovation and extension model – was one of unified quality in its exports, primarily measured in terms of a standard size and colour of the green coffee bean (before roasting). Smaller and off-colour beans

are rejected for export and continue to be sold for domestic consumption. This export strategy was represented by the iconic Colombian coffee producer, Juan Valdez, created in 1960, and marketed aggressively as “100% Colombian”. This market strategy in particular helped achieve a consistent premium for Colombian coffee above global traded green coffee market prices, including relative to similar quality coffees from elsewhere.

THEORETICAL INSIGHTS

Regulations and standards, part of the socio-technical regime, are one of the ways in which technological trajectories are stabilized (Geels and Schot 2007).

The Federation created its first Speciality Coffee Program in 1996, following the first strategic study commissioned by the national government in response to the new “free” market context, conducted by a mixed commission in 1994, “The Coffee Business in the face of the Free Market: Report of the Mixed Commission for the Study of Coffee” (*El Negocio Cafetero ante el Mercado Libre: Informe de la Comisión Mixta para el Estudio del Café*). The study recognized speciality coffees as an important potential, but there was some resistance within the Federation, as the notion of differentiation *within* Colombian coffee went against what had been the consistent Federation strategy of a unified export quality (100% Colombian). The program didn’t take off, and it wasn’t until the demand was more clearly articulated, alongside other political economic, environmental and technical landscape factors, which played a role in opening up the Colombian coffee sector to speciality coffee from 2002 onward. In other words, there was an alignment of niche innovation (e.g. the growing provenance and diversity of sustainability certifications) and landscape selection pressures that enabled an opening for a shift in the regime. This also included a re-alignment of actor roles, for NGOs, private exporter firms, the FNC, and farmers.

V. LANDSCAPE SHIFTS AND SHOCKS

I. A CHANGING POLITICAL ECONOMY: THE INTERNATIONAL COFFEE CRISIS

Colombia’s unified quality strategy (100% Colombian) worked fairly well under a managed market until the International Coffee Agreement disintegrated in 1989. The International Coffee Agreement between producing and consuming nations maintained quotas of supply to meet global demand, which helped keep prices relatively stable and high. When prices went above the agreed price ceiling, producer countries were permitted to release their supply beyond the agreed quota. When this agreement fell apart in 1989, it led to a drastic drop in prices, worsened by new entrants like Vietnam, and the mechanisation of production in Brazil, lowering their costs of production. Attempts to continue some quota agreements fell apart in 2001, and led to a crisis in coffee producing areas worldwide. This especially affected countries whose national economies relied heavily on coffee exports for foreign currency, and where small-scale producers were deeply

dependent on coffee for cash income. Combined with the violence in Colombia’s countryside of the 1990s and early 2000s, low coffee prices were devastating, and some coffee farmers turned to illicit crops for the faster cash cycle and higher prices they command (Technoserve 2014). This also provoked greater attention to other ways of adding value, including through access to the speciality coffee market, also by NGOs and governments concerned with the development impacts of the coffee crisis. Finally, private companies became more concerned with speciality coffee supply as consumer tastes shifted and supplies became vulnerable.

THEORETICAL INSIGHTS

The *sociotechnical landscape* constitutes “an exogenous environment beyond the direct influence of niche and regime actors (macro-economics, deep cultural patterns, macro-political developments).” (Geels and Schot 2007: 400)

THEORETICAL INSIGHTS

The breakup of the International Coffee Organization and associated International Coffee Agreement can be seen as a “landscape shock” in the language of the Multi-Level Perspective (Geels etc). This landscape shock then provoked openings for speciality coffee and eventually an increase in attention by policy-makers to the possibilities of speciality coffee.

DOCUMENTATION QUOTE:

As the agency charged with executing many US development programs, the US Agency for International Development (USAID) is positioned to play an important role in the administration’s support of small-scale coffee farmers and farm workers. It is crucial that USAID, along with other agencies, continually monitors the needs of small-scale producers and farm workers as the context of the coffee crisis evolves” (Oxfam 2005).

2. SHIFTING MARKETS: NEW CONSUMER TASTES AND CHANGING VALUE CHAINS — NEW ROLES FOR PRIVATE SECTOR FIRMS AND NGOs

One very important landscape change was that of shifting consumer tastes beginning in the late 1990s and the early 2000s. These had (and continue to have) two primary dimensions, also reflected in the diversity of the speciality coffee market. One was increasing concern by consumers around environmental and social conditions of production, and the advent of “conscious consumerism” – the idea of promoting positive social and environmental change through one’s purchasing decisions. The second was a growing set of consumers willing to pay higher prices for higher quality or “differentiated” coffees (e.g. by origin). For the former, the increase in social and environmental awareness was fostered in part by the work of NGOs, and in the case of coffee, was part of several organizations’ multi-pronged strategy responding to the dire conditions provoked (or worsened) by the coffee crisis. While this largely began with NGOs, private coffee companies were also increasingly pressured by shareholders and customers to take more responsibility for improving the social conditions of producers and the environmental impact of production, which some also saw as a business opportunity (García 2016).

DOCUMENTATION QUOTE:

“Oxfam is a partner in a comprehensive quality improvement project with CEPCO in Mexico, and there is excellent quality coming out of the PEARL project in Rwanda, just to name a few of many examples. This work needs to continue to expand the opportunities of the growing demand in the specialty market to more small-holders. Specialty traders note the growing demand for high quality coffee given both the increasing consumer demand and expansion of specialty giant Starbucks.” (Oxfam 2005).

One aim of third-party certification of products like Fairtrade coffee is that these labels provide some level of guarantee to customers that certain social and environmental criteria are being met when they encounter a product on a supermarket shelf. The first Fair Trade label, Max Havelaar, was started in the Netherlands in 1988, followed by the UK’s Fairtrade Foundation in 1992, and the international Fairtrade mark launched in 2002. Other third-party certifications include Rainforest Alliance (launched in 1995) and Utz (founded in 2002), while industry codes of conduct include the 4C Code of Conduct (established in 2007) and programs like Nespresso AAA (begun in 2003) or Starbucks C.A.F.E. Practices.

At the same time, there was increasingly a business case for these differentiated products, as speciality/sustainable coffees became one of the fastest growing market segments in coffee in the early 2000s. This also provoked a demand for a reliable supply, motivating some companies to begin to make contacts more directly with producers at the cooperative or even farm-gate level.

DOCUMENTATION QUOTE:

“It is important to understand that the growth in the value of the coffee market in both the US and Canada is due to the consumer shift to premium coffee. In the US, specialty or premium coffee accounts for 55% of the total market value of \$48 billion USD (Specialty Coffee Association of America, 2015). [...] In Canada, the total coffee market is \$6.2 billion CAD (Coffee Association of Canada, 2016), and in 2015, the market increased in value by 17% based on only a 5% increase in volume (Euromonitor International, 2016)” (Anderson 2017).

3. ENVIRONMENTAL CHANGE: DISEASE AND PEST BREAKOUTS, AGING COFFEE TREES, AND CYCLICAL WEATHER EVENTS

Colombian production dropped from about 20% of world output in the early 1990s to about 10% in 2000, with another decline in the late 2000s (ICO website). This is attributed to a number of causes, including environmental factors. Both the aging stock of coffee trees and the vulnerability of these traditional tree varieties to diseases like coffee leaf rust and pests such as the coffee borer beetle were identified as a renewed concern in the early 2000s. These weren't actually addressed until later in the decade. Nonetheless, during this same period the cyclical weather phenomena, El Niño and La Niña, caused lower yields, and in combination with high fertilizer prices, likely contributed to a new breakout of coffee rust and coffee borer beetle (García 2016). Starting in 2008, the FNC initiated programs to incentivise farmers to renovate their tree stock with new disease and pest-resistant varieties developed by Cenicafé. These are now seen to be “paying off” finally, but also meant a delay in productivity while trees matured to full productivity (~5 years). These challenges, and the associated low productivity, also contributed to both farmer and institutional interest in other ways of creating added value, such as speciality coffee.

