博士論文要約（Summary）

入学年 Entrance Year：2021
連合農学研究科
専攻 Course： Science of Bioresource Production
氏名 Name： IBIKOULE TOYIMI GODFRID ERASME

タイトル **Title**	Critical Issues Related to Cooperative Roles in the Maize Sector of the Republic of Benin—Performance analysis and collective marketing challenges—

キーワード Key word（**Maize producer cooperatives**）（**Impact**）（**Roles**）（**joint-selling**）（**Benin**）

In recent decades, Benin has experienced substantial economic growth, primarily driven by its agricultural sector, constituting 25% of the nation’s gross domestic product and almost half the workforce (World Bank, 2020). Although historically reliant on the cotton industry, known for its susceptibility to market fluctuations, the Beninese government has strategically diversified its agricultural focus towards other crops, including maize cultivation (MAEP, 2017). This strategic pivot aims to address economic volatility and foster regional equity, citing maize's noteworthy nutritional and economic benefits (INSAE, 2018; FAO, 2020). Despite efforts, the maize sector in Benin faces multifaceted challenges that hinder its optimal performance. These challenges include persistent issues such as low productivity, substantial post-harvest losses, underutilization of improved seeds, and inadequate financial support (MAEP, 2017; MAEP, 2021; Sossou, 2014; Nonvide, 2021). Overcoming these hurdles is imperative to unlocking the full potential of Benin's maize cultivation, mainly as it involves numerous smallholder farmers seeking additional income.

In response, agricultural cooperatives have emerged as instrumental solutions to the challenges faced by Benin's agricultural sector (CORAF/WECARD, 2015; Develtere et al., 2008). Cooperatives are acknowledged for enhancing market participation, ensuring product quality, fostering technology adoption, and improving overall economic performance. Consequently, rural households have witnessed improved livelihoods through enhanced income and economic opportunities (Abebaw & Haile, 2013; Birchall & Ketilson, 2009; Kumar et al., 2016; Ma et al., 2018; Tefera et al., 2017; Wossen et al., 2017). Aligned with Benin's commitment to agricultural development through cooperatives, the enactment of AUSCOOP in 2010 marked a significant milestone. As a result, 2,439 agricultural cooperatives were registered as of April 2019, with 48.6% focusing on grain production and marketing (Ibikoule & Lee, 2021).

This dissertation assesses maize producer cooperatives’ (MPCs) impact and coordination roles in the Alibori region. As the second-largest maize production area with a distinct market orientation (Yabi & Moustafa, 2011; Yabi et al., 2013), this region provides a pertinent context for MPCs investigations. Based on a comprehensive research approach, the dissertation employs a mix of qualitative and quantitative methods, including propensity score matching and multivariate probit models. This approach aims to assess the impact of MPCs on farm performance, farmers' revenues, and overall productivity. Furthermore, the study explores the intricate relationship between cooperatives' governance, institutional

environments, and MPCs' roles and influence on market coordination and commercialization. This dissertation encompasses 5 chapters—Chapter 1 is the general introduction setting the background and justification of the overall research. Chapters 2, 3, and 4 are the respective empirical studies performed, and lastly, Chapter 5 is the general conclusion summarizing the main findings and implications.

The initial empirical study seeks to evaluate the impact of MPCs on farm performance and producer revenue in Alibori, Benin. Employing a multi-stage sampling technique, the study focuses on high-output maize areas within the Kandi and Banikoara communes, surveying 380 farmers. The data were analyzed using logistic regression and Propensity Score Matching (PSM).

Descriptive statistics reveal that members often exhibit characteristics such as marital status, literacy, and extensive experience in maize farming, accompanied by larger farming plots. However, economic differences in tractor or fertilizer usage were not statistically significant. Institutional factors indicated that members had a higher propensity to engage with warehouse receipt systems (WRS) and had better access to training and extension services. Despite these advantages, challenges persisted, with a low rate of improved seed utilization and non-significant differences in credit access after matching, highlighting underlying issues. While MPC membership improved farmers' access to crucial productive services like improved seeds, credit, and grain storage facilities, the PSM analysis indicates that membership did not significantly translate into increased maize yields or enhanced agricultural income. This finding prompts reflection on the potential limitations of cooperatives in driving enhanced productivity and profitability within the agricultural landscape.

