

# Colombian Agricultural Supply Chain Policy: Impacts on Producers' Competitiveness and Livelihoods

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Since the early 1990s, Colombia has pursued innovative policies aimed at improving the competitiveness of 37 major commodity supply chains. Supply chain policy has received attention in other countries of Latin America and the Caribbean (LAC) as well, though little empirical evidence has been produced regarding the impacts of this work on product competitiveness and even less on rural livelihoods. In the final phase of a three-part study implemented by CIAT with support from the Ford Foundation, we assessed the impact of Colombian policies in a selected region of the country. This policy brief provides a synopsis of policies employed by the Regional Vegetable Supply Chain Committee of Boyacá from 2007 to 2012 and analyzes their impact on market competitiveness, income generation, and poverty alleviation.

## Key messages

- **Empowered producers:** Producers associations can contribute to improved productivity, higher incomes, and poverty reduction by providing training and building capacity.
- **Market focus:** Improved productivity is only half the battle. Policies that focus solely on productivity gains often fail to address key components of competitiveness, such as marketing strategies and consumer demand. Comprehensive strategies are needed to improve farmers' livelihoods.
- **Knowledge is power:** Regional committees effectively disseminate information about public programs, but the small number of participating farmers limits the scope of knowledge sharing.
- **Public support:** The ability of small farmers to compete in the marketplace depends in part on government efforts to strengthen producers associations. Regional committees can support and empower producers associations by expressing farmers' demands at the national level.

## Restructuring policies to boost participation

The Boyacá Regional Vegetable Committee (BRVC) was established in 2009. The policy promotes the decentralization of decision-making authority and encourages the flow of ideas between regional actors and the national council. The BRVC meets regularly with regional representatives from each "link" in the supply chain: farmers, input providers, research institutes, universities, industry, processors, vendors, and government representatives.

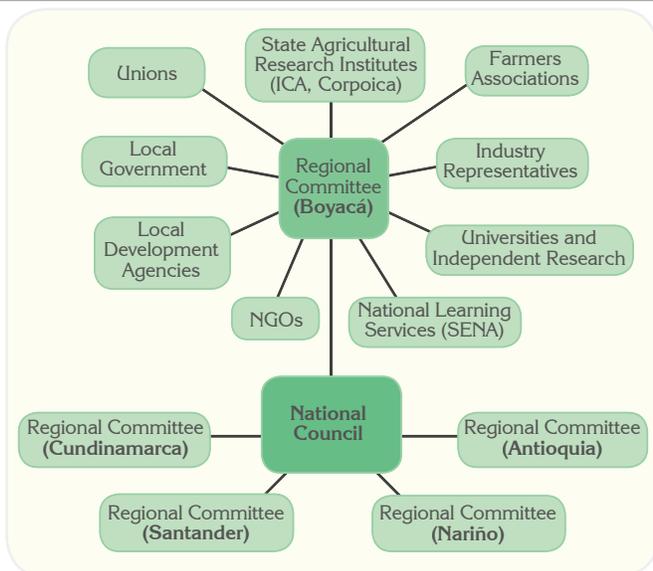
The ultimate goal of the BRVC is to collaborate with the supply chain national council in creating and implementing regionally specific projects that complement the national policy agenda. By sharing technical and logistical information, creating closer contacts with various chain actors, and coordinating the efforts of the national and regional committees, the BRVC streamlines public administration. **Figure 1** indicates the structure of Colombian supply chain organizations, using the example of the National Vegetable Supply Chain and the Boyacá Regional Vegetable Committee.