PARTICIPANT REFLECTIONS:

“My experience as a Colombian coffee farmer started in the year 2005, when I got a lot of land, and I had the opportunity to plant 5000 caturra (variety) trees. After some years when I was very happy with my crop; it was starting to go well, when the coffee rust enemies appeared. Then new varieties [also] appeared like Castillo and F6. Seeing the cost of planting new trees, I began to think that whatever

4. TECHNICAL CHANGE: NEW VARIETIES AND THEIR DIFFUSION; ROLE OF ICTS

Cenicafé has worked on the development of new varieties for decades (the Colombia variety was first developed in 1982), while the new Castillo variety was released for use in 2005, developed as a cross between Caturra and Timor Hybrid varieties. The Castillo variety is a low-bush, high-yield tree, adapted to the climatic and soil conditions of the Colombian coffee belt, with a higher resistance to coffee rust and a high cupping quality. Of course, the availability of new varieties did not guarantee adoption, and these have to be purchased and planted (accompanied by the loss of current productive trees). Policies and programs were thus oriented to incentivise this transition through subsidies and other programs for farmers - a top-down model of technology transfer. Farmers also started to look for other ways to maintain or improve coffee incomes.

Another technical change was the increased penetration of mobile telephony into rural areas. While certainly not universal, this did enable some farmers to have better, if heterogeneous, access to information on global prices, etc. and not only relying on the published daily price offered by local traders and the FNC through cooperatives. This may also be a factor in the transition or at least aspiration and expectation of some farmers getting into speciality coffees.

5. SOCIAL MOBILISATION

Many coffee farmers were unhappy with the management of the FNC, frustrated by its failure to address the needs of many of the most vulnerable farmers, a sense of lack of representation in the management of the hierarchical and highly centralised federation, and lack of support from the government during the worst moments of the crisis. Other agricultural sectors expressed similar frustrations at the lack of government support, including in the face of expanding pressures from extractive industries and associated conflicts around rural land and water use. When the government proposed an increase in the export coffee tax, coffee producers organized into local grassroots groups called the Movement for the Defense and Dignity of Coffee Producers (*Movimiento para la Defensa y Dignidad Cafetera*) or “Dignities Movement”. The movement initiated in 2012 with a series of eight demands, and which led in 2013 to mass protests by coffee farmers across the country. After multiple attempts to repress the protests by the government, a series of fierce negotiations led to an agreement around the establishment of price supports. While demands did not focus directly on research and innovation priorities, the mobilisation also led to a change in the management of the FNC in the next election, and some argue at least some openings in the institution, including some elements of inclusion, such as greater willingness to work with other organisations, and a greater support for regional committees. Further, the 2013 National Coffee Mission appointed by President Santos included representatives of the Dignities Movement in its working groups. This thread can also be traced in some of the recommendations of the 2013 Coffee Mission, described below, and may have helped open up opportunities for a more transformative innovation policy in coffee.

DOCUMENTATION QUOTE:

“Between 25 February and 8 March 2013, the most important protest in the history of the Colombian coffee sector occurred, the National Coffee Strike. This involved more than 100,000 coffee producers from 10 departments, who made their demands heard through marches, meetings, and blockage of principal roads“ (Cruz-Rodriguez 2013: 139).

DOCUMENTATION QUOTE:

“Even as the coffee protests were heavily repressed, the [existence of] negotiations sent a message of openness toward the demands having to do with small-scale farmers, and above all, they generated support from diverse actors” (Cruz-Rodriguez 2013: 145).

VI. TOP-DOWN POLICIES AND SPECIALITY COFFEE

1. COLOMBIAN ST&I INSTITUTIONS AND SPECIALITY COFFEE

The Ministry of Agriculture and Rural Development, Corpoica (the Colombian Corporation for Agro-fisheries Research), the Colombian Agro-fisheries Institute (ICA), and sectoral research organisations provide the orientation of government-funded agro-fisheries research and innovation. While Colciencias has an Agro-fisheries Programme, its priorities are also influenced by the Ministry of Agriculture. Nonetheless, one of the critiques of the broader institutional arrangement for research and innovation in the agro-fisheries sector has been its lack of coordination. The recent 2016 Strategic Plan for Science, Technology and Innovation for the Colombian Agro-fisheries Sector 2017-2027 seeks to create a coordinated strategic vision, and calls for policies to support the governance of an National Agrofisheries ST&I System and integrate this with the National ST&I System, to better link up value chain demands for research and innovation. Also new is the Siembra Platform set up by Corpoica, which aims to help highlight research and innovation demands by sector and region.

PARTICIPANT REFLECTIONS:

“The Ministry of Agriculture has never had a medium or long-term policy. In 100 years, it’s had 108 ministers. There is too much turnover. Strategies and policies are organized through the sectoral institutions.”

Many agro-fisheries policies have been led by, or require, sector institutions. Unlike other sectoral institutions, Cenicafé is funded by the coffee tax, and its priorities are largely set by the FNC. Like other organisations in the agro-fisheries sector, Cenicafé’s research and innovation objectives are oriented toward productivity improvement, toward increased competitiveness, as well as goals of improved rural livelihoods, food security, sustainability, climate adaptation, including via value-added and quality improvement strategies, etc. Cenicafé has had important results, especially in research and development into new varieties, and their associated patents, as well as development of new environmental management techniques, but is also criticised by some for its research and technology development model. While there is evidence of a shift in directionality toward diversity and sustainability as a focus of research policy given environmental and social pressures, the research model of Cenicafé remains focused on developing technologies for diffusion to producers.

DOCUMENTATION QUOTE:

The proposed Strategic Plan for Agro-fisheries Science, Technology and Innovation 2013-2019 describes research in coffee under the category of “environmental management and sustainability” across agro-fisheries subsectors: “In the sugarcane and coffee chains, research has focused on the reduction of contamination of aquifers with wastewaters and other waste from these agro-industries. In these and other crops another topic of research has been the development of indicators around the quality of ecosystems for conservation and landscape management, including around ants and other insects. Also favoured was the management of wastes from harvest and agro-industry in order to generate added value from these materials and to reduce their impact on the environment.”

PARTICIPANT REFLECTIONS:

There were different views on Cenicafé among our interviews. One interviewee pointed out that “critiques were leveraged at Cenicafé that it has little to do with innovation or even technology transfer,” while another interviewee said that “Cenicafé is fragmented in the directionality of its objectives.” Yet, as another pointed out: “Thanks to Cenicafé and the development of resistant varieties, farmers are still producing café, despite coffee rust. We were able to transition from 70% vulnerable tree stock to 70% resistant tree stock.”

While Colciencias itself has funded coffee-related research, including through Cenicafé, the only identifiable research projects and programs explicitly oriented toward *speciality coffee* have arisen recently in the context of the new General System of Royalties (GSR), which created a new science, technology and innovation fund with a regional orientation in the context of a constitutional reform

of the royalties system in 2012 (more on this below).

RESEARCHER REFLECTIONS:

A review of projects on coffee funded by Colciencias from 2011-2016 showed a range of topics to improve quality, identify biological and chemical attributes, develop technologies for harvesting, packaging, and farm management, and for improving environmental management. None explicitly mention speciality coffee in their titles.

