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**ARAŞTIRMA MAKALESİ** **RESEARCH ARTICLE**

# Factors Influencing Participation in Self-Managed Livestock Markets in Rural Communities in the Republic of Benin*

Benin Cumhuriyeti'ndeki Kırsal Topluluklarda Kendi Kendini Yöneten Hayvan Pazarlarına Katılımı Etkileyen Faktörler

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## Abstract

Livestock in West Africa is an example of regional value chain development. It is essentially based on the trade in livestock between production areas and consumption centers. The livestock trade is an important economic activity in pastoral and agro-pastoral communities as it is their source of income. The livestock trade in these regions takes place at several sites, the best known of which are the livestock markets. Two different types of livestock market are investigated in this study. Self-managed livestock markets (Marché à Bétail Autogéré: MBA), are new models for marketing livestock in the Republic of Benin. Unlike traditional livestock markets (Marché à Bétail traditionnel: MT), MBAs offer several advantages to its participants by creating a platform where sellers and buyers can meet to trade without intermediaries. The absence of the intermediary system in the operation of MBA markets makes them different from MT markets. Because of their important role in rural development, MBAs have become the focus of policy makers and international development organizations. The purpose of this study was to analyse the factors that affect farmers' participation in MBA markets. The study used primary data collected from face-to-face surveys of a random sample of 300 livestock farmers consisting of 150 respondents from the MBA and 150 respondents from the MT. Descriptive statistics and Binary Logistic Regression were used to analyze the data. The results of the Logistic Regression Analysis revealed that access to market information, payment type, cooperative partnership, beef cattle herd size, sheep herd size, goat herd size and farmland ownership have significant positive effects on MBA market participation, while distance to market has significant negative effects on MBA market participation. Improving these factors could increase the participation of livestock farmers in the MBAs in the Republic of Benin. This would increase their income and improve their living conditions. Knowledge of the factors influencing participation in MBA markets would also help stakeholders and policy makers in their decision making.

**Keywords:** Binary logistic regression, Republic of Benin, Self-managed livestock markets, Traditional livestock markets, Rural development

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## Öz

Batı Afrika'da hayvancılık faaliyeti, bölgesel bir değer zinciri gelişimine karşılık gelmektedir. Bu zincir, temel olarak üretim alanları ile tüketim merkezleri arasındaki hayvan ticaretinden oluşmaktadır. Batı Afrika'da hayvan ticareti, pastoral ve agro-pastoral toplulukların gelir kaynağı olması nedeniyle önemli bir ekonomik faaliyettir. Bu bölgelerde hayvan ticareti, en yoğun olarak hayvan pazarlarında olmak üzere farklı yerlerde gerçekleştirilmektedir. Bu çalışmada bir Afrika ülkesi olan Benin Cumhuriyeti'nde iki farklı hayvan pazarı modeli kapsama alınmıştır. Bunlardan biri olan "Kendi Kendini Yöneten Hayvan Pazarları (*Marché à Bétail Autogéré*: MBA)", Benin Cumhuriyeti'nde hayvanların pazarlanması için yeni bir modeldir. Diğer hayvan pazarı modeli olan "Geleneksel Hayvan Pazarlarından (*Marché à Bétail traditionnel*: MT)" farklı olarak MBA'lar, satıcı ve alıcıların aracılar olmadan ticaret yapmak için bir araya gelebilecekleri bir platform oluşturarak paydaşlarına çeşitli avantajlar sunmaktadır. MBA'ların işleyiş mekanizmasında aracılık sisteminin bulunmaması, bu pazarları MT'lerden farklı kılmaktadır. Kırsal kalkınmadaki önemli rolleri nedeniyle, MBA'lar Benin Cumhuriyeti'nde politikacıların ve uluslararası kalkınma kuruluşlarının odak noktası haline gelmiştir. Bu nedenle, bu araştırmada çiftçilerin Kendi Kendini Yöneten Hayvan Pazarlarına katılımını etkileyen faktörlerin analiz edilmesi amaçlanmıştır. Araştırmanın birincil verileri, 150'si MBA'lardan ve 150'si MT'lerden olmak üzere 300 çiftçiden oluşan rastgele bir örneklemle yüz yüze yapılan anketler aracılığıyla toplanmıştır. Verileri analiz etmek için tanımlayıcı istatistikler ve Binary Lojistik Regresyon analizi kullanılmıştır. Sonuçlara göre, pazar bilgilerine erişim, ödeme şekli, kooperatif ortaklığı, sığır sürüsünün büyüklüğü, koyun sürüsünün büyüklüğü, keçi sürüsünün büyüklüğü ve tarım arazisi büyüklüğü çiftçilerin MBA seçimini anlamlı ve olumlu yönde etkilerken, pazara uzaklık MBA seçimini anlamlı ve olumsuz yönde etkilemektedir. Belirlenen bu faktörlerle ilgili iyileştirmelere gidilmesi, Benin Cumhuriyeti'ndeki hayvan yetiştiricilerinin bu yeni pazar modeline katılımını artırabilecektir. Bu ise yetiştiricilerin gelirlerini artırırken, yaşam koşullarını da iyileştirebilecektir. Bu araştırmanın sonuçları, gelir ve yaşam koşullarının iyileştirilmesi hedefleri yönünden, pazar paydaşlarına ve politikacılara karar alma süreçlerinde yardımcı olacaktır.


