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RESEARCH ARTICLE

Effect of Agribusiness Clusters on Smallholder Soybean Farmer's Extent of Contract Farming Participation in Northern Benin

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ARTICLE INFO	ABSTRACT
	This study analyzed the effect of the agribusiness cluster (ABC) on the extent of contract farming (CF) adoption by soybean smallholder producers in the northern part of Benin. For this purpose, a two-limit Tobit model was employed based on data collected from 360 soybean farmers, members, and non-members of ABC. The results show that ABC's implementation influences the extent of CF adoption for ABC's members and non-members living in the villages where this approach is implemented. This could be explained by the fact that approaches based on peasant groups improve communication between actors, which, in turn, enhances trust between stakeholders. This trust fosters soybean farmers' participation in CF. Younger farmers and those who have contact with extension agents are more likely to increase their involvement in CF. Additionally, membership in a cooperative and residence in villages far from urban areas significantly influence the intensity of CF adoption. This is because peasants living in villages far from urban areas have more difficulties accessing the market and are, in turn, more open to alternatives (such as ABC and CF) that would facilitate their access to markets. Producers with a higher level of education are less likely to increase the extent of their CF adoption because they prefer more autonomy and flexibility in their decisions regarding when, how, and to whom to sell their soybeans. This study suggests that promoting approaches based on peasant organizations, such as ABC and cooperatives, improving the level of peasant information, and providing technical training in soybean production are necessary to boost the extent of CF adoption.

INTRODUCTION

Agriculture plays a significant role in the economic and social growth of Sub-Saharan African countries. In Benin, agriculture contributes considerably to improving household living conditions and reducing poverty and allows the country to cover a large part of its nutritional needs (Agboton et al., 2018). Agriculture employs approximately 70% of the active population and 36% of the Gross Domestic Product (GDP) (MAEP, 2017). Thus, the agricultural sector is a strategic asset for a country's socioeconomic progress.

Unfortunately, Benin's agricultural sector is characterized by low productivity and competitiveness. Indeed, the sector is dominated by smallholder farmers who face several constraints, notably limited access to services such as agricultural extension, restricted access to quality inputs, poor market access for harvests, and real-time rural credit, which are crucial prerequisites for upgrading commodity value chains (Wiggins et al., 2010; Tidjani et al., 2022; Issahou et al., 2023).

To improve this situation, contract farming (CF) has been introduced as a tool to integrate smallholder producers into agricultural value chains. Indeed, CF has been promoted as an institutional solution to various problems faced by farmers, particularly inadequate technology and lack of access to factor and product markets (Swain, 2018). CF is an agreement established before production between the producer and buyer that guarantees access to the market while facilitating access to the technologies and inputs necessary for improving production (Kimbi et al., 2024). CF should drive farmers to adopt good production practices, leading to quality products that meet the market requirements.

Unfortunately, the adoption rate of CF is relatively low, mainly because of conflicts related to negotiations and implementation of agreements (Issahou and Sodjinou, 2024). Various studies (Sabi Yo, 2021; Issahou et al., 2023) have highlighted the crisis of trust among stakeholders. Trust and attitude significantly influence farmers' intention to participate and the extent of their participation in CF (Khalili et al., 2024). To improve the level of trust between stakeholders, agribusiness clusters (ABCs) have been promoted for more than two decades as instruments that can facilitate interactions between actors in value chains and, therefore, constitute, among other things, a space for building trust.

Thus, ABCs catalyze the development of CF. This is one of the reasons why the government has targeted CF and ABCs as tools for bringing a critical mass of family-type farms into a dynamic of professionalization that ensures that production meets market demand (MAEP, 2017; Kimbi et al., 2024).

After over two decades of implementation, it is legitimate to investigate whether the ABC improves the extent of farmers' participation in CF. This study attempts to answer this question based on the specific case of soybean producers in Northern Benin. This study assesses the influence of ABCs on the extent of soybean farmers' participation in CF. The socioeconomic and institutional factors that affect the adoption of CF are also assessed.

