

Info Note

Transitioning to more sustainable, low emissions agriculture in Brazil

Lessons from certification and other projects for sustainable cattle and coffee in Brazil

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KEY FINDINGS

Cattle

- Cattle producers joined sustainability initiatives primarily to increase production, reduce production costs, learn new practices and access innovations, and because of their interest in sustainability.
- Farmers who shifted to sustainable intensification practices increased their productivity. Some also accessed new markets and a minority earned higher prices.
- Producers sought farming advice mostly from nearby farmers and technicians promoting sustainability initiatives.
- The cost of changing farm practices, insufficient technical assistance or capacity, and difficulty in complying with legal standards were the major barriers preventing other cattle producers from participating in sustainability initiatives.
- The greenhouse gas (GHG) emissions per kg of beef of cattle farmers in sustainable intensification programs were 18% lower compared to neighboring farms not in the programs.
- Early life-cycle cattle ranching (e.g. calving, early rearing), commonly associated with deforestation, has been more engaged with NGO initiatives providing support and agronomic outreach rather than formal standards and reporting.

Coffee

- Coffee farmers joined a certification program because of requests from buyers, potential for receiving price premiums on their coffee, and to access new markets with certified products.
- Coffee farmers producing certified coffee increased their economic efficiency, mainly due to higher productivity, compared to before they certified.
- Coffee producers' connections to technicians and access to information mostly revolved around their participation in cooperatives

POLICY RECOMMENDATIONS

- Build on market development lessons from the coffee sector to enhance sustainability, quality, traceability, and branding in the cattle sector.
- Expand sustainability initiatives' capacity to deliver market access, technical assistance, and finance services to more cattle farmers.
- Continue support to producers in sustainability initiatives over multiple years, as they are likely to increase the sustainability of their practices with time.
- Expand agronomic outreach and sustainability initiatives to calving and early rearing operations to reduce associated deforestation and GHG emissions.

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Cattle sector findings

Reducing GHG emissions through sustainability initiatives

- **Enteric fermentation and manure management were the major contributors to direct GHG emissions on cattle farms (Figure 3).** In our sample of 40 farms in various regions of the Amazon, enteric fermentation accounted for 74% of GHG emissions from cattle farms, while manure management accounted for 22% of the total (Bogaerts et al. 2016 and in review).

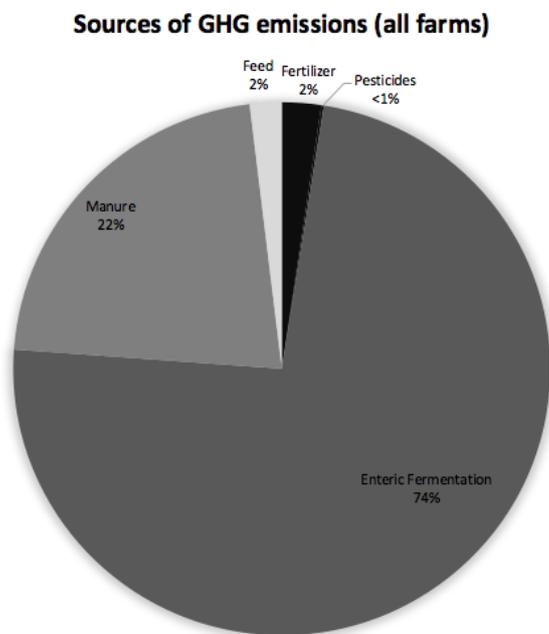


Figure 3. Sources of GHG emissions (all farms)

- **On average, farms participating in sustainability programs with an intensification component had 18% lower GHG emissions per kg of beef produced than neighboring farms not in these programs.** Farms in programs had an average of 36 kgCO₂e per kg beef compared to non-program farms at 45 kgCO₂e per kg beef produced. (Bogaerts et al. 2016 and in review).
- **Farms participating in sustainability programs that had been operational for at least two years had 35% lower GHG emissions per kg of beef produced than neighboring farms not in these programs,** suggesting that it may take a while for such programs to realize their full impacts. Farms in programs had an average of 34 kgCO₂e per kg beef compared to non-program farms at 53 kgCO₂e per kg beef produced. (Bogaerts et al. 2016 and in review).
- **Farms participating in sustainability programs with an intensification component had reduced slaughter age and increased stocking rates,** in line with the objectives of those intensification programs (Bogaerts et al. 2016 and in review). Average male slaughter age was reduced by more than 3 months

for cattle on program farms, a significant difference from non-program farms. On average, program farms reported a 23% increase in the head of cattle on farm since joining their respective programs, although 8 of 19 program farms had yet to report an increase.