**Anahtar Kelimeler:** Binary lojistik regresyon, Benin Cumhuriyeti, Kendi kendini yöneten hayvan pazarları, Geleneksel hayvan pazarları, Kırsal kalkınma

## 1. Introduction

The Republic of Benin is a country with an agricultural economy where livestock farming occupies a predominant place in the national economy. Its contribution to the Gross Domestic Product is 5.82% and represents 15.55% of the Gross Agricultural Production value (FAO and ECOWAS, 2016). The populations involved in livestock activities in Benin are mainly pastoralists and agro-pastoralists. Their economic viability depends on animal husbandry. Most pastoralists are from the Peulh ethnic group and own large herds of beef cattle, sheep or goat (Chabi, 2016). As for the agro-pastoralists, they are a mixture of several ethnic groups (Peulh, Gando, Bariba, etc.) and combine livestock with agriculture. The number of animals is an important capital element for farmers. In the past, farmers did not usually sell their animals, but today most of them are involved in commercial production and trade of live animals. This is due to many reasons such as: the increasing demand for meat and other animal products due to the growing population (Onibon, 2004); the creation of the MBA, which give farmers the opportunity to deal directly with buyers; the improvement of animal prices; the sedentarization of some nomadic farmers in order to avoid the effects of climate change, etc.

Most live animal transactions take place in livestock markets. There are mainly two types of livestock markets in the Republic of Benin. These are traditional livestock markets (MT), which are the oldest market model in Benin and self-managed livestock markets (MBA), which are a new model (UDOPER, 2007). This study will focus on the MBA markets. Because of their economic and financial weight, the MBA markets are a real pillar of local development. They are a new model of livestock marketing developed and managed by the farmers themselves. These markets are the focus of livestock farmers, livestock traders, local authorities, national and international organizations.

The participation of livestock farmers in the market has been widely considered essential for the livelihoods of rural people and economic growth in developing countries (Barret, 2008). The rise in income is expected to be achieved principally through the involvement and participation of small-holder farmers and rural communities in economic activities along the market value chain and concomitant employment generation (Kyeyamwa et al., 2008; Ayele et al., 2019).

Analysis of market participation is fundamental to transforming livestock farming to market orientation then, expected increase market participation. Markets are a reflection of the territorial dynamics in which livestock farming and product marketing activities take place (Duteurtre, 2010). Analysis of market participation indicates the factors that affect farmers' choice. For example, when transaction costs are high, it discourages market participation by small-scale farmers (Key et al., 2000). According to Zaibet et al. (2009), the non-participation in the market by farmers negatively affects the continuity and therefore the sustainability of the livestock activity.

The analysis of factors affecting livestock farmers' participation in livestock markets has been conducted in many scientific studies (Alene et al., 2008; Ayele et al., 2019; Abate and Addis, 2021; Lutta et al., 2021). This is very important in the case of Benin because of the great interest that MBA markets represent nowadays in the rural economy. However, very few research has been conducted in the livestock sub-sector to specifically study MBA in Benin. Onibon, (2004) revealed the existence of the MBA markets in a report and described their functioning. But, there is no studies have been conducted on the determinants of farmers' decisions to participate in the MBA in the Republic of Benin.