PARTICIPANT REFLECTIONS:

“Nobody’s really talked about speciality coffees [in research and innovation policy discussions]. There haven’t been policies directed specifically at speciality coffees.”

2. THE COFFEE MISSIONS (2002 AND 2013)

In the midst of crisis, the 2002 Coffee Mission (“Mission for the Institutional Adjustment of Coffee Production”) recommended a comprehensive reform of the sector’s institutions, and wrote that the institutional apparatus should focus on “technical assistance, research and scientific experimentation, and the maintenance of the promotion of Colombian coffee” (Silva et al 2002). While the FNC henceforth developed a greater focus on the development of speciality coffees, there was minimal emphasis in this period (2002-2013) on technical assistance, research and experimentation, as had been recommended by the Mission (Echevarria et al 2014). Policy actions in the later 2000s emphasized tree renewal programs (replacing old, less productive trees vulnerable to disease with new disease and pest-resistant varieties), provision of subsidized or free inputs such as fertilizers and fungicides, access to credit lines to buy inputs and refinancing of prior debts, a price subsidy program, slightly more flexible quality standards in the context of disease and pest spread, and hedging against falling coffee prices with coffee futures (Garcia 2016). None of these indicate a Frame 3 approach. In response to concerns about the continuing lack of competitiveness of Colombian coffee, and also in light of related unrest in the sector (mentioned above), a new mission was commissioned in 2013, which moves toward a Frame 3 approach in part.

Thus the first signs of significant pressure from within the regime for a change emerged in the 2013 Coffee Mission (“The Mission on Studies for the Competitiveness of Coffee in Colombia”) created by President Santos to “conduct a deep and integrated analysis of different aspects of the sector at a global and national level.” This set out “to design a set of public policies and strategies to confront the structural problems in the sector, in terms of production, commercialization, innovation,

generation of value added, risk management, social aspects like the generation of employment and income, and lastly, the institutional framework of the sector” (Conpes 3763 of 2013).

In contrast with the two prior Missions, this Commission involved a much wider set of actors; this inclusion was partly forced by the social movement activism of the coffee producer base, and also employed methodologies like scenario-planning. “This Commission included members from different social, regional and employment sectors, with very heterogeneous visions regarding the strengths and weaknesses of coffee and its possible futures. It also worked with total independence in a political moment marked by new dynamics in the country, including the rise of social movements like the *Dignidades Cafeteras* and the agro-fishery sector protests” (Echevarria et al 2014).

The Commission pointed out policies and norms seen to be inhibiting the growth of speciality coffees in their rigidity. In particular, the Mission argued that norms focused on promoting a single model of coffee production in Colombia were actually disfavoured speciality coffee.

Significantly the Mission also called for a shift in institutional arrangements from the centralised model to a regional focus allowing for greater input by regional actors. More specifically, they recommended a reorientation of resources destined for regional investment (Law 863 requires 16% of the coffee tax to be invested in the regions). In particular, they called for orienting these resources “toward research (via a more regionalised agenda by Cenicafé); to technical assistance, with a greater input by regional entities; toward the implementation of Good Agricultural Practices; and toward associative mechanisms that generate a reduction in production costs” (Echevarria 2014: 45). Finally, they recommended that Cenicafé’s governing board should include representation from all actors in the productive chain. Nonetheless, they still advocate a linear model of research and innovation, where technologies developed by Cenicafé should be delivered to farmers via the extension service.

DOCUMENTATION QUOTE:

The Mission pointed out that ‘regulations of export coffee quality remained focused on a model of homogeneous production, which doesn’t favour cultivation of diverse varieties, in diverse soils, using diverse forms of production and processing – all factors that can contribute to a greater differentiation of the final product. With regards to the consumer, the preference isn’t always for quality, but for “difference”.’ (Echevarria et al 2014: 18)

VII. BOTTOM-UP OR REGIONAL POLICY EXPERIMENTATION

The opportunities presented by the demand for speciality coffee, in combination with social mobilisations and top-down pressures for change, have also led to important new pilot programmes. Some of these experiments arose out of the opportunity of the reform of the royalties system in Colombia, mentioned above. This resulted in opening up a new source of regional STI funding focused on regional development. In this context, Antioquia department was able to fund an experimental research and innovation project that engaged over 1000 smallholders (with a particular emphasis on women and youth) in building new capacities crucial for speciality coffee, such as tasting, cultivation and post-harvest practices, administrative, entrepreneurial and leadership skills. The same programme also supported new research into how to generate quality during different moments of the cultivation, harvesting and processing cycle. This also resulted in the establishment of a regional policy for speciality coffee, with a focus on these innovative elements. The success of this was not carried forward by the proceeding governor, but the experience was brought back to the FNC (now with at least some more openness given the change of leadership following the social mobilisations). This initiative is now being experimented in nine other regions, using money from the General System of Royalties fund, while involving the FNC, regional committees and other local actors from outside the FNC. These include the SENA (technical-vocational training college), NGOs, departmental governments and municipalities or mayors' offices, who are helping to host new regional competitions around speciality coffee, which also serve to help connect producers and buyers for the best coffees, which also can sometimes command very high prices. Other programmes include small grants for coffee entrepreneurs through the SENA's *Fondo Emprender*; these have been awarded in particular to women, to support them in creating their own business around speciality coffee. In other words, there are new networks being built, with a different scale and approach to policy, and perhaps a more inclusive approach than prior research efforts in coffee.

RESEARCHER REFLECTIONS:

A new regionally-focused science, technology and innovation fund was created through a constitutional reform of the royalties system in 2012. This General System of Royalties dedicates 10% of all royalties from oil, mining and gas toward ST&I in Colombia's regions. These projects are to be aligned with departmental and regional development priorities, and the prioritisation of projects involves new regional actors in agenda-setting for ST&I.

SUMMARY OF POLICY NARRATIVE

The impact of S&T public policy in Colombia has been mainly felt in the building of an infrastructure of skills and technical support to support a predominantly top-down model of coffee production. A knowledge-base and infrastructure will continue to be critical and make the coffee sector a viable economic activity for a very large number of people. However, the crisis in the price of commodity coffee and the rise of speciality coffee poses a completely new situation in a sector increasingly characterised by greater diversity (by region, by producers, by coffee type). Though heavily critiqued for a number of reasons, the General System of Royalties is a key tool for Colombian policy makers presently. It is held up as an opportunity for regions to be responsive to local industry and social needs, and is supposed to allow for bottom-up responses. This is an important topic for a number of economic geographers interested in transitions, who argue that niches emerge and need to be supported at the regional level and through regional policy first and foremost (Boschma et al 2017, Garud and Karnoe 2003). This impinges on local policy makers and others involved in regional agenda-setting to have the training and the ability to spot potential niches, provide support through horizontal networks and see the potential for systemic and transformative change. In so doing, however, the experience also raises questions regarding a new relationship between the central government, central economic and S&T policy and the regions.

VIII. SIX VARIABLES OF TRANSFORMATIVE INNOVATION POLICY

1. DIRECTIONALITY AND GOAL ORIENTATION

Speciality coffee was not a public policy-driven initiative, nor has public policy, as far as we know, conducted exercises to map out different directions that speciality coffee (specifically) could take. Nonetheless, a number of features that characterise speciality coffee have helped provide directionality. While some of these require the support of policy to be effective, others are bottom-up, or are the consequence of new forms of production to meet certifications.

RESEARCHER REFLECTIONS:

However, there have been exercises in scenario-planning for coffee more generally as part of the 2013 Coffee Mission.

