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TECHNICAL EFFICIENCY OF DREG'S RICE PRODUCTION IN BENIN: CASE OF THE MUNICIPALITY OF SAVÈ

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ABSTRACT: *The aim of this article is to study the technical efficiency of the rice producer of dregs of the municipality of Savè and to identify the determining factors of the production of the rice in the optics of a sustainable agricultural productivity. The results of the estimation of the border of production show that the technical efficiency of rice producer is situated between 72.02 % and 98.25 %, with an average technical efficiency of 90 %. The access to the cash credits, the quantity of agricultural inputs, the membership in an agricultural cooperative and the quantity of seed improved by rice determine the technical efficiency of the production of the rice in the municipality of Savé in Benin. These results reveal the existence of the possibilities to improve the agricultural technical training, the academic level and educational. These agricultural practical basic possibilities are necessary conditions to increase better rates of efficacy technique of the production of the rice of dregs.*

KEYWORDS: technical efficiency, border of possibility, rice of dregs, agricultural practices,
JEL: C23, C24, Q32

INTRODUCTION

In Benin, the food habits change and the rice, formerly consumed in special occasions, is today a daily consumer product, so in town as in rural areas. The statics of the "Ministère de l'Agriculture, de l'Elevage et de la Pêche" (MAEP, 2013)1 shows that the national needs are between 25 and 30 kilograms per capita per year, that is 235 500 to 279 000 tons a year. They are covered for the moment in 47 % by the national production, obliging the country to import. In order to protect its currencies, strengthen its economy and guarantee its food sovereignty, the government launched in 2009 a strategic Plan of launching of the farming sector so called Plan stratégique de relance du secteur agricole (PSRSA) , of which rice sector is one of priorities. The promotion of the rice growing was always collected as a necessity since the 1960s, especially through diverse plans of economic and social development. These plans highlighted the fact that Benin «can produce on its ground not only of which to satisfy the needs for its rice consumption, but also a part of the needs for the nearby countries, in particular Nigeria «(DPP / MAEP, 2011). The strategies concerned at first the promotion of the big rice perimetersit then on the small scopes without tangible results. The rice benefits nowadays from a big political interest within the framework of the development of the sectors. The average quantity of rice consumed a year per capita about 25 to 30 kg, is an annual total consumption varying between 175 000 and 210 000 T, according to the data of the SNDR (2011). Needs in consumption increase from day to day while the national production capacity does not succeed in facing it. The available statistics reveal that the total production would be about 219 101 tons of paddy produced in 2012 on a surface about 65 729 hectares. The climatic conditions of

[1]**MAEP(2013)** : Ministry of Agriculture, the Breeding and the Fishing, Mise en Œuvre du PNlA du Bénin pour le MAEP ; le Rapport d'étape 2013 validé

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the country favor widely possibilities of extension of the rice exploitations and the improvement of the productivity. At present, the request in consumption of rice of the population exceeds the supply. Benin is then obliged to import every year important quantities of rice. These imports are at present esteemed at more than 120 000 tons of rice to compensate the deficit. The statistics for year 1997 reveal that every Beninese consumes on average 12 kg of rice a year (against 2,9 kg / year in 1965), what is low compared with the consumption in other countries of the sub-region. However, the consumption of rice remains low compared with the consumption of maize, sorghum and the millet; except the departments of the South Benin. Except the ground, seeds constitute the main factor of production in the rice sector (MAEP, 2014). The rice producing rural households are used to use a part of their previous harvest as seeds for the campaign. Since a few years, we note more and more in the use of certified seeds. In this situation, various varieties of rice are produced. The inventory of rice producer realized in 2010 by the CCR-B revealed that more than thirty varieties of rice are produced in Benin. The varieties IR 841 and NERICA L20 stand out more and more. From 1961 till 1978, the production knew a fast development with the development of perimeters irrigated by national companies. At the beginning of the 80s, these big perimeters were given up and the rice production widely decreased, crossing 20 000 t unless 10 000 tons. The activity really started again only at the beginning of the 90s and knew since a certain craze because the current production reaches 50 000 t. However, the production remains very lower than needs. This production does not exceed 30 000 t of rice after shelling (that is 4,2 kg / hbt) and 50 000 tons (7,6 kg / hbt) must be imported to satisfy the national demand. The absence of specific fertilizers for the constituted rice a constraint important for the production. Better, while fertilizers cotton are available very early for the culture of the cotton, the producers of rice have there with difficulty access. It's the same for food-producing fertilizers which are rather late set up, already handicapping the yields. The rice producers of the South-Benin markets their rice after shelling(dissection), without étuvage, at a price(prize) varying between 225 and 250 FCFA kg, for a final price to the consumer upper or equal to 350 FCFA kg. The sale to storekeepers constitutes the dominant mode of marketing. The cost of the shelling which was between 10 and 15 F in 1996-1998 passed to 25 FCFA the kilo. The official statistics (ONASA, 2014) announce a more attractive sale price for the local rice, but in reality, the average quality of rice produced in Benin is rather lower than the one imported. Studies led in the South of the country (INRAB, 2014), show that the rice produced locally is not competitive in front of imported rice, of equivalent quality. The consumers consider that the local rice contains many impurities, a high rate of cracks, is sold to a high price and is not available everywhere. Their preference thus goes to the imported rice, for which they are sensitive in following qualities: before any cleanliness and the rate of cracks, the level of availability, the aroma or the perfume, the mode of presentation and packaging, the behavior in the cooking. Besides, the only development of the perimeters (made at great expense) for a control of the water in the objective to increase the production of rice could not guarantee a long-term viability of the rice growing. The intensification of the national production of rice was imperative in the international context of rise in prices of foodstuffs. And it is true especially as in Benin, as in other countries of western Africa; the production of rice is far from satisfying the demand which does not stop increasing. This article will center on the rice of dregs with cause, on one hand, of its importance in the Beninese rice growing and, on the other hand, the low potentiality used (8 %). Benin disposes more rice landing; 322 000 hectares of lands among which 205 000 hectares of dregs and 117 000 hectares of easily flooded plains. Benin is a part of countries of western Africa which arrange important hydraulic resources and hydro agricultural distributed on the area of the national territory. The Unit Dregs of the Head office of the Development and the Rural Equipment (DGAER), ex Direction of the Rural Engineering, estimates superficial and