This study aimed to analyze the factors that influence participation in the MBAs in pastoral and agro-pastoral communities in the municipalities of Gogounou, Nikki, Bassila, Matéri, Savè and Iwoyé (Kétou) in Benin. This will increase the participation of livestock farmers in the MBAs in Benin.

This information is crucial for understanding the socio-economic and market factors of the MBA markets' participation in Benin. Because lack of knowledge about factors that determine livestock market participation among the pastoral communities can lead to misguided interventions that can impact on improving household welfare of pastoralists (Ehui et al., 2009; Alkemade et al., 2013).

## 2. Materials and Methods

This research was carried out in the Republic of Benin. It was conducted in both traditional (MT) and modern (MBA) livestock markets. In the MT markets, the trading system is traditional and intermediaries-driven. They are common in the local areas of many African countries. The MBA markets are the modern livestock markets where the transactions take place without intermediaries. The trading system is much more

organized and modernized than that in the MT markets. The research aimed to analyze the factors influencing participation in MBAs in rural communities in the Republic of Benin.

A two-stage sampling procedure was used to draw the sample respondents. In the first stage, with the help of the head of the Ministry of Agriculture Department, the potential MBA and MT markets were identified in the municipalities of Gogounou, Nikki, Bassila, Matéri, Savè and Iwoyé (Kétou). In the second stage, from the identified MBA and MT, 300 livestock farmers (150 from MBAs and 150 from MTs) were randomly selected and surveyed. Face-to-face surveys were conducted using a structured questionnaire.

The values of the descriptive statistics were used for the purpose of summarizing and presenting the data. To compare the frequency distribution of one variable to another, cross-tabulations were also used. The relationship between market participation and continuous independent variables (beef cattle herd size, sheep herd size, goat herd size, household size, farmland ownership, distance to market, age, education level) was determined by using Pearson Correlation Coefficients (Chhetri et al., 2013; Shrestha, 2019). Chi-square tests were used to examine the degree of association between market participation and categorical independent variables (gender, access to market information, payment type, pasture use, cooperative partnership, access to credit) (Chhetri et al., 2013; Shrestha, 2019). The variance inflation factor (VIF) was used to check multicollinearity. Variable with a high VIF value (VIF ≥ 10) was removed from the model (Girma and Abebaw, 2012; Shrestha, 2019; Marwati et al., 2020). The Binary Logistic Regression Model was used to determine the factors that influence the farmers' participation in MBA markets. Only the independent variables of the regression model with a statistically significant coefficient were interpreted.

The Binary Logistic Regression Model belongs to the general class of binary choice model, where the dependent variable is dichotomous (Greene, 2003). It is an extension of the linear probability model and takes the form:

$$\gamma_i = X_i\beta + \varepsilon_i \quad \text{(Eq.1).}$$

$\gamma_i$ = 1, if $\gamma_i$ * > 0, otherwise $\gamma_i$ = 0

Where $X_i$, is the vector of independent variables related to ith livestock farmers. The dependent variable γi, is equal to 1 if the farmer decides to participate in the MBA market and 0 otherwise. Equation (1) above describes the probability of a farmer deciding to participate in the MBA market. Gender, access to market information, payment type, pasture use, cooperative partnership, access to credit, beef cattle herd size, sheep herd size, goat herd size, household size, farmland ownership, distance to market, age and education level are the independent variables in the model. Their coefficients were used to interpret the variation they bring to the model (*Table 1*).

The above linear model can be transformed into a cumulative probability function as follows:

$$P_i = F(X_i\beta) \quad \text{(Eq.2) (Greene, 2003)}$$

If the cumulative probability function is logistic, then we have the logit model of the form:

$$P_i = \frac{1}{1+e^{-xi\beta}} \quad \text{(Eq.3).}$$

The marginal effect of a particular variable on the probability that a particular household decides to sell is given by:

$$\frac{\partial Pi}{\partial Xi} = f(X'\beta)\beta k \quad \text{(Eq.4)}$$

It takes the form:

$$f(X'\beta) = \frac{e^{-x\prime\beta}}{(1+e^{-x'\beta})^2} \quad \text{(Eq.5) (Greene, 2003)}$$