The advent of speciality coffee has helped open up a greater diversity of options beyond a focus on productivity to (various types of) innovation in coffee around quality, as well as environmental and social concerns. This has provoked attention – from both policy and from private firms – to fostering a broad range of capabilities among small-scale producers. In other words, this has entailed a shift from a primary focus on how to increase yields (improved tree varieties, better rotations, increased fertilizer use, soil improvement, etc.) to a greater focus on building up farmer knowledge about the taste and quality of their coffee (including greater attention to post-harvest practices), about “clean” or environmentally friendlier production practices (management of water use and wastewater disposal, storage of inputs, sanitary fermentation practices, etc.), and about

administrative challenges and opportunities for export. Special programmes oriented to women farmers, youth, and people displaced by Colombia’s long-standing violent conflict also indicate a particular directionality of policy – focused on improving rural livelihoods of particular historically marginalized populations. This focus on quality and capabilities has at least in some cases helped increase pride in the craft of growing quality coffee, which may have broader spill over effects in terms of building up a community’s social capital, seen as vital for the “post-conflict” context.

While policy support is very important in this context (e.g. around extension services, training opportunities, etc.), the drivers of change in this directionality appear to have been largely from outside the policy arena, including in marketing and brand opportunities in supply chains (demand-led), and the rise of new product certifications and standards. While evidence about the impacts of certification initiatives on farm-level incomes is actually mixed, it does seem that certifications have shifted practices and helped build new capabilities in small producers. But are standards enough to also provoke experimentation and innovation? Here the role of policy could be critical. But it doesn’t seem that policy has been particularly oriented toward smallholder experimentation, and only recent policy experiments begin to move in that direction.

Finally, one could argue that the new regionally-focused ST&I Fund of the General System of Royalties has a particular directionality – focused on funding research and innovation linked to regional development priorities. While this Fund has no explicit sectoral focus, a number of regions have chosen to invest these resources in projects related to speciality coffee.

Speciality coffee growers currently represent only a proportion of the total population of Colombian coffee growers, and there is a limit to which speciality coffee can expand because of insufficient demand at present, but also because the natural biophysical conditions that need to be in place to grow quality coffee only exist in some areas. Nonetheless, more generally, it could be argued that the discussion of speciality coffee raises an overdue debate concerning the role of public policy in encouraging food diversity, improved nutrition and food security that brings together relevant actors and considers different roles of agribusiness, family farming, and peri-urban farming that would have quite different directions.

RESEARCHER REFLECTIONS:

Another factor that has limited the expansion of speciality coffees (or other licit commercial activities) in Colombia is the historic violence experienced in many parts of the countryside.

DOCUMENTATION QUOTE:

“Today there are various seals (voluntary sustainability standards) whose supply in Colombia and the world exceeds demand, and the price premiums associated with some of these products has diminished. As a consequence, the cultivation of specialty coffees may be an important alternative in Colombia, and should continue to be promoted, but cannot be a generalized model for all Colombian coffee producers.” (Echevarria 2014: 44)

3. CHANGES IN THE SOCIO-TECHNICAL REGIME

As mentioned above, the socio-technical regime refers to the relationships, techniques, routines and practices, norms, standards, institutions, and even cultural meanings around, in this case, coffee. Speciality coffees have provoked significant changes in a number of components of the coffee socio-technical regime, including around the production model, in the reconfiguration of some roles and relationships between actors, the development of new competencies in production, management and marketing, and also cultural change – in terms of identity, expectations and perceptions. Other features of the regime have not (yet) changed.

The production model

The production model has shifted from a focus on productivity and homogeneous offer of a single type of Colombian coffee to an increasing focus on taste and differentiation with speciality coffees, which requires different production supports and greater attention to cultivation *and* processing practices. This is demanded by certification schemes, and has required attention beyond just increasing the application of fertilizers and planting resistant varieties to greater care around Good Agricultural Practices throughout the agricultural cycle, including in post-harvest fermentation and drying activities as well. These often include particular attention to reducing environmental impacts.

PARTICIPANT REFLECTIONS:

“The organization of the farm changes. Everything needs to be marked – for example, ‘this is the place to store inputs [like fertilizers and insecticide]’, and there is the implementation of best practices in post-harvest activities”.

New organisational arrangements, roles and relationships

Speciality coffee has also incentivised a shift from a model of individual production to an increase in associative organisations, both to achieve scale and to engage with certification schemes. This also requires a cultural change, from more individualistic or family-based model to a more collective communal model, requiring trust. While this shift toward associativity has at times been supported by the FNC, this also turned out to be disruptive to their model (the existing socio-technical regime), as farmer associations in some cases took on roles that were done by the FNC cooperatives and committees, becoming competitors.

PARTICIPANT REFLECTIONS:

“These organizations [farmer associations] play an important role (e.g. in the case of Huila), in reducing intermediaries, and facilitating relationships between coffee farmers and exporters or roasters. Producers had to associate to improve their market opportunities, also enabling economies of scale in buying inputs, and sometimes for infrastructure.”

And in the new market for speciality coffees, private actors have become more engaged at the local level. Some coffee companies, exporters and certifiers began offering technical assistance and training directly to farmers or farmer associations, going around the FNC committees and extension services. This “redesign of their procurement systems” was aimed in part to guarantee a consistent supply of quality product for their growing consumer base (García 2016: 139).

Now the FNC has programmes to promote the development of speciality coffees, which includes their extension service, in collaboration with local governments, departmental-level committees, cooperatives, and other local public and private actors. Cooperatives and local governments have also been important actors in financing projects and providing technical assistance, as have some NGOs and bilateral aid organizations, and the SENA, including through its funding scheme, *Fondo Emprender*.

PARTICIPANT REFLECTIONS:

“[In] 2004, the association was created with 50 members, aiming toward the improvement of quality of life of its members. In 2005, exporters came: Curcafe/Lavazza Italy helped us with certification in Good Agricultural Practices, and housing improvement, bought our coffee and gave us technical assistance. With the first certifications we had a premium for quality. Then in 2011, Virmax-Caravela offered incentives of a bonus and premium for speciality coffee; they did a cupping profile, [provided] technical assistance, monitoring of processes, with potential for export. In 2012, we strengthened the group, and developed productive alliances. In 2015, we have our own parchment processing and toasting, our own brand, and we manage inputs. In 2017, we have 150 people in the association.”

New competencies, new identities and expectations

As speciality coffee is focused on quality and farming practices, it has often demanded new technical knowledge and skills, including in post-harvesting processes. Associated training activities include good farming practices and environmental management, information on farm soils and climate, but also cupping (tasting and profiling coffee, similar to wine), so that farmers actually know what their own coffee beans taste like, and learn about different preparation methods (e.g. espresso-based drinks). This is a significant shift for several reasons. First, this has provoked a different perception of coffee by farmers; one might even say a de-alienation between farmers and their crop. Farmers speak with pride about their coffee’s flavour profiles. And importantly, this has also in some cases provoked farmers to experiment with their practices, in order to improve coffee quality.

PARTICIPANT REFLECTIONS:

“My farm started in 2003, producing conventional coffee. I worked for other people and I heard about a farmer who produced speciality coffee. I began to ask and he taught me the techniques to do it, and I started to do it, but it didn’t work. [It turned out] when I did soil testing that the soil was too acidic. Then everything changed and I was able to produce speciality coffees with very high cupping grades. In my family we see coffee differently now, and the change has been really good...”