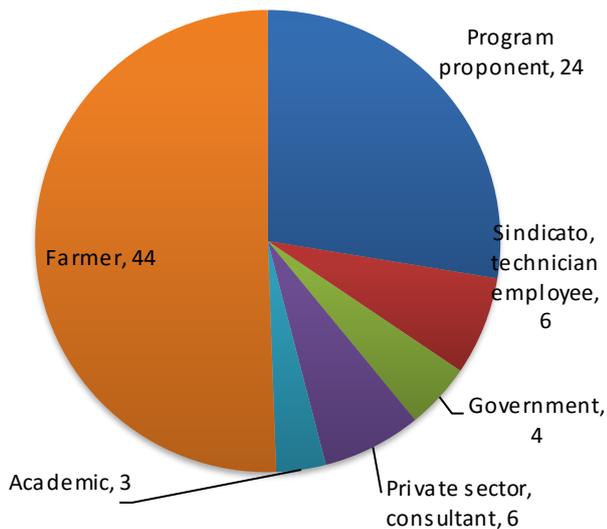
On design and limitations of cattle sector sustainability programs

- **Sustainable cattle programs in Brazil were diverse and used different and overlapping approaches to target producers.**
- **Industry-led initiatives mainly targeted producers towards the end of the cattle life cycle.**
- **Industry-led initiatives often drew on government best management practices (such as EMBRAPA) or voluntary standards (including company's own standards) to promote improved practices or certify sustainability.**
- **The main programs reaching small farmers involved in early life-cycle cattle rearing, a producer type strongly associated with deforestation, were NGO-based initiatives that emphasize outreach and support rather than formalized standards and reporting.** Solidaridad's Rural Horizonte farmer self-assessment tool is an example.
- **Insufficient technical assistance was viewed as a major barrier to cattle intensification** by 20 sustainable cattle stakeholders from industry, cattle associations, non-governmental organizations, and government (Maguire-Rajpaul et al. 2016, in review a, b).

On social networks shaping knowledge dissemination and influence

- **The majority of influential social network relationships influencing a farmer to join a sustainability program were nearby farmers.** Most influential social connections in our sample of 44 cattle farmers were farmer-to-farmer (59% of all connections in the sampled network), of which 59% were farmers within 20 km or in the same town as the interviewee (Hajjar et al. in prep.) (Figure 4). 15% of the farmers' connections were to farmers that were over 100 km away. For the program farms, 30% of their advice network connections were to proponents of the program, while for the sampled non-program farms, program proponents represented only 17% of advice connections to farmers.

Affiliation of advice ties for cattle farmers in a sustainability program



Affiliation of advice ties for cattle farmers not in a sustainability program

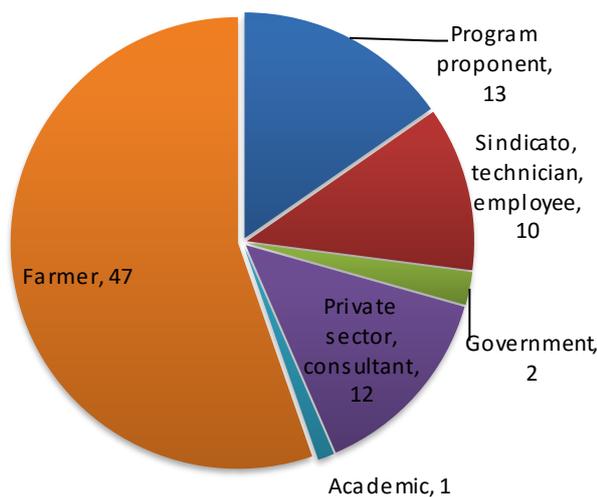


Figure 4. Cattle social networks – affiliation of advice ties (relationships) (n=44)