## Analyzing the impact of regional supply chain policy

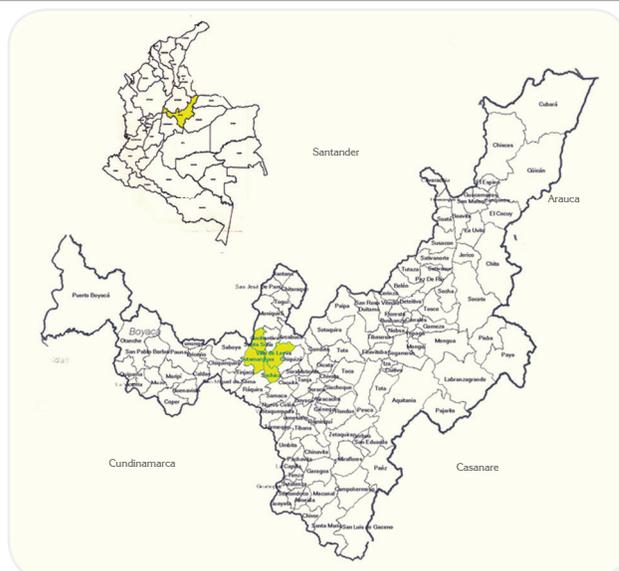
To determine the direct effect of regional supply chain policy on farmers' productive capacity, incomes, and livelihoods, we designed and conducted an extensive survey with 120 tomato farmers in four municipalities of the region (**Figure 2**). We collected detailed information about the Boyacá Regional Vegetable Committee and its policy initiatives, including technical assistance, field training, promotion, and marketing as well as access to financial services (credit, insurance, and government subsidies). Survey questions also captured socio-economic information related to household members, employment, finances, income, human capital, land ownership, and tenancy.

The survey considered three groups of farmers in particular: (1) those who participate in farmers associations and are active members of the BRVC; (2) those receiving extension services from a local development agency, ADEL Dinosaurios;<sup>1</sup> and (3) independent

1. ADEL Dinosaurios is a public-private local development agency, which acts as the technical secretariat of the BRVC. As such, ADEL works with farmers that are affiliated with the BRVC as well as independent farmers affiliated neither with the BRVC nor any other state program.



**Figure 1.** Structure of the Boyacá Regional Vegetable Committee and its relation to the National Supply Chain Council.



**Figure 2.** Focus municipalities in Colombia's Boyacá region.

**Note:** Our surveys focused on the four principal tomato-producing municipalities of Boyacá: Villa de Leyva, Santa Sofía, Sutamarchán, and Sáchica. According to producer interviews, 400 to 500 tomato producers operate in these municipalities.

farmers with no direct ties to farmers associations or the regional committee.

To estimate changes in poverty levels, we used the Grameen Foundation's Progress out of Poverty Index (PPI). We first asked participants to answer questions based on their 2014 assets, and in an effort to gauge change, asked them to recall what their answers would have been five years before in 2007 (see PPI text box on page 4).

In addition, we constructed two indices to determine the impact of policy initiatives involving technical assistance and training programs. We then used a production determinant model (Ordinary Least Squares, OLS), propensity score matching (PSM), and Probit probability models to estimate the policy impact on producers' income, yield, and probability of escaping poverty.

### Access to information and services

The Colombian Ministry of Agriculture and Rural Development (MADR) focuses on regional committees based on the belief that improving communication between national and regional actors will provide farmers with better access to technical information

and relevant state programs.<sup>2</sup> We found that farmers belonging to producers associations are 42% more likely to be familiar with the work of the BRVC and 75% more likely to have received information about government programs, such as certification programs and financial services.<sup>3</sup> Likewise, farmers belonging to producers associations or ADEL are more likely to receive technical assistance, capacity building, and training from agronomists or other professionals.

The technical assistance and training programs administered by ADEL were the most comprehensive and thorough, meriting scores of 32.5 and 14.6 on their respective indices.<sup>4</sup> By comparison, the technical assistance and training programs provided by the

individual associations and other actors (including farm input salesmen) were rated much lower.

Interestingly, farmers were 2.5% more likely to join a farmers association when they had heard about the MADR programs, possibly indicating that access to information motivates them to participate. The BRVC has done little to improve access to financial services, and while many farmers receive loans from informal sources or banks, few have insurance or take advantage of subsidies offered for inputs and machinery.<sup>5</sup> (see Table 1).

### Production and profit

As a regional expression of MADR's national supply chain policy, the BRVC aims to improve farmers' competitiveness.<sup>6</sup> Our findings suggest, however, that farmers participating in MADR programs are not necessarily

2. Farmer participants were selected based on their membership in producers associations and thus implicit involvement with the regional committee. Surveyors randomly selected independent producers.
3. Financial services include formal services, both private and public, such as banking, savings, loans, personal and crop insurance, and state agricultural subsidies – for example, special agricultural loans through Crédito Finagro or programs such as DRE (Rural Development with Equity) subsidies.
4. The index ranges from 0–100, with 100 being the highest possible score.