METHODOLOGY

Data used

The data used in this study were collected through surveys conducted from 2022 to 2023 in the three largest soybean-producing communities in Benin (Kandi, Nikki, and Copargo). In each of these communes, discussions with resource persons (in particular, extension agents, peasant organizations, etc.) allowed us to select three soybean-producing villages based on criteria such as the quantity of soybeans produced, the availability of an ABC, and the potential to find producers involved in CF. In each village, approximately 40 soybean producers were systematically randomly selected from the list of producers drawn up following a census conducted for this purpose. Overall, 360 producers were interviewed using a questionnaire (Table 1).

In addition to the quantitative data, qualitative data were collected from key informants using an interview guide. The data collected included producer characteristics (age, gender, education level, cooperative membership, contact with extension agents, etc.), the existence of ABCs in the village, producer membership in ABCs, the condition of the access road to the village, and the proportion of soybeans sold through CF.

Table 1. Distribution of the sample of producers according to ABC membership

Commune	Membres de cluster	Non membre de cluster	Total
Nikki	59	61	120
Kandi	75	45	120
Copargo	60	60	120
Total	194	166	360

DATA ANALYSIS

This study assesses the influence of ABCs on the extent of farmers' participation in CF. The extent of producers' participation in CF is represented by the share of soybeans the farmer sells through CF. Indeed, the share of the soybean harvest marketed through formal CF constitutes, in some way, the intensity of the adoption of CF by the producer. Notably, other variables are also used in the literature to assess the intensity of farmers' participation in the CF. For example, Swain (2018) used the rate of allocation of inputs such as land and labor to produce crops under CF.

To identify the effects of ABCs and other socioeconomic factors on farmers' participation in CF, we used a two-limit Tobit model. In the study sample, the share of soybeans marketed through CF varied from zero (56.6% of respondents) to one (1.4% of farmers). As the dependent variable is between $L_1 = 0$ and $L_2 = 1$, the appropriate analytical approach is the two-limit Tobit model, which is specified as follows (Greene, 2012):

$$Z_i^* = x'\alpha + \mu_i \qquad\qquad\qquad (1)$$

$$\text{and } Z_i \;\; = L_1 \text{ if } Z_i^* \leq L_1$$
$$= Z_i^* \text{ if } L_1 < Z_i^* < L_2$$
$$= L_2 \text{ if } Z_i^* \geq L_2$$

where, i indicates the farmer, Z_i is the dependent variable, x_i represents the vector of the explanatory variables (defined as in equation 1), α is a vector of unknown parameters, μ is an error term assumed to be normally distributed with mean 0 and variance σ^2, and Z^* is a latent variable (not observed for values less than 0 and greater than 1) assumed to have a normal, homoskedastic distribution with a linear conditional mean (Wooldridge, 2005).

Based on adoption studies, three categories of explanatory variables were considered: those that could positively influence the extent of farmers' participation in CF, those that we hypothesized should have negative effects, and those whose signs are difficult to predict (table 2). The factors in the first category included residing in a cluster village (CLUSVI), membership in a cluster (CLUSTER), producer's gender (GENDER), education (EDUCP), membership in a peasant cooperative (MCOOP), training of the farmer in soybean production techniques (TRNSOY), participation in CF negotiation meetings (PATCAG), contact with extension agents (CEXTEN), and share of soybean income in household income (REVSOY). Indeed, various authors (Hoang and Nguyen, 2023; Awode and Sodjinou, 2023; Assouma et al., 2023; Issahou, 2024) have shown that clusters, level of education, membership in a cooperative, awareness and income from soybeans tend to improve the propensity of producers adoption of CF.

The distance between the producer's home and the nearest periodic market (DISTPM) is the only variable whose coefficient is hypothesized to have a negative sign—producers living close to these markets tend to neglect CF. Variables with positive or negative signs include the producer's age (AGEP), the practice of off-farm activity (OFARM), and the condition of the road leading to the producer's village (VILRSTAT).