In some, but not all cases, this has also resulted in significantly higher incomes. Finally, it demands environmental awareness. As farmers engage more directly with exporters and certifiers, some coffee growers have also developed a business or entrepreneurial mind-set in how they manage their farm, even seeking to set up their own private companies. Finally, consumer tastes in Colombia (especially in cities) are also changing, with a growing market for speciality coffees domestically. This has enormous potential to establish a direct relationship between consumers and producers and reduce the portion of value going to various intermediaries.

Limits to change in the regime

Nonetheless, changes in the socio-technical regime have stopped short in some aspects. For example, traceability is a key dimension of the new speciality coffee context, as certified or origin coffee requires such assurances. Yet, this is a one-way traceability, conceived from the perspective of the retailer/consumer. Within the category of speciality coffees are “exotics” which come from a specific farm (micro-lots) or estate, requiring different logistics to maintain identity and traceability. Unless they participate in the (yet relatively small) micro-lot programme of the FNC, farmers don’t necessarily know exactly who bought their coffee, at what price, because of what certification, etc. Traceability from the perspective of the producer could be very important for their planning and investment decisions. The socio-technical system needs major changes in order to accommodate these new requirements and to scale this type (or direction) of traceability beyond the small FNC micro-lot programme.

PARTICIPANT REFLECTIONS:

“A coffee producer can have multiple certifications, each one of which demands traceability, but there is no traceability in the other direction. They don’t know through which channel the coffee was eventually sold. There is no system for that kind of separation/traceability. So they make a great effort to improve quality, but then they get to the cooperative and their coffee gets mixed with whatever other coffee that is there.”

Another challenge is the adoption of new practices and a question of identifying where the bottleneck lies. While some interviewees point to farmers as resistant to adopting new practices, another pointed to extension agents as the obstacle. Yet this raises important questions about maintaining coherence of standards (often the role of extension agents) while also encouraging experimentation and entrepreneurship.

PARTICIPANT REFLECTIONS:

“The bottleneck is in adoption of new practices. Cenicafé has a technological package – from physiology to soils, inputs, and climate. But fertilizers are prohibitively expensive, and many have aging coffee stock. There is a lack of planning regarding the organization and rotation of the farm, and a poor diversification policy. The problem is with extension agents who don’t absorb new information...”

Finally, the research and innovation model of Cenicafé remains a supply-driven linear model. This must shift in order to learn from, and promote, innovation and experimentation at the grassroots level.

4. SECOND-ORDER LEARNING

A Frame 3 approach is said to focus on “innovation as a search process, guided by social and environmental objectives, informed by experience and the learning that accompanies that experience, and a willingness to revisit existing arrangements to de-routinize them so as to address societal challenges” with the supposition that the innovation process must therefore be “inclusive, experimental, and aimed at changing the direction of socio-technical systems” (Schot and Steinmuller 2016: 18). Deep learning or second-order learning “enables changes in cognitive frames and assumptions” and “must include grassroots innovation with communities and civil society” (Schot and Steinmuller 2016: 19).

For the case of coffee, while certifications and new quality demands have provoked new types of learning, this has not (yet) provoked a high degree of second-order learning. The efforts by Cenicafé to produce different coffee varieties were very much a supply-led model (Frame 1 and 2), where research was funded to develop new varieties which were then passed on to farmers through subsidy programs, etc. Certifications have provoked new relationships and helped some smallholders develop skills around coffee tasting, washing, fermenting and drying. This allowed some farmers have a new sense of the coffee they were producing - from just producing a coffee bean to producing a drink (a shift in cognitive frame), and in some cases led to experimentation. Thus, a number of types of learning were identified by workshop participants in the context of speciality coffee, which can be grouped as technical, relational, entrepreneurial and environmental (see Table). These new relationships and pathways of speciality coffee have begun to challenge the status quo of the FNC, the major institutional actor in coffee. New intermediary actors and networks, like farmer associations and exporters, have also helped demonstrate a need for new

types of policies around speciality coffee. While there is evidence of some experimentation in that direction, there is yet some distance to go to fully change the direction of the socio-technical systems.

Table: Types of learning linked to speciality coffee identified in the workshop

Before speciality coffee	With speciality coffee	Type of learning
Individual coffee producers	Increased associativity among coffee producers, networks of collaboration, information sharing. This has occurred especially because speciality coffee in Huila wasn't directly a result of financing by the FNC.	Relational
Lack of knowledge about the value or qualities of coffee beyond the seed.	Increased knowledge about coffee as a drink, which motivated farmers to seek out new techniques to improve taste (specialisation)	Technical
Precarious and unsanitary techniques	Improvement of techniques, sanitary and quality standards	Technical
Absence of experimentation. Conformity with the lines of action and priorities of the FNC	Experimentation. Some capacity to innovate in fermentation and drying methods.	Entrepreneurial
Dependency, especially on one seed and one traditional institutionality	Relative increase in independence, though somewhat precarious: small associations with more autonomy from FNC, though perhaps greater dependency on exporters (learning about exporting, markets, firm creation)	Entrepreneurial
Minimal environmental stewardship	The certifications helped to improve environmental awareness	Environmental

5. TENSIONS/CONSENSUS

Resistances to change within the regime have been described above. According to participants at the workshop, differences of opinion or participation in speciality coffees was largely a result of lack of knowledge, lack of access to information which led to distrust or passivity. Some argued that there had been little resistance to the idea of speciality coffee, but others suggested resistances did arise in response to changing the orientation or directionality from a focus on quantity to one of quality – requiring new forms of managing production and of organising the farm. However,

participants also recognized that different groups with different experiences (e.g. women or displaced people) might lead them to engage differently with speciality coffees. The challenge that was identified was to do awareness-raising to educate and change people’s perspectives. This was seen to be the role of technical assistance, of young people, and institutions like technical colleges (SENA) and universities.

6. INCLUSION

The production of Colombian coffee has (unlike other countries such as Brazil) always had a strong social component because of the more than half a million agricultural producers that grow coffee. Therefore the institutions set up by the FNC have been strongly influenced by the need to be inclusive in the production system, infrastructure and logistics. Nonetheless, the system is also highly centralised and top-down. Therefore policy priorities have historically been dominated by maintaining yields of coffee production (against blights, maintenance of price) for all types of producers.

One very important change in the context of speciality coffees is the growth and importance of new grassroots associative organisations. This has arisen in part because certifications require farmers to be organized in this way, or because they need the volume of production in order to negotiate, both thereby incentivizing this organisational and cultural shift in order for smallholders to participate in speciality markets and gain access to infrastructure and training opportunities, which are sometimes not offered at the individual farm level.

As participants at the workshop noted, however, the term inclusion can be very vague, and it must be specified *who* is being included, and in *what*. For many at the workshop, inclusion has been functional and refers to their inclusion in farmer associations, which has meant developing new competencies, inclusion in trainings and events, in developing new perspectives, and inclusion in results in terms of income. Responses varied in terms of inclusion in decision-making at the cooperatives and in the FNC. Associativity was apparently supported by the FNC and the cooperatives only up to the point where they started to see the associations as a competitive threat.

Finally, with speciality coffees there has also been a particular attention to participation by women and youth in each of the activities above, as target populations of some public policies and training programmes. Examples include *Mujer Cafetera*, which promotes women’s participation as coffee farmers and entrepreneurs, and the Antioquia speciality coffee programme, which focused on youth in particular.

PARTICIPANT REFLECTIONS:

“Before we [women] were behind [in the background]; now, through specialty coffees, we are out front, selling, getting to know things. [Now I can say] I’m good. I’m a businesswoman.”