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subterranean waters respectively at 13 billions and 12 billions cubic meters. The irrigable lands are estimated at 322 900 ha of irrigable lands among which 117 000 ha of easily flooded plains and 205.900 ha of dregs (CBF / DGR, 2000). Benin has then a not insignificant potential in natural resources for the production of rice. The distribution of the potentialities in dregs of Benin shows that the departments of Zou / Collines include 31,57 %, the Atacora / Donga 27,44 %, the Borgou / Alibori 16,03 %, the Atlantic Ocean 7,28 %, the Mono / Couffo 8,45 % and the Ouémé / Plateau 9,23 %. The rice growing of dregs is almost everywhere practiced in Benin because of the presence of the dregs on the whole of the territory. It is practiced in dregs generally not fitted out with yields even lower than the average estimated at 5 tons a hectare. It is this type of rice growing who groups the majority of the rice exploitations. She can be made in monoculture or in associated culture. The choice of the region of Savè, municipality of Collines and Zou is understandable by the fact that it is one of the municipalities that arranges enormous not exploited dregs and which produces an important quantity of the Rice in Benin. Besides, this municipality also produces in great quantities the food-producing productions such as the manioc, the yam, the maize, the soy. It first producing municipality of mahogany. The weakness of the offer of rice in the municipality of savè are especially connected to the inadequacy of the incentives in the production and in the lack of efficiency of rice producers .The incentives in the production of the rice in Benin are very limited compared with " the white gold " which benefits more from supports regarding training, regarding professional organization, from subsidies of inputs and from the cash credits.

LITERATURE REVIEW

The concept of the efficiency dresses more and more a major concern in agricultural economy. This concern is centered on diverse studies made in several spatial frames. The various agricultural productions which the technical efficiency are analyzed concern cereal and tubers (maize, manioc, sorghum, millet.) and the productions of pension (cotton, rice, banana, coffee, cocoa.). Numerous approaches are used to estimate the borders of production and to measure the level of efficiency. These approaches are classified according to the shape presented by the border and according to the nature and the properties supposed by the gap between the observed production and the maximal production. The first distinction allows to classify two categories of approaches those parametric and those non parametric. The second distinction allows to dread the parametric approaches through two methods: the inferential methods (statistics) and the descriptive methods. The last one differentiates the stochastic borders of the determinist borders. The first centered works the notion of efficiency are attributed to Koopmans (1951) and to Debreu (1951), Farrell (1957) and Amara and al (2000). In conclusion, the economic literature proposes two big approaches to establish a border of production and measure the technical efficiency: The parametric approaches proposed by Aigner and Fallen (1968), Aigner and al. (1977) and Meuse and Van Den Broeck(1977), and the approaches non parametric proposed by Charnes and al. (1978) and Banker and al. (1984) (see also Badillo and Paradi, 1999; Amara and Romain, 2000; Borodak, 2007; Latruffe, 2010). The parametric approach imposes a functional shape to specify the border of production, the cost function or the profit function.It uses econometric tools to estimate the parameters of these functions. The gap compared with the border of production determines the ineffectiveness of the company. The non-parametric approach finds its origins in the works of Farrell (1957) and Farrell and Field house (1962) and proposes a relative measure of the border of efficiency built from a cloud of points representing the ratios inputs / outputs and wrapping all the observations of a sample.