Table 2. Variables that could potentially determine the extent of adoption of contract farming

Variable	Description	Type of variable	Expected sign
Independent variables			
CLUSVI	Reside in a village where a cluster exists	Binary (1=yes, 0=no)	+
CLUSTER	Cluster membership	Binary (1=yes, 0=no)	+
AGEP	Farmer's age (in year)	Continu	+/-

GENDER	Gender of the farmer	Binary (1=male, 0=female)	+
EDUCP	Farmer's education level (in year)	Continu	+
MCOOP	Cooperative membership	Binary (1=yes, 0=no)	+
CEXTEN	Contact with extension agents	Binary (1=yes, 0=no)	+
OFARM	Involved in an off-farm activity	Binary (1=yes, 0=no)	+/-
TRNSOY	Technical training in soybean production	Binary (1=yes, 0=no)	+
PATCAG	Participation in CF negotiation meetings	Binary (1=yes, 0=no)	+
REVSOY	Share of soybean in household income (%)	Continu	+
DISTPM	Distance to nearest periodic market (km)	Continu	-
VILRSTAT	Condition of the access road to the village	Ordinal (1= Poor in all seasons, 2= Poor in rainy seasons, 3= Good in all seasons)	+/-
Dependent variable			
PSHAR	Share of the soybean harvest marketed through formal CF	Continue (range from 0 to 1)	

It is worth noting that the two-limit Tobit model's coefficients (α) are not interpretable in terms of the marginal effects of the explanatory variables on the extent of the farmer's participation in CF. Accordingly, we calculated these marginal effects using the following formula (Greene, 2012):

$$\frac{\partial E(y|x)}{\partial x_k} = \alpha_k \left(\Phi\left(\frac{1-x'\alpha}{\sigma}\right) - \Phi\left(\frac{-x'\alpha}{\sigma}\right) \right) \qquad (2)$$

where $\Phi(\cdot)$ is the cumulative distribution function of the standard normal distribution. We calculated the standard errors of these marginal effects using the delta method.

RESULTS AND DISCUSSION

Socioeconomic characteristics of soybean farmers surveyed

Table 3 presents the characteristics of soybean producers. On average, the producers were 38 years old and were mainly men (85% of the interviewees). Their level of education was relatively low (four years on average), and 73% of them were members of a cooperative. Similarly, 98% of cluster members belonged to a cooperative group compared to 43% of their peers who were not cluster members. Cluster members were primarily in contact with extension agents (78% of respondents), unlike non-members (34%). Additionally, more than 88% of the cluster members received technical training in soybean production compared to only 46% of the non-members. Approximately 54% of the producers interviewed participated in contract negotiation meetings compared to 29% of the non-cluster members. Cluster members resided relatively closer to periodic markets (around 4 km), unlike their peers (5 km on average), who were relatively farther away from these markets. Soybean income constituted, on average, 4–6% of the household income of the producers interviewed.

Table 3. Some socioeconomic characteristics of the respondents

| Variable | Label | Cluster | | All |
		Non member	Member	
AGEF	Age of the producer (in year)	35.52 (10.98)	39.61 (10.89)	37.73 (11.10)
FGENDER	Gender of the producer (%)			
	Male	92.17	78.35	84.72

	Female	7.83	21.65	15.28
NINSTC	Formal education (in year)	3.50 (2.44)	3.65 (2.65)	3.57 (2.45)
MCOPP	Cooperative membership (% of yes)	43.37	98.45	73.06
CNENTE	Contact with extension agents (% of yes)	34.34	77.84	57.78
EXTAGR	Involved in an off-farm activity (% of yes)	45.25	39.44	42.57
FRMSO	Technical training in soybean production (% of yes)	46.39	88.14	68.89
PCAGR	Participating in contract farming negotiation meetings (% of yes)	28.55	53.86	40.22
RevSoj	Share of soybean in producer's household income (%)	4.29 (2.12)	6.12 (1.25)	5.19 (1.85)
DISTVM	Distance to nearest periodic market (km)	5.28 (10.31)	4.14 (5.70)	4.75 (9.39)
RSTAT	Condition of the access road to the village (%)			
	Poor condition in all seasons	1.25	0.40	0.86
	Poor condition in rainy seasons	83.34	63.43	74.16
	Good condition in all seasons	15.41	36.17	24.98

Types of contract farming practiced and extent of adoption of these CF

Four types of CF are identified in the study area: production-oriented, market-oriented, storage-oriented, and traditional CF. The adoption of each contract depends on the objective sought by the producer or the problem they face. Thus, the adopters of traditional contracts are mainly farmers with poor information regarding modern contracts or severe financial difficulties. Adopters of production-oriented contracts are primarily interested in obtaining high-quality inputs, whereas adopters of storage-oriented contracts are generally members of warranting systems. Finally, the adopters of market-oriented contracts want to guarantee a market for production. These results are consistent with those of Issahou and Sodjinou (2024), who found four types of contracts and noted that production-oriented CF was the most beneficial for producers. Notably, only soybeans marketed through formal CF are assessed in this study.