REFLECTIONS ON TRANSFORMATIVE POLICIES FROM THE WORKSHOP

Within the context of the workshop, participants identified the following important elements as part of transformative policies. First, they called for a strong institutional framework, including an overarching legal framework (Ley Marco) that favours the agro-fisheries sector consistently, beyond the context of exceptional circumstances (such as during natural disasters). Policy should focus on marginalised populations, especially rural women and youth, and should include components of awareness-raising, participation, training, and accompaniment. The FNC should provide greater presence in the countryside, more spaces for reflection, greater representation of smallholders, and a reengineering of the extension service. In the context of the post-conflict, it is essential to direct resources and programs to associative organisation.

TIMELINE

Year	Text	Text source	Group
1927	The National Federation of Coffee Growers of Colombia (FNC) is founded "to develop and strengthen the coffee industry, assuring the wellbeing of producers through a sectoral, democratic and representative organization."	FNC website https://www.federaciondecafeteros.org/static/files/Linea80.pdf	Colombia
1928	The extension service of the FNC is created "to offer technical assistance to coffee farmers and promote better practices among them."	FNC website https://www.federaciondecafeteros.org/static/files/Linea80.pdf	Colombia
1938	Cenicafé is created, the national coffee research institution of the FNC	FNC website https://www.federaciondecafeteros.org/static/files/Linea80.pdf	Colombia
1940	Creation of the National Coffee Fund, a parafiscal account funded by a tax on coffee exports per lb, in order to "strengthen the sector and stabilize coffee farmers' incomes."	FNC website https://www.federaciondecafeteros.org/static/files/Linea80.pdf	Colombia
1960	Creation of the personality and brand icon, Juan Valdez "in order to make the foreign consumer aware of the quality of Colombian coffee, and to promote its consumption worldwide."	FNC website https://www.federaciondecafeteros.org/static/files/Linea80.pdf	Colombia
1961	The Manuel Mejía Foundation is founded, and construction begins on an educational centre to train coffee producers, their families and rural communities in general.	Manuel Mejía Foundation website http://www.fmm.edu.co/quienes-somos/conozca-nuestra-historia/	Colombia

1982	The Specialty Coffee Association of America (SCAA) is established in the USA by a small group of coffee professionals seeking a common forum to discuss issues and set quality standards for the specialty coffee trade	SCAA website http://scaa.org/?page=history	International
1982	Cenicafé develops the Colombia Variety, resistant to coffee leaf rust	Cenicafé website http://www.cenicafe.org/es/publications/avt0349.pdf	Colombia
1988	Max Havelaar, the first Fair Trade label, is launched by Solidaridad, a Dutch development agency. The first Fair Trade coffee arrives in Dutch supermarkets from Mexico.	Fairtrade International website https://www.fairtrade.net/about-fairtrade/history-of-fairtrade.html	International
1989	First SCAA Conference and Exhibition held in New Orleans, USA	SCAA website http://scaa.org/?page=history	International
1991	Cafédirect, pioneering ethical coffee brand, is launched in response to the 1989 coffee crisis in partnership with Twin & Twin Trading, Oxfam, Traidcraft and Equal Exchange, UK	Twin website http://www.twin.org.uk/who-we-are/	International
1992	The Fairtrade Foundation UK is established by collaboration between various NGOs: CAFOD, Christian Aid, Oxfam, Traidcraft, Global Justice Now, and the National Federation of Women's Institutes.	Fairtrade Foundation website http://www.fairtrade.org.uk/en/what-is-fairtrade/who-we-are	International
1992	The Asprocafé Ingrumá cooperative in Caldas is the first small-scale producer organisation certified Fair Trade in Colombia. The cooperative is founded in 1991 and first exports to international markets in 1992. 80% of the members of the cooperative are indigenous Embera-Chami people, and nearly 40% of the producers are women.	Coordinador de Comercio Justo en Colombia website http://www.comerciojustocolombia.org/comercio-justo/en-colombia/ and Fairtrade USA website http://fairtradeusa.org/producer-profiles/asprocafe-asprocaf-ingrum	Colombia

1995	First Rainforest Alliance certified farm (in Guatemala)	Rainforest Alliance website http://www.rainforest-alliance.org/about	International
1996	The FNC creates its first Speciality Coffee Programme, though this has limited support for its first years.		Colombia
1996	The first conference on sustainable coffees is held at the Migratory Bird Center of the Smithsonian Institute in Washington, DC	SCAA website http://scaa.org/?page=history	International
2000	Worldwide speciality coffee market grows to US\$8 billion	SCAA website http://scaa.org/?page=history	International
2002	Launch of the Oxfam report "Mugged: Poverty in your Coffee Cup" about the coffee crisis	Oxfam America website (https://www.oxfamamerica.org/publications/mugged-poverty-in-your-coffee-cup/)	International
2002	Launch of the international Fairtrade label in order "to improve the visibility of the Mark on supermarket shelves, facilitate cross border trade and simplify export procedures for both producers and exporters." Producer representatives also join the Fairtrade International Board of Directors for the first time.	Fairtrade International website https://www.fairtrade.net/about-fairtrade/history-of-fairtrade.html	International
2002	The FNC creates Procafecol and the first Juan Valdez cafés, providing a new boost to speciality coffee in Colombia.		Colombia
2002	2002 Colombian Coffee Mission ("Mission for the Institutional Adjustment of Coffee Production") recommends a comprehensive reform of the sector's institutions, including a focus on "technical assistance, research and scientific experimentation, and the maintenance of the promotion of Colombian coffee" (Silva et al 2002)		Colombia
2002	The Utz Kapeh certification is founded by a Belgian-Guatemalan producer, Nick Bocklandt, and Ward de Groote, a Dutch roaster, with the help of the Dutch NGO Solidaridad, with the objective of implementing sustainability on a large scale in the international market. Utz Kapeh means "good coffee" in the Mayan language Quiché.	Utz Kapeh website https://utzcertified.org/en/aboututzcertified/the-story-of-utz	

2003	The Nespresso AAA Sustainable Quality programme is established by Nestlé as part of its Nespresso line in collaboration with Rainforest Alliance	Nestlé website https://www.nestle-nespresso.com/about-us/our-history#	International
2004	Smallholder coffee farmer associations are established in Huila with support of the Specialty Coffee Programme of the FNC		Huila
2005	The FNC releases the Castillo® Variety, which was developed by Cenicafé, based on a cross between Caturra variety and a Timor Hybrid. The new variety is adapted for production in the Colombian coffee belt, and has a higher resistance to coffee leaf rust and an excellent cupping profile.	Cenicafé website http://www.cenicafe.org/es/publications/avt04261.pdf	Colombia
2006	Worldwide speciality coffees market hits US\$12 billion	SCAA website http://scaa.org/?page=history	International
2006	FNC creates the Women's Coffee Programme ("Mujer Cafetera") "by means of an integral policy of gender equity [...] to support the empowerment of women in all areas related to coffee production, participation in the FNC, and community leadership."	2015 FNC Report "Informe Comportamiento de la Industria" p 61 https://www.federaciondecafeteros.org/static/files/Informe_Comportamiento_de_la_Industria_2015.pdf	Colombia
2006	The 4C Association is established in 2006 as a multi-actor association of producer, industry, NGO and commercial organisations from 20 countries to discuss the challenges of sustainability in the coffee sector, and launches the 4C Code of Conduct (sustainability standard) in 2007.	Global Coffee Platform website http://www.globalcoffeepatform.org/about/our-history	International
2009	First national cupping competition in Colombia	Ministry of Education website http://www.mineducacion.gov.co/cvn/1665/w3-article-202229.html	Colombia