***Table 1. Variables used in the model***

| Variables | Variable Description | Variable Type | Expected sign |
|---|---|---|---|
| Dependent Variable | MBA market participation<br>Y = 1 (participation)<br>Y = 0 (otherwise) | | |
| Independent Variables | | | |
| Access to market information | Farmer's access to market information (1 = Yes, 0 = No) | Dummy | + |
| Payment type | Payment type (1 = Cash, 2 = Credit) | Dummy | + |
| Pasture Use | Use of pasture (1 = Yes, 0 = No) | Dummy | + |
| Cooperative partnership | Partnership to a livestock organization (1 = Yes, 0 = No) | Dummy | + |
| Access to credit | Farmer's access to credit (1 = Yes, 0 = No) | Dummy | + |
| Beef cattle herd size | Number of cattle owned (number) | Continuous | + |
| Sheep herd size | Number of sheep owned (number) | Continuous | + |
| Goat herd size | Number of goat owned (number) | Continuous | + |
| Household size | Number of family members (number) | | ± |
| Farmland ownership | Farmland owned (ha) | Continuous | + |
| Distance to market | The distance to market (km) | Continuous | - |
| Education level | Farmer's education level (year) | Continuous | + |

## 3. Results and Discussion

### *3.1. Descriptive information of sample*

Among the sample respondents, 97.67% were men and 2.33% were women. Men are generally head of the households and owners of the herd; their sons are shepherds; their wife has the right to milk the herd and sell it. Men are more likely to be involved in decision making (Nightingale, 2002; Chhetri et al., 2013). 45.33% were between 41-60 years old. 76% had a primary education level. The family size of 40% of the farmers is less than or equal to 3 members (*Table 2*).

***Table 2. Descriptive statistics results for the livestock farmers***

| | MBA | | MT | | General | |
|---|---|---|---|---|---|---|
| | Number | % | Number | % | Number | % |
| Gender | | | | | | |
| Male | 147 | 98.0 | 146 | 97.3 | 293 | 97.7 |
| Female | 3 | 2.0 | 4 | 2.7 | 7 | 2.3 |
| Total | 150 | 100.0 | 150 | 100.0 | 300 | 100.0 |
| Age | | | | | | |
| 21-40 | 90 | 60.0 | 40 | 26.7 | 130 | 43.3 |
| 41-60 | 48 | 32.0 | 88 | 58.7 | 136 | 45.3 |
| ≥61 | 12 | 8.0 | 22 | 14.7 | 34 | 11.3 |
| Total | 150 | 100.0 | 150 | 100.0 | 300 | 100.0 |
| Education level (year) | | | | | | |
| Uneducated (<1) | 3 | 2.0 | 63 | 42.0 | 66 | 22.0 |
| Primary school (1-6) | 142 | 94.7 | 86 | 57.3 | 228 | 76.0 |
| College (7-10) | 5 | 3.3 | 1 | 0.7 | 6 | 2.0 |
| Total | 150 | 100.0 | 150 | 100.0 | 300 | 100.0 |
| Household size | | | | | | |
| ≤3 | 94 | 62.7 | 26 | 17.3 | 120 | 40.0 |
| 4-7 | 44 | 29.3 | 72 | 48.0 | 116 | 38. 7 |
| 8-11 | 12 | 8.0 | 51 | 34.0 | 63 | 21.0 |
| ≥12 | - | - | 1 | 0.7 | 1 | 0.3 |
| Total | 150 | 100.0 | 150 | 100.0 | 300 | 100.0 |

### *3.2. Econometric analysis*

The Binary Logistic Regression Model was used to determine the factors affecting the MBA market choice of farmers. Binary Logistic Regression is a method used to determine the causal relationship between the dependent

variable and the independent variables if the dependent variable is binary or sequential (Şeref et al., 2016). In this study, those who chose MBA as the dependent variable were taken as Y=1 and those who did not choose Y=0. Model fit hypotheses are as follows.

**$H_0$ :** The model fits the data.

**$H_1$ :** The model doesn't fit the data.

According to the analysis results, the Nagelkerke $R^2$ value of the model was calculated as 0.724; according to the coefficient of this value, the variables found in the model explain 54% of the model. According to the results of the analysis -2Log Probability Value is 181.033 (*Table 3*).