5. Probit models were used to determine the probability of belonging to a producers association, according to certain producer's characteristics, such as access to financial services. See Parra-Peña et al. (2013).
6. The authors assume that all activities implemented by the BRVC are in line with MADR policies and represent local expression of the national policy.

more productive. As indicated in **Figure 3**, independent farmers have, on average, higher yields (8,708 containers per *fanegada*<sup>7</sup>) than farmers participating in ADEL (4,400 containers per *fanegada*) and members of producers associations (3,907 containers per *fanegada*).

That said, high standard deviations within a group, especially among independent farmers, likely indicate that technology and management practices are not equally adopted. This could have larger implications, as our findings indicate that the adoption of technology

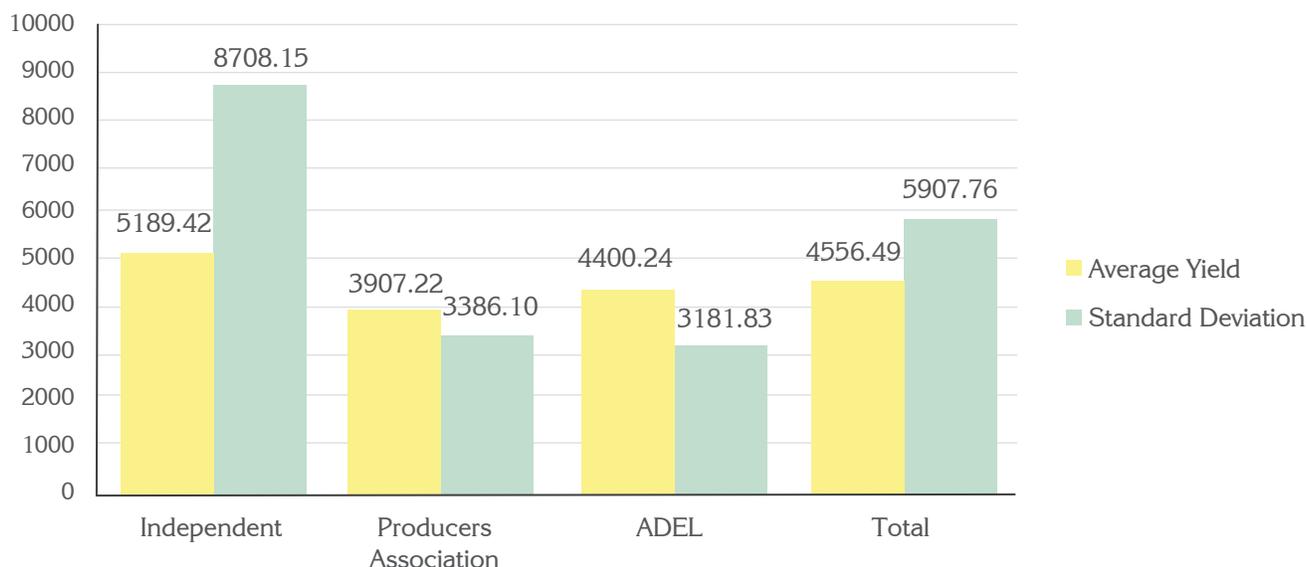
greatly affects yield. When compared to farmers that cultivate only traditional “open-air” tomatoes, farmers using greenhouses or a blend of traditional and greenhouse practices increased their production by 85% and 119%, respectively.

**Table 1.** Technical assistance and capacity building indices (average and standard deviation, 2013).

	Technical assistance index*			Training index**		
	Received by associations	Received by ADEL	Received by others	Provided by associations	Provided by ADEL	Provided by others
Average	14.58	32.54	6.95	11.65	14.62	11.12
Standard deviation	(30.79)	(39.64)	(21.94)	(24.09)	(26.01)	(23.26)

\* The technical assistance index scores the overall quality of assistance received from each entity (ADEL, producers associations, or other) on a scale of 1 to 5 (with 1 = very poor and 5 = very good), based on farmers’ perceptions. The index ranges from 0–100, with 100 being the highest possible score.

\*\* The training index grades the quality of training offered by each entity (ADEL, producers associations, and other) on a scale of 0–4 (with 0 = no training, 1 = very poor, and 4 = very good) in four areas: seed selection, fertilizer use, plant health, and irrigation. The index ranges from 0–100, with 100 being the highest possible score.