The second empirical study seeks to clarify the reasons behind MPCs' underperformance based on practitioners' experiences. It delves into the intricacies of MPCs by employing qualitative case studies to scrutinize organizational structures, governance, and business operations across six cooperatives, including unions. The study's methodology consists of in-depth interviews with cooperative leaders and members, supplemented by secondary data from agricultural bureaus and development programs. It assessed the legal and institutional framework, cooperative establishment processes, and government involvement, following Chaddad's (2006) and Lee et al. (2019) insights on cooperatives' organizational structure and governance.

The comparative analysis of MPCs in both districts underscored the influence of collective action backgrounds, support systems, and political contexts on cooperative development. A contrast emerges between the more facilitated Djidja cooperatives and the conflict-constrained Kandi counterparts. The former, benefiting from robust support systems, outshines the latter, where internal conflicts and inadequate governance hinder cooperative activities. This disparity is prominently reflected in joint selling efforts, with Kandi's farmers often performing maize marketing independently despite cooperative membership. Djidja's MPCs demonstrated more effective operations attributed to better leadership, training, and support, contrasting with Kandi's cooperatives grappling with conflict and poor leadership, mirroring the challenges Benin's cotton cooperatives faced. Federated cooperatives or unions in both districts aimed to enhance market reach, but their success varied. Kandi's union faced operational challenges, while Djidja's union showed potential despite marketing hurdles. This study accentuates the

pivotal role of skilled leadership and underscores the necessity for ongoing support and managerial capacity enhancement to boost cooperative efficacy.

The last empirical study scrutinizes the transaction mechanisms within Benin's maize market, navigating the competitive landscape where various channels compete with MPCs. Through stakeholder interviews, the study identifies critical marketing channels and their distinct features. Moreover, a probit regression analysis was employed to identify factors influencing maize producers' choice of marketing channels based on a comprehensive survey of 246 maize farmers in Kandi.

The market structure in Benin is categorized into primary, secondary/aggregation, and terminal or border markets, with Kandi recognized as a pivotal secondary market. Within this hierarchy, maize is gathered in Kandi for export through border markets like Malanville, reflecting price trends that mirror market abundance and scarcity cycles. Prices exhibit a pattern, being lowest immediately after harvest, slightly increasing post-harvest, and reaching their peak during the lean season. Further, the multivariate probit analysis unveiled a pattern in farmers diversifying sales through various channels, with choices influenced by factors such as age, cooperative membership, proximity to markets, access to credit, the timing of sales, and the average price obtained for maize. The study underscores that while MPCs offer certain advantages, they are less favored due to competing incentives from other channels. Specifically, the enticing incentives from collectors—availability of loans— and logistical support from private brokers emerge as decisive factors guiding producers towards alternative marketing channels rather than cooperatives.

The dissertation critically examines the impact, role, and challenges of MPCs in northern Benin, particularly their influence on the maize sector and farmers' market access in Alibori. The findings reveal that MPC membership lacks a significant impact on access to services, maize yield, and farmers' revenue. These limitations are mainly due to a poor organizational structure and governance system exacerbated by leadership conflict. Consequently, there is an absence of robust joint-selling initiatives within MPCs as essential services such as transportation and loans are offered by traders.

A key recommendation is to empower MPCs in marketing endeavors, mainly through joint selling and credit services, reducing reliance on external collectors and catalyzing agricultural development. Also, engaged membership, bolstered by partners-backed cooperative training and effective conflict-resolution strategies, is required for MPCs' effectiveness. While offering valuable insights, the study acknowledges limitations, notably its narrow focus on the maize sector in Alibori, which may not fully capture the broader agricultural context of Benin.

REFERENCES

Abebaw, D., & Haile, M. G. (2013). The impact of cooperatives on agricultural technology adoption: Empirical evidence from Ethiopia. Food Policy, 38(1), 82–91. https://doi.org/10.1016/j.foodpol.2012.10.003

Birchall, J., & Ketilson, L. H. (2009). Resilience of the cooperative business model in times of crisis. ILO.