Our field results also show that the share of soybeans marketed through CF varies depending on farmers' status. Thus, cluster members market approximately 53% of their soybeans through ABCs, compared to 10% for non-members. Surveyed soybean farmers market 20–51% of their soybeans through CF (figure 1). Similarly, ABC member producers do not market all of their soybeans through CF. Indeed, given the pressing need for money, some farmers sell some of their soybeans through traditional contracts. Others, especially those without financial problems, use part of the soybeans to meet contractual terms, and the second part is sold to buyers who offer more remunerative prices. Among the various reasons for the reluctance of farmers to market their entire production through CF, one is the price difference between that offered in the contract and that practiced in the market at harvest time. Another reason is the existence of conflicts during periods of contract negotiations and contract implementation. These conflicts are often caused by disagreements over the transfer prices of soybeans, particularly when the market price is relatively high. Our results are consistent with the findings of Vicol et al. (2022), in which conflicts seriously impact the degree of participation in CF and, therefore, the share of harvests farmers sell through CF. Conflicts also result from the fact that different stakeholders can manipulate or interpret the contract in a way that suits them (Vicol et al., 2022). It follows that investments in raising awareness and building trust among stakeholders are significant factors in improving farmers' participation in CF.
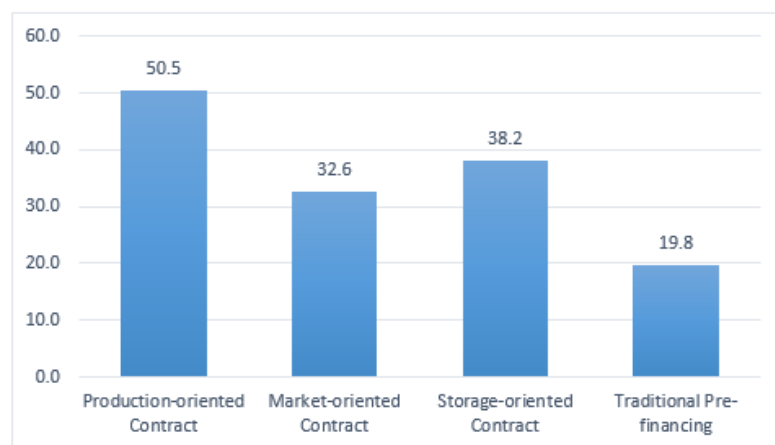
Figure 1. Percentage (%) of soybean marketed from various contract farming

Effect of ABC on the extent of contract farming adoption

The results of the two-limit Tobit model presented in Table 4 indicate that residing in a cluster village positively and significantly influences (at the 5% level) the share of soybeans marketed through CF. Thus, the share of soybeans marketed through CF increases by three percentage points when the producer resides in a village where a cluster is implemented compared to peasants not living in this type of village. Similarly, belonging to a cluster positively and significantly affects the quantity of soybeans sold through CF. Indeed, the share of soybeans sold through CF tends to increase by 18 percentage points when the producer is an ABC member compared to their peers who are not.

In short, ABC's implementation influences the share of soybeans marketed through CF for participants and non-participants in ABC villages. This could be explained by the fact that approaches based on peasant groups, such as the ABC, improve communication between actors, which, in turn, promotes trust. Our finding is in line with Issahou (2024), who argues that ABC improves knowledge of the content of contracts, attitudes, and the level of trust between stakeholders. According to Khalili et al. (2024), this trust exerts a significant influence on farmers' willingness to participate and the extent of their participation in CF.