**Figure 3.** Average tomato yields (containers per fanegada\*).

\* 1 fanegada is approximately 6,400 square meters. One container (*canastilla*) is equal to approximately 22 kilograms.

Farmers that sell to a trader or directly to a major urban wholesaler tend to produce, on average, 68% and 45% more, respectively, compared to farmers selling directly to the local market. However, farmers that sell to traders and wholesalers cite unpredictable demand and extreme

price fluctuations as major obstacles restricting profit and limiting their ability to plan and invest.

Associated farmers are 55% more likely to obtain quality certifications (such as Good Agricultural Practices Certification), which are necessary for commercializing their products via

formal channels. But such certification does not necessarily give them a market advantage or additional profits. Our research indicates that certification does not imply higher prices, but rather better practices result in higher yields, leading in turn to higher overall profits.

7. One *fanegada* is approximately 6,400 square meters.

## Progress Out of Poverty Index, PPI

The Progress Out of Poverty Index (PPI) was developed by the Grameen Foundation for measuring vulnerability to poverty in specific countries. The index is unique in both its simplicity and accuracy: the answers to 10 brief questions about a household's characteristics and asset ownership are scored to calculate the likelihood that an individual is living at or below various national and international "poverty lines."

PPI questions for Colombia:

1. How many members of the family are 18 years old or younger?
2. What is the highest level of education completed by the female head of household?
3. How many family members spent the majority of last week working (employed)?
4. How many family members are formally employed by private companies or the government?
5. Based on your tax receipts, under what category of electrical service is the home registered?
6. Does this home have a functioning washing machine?
7. Does this home have a functioning refrigerator?
8. What type of fuel do you typically use to cook with?
9. Does this home have a working DVD player?
10. Does this home have a functioning car or motorcycle?

Once a score is calculated based on the questions above, the PPI Colombia Scorecard (2012) is used to predict the likelihood that a household has fallen below any one of the following poverty lines: National Poverty line, National Food line, 150% National Poverty line, 200% National Poverty line, USAID Extreme Poverty line, International PPP \$1.25, International PPP \$2.50, International PPP \$3.75, or International PPP \$5.00.

More information regarding the PPI can be found at: <http://www.progressoutofpoverty.org/>

### Poverty

In 2012, the average incidence of poverty in Boyacá was 35.6%, with a Gini index of 0.532 (compared to the national incidence of 32.7% and national Gini index of 0.539).<sup>8</sup>

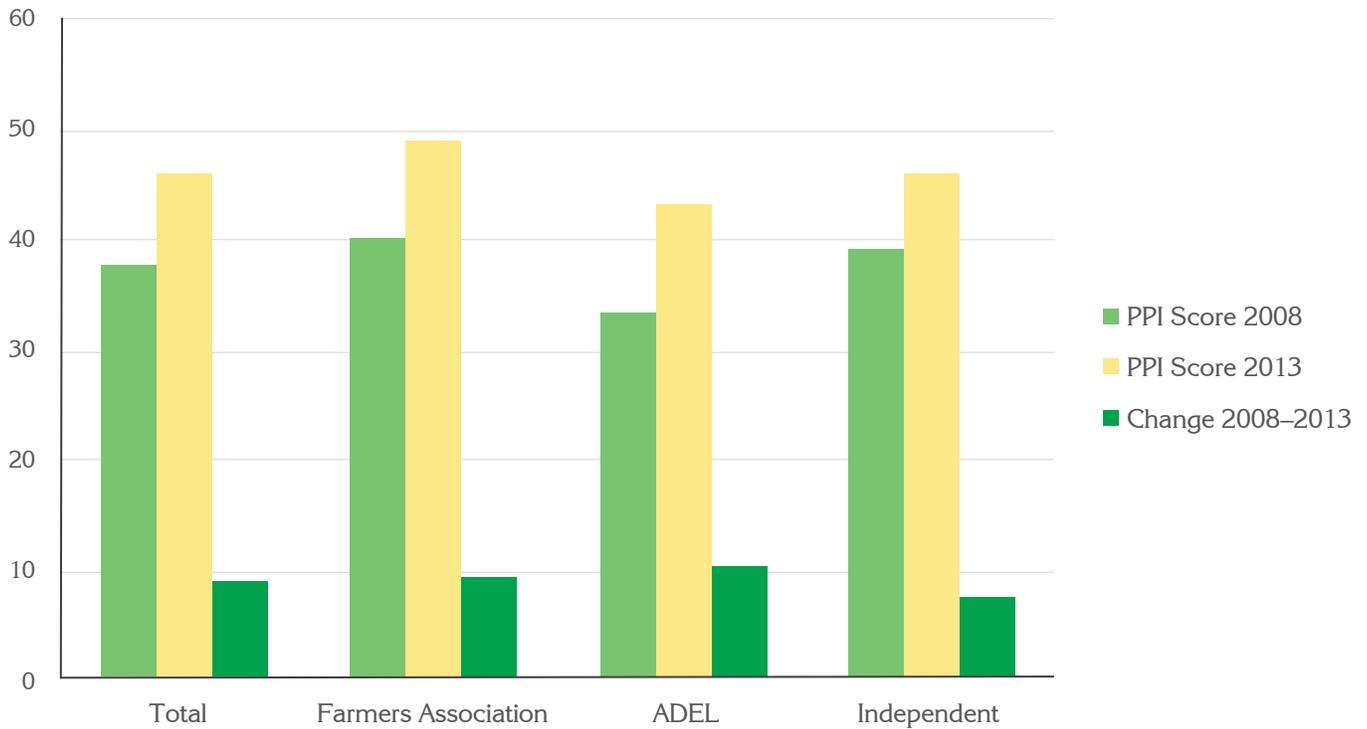
Associated producers are least likely to be poor, with 24.73% falling below the poverty line, compared to 27.35% for independent producers and 32.3% for producers working with ADEL. However, between 2008 and 2013, the likelihood of household poverty decreased by an average of 38.8%. Farmers associated with ADEL saw the greatest improvement (+9.83 PPI