On farm-level barriers to, and incentives for, joining sustainability programs

- The main challenges that participating farmers experienced in joining sustainability programs were: a) the costs of changing management practices, b) building sufficient technical capacity, and c) following legal standards (Hajjar, Newton et al. in prep.). On a scale of 1 to 3, where 1 is not challenging, 2 is somewhat challenging and 3 is very challenging, the 21 sampled program farms ranked these challenges on average 2 or above.
- The main challenges that non-participating farms anticipated from joining sustainability programs were: a) the costs of changing management practices, b) following legal standards, and c) obtaining financing (Hajjar, Newton et al. in prep.). On a scale of 1 to 3, the 20 sampled non-program farms also ranked these challenges on average 2 or above.
- Several farms not participating in a sustainability program reported that the reason they weren't participating in one is that there was no opportunity for them to be in one (6 of 18 responses). Others perceived it to be too much work for too little benefit (5 of 18 responses) (Hajjar, Newton et al. in prep.).
- Most farmers participating in a sustainability program paid for all required changes from their own farm income. Most reported costs of between 100,000-300,000 Brazilian reais (Hajjar, Newton et al. in prep.).
- The most important motivations to participate in a sustainability program were the opportunities to increase production, learn new practices or technologies, and reduce production costs. These motivations were reported equally often by farmers participating in such a program and by those not participating in one (Hajjar, Newton et al. in prep.). They were the top 3 of 14 motivations for either joining or potentially joining a program, while interests in sustainability also tied for third in importance for program farms.
- Farmers not participating in a program said that they would be more motivated to do so if there were a greater chance of accessing a price premium. The potential for getting a price premium was the third most motivating factor for non-program farms. Farmers already participating in programs were much less motivated by a price premium (ranking it 11th of 14 motivations), nor was a price premium realized following adoption of program activities (Hajjar, Newton et al. in prep.).

Coffee sector findings

On barriers and incentives

- **The key motivations for farmers to certify their farms were economic.** Both certified and non-certified farmers on average ranked the possibility of a price premium, access to new markets for certified products, and requests from buyers in the top four (out of 13) motivations. This supports the findings of previous studies (Adshead 2015; González-Chaves 2016).
- **Farm size was not always or necessarily a barrier to farmers participating in certification programs.** In a comparison of 29 certified and 31 non-certified coffee farms in Minas Gerais, Brazil, there was no statistically significant difference in average size of farms that participated in the SAN certification program and those that did not. All farms in the sample were members of a cooperative, and several were certified under a group certification. It is possible that collective association, farmer extension, subsidies, and cost savings associated with cooperative membership and group certification reduced some challenges that prevent smaller farms from becoming certified (Adshead 2015, Adshead et al. in prep.).
- **Environmental concerns (e.g. protection of legal reserves; benefits from ecosystem services) were cited by few farmers as either a motivation or a barrier for coffee farmers to become certified.** When asked to free list challenges and motivations, about 25% listed it as a motivation and less than 10% listed the environment as a challenge. For those farmers who listed environment in either regard: 63% stated that the environment as a barrier to getting certified was not challenging, while 37% stated that the environment was very motivating to get certified.

On economic costs and benefits of coffee certification

- **Direct economic costs of coffee farming and coffee prices were not significantly different between certified and non-certified farms.** The price paid to farmers for coffee did not differ between certified and non-certified farms. The direct costs of certification were not a significant influence on the economics of certified farms (Bini et al. 2016).
- **Coffee certification in the case study area contributed to greater productivity, increased revenue, and greater production efficiency (higher yields and revenues; lower costs). Therefore, the main economic advantages of certification may occur on farms as a result of better management and efficiency.** The adoption of certification may thus be economically justified independently of expectations of market benefits (Bini et al. 2016).

On continuous improvement and management

- **There was a trend of higher compliance over time on certified farms, suggesting that certification is associated with in continuous improvement.** The number of non-compliances recorded in audit reports decreased over the nine years studied, for both individually- and group-certified farms, of all sizes (Maguire-Rajpaul et al. 2016, in review a, b).
- **Compliance with environmental criteria (e.g. protection of biodiversity, water and waste management, pesticide use) in certification programs was statistically significantly and positively correlated with procedural or management criteria (e.g. planning, farm management),** based on 435 audits of 103 certified individual farms and groups of farms in the coffee sector in Brazil. (Maguire-Rajpaul et al. 2016, in review a, b).
- **Compliance with social criteria (e.g. minimum wages, occupational health, safety) in certification programs was statistically significantly and positively correlated with procedural or management criteria (e.g. planning, farm management),** based on 435 audits of 103 certified individual farms and groups of farms in the coffee sector in Brazil (Maguire-Rajpaul et al. in review a). Strengthening farm management, planning and procedures may support on-farm social and environmental performance for sustainability, but further evidence is needed to confirm this conclusion.

On social networks shaping information flows and influence

- **Certified coffee farmers had a significantly higher number of connections with people from whom they sought advice on farming in their social networks than non-certified farmers – averaging 3.41 versus 2.48 connections, respectively (Figure 5).** Certified farmers also had significantly more influential connections to people who influenced their decision on whether to certify – averaging 1.14 influential connections vs 0.23, respectively (Hajjar et al. in prep.).
- **Cooperative technicians were the main sources of information for both certified and non-certified coffee farmers,** and were the most influential relationships for certified farmers (Hajjar et al. in prep.). Of the total connections in the sampled network (176), connections from the surveyed farmers to cooperative technicians numbered 83, or almost 50% of all connections. 72% of influential connections for certified farmers were to coop technicians (Hajjar et al. in prep.).