Table 4. Factors determining the extent soybean farmers' participation in contract farming: two-limit Tobit regression results

Variables	Label	Coefficient	Marginal Effect
ABCV	Reside in a village where a cluster exists (1=yes)	0,100** (0,046)	0,034** (0,015)
CLUSTER	Cluster membership (1=yes)	0,390*** (0,049)	0,181*** (0,028)
AGE100	Farmer's age (in year)	-0,220 (0,153)	-0,078 (0,054)
GEND	Gender of the farmer (1=male)	-0,003 (0,062)	-0,001 (0,022)
EDUC10	Farmer's education level (in year)	-0,085** (0,038)	-0,030** (0,014)
COPP	Cooperative membership (1=yes)	0,164*** (0,048)	0,058*** (0,017)
CVUL	Contact with extension agents (1=yes)	0,121*** (0,042)	0,044*** (0,016)
OFARM	Involved in an off-farm activity (1=yes)	-0,078** (0,038)	-0,027** (0,013)

FSOY	Technical training in soybean production (1=yes)	0,248*** (0,047)	0,094*** (0,019)
PCAGR	Participating in agricultural contract negotiation meetings (1=yes)	0,082** (0,040)	0,030** (0,015)
RSOY10	Share of soybean in household income (%)	0,272*** (0,103)	0,096*** (0,037)
DISTVM10	Distance to nearest periodic market (km)	0,067*** (0,023)	0,024*** (0,008)
RSTAT	Condition of the access road to the village (1= Poor in all seasons, 2= Poor in rainy seasons, 3= Good in all seasons)	-0,207*** (0,057)	-0,073*** (0,020)
_cons	Constant	-0,001 (0,151)	

Effect of socioeconomic factors on the extent of adoption of contract farming

As shown in Table 4, the **producer's age** has a negative but non-significant influence on the extent of CF adoption. This negative influence means that the older the farmer, the lower the extent of CF adoption. These results are in line with the findings of Ndlovu et al. (2024), who, in a study conducted in Kwazulu-Natal (South Africa), found that age does not influence farmers' participation in CF. According to these authors, this situation could mean that older producers would be resistant to the contract or would not be up-to-date with information technologies that should play a fundamental role in accessing information on the benefits of CF. However, our findings are contrary to those of Kimbi et al. (2024), for whom older producers were more likely to engage in CF than young people. According to the authors, this could be because older farmers would have more difficulty accessing the market and are, by extension, more open to alternatives that would facilitate their access to markets.

The **education** of the farmer has a negative and significant influence on the extent of CF adoption (at the 5% level). Increasing the producer's education level by one year decreases the extent of CF by three percentage points (table 4). This result is in line with Behera (2019), who found that more formally educated producers tend to participate less in contract farming, or even reduce the share of their harvest sold under contracts. According to Hoang and Nguyen (2023), producers with a higher level of education may "prefer higher profits with higher risks; thus, they prefer more autonomy and flexibility to decide when and to whom to sell for higher prices" (Hoang and Nguyen, p. 847) For them, a higher education level may hinder producers from participating in CF.

Table 4 shows that the practice of an **off-farm activity** negatively and significantly influences the extent of CF adoption. Thus, the extent to which producers involved in an off-farm activity adopt CF is approximately three percentage points lower than that of producers not engaged in an off-farm activity. These results corroborate the findings of Swain (2018) according to whom the practice of off-activity decreases the extent of the farmer's adoption of CF.

The **share of soybeans in household income** positively and significantly influences the extent of CF adoption among soybean farmers. The higher the share of soybean income in the producer's household income, the higher the extent of their adoption of CF.

Effect of other institutional factors on the extent of contract farming adoption

Peasant **membership in a cooperative** positively and significantly influences CF adoption. In other words, when a farmer participates in a cooperative, the extent of CF adoption is expected to increase by six percentage points. This could be explained by the fact that the cooperative constitutes a space that improves trust between the contracting parties. This constitutes one of the entry points for firms that rely on these cooperatives for better exchanges with their members. This result is consistent with the findings of Ndlovu et al. (2024), who state that cooperatives enable farmers to collaborate and share market information. These cooperatives reduce transaction costs (for information,

marketing, and so on) and increase smallholder preferences for CF (Widadie et al., 2020). According to Hoang and Nguyen (2023), cooperative membership is a vital catalyst that promotes farmers' participation in CF and the extent to which they participate.