***Table 3. The Significance Values of the Model Parameters***

| -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
|---|---|---|
| 181.033 | 0.543 | 0.724 |

The *Table 4* shows the Sig. value found for the Hosmer and Lemeshow test is 0.900, which provides information about the goodness of fit of the created model, shows that the model is fitted (May and Hosmer, 2003). The Hosmer and Lemeshow test statistic, which shows the Chi-Square distribution, is used to test the goodness of fit of all the variables of the model (Shrestha, 2019; Altekin and Demirbaş, 2021).

***Table 4. Results of Hosmer and Lemeshow***

| Hosmer and Lemeshow Test | | |
|---|---|---|
| **Chi-square** | **df** | **Sig.** |
| 3.485 | 8 | 0.900 |

The Binary Logistic Regression Model results showed that access to market information, payment type, age, pasture use, cooperative partnership, beef cattle herd size, sheep herd size, distance to market and education level significantly influenced the participation of livestock farmers in MBA markets in the Republic of Benin.

Beef cattle herd size had a significant positive correlation with MBA market participation (*Table 5*), implying that as the size of the livestock increases, the incentive to sell increases and the participation in the market increases. Regression results also showed beef cattle herd size had a significant positive association with participation in the MBA market at 1% significant level (*Table 7*). This confirms the findings of Barrett et al. (2003) and Lutta et al. (2021), who stated that the decision to participate or not in market was significantly determined by pastoralists attaining and maintaining sufficiently large herd sizes and hence become willing to liquidate animals through the market. Kyeyamwa et al. (2008) stated that having a bigger herd size positively influences the probability of selling. Higher herd size increases households' market participation (Ehui et al., 2009; Vincent et al., 2010; Terfa, 2012; Ayele et al., 2019).

As expected, correlation test (*Table 5*) and regression analysis (*Table 7*) showed that the distance to market had a significant negative association with the MBA market participation at 1% significant level. It suggests that the further away the market is, the less the participation. This may also be due to poor road conditions in rural areas. Farmers therefore go to the nearest markets to avoid wasted time and high transportation costs. This is in the line with the result of Lutta et al. (2021) who found that the distance to market negatively influences the decision to participate in market. They also stated that the closer a household is to the nearest market, the lesser would be the transportation cost, loss of livestock weight due to longer trekking hours, and better access to market information and facilities. Key et al. (2000) and Makhura et al. (2001) found that distance to market negatively influences both the decision to participate in market and the proportion of output sold. In contrast, Kyeyamwa et al. (2008) found that distance to market does not significantly influence the decision to sell at the market.

Chi-square tests showed a significant association between the payment type and market participation (*Table 6*). Moreover, regression results also showed payment type had a significant positive influence on market participation at 1% significant level (*Table 7*). This implies that the farmer's participation in the market increases if the sales result in cash payments. This result indicates that farmer prefer payment in cash than credit. One of the critical bases of MBA market is to make the animal trading system different from MT market by improving the payment system (Onibon, 2004). This point attracts more the farmers to MBA markets. Because they know they will sell and get their money in cash.

***Table 5. Correlations between continuous independent variables and market participation (N = 300)***

| Independent variables | Market participation |
|---|---|
| Beef cattle herd size | 0.422* |
| Sheep herd size | 0.055 |
| Goat herd size | -0.038 |
| Household size | 0.131* |
| Farmland ownership | -0.006 |
| Distance to market | -0.377* |

* means correlation is significant at 5%

Cooperatives partnership showed a significant association with market participation (*Table 6*), yielding a significant positive coefficient at 1% significant level (*Table 7*), which suggests that farmers who are members of a livestock farmers cooperative tend to have a high market participation. Partnership in groups is used as a proxy for group marketing (Lutta et al., 2021). This allows farmers not to depend on traders (middlemen) for market information, because they can benefit from this service with the cooperatives. Alene et al. (2008) and Lutta et al. (2021) found that being a group member positively influences the decision to participate in livestock market. Agricultural cooperatives reduce the likelihood of traders being sources of market information by increasing the probability of selling (Girma and Abebaw, 2012).