Chaddad, F. R. (2006). Networking for competitive advantage: The case of US agricultural cooperatives. The Annual World Symposium of the International Food and Agribusiness Management Association, 31.

CORAF/WERCAD. (2015). Mecanismes de financement durable de la chaine de valeur mais dans la zone uemoa.pdf (p. 16). http://www.coraf.org/wpfd_file/mecanismes-de-financement-durable-de-la-chaine-de-valeur-mais-dans-la-zone-uemoa/

Develtere, P., Wanyama, F., and Pollet, I. (2008). 'Cooperating out of Poverty: the Renaissance of the African Cooperative Movement', ILO/The World Bank Institute, Geneva.

Ibikoule, G. E., & Lee, J. (2021). Characteristics of trends and historical path of agricultural cooperatives in the Republic of Benin. 71, 31–40.

INSAE. (2018). Agricultural Production in Bénin Maize Production: 1995-2016. [Electronic ed: Open Data For Africa]. Ministry of Agriculture Livestock and Fisheries.

Kumar, A., Roy, D., Trapathi, G., Joshi, P., & Adhikari, R. (2016). Can contract farming increase farmers' income and enhance adoption of food safety practices?: Evidence from remote areas of Nepal: IFPRI Discussion Papers, April.

Lee, J., Morishima, T., & Kiyono, S. (2019). The paths of organizational reform in European agricultural cooperatives: A case study of agricultural cooperatives in F&V Sector in Almeria, Spain. Journal of Rural Economics, 91(2), 121–133.

Ma, W., Abdulai, A., & Goetz, R. (2018). Agricultural Cooperatives and Investment in Organic Soil Amendments and Chemical Fertilizer in China. American Journal of Agricultural Economics, 100(2), 502–520. https://doi.org/10.1093/ajae/aax079

MAEP. (2017). Plan Stratégique de Développement du Secteur Agricole (PSDSA): Orientation stratégiques 2025, République du Bénin, (p. 132).

MAEP. (2021). Recensement National de l'Agriculture 2019, volume 3, principaux tableaux. Ministère de l'agriculture de l'Elevage et de la Pêche, Direction de la Statistique Agricole (DSA).

MAEP. (2022). Réalisation de la campagne agricole 2020–2021 au Bénin. Cotonou: Ministère de l'Agriculture de l'Elevage et de la Pêche. Direction de la Statistique Agricole (DSA). https://dsa.agriculture.gouv.bj/statistics/vegetale

Nonvide, G. M. A. (2021). Adoption of agricultural technologies among rice farmers in Benin. Review of Development Economics, 25(4), 2372–2390. https://doi.org/10.1111/rode.12802

Sossou et al. (2014). Rural Credit and Farms Efficiency Modelling Farme.pdf. 2014.

Tefera, D. A., Bijman, J., & Slingerland, M. A. (2017). Agricultural Co-Operatives in Ethiopia: Evolution, Functions and Impact: Agricultural Co-operatives in Ethiopia. Journal of International Development, 29(4), 431–453. https://doi.org/10.1002/jid.3240

World Bank. (2020). Agricultural Competitiveness and Export Diversification Project; World Bank: Washington, DC, USA; p. 119.

Wossen, T., Abdoulaye, T., Alene, A., Haile, M. G., Feleke, S., Olanrewaju, A., & Manyong, V. (2017). Impacts of extension access and cooperative membership on technology adoption and household welfare. Journal of Rural Studies, 54, 223–233. https://doi.org/10.1016/j.jrurstud.2017.06.022

Yabi, A. J., & Moustafa, R. (2011). Analysis of maize production and supply for food security improvement in the Borgou region in North east of Benin. Issues and challenges in rural development.

Yabi, A. J., Tovignan, S. D., & Moustafa, R. (2013). Analysis of maize production and supply for food security improvement in the Borgou region in Northeast of Benin. African Journal of Agricultural Research, 8(11), 943–951. https://doi.org/DOI: 10.5897/AJAR11.1625