Contact with **extension** agents positively and significantly affects the extent of CF adoption. Thus, the extent of soybean farmers' participation in CF tends to increase by four percentage points when the producer is in contact with an extension agent compared to their peers without contact with these agents. Extension agents, as well as cooperatives, are intermediaries that firms or buyers use to contact producers. This increases the level of trust among stakeholders. Therefore, cooperatives and extension services can sensitize producers to CF to promote their participation in CF. This result is consistent with the findings of Nazifi and Hussaini (2021) and Khalili et al. (2024), who also note that trust affects the rate of CF adoption. According to Kimbi et al. (2024), the positive effect of extension on CF adoption can also be attributed to the enhanced agricultural knowledge, skills, and awareness of CF that farmers gain, significantly improving their readiness and ability to engage in CF.

Technical training in soybean production and **participating in agricultural contract negotiation meetings** positively and significantly influence CF adoption. Thus, peasants who receive training in soybean production techniques and those who participate in CF negotiation meetings are more likely to increase the extent of CF adoption by nine and three percentage points, respectively, compared to those who are not trained or do not participate in CF negotiation meetings. This result is not in line with that of Nazifi and Hussaini (2021), who note that farmers with less technical training in good agronomic practices participate more in CF.

The **condition of the road** leading to a producer's village significantly influences the extent of CF adoption. In other words, living one kilometer further from a periodic market increases the extent of CF adoption by 0.24 percentage points. Similarly, the worse the access roads to the producer's village, the higher the extent of CF adoption. Thus, improving road quality by 1% tends to reduce the extent of CF adoption by seven percentage points. Thus, producers living close to periodic markets with high-quality access roads are less likely to intensify their CF adoption. The negative influence of distance on CF adoption indicates that producers living far away from urban areas have lower levels of contract participation. These results are consistent with those of Nazifi and Hussaini (2021), who, in a study conducted on maize CF in north-western Nigeria, showed that distance and the condition of the access road significantly influence the intensity of CF adoption. Under such conditions, Nazifi and Hussaini (2021) suggest that collection points be installed close to communities or in producers' villages to improve their participation.

CONCLUSION AND IMPLICATIONS

This study analyzed the influence of ABCs on the extent of CF adoption. Using a two-limit Tobit model on data collected in three communes of Benin, the study shows that implementing ABCs influences the intensity of CF adoption significantly for ABC members and non-members in villages where this approach is implemented. The primary reason is the fact that ABCs create trust between stakeholders and facilitate the grouping of small quantities of soybeans produced by smallholder producers in sufficient amounts for the buyer. ABCs also reduce transaction costs, particularly for firms. Socioeconomic and institutional factors such as producer education, the practice of off-farm activities, membership in a cooperative, contact with extension agents, and the conditions of the roads leading to producers' villages significantly determine the extent of CF adoption by soybean farmers. This study suggests that promoting approaches based on peasant organizations, such as ABC and cooperatives, improving the level of peasant information, and providing technical training in soybean production are necessary to boost the extent of CF adoption.

soybean producers interviewed, as well as their organizations and extension agents for their availability and valuable contribution.

REFERENCES

Agboton M, PL Sèwadé, MAT Ayenan, 2018. Successes and challenges in tackling constraints in soybean processing through, article de revue, vol 3, 17p.

Assouma A, E Sodjinou, Z Amadou, and JA Yabi, 2023. Déterminants de la participation des producteurs aux Agribusiness Clusters (ABC) au Bénin. Bulletin de la Recherche Agronomique du Bénin, 33(4) : 116-127.

Awode OR, and E Sodjinou, 2023. Influence des Agribusiness Clusters (ABC) sur l'accès des petits riziculteurs aux services agricoles de productivité au Centre et au Nord du Bénin. Bulletin de la Recherche Agronomique du Bénin, 33(5) : 36-46.