***Table 6. Chi-square test results for categorical independent variables and market participation***

| | | Market participation | | Non-market participation | | | |
|---|---|---|---|---|---|---|---|
| | | Freq. (N=150) | Proportion (%) | Freq. (N=150) | Proportion (%) | $x^2$ | Sig. |
| Gender | male | 149 | 99.3 | 144 | 96.0 | 3.657 | 0.056 |
| | Female | 1 | 0.7 | 6 | 4.0 | | |
| Access to market | Yes | 84 | 56.0 | 67 | 44.7 | 3.854 | 0.050 |
| information | No | 66 | 44.0 | 83 | 55.3 | | |
| Payment type | Cash | 63 | 42.0 | 18 | 12.0 | 34.247 | 0.000* |
| | Credit | 87 | 58.0 | 132 | 88.0 | | |
| Pasture use | Yes | 144 | 96.0 | 125 | 83.3 | 12.987 | 0.000* |
| | No | 6 | 4.0 | 25 | 16.7 | | |
| Cooperative | Yes | 67 | 44.7 | 7 | 4.7 | 64.578 | 0.000* |
| partnership | No | 83 | 55.3 | 143 | 95.3 | | |
| Access to credit | Yes | 44 | 29.3 | 46 | 30.7 | 0.063 | 0.801 |
| | No | 106 | 70.7 | 104 | 69.3 | | |

* significant at 5 %

The number of sheep owned (herd size) had a significant positive effect on market participation at the level of 10% significance (*Table 7*). As the sheep herding increases, market participation increases. Sheep occupy the second place in animal sales after beef cattle. Especially during the periods of Eid al-Adha, New Year celebrations and traditional holidays, its demand increases (Moussa, 2014).

Access to market information had a positive and significant effect on the market participation at 5% significant level (*Table 7*). Ayele et al. (2019) and Lutta et al. (2021) found that farmers' access to market information had positively and significantly influenced the probability of farmers' decision to sell beef cattle. Access to market information boosts confidence of farmers who are willing to participate in the market (Zamasiya et al., 2014; Bahta and Bauer, 2007). Market information in the livestock sector remains one of the major challenges. But it is necessary for farmers to be well informed about the market demand and prices offered, as they are very important for the decision making to sell or not their animals (Musemwa et al., 2007). Farmers with price information are

more likely to participate in the market than those without (Barrett, 2008). Although access to market information is difficult in pastoral settings, MBA markets offer participants the advantage of acquiring it easily, mainly through farmers' organizations, management committee, livestock organizations network, etc. Due to poor and asymmetric access to market information, farmers receive low prices and this leads to high marketing cost (Alene et al., 2008; Sehar, 2018). The non-participation of farmers in livestock markets is not due to market information problems (Girma and Abebaw, 2012). The availability of complete and timely market information on supply, demand and price, enhance spatial market integration and price transmission (Rahman et al., 2019). Relevant information enables farmers to increase their income (Nechar et al., 2021). Market information can be an important instrument in the support of rural development and poverty alleviation in developing countries (Rad et al., 2013).