- **Certified coffee farmers did not exert significant influence on the decisions of other coffee farmers to become certified.** Of those surveyed who were certified, none reported that they were influenced by other certified farmers in their decision to certify. In fact, certified farmers said they did not talk to other certified farmers particularly often – of the 31 network ties from certified farmers to other farmers, only 3 were to certified farmers (Hajjar et al. in prep.).
- **There was no significant difference between certified and non-certified farmers in terms of their reported knowledge about ecosystem services, as those services related to farm productivity.** None of the 60 farmers interviewed reported that they associated ecosystem services from legal reserves (e.g. pollinator services, or pest control) with on-farm productivity. We speculate that this finding may in part be because 20-30% of certified farmers met their Forest Code obligations with legal reserves outside of their farm (González-Chaves 2016).

Conclusion

To respond to increasing pressures for sustainability in the cattle sector, relevant initiatives exist in Brazil. However, more could be done to increase producers' interest and capacity to participate in them. Initiatives' scope and reach to farmers also need to be expanded, as cattle producers' demands for more services is higher than the present capacity of project organizations.

What is needed now? First, support for technical advice, finance and market access are important services to aid producers in shifting to new practices. Where markets do not drive demand for sustainability practices and provide higher prices, technical and financial support will be especially important. Making services easily available to farmers will encourage wider participation.

Second, sustainability, traceability, and branding for final consumers have been a component of market development of coffee for two decades in Brazil, but only just started in the beef sector. Sustainability initiatives for coffee have enjoyed high price premiums and support from cooperatives to make this possible. Efforts in the cattle and beef sector are more recent and still in a pilot phase. Beef in Brazil also faces the constraints of multiple cattle life stages, land tenure insecurity and illegality, and no price premium. Keeping the entry requirements for practices initially low and supporting more ambitious changes over time may increase farmer participation, though may also reduce the sustainability improvements in the short term. Different types of sustainability initiatives – from those focused on standards and labeling to those more focused on agronomic outreach and support, may be necessary to most effectively and equitably reach all stages of the cattle life cycle.

Third, better understanding is also needed about how programs can continuously improve socio-environmental performance. Sustaining programs over multiple years appears to be one strategy. Improving farm management and planning capacities may also help.

Fourth, public policy and market-based sustainability initiatives should mutually reinforce—and check—each other. Certain features of market-based instruments such as certification—market incentives, transparency, incremental improvement and multi-stakeholder participation in the development, implementation, and monitoring of these policies can be extended through public policies. Governments can help raise ambition towards higher performance and catalyze technical transitions through concessional finance, technical assistance, and collective organizations. Large-scale impact is more likely when private and public policies begin to share these principles and goals.

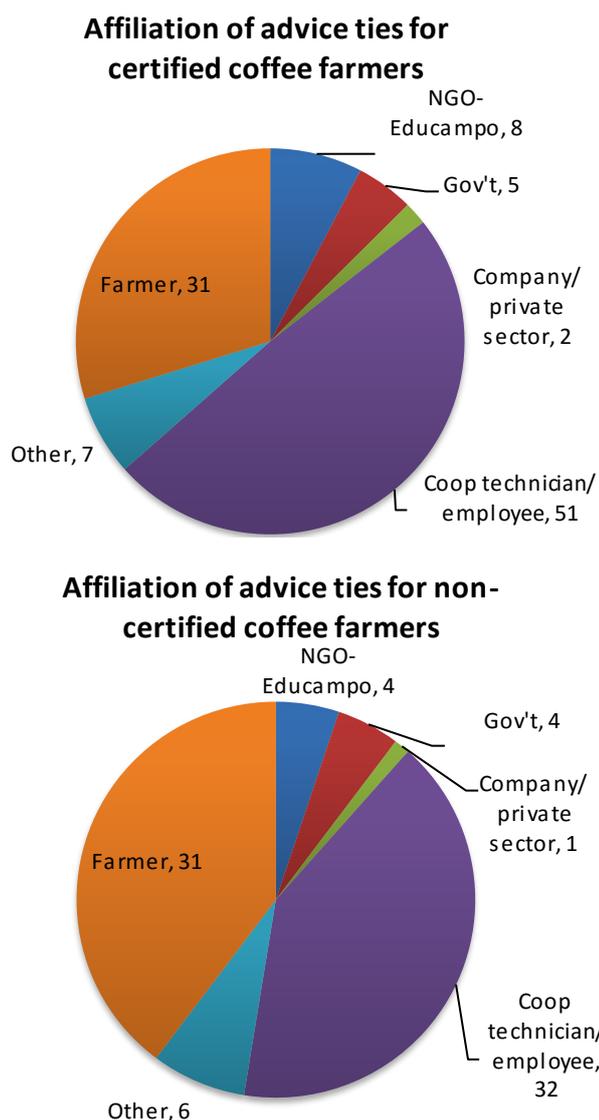


Figure 5. Coffee social networks – affiliation of advice ties (relationships) (n=60)