Behera DK, 2019. Farmer's participation in contract farming in india: a study of Bihar. Agricultural Economics Review, 20(2): 80-89

Khalili F, S Choobchian, and E Abbasi, 2024. Investigating the factors affecting farmers' intention to adopt contract farming. Scientific Reports, 14: 9670. https://doi.org/10.1038/s41598-024-60317-x

Greene WH, 2012. Econometric Analysis, 7th ed. Upper Saddle River, NJ: Pearson.

Hoang V, and V Nguyen, 2023. Determinants of small farmers' participation in contract farming in developing countries: A study in Vietnam. Agribusiness 39(3): 836-853. https://doi.org/10.1002/agr.21795

Issahou I, 2024. Impact de la contractualisation sur l'efficacité technique et le bien-être des ménages producteurs de soja au Bénin. PhD dissertation, Unersity of Parakou, Benin

Issahou I, and E Sodjinou, 2024. Does Agribusiness Cluster Improve Soybean Smallholder Farmers' Participation in Contract Farming? Evidence from Benin. Pakistan Journal of Life and Social Sciences, 22(2):18927-18943

Issahou I, E Sodjinou, E Tchigo, and J Yabi, 2023. Caractérisation des différentes formes de contractualisation pratiquées par les producteurs de soja au Centre et au Nord du Bénin. Bulletin de la Recherche Agronomique du Bénin (BRAB), 33(03): 125-137.

Kimbi TG, S Sieber, E Akpo, C Magomba, and F Mishili, 2024. Key drivers behind contract farming engagement decisions in Tanzania: empowering sorghum farmers, Cogent Social Sciences, 10:1, 2396957, DOI: 10.1080/23311886.2024.2396957

MAEP (Ministère de l'Agriculture, de l'Elevage et de la Pêche), 2017. Plan Stratégique de Développement du Secteur Agricole (PSDSA) 2025 et Plan National d'Investissements Agricoles et de Sécurité Alimentaire et Nutritionnelle PNIASAN 2017-2021. Cotonou. Bénin 139p.

Nazifi B, and YI Hussaini, 2021. Determinants of participation in contract farming among smallholder maize farmers in north-western Nigeria. Acta Sci. Pol. Agricultura, 20(4), 147–160. DOI: 10.37660/aspagr.2021.20.4.2

Ndlovu PN, JM Thamaga-Chitja, and TO Ojo, 2024. Drivers of the level of market participation among smallholder urban vegetable farmers in KwaZulu-Natal, South Africa, Cogent Food & Agriculture, 10:1, 2437139, DOI: 10.1080/23311932.2024.2437139

Sabi Yo OB, 2021. Effets socio-économiques de la contractualisation des liens d'affaires entre les acteurs sur la performance de la Chaîne de Valeur Ajoutée du riz étuvé au Nord-Ouest du Bénin. PhD Dissertation, University of Parakou, Benin.

Swain BB, 2018. Determinant in Intensity of Farmers' Participation in Contract Farming: The Study of Gherkin and Hybrid Paddy Seed Cultivation in a South Indian State. Journal of Land and Rural Studies, 6(2): 1–21. https://doi.org/10.1177/2321024918766

Tidjani N, FT Zakari, N Ollabode, and JA Yabi, 2022. Evaluation de l'effet de l'innovation sur l'efficacité économique de la production de soja dans le Borgou au Nord du Bénin. International Journal of Accounting, Finance, Auditing, Management and Economics, 3(6-2), 1-19.

Vicol M, N Fold, C Hambloch, S Narayanan, and HP Niño, 2022. Twenty-five years of Living Under Contract: Contract farming and agrarian change in the developing world. Journal of Agrarian Change, 22:3–18.

Widadie F, J Bijman, and J Trienekens, 2020. Farmer preferences in contracting with modern retail in Indonesia: A choice experiment. Agribusiness, 37(2): 371-392. https://doi.org/10.1002/agr.21652

Wiggins S, J Kirsten, and L Llambí, 2010. The Future of Small Farms. World Development, 38(10), 1341-1348. https://doi.org/10.1016/j.worlddev.2009.06.013

Wooldridge JM, 2005. Introductory Econometrics: A Modern Approach. Third Edition. (South-Western Cengage Learning, Florence)