points on average), followed by associated farmers (+8.94) and independent farmers (+7.5) (see **Figure 4**).

Several data restrictions make it difficult to attribute these decreases in poverty levels solely to supply chain policy. High standard deviations within groups make it difficult to accurately compare changes in averages. Furthermore, PPI data based on farmers' recall increases the chance of error. Nonetheless, there is little doubt that some notable improvements documented can be attributed at least in part to policy advances.

Probit model estimates indicate that capacity building and training are linked to poverty reduction. Diversifying production has an even stronger impact on poverty, as each additional crop cultivated for commercial purposes correlates with an increase in the likelihood that a farmer will have experienced a positive change in PPI score. These indicators suggest that regional committees should focus on supporting farmers associations and extension services that can provide production and marketing training and promote crop diversification.

8. Bulletin, DANE, 2013.



**Figure 4.** Average PPI score (2008 and 2013).

**Note:** Values closer to a PPI score of 100 reflect a lower probability of being in poverty.

## Conclusions

Our findings suggest that the supply chain policy implemented by the Boyacá Regional Vegetable Committee contributed positively to the competitiveness and livelihoods of tomato producers participating in Boyacá. More broadly, we conclude that regional committees may be effective in supporting pro-poor supply chain policy when this policy is introduced via strong producers associations. Training and technical assistance, particularly when provided by farmers associations, are most strongly correlated with poverty alleviation. Affiliation with a producers association (or in this case, a local development agency) is thus a key determinant of policy efficacy.

## Further reading

This policy brief is based on an ongoing project report:

Parra-Peña et al. 2013. ¿Funcionan las políticas públicas que fomentan las cadenas productivas agrícolas en Colombia? El caso del tomate en Boyacá. Cali, Colombia: International Center for Tropical Agriculture (CIAT).

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Wiggins S; Keats S. 2013. Leaping and learning: linking smallholders to markets in Africa. London: Agriculture for Impact, Imperial College and Overseas Development Institute.

## Correct citation

Parra-Peña RI; Miller V; Lundy M. 2014. Colombian agricultural supply chain policy: impacts on producers' competitiveness and livelihoods. CIAT Policy Brief No. 20. Centro Internacional de Agricultura Tropical (CIAT), Cali, Colombia. 6 p.

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## Acknowledgements

The authors would like to thank **Elizabeth Minchew** and **Jorge Sellare**, visiting researchers from the Universidad Autónoma de Madrid in Spain and University of Erfurt in Germany, respectively, for their invaluable contributions to the final paper and this policy brief. Thanks are also due to **Pilar Santacoloma (FAO)** and **Gustavo Setrini (NYU)**, who provided helpful comments and advice for strengthening this policy brief.



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