***Table 7. Factors influencing the decision to participate in MBA markets***

| Variables | B | S.E. | Wald | Sig. | 95% C.I.for EXP(B) | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| Access to market information (1 = Yes, 0 = No) | 0.934 | 0.429 | 4.725 | 0.030** | 1.096 | 5.902 |
| Payment type (1 = Cash, 2 = Credit) | 1.876 | 0.498 | 14.207 | 0.000* | 2.461 | 17.317 |
| Pasture use (1 = Yes, 0 = No) | 0.765 | 0.725 | 1.112 | 0.292 | 0.519 | 8.905 |
| Cooperative partnership (1 = Yes, 0 = No) | 2.636 | 0.624 | 17.868 | 0.000* | 4.112 | 47.388 |
| Access to credit (1 = Yes, 0 = No) | -0.159 | 0.472 | 0.114 | 0.736 | 0.338 | 2.150 |
| Distance to market =1 | - | - | 23.248 | 0.000* | - | - |
| Distance to market =2 | 1.138 | 0.522 | 4.746 | 0.029** | 1.121 | 8.681 |
| Distance to market =3 | -1.827 | 0.534 | 11.726 | 0.001* | 0.057 | 0.458 |
| Beef cattle herd size =1 | - | - | 15.046 | 0.002* | - | - |
| Beef cattle herd size =2 | 0.887 | 0.570 | 2.422 | 0.120 | 0.794 | 7.423 |
| Beef cattle herd size =3 | 1.414 | 0.590 | 5.752 | 0.016** | 1.295 | 13.069 |
| Beef cattle herd size =4 | 3.348 | 0.897 | 13.944 | 0.000* | 4.907 | 164.867 |
| Sheep herd size =1 | - | - | 4.881 | 0.087*** | - | - |
| Sheep herd size =2 | 1.177 | 0.536 | 4.834 | 0.028** | 1.136 | 9.273 |
| Sheep herd size =3 | 0.835 | 0.531 | 2.471 | 0.116 | 0.814 | 6.529 |
| Goat herd size =1 | - | - | 17.423 | 0.000* | - | - |
| Goat herd size =2 | 0.234 | 0.545 | 0.184 | 0.668 | 0.434 | 3.678 |
| Goat herd size =3 | 1.833 | 0.466 | 15.474 | 0.000* | 2.508 | 15.577 |
| Household size =1 | - | - | 2.432 | 0.296 | - | - |
| Household size =2 | 0.692 | 0.492 | 1.978 | 0.160 | 0.761 | 5.242 |
| Household size =3 | 0.111 | 0.533 | 0.043 | 0.835 | 0.393 | 3.179 |
| Farmland ownership =1 | - | - | 3.970 | 0.137 | - | - |
| Farmland ownership =2 | 1.031 | 0.518 | 3.963 | 0.046** | 1.016 | 7.738 |
| Farmland ownership =3 | 0.681 | 0.533 | 1.631 | 0.202 | 0.695 | 5.620 |
| Education level =1 | - | - | 0.000 | 1.000 | - | - |
| Education level =2 | 17.425 | 18875.984 | 0.000 | 0.999 | 0.000 | - |
| Education level =3 | 19.150 | 25216.392 | 0.000 | 0.999 | 0.000 | - |
| Constant | -5.451 | 1.168 | 21.775 | 0.000* | - | - |
| Nagelkerke $R^2$=0,724; -2Log Likelihood=181.033; Percentage Correct=%88,3 | | | | | | |

*, ** and *** mean that variable is significant at 1%, 5% and 10%, respectively.

The number of goats owned (herd size) has a significant and positive effect on market participation at 1% significant level. Small ruminants such as goats play an important role in livestock (Ayele et al., 2003), and in improving the livelihoods of farmers of farmers. Farmers raise them both for consumption and for markets.

Farmland ownership has a significant and positive effect on the participation of farmers in the MBA at the level of 5%. Agricultural land is an important factor of production allowing households to produce more in order to sell the surplus in the market (Alene et al., 2008).

**4. Conclusions**

Livestock farming plays a crucial role in the livelihood of pastoralists and agro-pastoralists in the Republic of Benin. However, the marketing of animals is not well structured and developed. Livestock farmers have limited access to the market due to various factors. In this context, this study sought to determine the factors that influence the decision of livestock farmers to participate in livestock markets, particularly in MBA markets, which are a new model of

livestock trade in the Republic of Benin.

The results of Logistic Regression model showed that access to market information, payment type, cooperative partnership, beef cattle herd size, sheep herd size, goat herd size, distance to market and farmland ownership determine the degree of participation of farmers in the MBA market in the study area.

Making relevant market information available to livestock farmers is crucial to increase the probability of their market participation decision and as well as receiving fair price for their commodity (Ayele et al., 2019). Cooperative partnership should be encouraged because it increases market participation, provides real-time market information and increases the likelihood of market sales. It is important to encourage and support the young livestock farmers to participate in MBA markets. This could create employment opportunities for unemployed youth in rural areas by allowing them to engage in the livestock trade. The inclusion of women in the livestock trade at all levels is also important. The pastoral system should be improved to increase animal production and productivity. The government should invest more in the education of livestock farmers to increase their decision-making capacity and productivity. MBA markets, as formal and well-structured markets, should be multiplied throughout Benin to allow farmers to easily sell their animals and animal products through short marketing channels and then improve their income.

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