

## HAFL Master's Thesis Abstract

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*English Title:* **Cadmium in cocoa from Colombia: Assessment of challenges and mitigation strategies to support smallholder farmers**

*English Summary*

Many Colombian smallholder farmers live in vulnerable contexts, affected by decades of armed conflict. Around 100'000 depend on cacao for their main income. Many more farmers could benefit from cultivating cacao, economically and also socially with cacao as a legal alternative to illicit crops. However, cadmium, a heavy metal which in certain doses is highly toxic for humans, presents a challenge to materializing this potential. With recent research indicating even higher negative health impacts than assumed, new or stricter regulations regarding the cadmium content of food have emerged. Amongst others, the European Union introduced cadmium limits for cacao-based products that entered into force in 2019. As a consequence, farmers might lose their basic income when not being able to sell their cacao due to elevated cadmium levels. Latin America is particularly affected, including Colombia. While the region is known for high-quality cacao, some of its cacao has shown relatively high cadmium values. To exploit the cacao's economic and social potential for thousands of smallholders, effective cadmium mitigation solutions are hence urgently needed.

The thesis assesses challenges and prioritizes approaches of Colombian cacao stakeholders to mitigate cadmium levels of soils, cacao beans and final cacao-based products. The research was conducted in cooperation with Swisscontact who leads the development of a national cadmium mitigation strategy. Based on a case study approach, qualitative data were collected. During a one-month field research from October to November 2019, 17 stakeholder interviews and two farm visits were conducted, several workshops and roundtables attended, and background conversations led. Furthermore, data analysis followed the qualitative content analysis approach.

An analysis of the Colombian cacao value chain and cadmium values in different regions points out the main challenges for the cacao sector regarding cadmium. Based on that, it is shown that the EU regulation on cadmium has not yet directly impacted the sector economically. However, indirect economic impacts such as damage to the brand of Colombian cacao are already felt. Future impacts are expected, including serious negative social impacts for farmers who mostly would not have immediate income alternatives. Finally, the assessment of cadmium mitigation approaches shows that a remarkable scope of projects and measures is already conducted by national stakeholders. A first prioritization matrix

based on effectiveness, acceptability and implementation indicates a range of high potential mitigation measures, but also stresses the need for more research, particularly for field testing to adapt solutions to farm conditions. With more research and field trial results, the matrix can be further developed to prioritize approaches and inform investment decisions.

A main recommendation is to integrate the technical mitigation strategies into a holistic cacao value chain approach, tackling further challenges such as low productivity and quality. Such approach would include an increased focus on participatory research projects, improved extension services, a more systematic internal and external communication, and continuing stakeholder coordination. The national cadmium mitigation strategy addresses most of these aspects, and hence plays a central part in supporting farmers, industry, policy and research to tackle the cadmium challenge.

The analysis and findings of this thesis should inform international stakeholders, such as Swiss chocolate producers, about the actual cadmium situation in Colombia and the magnitude of mitigation strategies implemented by the sector. Thereby, it might contribute to avoid adverse market effects for Colombian cacao and negative impacts for smallholder farmers.

*Keywords:* *Theobroma cacao*; cadmium; Colombia; smallholders; value chains

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