Further reading

- Adshead D. 2015. A landscape-level approach to equity in certification: results from the coffee sector in Minas Gerais, Brazil. MSc thesis. University of Oxford. dan.adshead@gmail.com
- Adshead D. et al. *In prep.* dan.adshead@gmail.com
- Bini D, Pinto LFG, Miranda S, Vian C, Fernandes RN. 2016. Socioenvironmental certification of farms is economically advantageous. *Sustentabilidade em debate*, No 3. Piracicaba: Imaflora. p. 25-33. <https://ccafs.cgiar.org/publications/sustainability-good-business-agriculture>
- Bogaerts M, Cirhigiri L, Robinson I, Rodkin M. 2016. Climate change mitigation through intensified pasture management: estimating greenhouse gas emissions on cattle farms in the Brazilian Amazon. MS thesis. School of Natural Resources and Environment, University of Michigan. megkb@umich.edu
- Bogaerts M, Cirhigiri L, Robinson I, Rodkin M, Hajjar R, Newton P. *In review.* Climate change mitigation through intensified pasture management: estimating greenhouse gas emissions on cattle farms in the Brazilian Amazon. Working Paper. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). megkb@umich.edu
- González-Chaves, AD. 2016. Coffee certification and Ecosystem services in Brazilian Savannas (Cerrado): Barriers and Incentives to Sustainability. MsC Thesis. Universidade de Sao Paulo. adgonzalez86@gmail.com
- Hajjar R et al. *In prep.* Social network analysis. reem.hajjar@gmail.com
- Hajjar R, Newton P et al. *In prep.* Project synthesis. reem.hajjar@gmail.com
- Maguire-Rajpaul (née Ferris) VA. 2016. How Brazil's sustainable cattle schemes could beef up to conserve forests and sustain rural livelihoods. MPhil thesis. University of Oxford. victoria.ferris@ouce.ox.ac.uk
- Maguire-Rajpaul VA, Pinto LFG, Rajpaul V, Rodrigues A, McDermott CL. 2016. Management is a need for continuous improvements and sustainability in agriculture. *Sustentabilidade em debate*, No 3.

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- Maguire-Rajpaul VA, Alves-Pinto HN, Galuchi T, McDermott CL. *In review a.* How Brazil's sustainable cattle schemes could beef up to reduce emissions, conserve forests and sustain rural livelihoods. Working Paper. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). victoria.ferris@ouce.ox.ac.uk
- Maguire-Rajpaul VA, Rajpaul V, McDermott CL, Pinto LFG. *In review b.* On-farm compliance and landscape-level social equity in coffee certification: the role of procedural versus performance-based standards. *World Development*. victoria.ferris@ouce.ox.ac.uk

Findings and policy recommendations result from a joint initiative that investigates how to harness private sector cattle certification to reduce the amount of deforestation and greenhouse gas emissions from cattle farming in Brazil, using the experience of coffee sector certification as an example. The team is composed of researchers from the University of Michigan, the Institute of Agricultural Management and Forest Certification (IMAFLORA), University of São Paulo, University of Oxford, University of Colorado Boulder, the Rainforest Alliance, and the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) at the University of Vermont, with support from the Global Innovation Initiative.

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¹The surveyed programs were (project proponent in parantheses): Novo Campo Project in Mato Grosso (Instituto Centro da Vida); an intensification program in Rondônia (Imaflora, Vida Verde, Marfrig Global Foods); a silvo-pastoral program in Amazonas (Instituto de Conservação e Desenvolvimento Sustentável do Amazonas – IDESAM); and Pecuária Verde Program (Sindicato Rural de Produtores Rurais de Paragominas).

CCAFS and Info Notes

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is a strategic partnership of CGIAR and Future Earth, led by the International Center for Tropical Agriculture (CIAT). CCAFS brings together some of the world's best researchers in agricultural science, development research, climate science and Earth System science, to identify and address the most important interactions, synergies and tradeoffs between climate change, agriculture and food security.

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