2010	The FNC's Micro-Lot Coffee Programme links individual producers with international buyers, whereby small quantities of high quality coffee are offered to international buyers by the commercial department of the FNC. Premiums for quality are transferred back to the producer.	2015 FNC Report "Informe Comportamiento de la Industria" p 61 https://www.federaciondecafeteros.org/static/files/Informe_Comportamiento_de_la_Industria_2015.pdf	Colombia
2011	First inter-institutional speciality coffee fair is held in northeastern Huila		Huila
2012	Movement for the Defense and Dignity of Coffee Producers begins to organize, leading to mass protests in 2013	Cruz-Rodriguez 2013	Colombia
2012	Constitutional reform of the Colombian royalties system creates a new fund for regional science, technology and innovation projects oriented to regional development; this enables Antioquia to develop a multi-institutional research and innovation project focused on speciality coffee, later to be replicated in other departments		Colombia
2013	The 2013 Colombian Coffee Mission ("Mission on Studies for the Competitiveness of Coffee in Colombia") engages a wider set of actors, including representatives of the Dignities Movement, and aims "to design a set of public policies and strategies to confront the structural problems in the sector, in terms of production, commercialization, innovation, generation of value added, risk management, social aspects like the generation of employment and income, and lastly, the institutional framework of the sector" (Conpes 3763 of 2013).		Colombia
2014	Huila contributes nearly 90% of the micro-lots that are sold by the FNC to small roasters internationally.	2014 Informe Departamental Cafetero, p. 57.	Huila
2014	In 2014 in Huila, 7,214 farms have Fairtrade certification, 1,470 farms are certified by Utz Kapeh, 891 farms have Rainforest Alliance certification, and 12,674 farms are licensed under the 4C code of conduct.	2014 Informe Departamental Cafetero, p. 58.	Huila

2014	The Extension Service, together with farmers on "certified participatory agricultural innovation farms" helped to "validate the technical advances of Cenicafé" by "evaluating potential new hybrids, under the the actual conditions of coffee production in Huila" as well as to help in making a "regional evaluation of promising lines for the development of a regional variety of Castillo coffee tree specific to Huila."	2014 Informe Departamental Cafetero, p. 60.	Huila
2015	The IVth Convention of the International Women's Coffee Alliance is hosted in Colombia with the FNC. Further, two gender-related indicators are included in the FNC's Strategic Plan, and a new application is being developed for the registration of women coffee farmer associations in the FNC's information system (SICA).	2015 FNC Report "Informe Comportamiento de la Industria" p 61 https://www.federaciondecafeteros.org/static/files/Informe_Comportamiento_de_la_Industria_2015.pdf	Colombia
2015	23.5% of Colombia's coffee exports are speciality coffee. Also, 209,081 farms in Colombia have at least one certification or verification of a standard (e.g. Rainforest, 4C, Fairtrade, Utz). These farms are the property of 165,385 farmers, roughly 1/3 of all Colombia farmers. More than 110,000 of these belong to the 4C Code of Conduct.	2015 FNC Report "Informe Comportamiento de la Industria" p 30 https://www.federaciondecafeteros.org/static/files/Informe_Comportamiento_de_la_Industria_2015.pdf	Colombia
2016	Colombia hosts its 9th trade fair on speciality coffees "ExpoEspeciales Café de Colombia" under the theme "Colombia, Land of Diversity", with 13,809 international and national attendees. The winning coffee of the micro-lot competition was auctioned for a record-breaking price of US\$50.50 per lb.	https://huila.federaciondecafeteros.org/buenas_noticias/EXPOESPECIALES_VISITANTES/	Colombia

X. THE CHANGING NETWORK OF RESEARCH IN COLOMBIAN COFFEE

An important research question in transitions analysis is how to define, observe and measure the scope and scale of change in transitions. One novel approach is to define transitions as a change in the architecture of networks that delimits the research topics, the main actors and the institutions within a socio technical regime. We have used this coffee case study as a space to conduct some experiments along these lines. The qualitative evidence for this report has suggested that Colombian coffee has undergone some transformative changes in terms of practices and organisation. We want to investigate if these so-called transformations have been mirrored by a change in research into coffee during the same period in Colombia. We use a social network analysis method that allows us to observe structural changes in the research around Colombian coffee over time. This is done firstly by grouping publications that include the word coffee and contain at least one Colombian author from the web of science. From the resulting data a network map was built of all the articles published between 2006 and 2016. We then construct “invisible colleges”, which are articles that share similar bibliographies and therefore appear to be writing on similar themes (at minimum share 5 citations). Growing invisible colleges would suggest certain common research themes and an opportunity to build a critical mass of research in an area.

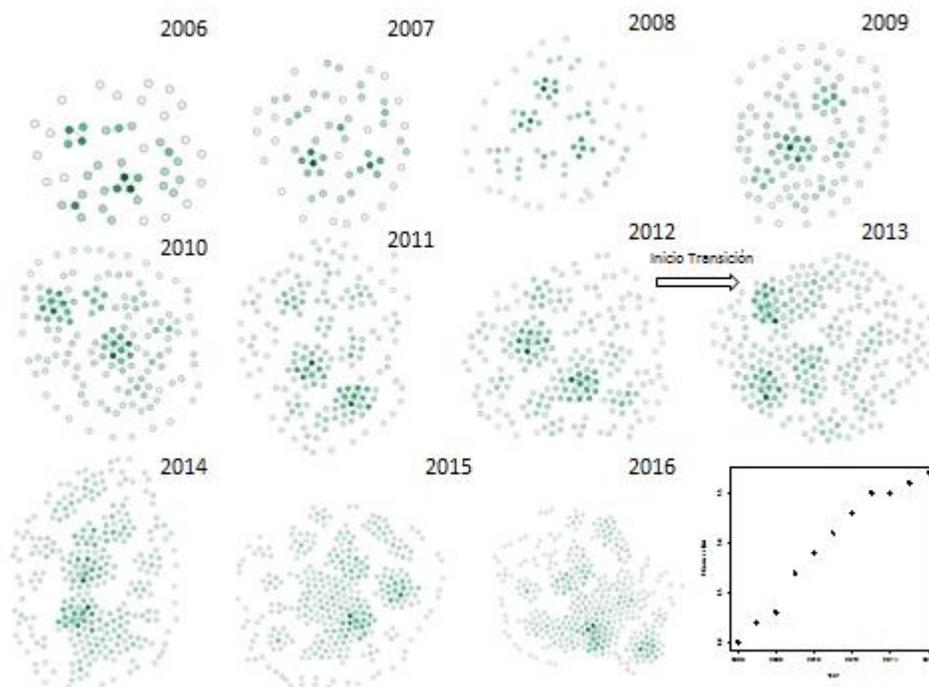


Figure 3

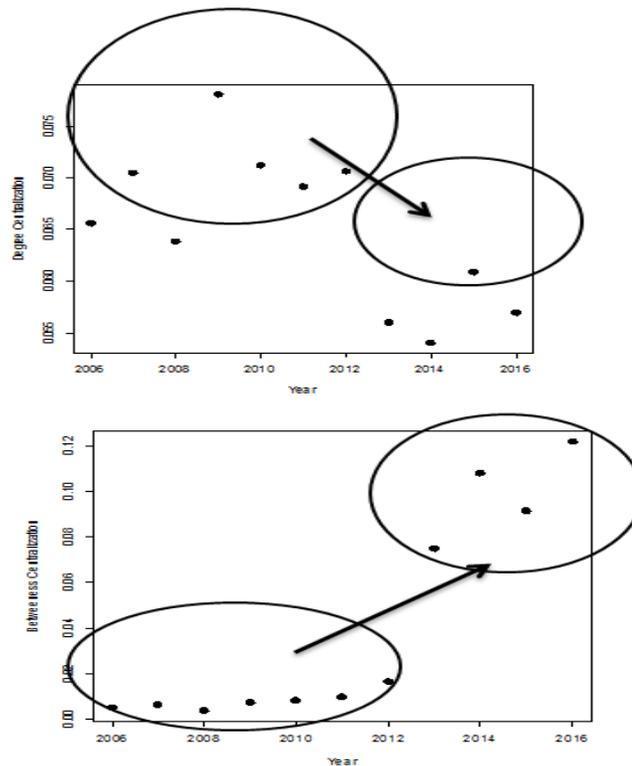


Figure 4

Figure 3 above shows that over time the total number of articles (grand component) written on coffee by Colombian authors increases. **Figure 4** also shows two critical features. We see a fall in the degree of centralisation (tendency for articles overall to be linked), suggesting a fragmentation of research themes caused by new lines of research being added. However, from 2012 onwards there is an abrupt change in the structure of the network with the degree of intermediation (the tendency for certain articles to link other articles) rising rapidly. In other words certain articles are playing an increasingly important role in bringing together other articles that otherwise would not be associated. **Figure 5** shows the key emerging themes that are coalescing this research shift in 2012, with the key word “diversity” being the most dominant new word. The importance of research that includes study of diversity is therefore taking place in the Colombian research sphere. This is significant and mirrors important changes in the coffee sector through case study evidence.

XI. OTHER PARTICIPANTS' VOICES

"In 2012 my girlfriend [...] got pregnant. Her father gave us a plot of land on which my wife and I planted 4000 trees. Her father works in speciality coffee, which has got me into it. An agro-ecological engineer with a Canadian agency arrived at my farm and taught me organic and ecological agricultural management methods. Three friends and I got involved and started working that way. In 2016 we created a farmer association involving six farmers with integrated and self-sustaining farms, using organic and sanitary agriculture methods. We then participated in national competitions and trade fairs with our own branded toasted and ground 100% organic coffee."

"My father was a coffee farmer who had limited academic studies, but was a community leader. I inherited land from him and began to plant coffee. I started with 4000 trees. Now I have 8 hectares. My father taught us to work with the community and because of this, we formed an association of 15 members. We managed to access training with the SENA and the FNC. Thanks to these trainings I managed to access public funds through the SENA, and I'm a beneficiary of the Fondo Emprender, which helped us to found our coffee company in 2012. In that same period, we participated in a cupping competition [Cup of Excellence]. We'd been using subproducts of the coffee, mucilage and microbial teas [to enrich] the soil, which enhanced the coffee, and gave new notes to the cupping taste. We achieved fifth place out of 1000 participants. That motivated us to continue with the speciality processes. The contest helped to convince us of speciality coffee."

"[In] 1997, the cooperative Coagrobrisas was born, with approximately 25 families. In 2009, with a great effort involving more than 150 families and help from USAID we were able to industrialize our operations in a manner sustainable with the environment and with certifications from Starbucks, Utz, Fairtrade and Rainforest. In 2015, we were able to export 11 containers of green coffee to Japan. In 2016 we had the opportunity of establishing the first granulated instant specialty coffee from the department of Huila, which represents added value. In 2017, a group of young people, children of coffee farmers, created a commercial company in order to do marketing and innovation, getting into new information technologies. Our objective is to distribute not just Opicafé, but also other other specialty coffees so all can benefit."

"Good Agricultural Practices started 20 years ago in response to deteriorating soil quality, with a focus on cultivation practices; now with certifications, there is much more focus on Good Agricultural Practices in post-harvest processing too"

"A challenge is to change the behavior of producers; it's a cultural change, from individuals to an associative model. It is necessary to generate trust"

"We've learned we can only progress united and organized."

"FNC made an effort to promote farmer associativity, but then saw that when they became associated, they wanted to distance themselves from the FNC!"

"Before, for me, coffee was just a seed. Now it is a drink."

"As a woman coffee producer, we've tried to change tradition. [Before] we only washed the coffee, dried it and sold it. Now we are more conscious of the climatic conditions and processes which enable us to get a better quality coffee."

XII. References

Anderson, J. (2017) Generational Impact on the Coffee Industry: Millennials are driving the coffee bus; Where will they take us? Premium Quality Consulting. Sponsored by Silver Chef State of the Coffee Industry Report, February 25.

Boschma, R. (2017), 'Relatedness as driver of regional diversification: a research agenda', *Regional Studies* 51(3), 351–364.

Cenicafé website <http://www.cenicafe.org/es/publications/avt04261.pdf> (accessed 10 May 2017).

Colciencias (2013) *Propuesta Plan Estratégico de Ciencia, Tecnología e Innovación Agropecuario 2013-2019*. Documento interno de trabajo. Colciencias y el Ministerio de Agricultura y Desarrollo Rural.

Echevarria, J.J., Esguerra, P., McAllister, D., and C.F. Robayo (2014) *Informe de la Misión de Estudios para la Competitividad de la Caficultura en Colombia. Resumen Ejecutivo*.

FNC (2015) *Comportamiento de la Industria Cafetera Colombiana 2015. Informe*. Bogotá, Colombia: Federación Nacional de Cafeteros. https://www.federaciondecafeteros.org/static/files/Informe_Comportamiento_de_la_Industria_2015.pdf (accessed 6/2/2017).

FNC (2014) *Por la Caficultura que Queremos: Informe de Comités Departamentales*. LXXX Congreso Nacional de Cafeteros 2014. Bogotá, Colombia: Federación Nacional de Cafeteros.

FNC (2011) *Caficultura Climáticamente Inteligente: Informe de Comités Departamentales*. LXXVI Congreso Nacional de Cafeteros 2011. Bogotá, Colombia: Federación Nacional de Cafeteros.

Garcia-Cardona, J. (2016) *Value-added Initiatives: Distributional impacts on the global value chain for Colombia's coffee*. Doctoral thesis. Institute of Development Studies, University of Sussex, Brighton, UK.

Garud, R. & Karnoe, P. (2003), 'Bricolage versus breakthrough: distributed and embedded agency in technology entrepreneurship', *Research Policy* 32(2), 277 – 300. Special Issue on Technology Entrepreneurship and Contact Information for corresponding authors.

Geels, F. and Schot, J. (2007) Typology of sociotechnical transition pathways. *Research Policy* 36, 399–417.

ICO website http://www.ico.org/trade_statistics.asp (accessed 29 May 2017)

National Federation of Coffee Growers of Colombia website
<https://www.federaciondecafeteros.org/index.php?fnc/glosario> (accessed 10 May 2017)

Oxfam (2005) “The Coffee Crisis Continues: Situation Assessment and Policy Recommendations for Reducing Poverty in the Coffee Sector.” Policy Paper. Boston: Oxfam America.

Oxfam (2002) *Mugged: Poverty in your Coffee Cup*. London: Oxfam International.

PECTIA (2016) *Plan Estratégico de Ciencia, Tecnología e Innovación del Sector Agropecuario Colombiano (2017-2027)*. Bogotá: Colciencias, el Ministerio de Agricultura y Desarrollo Rural y Corpoica.

Smith, A., Stirling, A., Berkhout, F., (2005) The governance of sustainable socio-technical transitions. *Research Policy* 34, 1491–1510.

Technoserve (2014) *Colombia: A business case for sustainable coffee production*. Bogotá: IDH.