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This approach is of determinist type but is not bound to a predetermined functional form. According to the traditional micro-economic theory, the studies of technical or economic efficiency do not have their reason for being because the producer is supposed to be rational and profit "maximize" of. Consequently, every developer would always be on the border of production or on the border of cost. This situation does not translate the reality of the rational behavior of the producers. On the other hand, Nuama (2010) identifies the sources of increase of the production of rice in Ivory Coast from a border of stochastic production. With a sample of 143 producing households of rice was pulled in a random way. These results of the estimations show that the membership in a grouping of mutual aid, the access to the credit, the access to the earth by rent, the possession of an exploitation of culture of pension are the main determiners the increase of the production of rice producer on the other hand, the vulgarization such as practiced at present by the supervisory service of the rural world is not an effective determiner of the increase of the production of rice. In the same order of idea, Nuama (2006) shows the producers generally is not situated for the greater part on the borders of production and cost. Keane and al (2009), notify that this notice is very tangible in low-income countries and in countries development where the farmers operate it lowing for their potential capacity of production. In fact, the experience indicates that the producers or the producers generally are never situated, at least in their majority, on the borders of production and the cost (Nuama, 2006). Most of the farmers stemming from low-income countries and from developing countries operate below their potential production capacity (Keane and al, on 2009). Indeed, since the food crisis of 2007-2008, as well the authorities in charge of the agriculture, the technical and financial partners and the direct actors of the sector (producers, transformers and storekeepers) have improve the sector of the rice. The adoption and the perception of the innovations remain a way to increase the agricultural productivity. In the same logic, Thus Butault (2006) shows that the agriculture is in front of the challenge to have to improve the productivity of the other factors that the work such as the intermediate consumptions and the capital. Outside the study of the eco-efficiency, several works examined the technical efficiency by basing itself on inputs and conventional products of the agricultural activity (for example Latruffe and al., 2004; Latruffe, 2005; Larue and Latruffe, 2009; Lachaal and al., 1994; Chemak and al., on 2010; Alvarez and Arias, 2004). Most of these works base themselves on the classic combinations(overalls) of inputs and the products which allow to study the level of productive performance of the exploitations(operations) and the effects of certain structural variables (size, structure of the exploitation(operation), etc.) and cyclical (subsidies, reforms of agricultural policies, etc.). However, there are few works, in particular in Africa in the South of Sahara which study the technical efficiency of farms by taking into account the environmental aspects or the aspects of use of natural resources. Besides, the initiatives of sustainable agriculture such as that of the ecologically intensive agriculture((Griffon, 2007), insist more and more on the integration of natural resources and the ecological features in the process of production (Griffon,2013; Ben El Ghali and al ., 2013). So the analysis of the productivity of farms has to take into account the efficiency of use of the natural resources which, until now was likened to all the intermediate consumptions, without integrating the rarity of the resource and the effect of its degradation. Javed and al (2010) demonstrates that the increase of the production of the rice is led by the increase of cultivated surfaces. They concluded that this increase is strengthened in the short term by the improvement of the efficiency of the existing resources assigned to the production of the rice and to the development of new technologies. For Kaboré (2007), besides, the only development of the perimeters (made at great expense) centered on a control of the water is a determining objective to increase the production of rice. This production seems to guarantee a long-term viability of the rice growing. Actions of improvement of the performances of the producers is an

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appropriate condition to increase the yields and the offer of the rice in the optics to satisfy a demand growth for Burkina Faso.

Data, modelling and Econometric option

This section is centered on the data, the modelling and the econometric option.

Sampling Method and data collection

The municipality of Savé arranges several dregs in certain districts. All in all, in count several of 45 dregs with big potentiality (INRAB, 2014). This municipality of the departments of Zou and Collines is for agricultural vocation. The rice production occupies a dominating place, more than 35 % of arable land. The productions such the maize, the manioc, the yam, the soya constitute the main part of the food diet. Among the most important rent cultures are the cotton and the mahogany. The farmers held for this article produce rice of the municipality of Savé. To define the criteria of sampling, a forward-looking study was led in three big rice potentiality districts. This study was preceded by a pre-survey to refine questionnaires, and it with the support of the technical structure of the agriculture such the National Institute of Agronomic Researches for Benin (INRAB). The rice agricultural population count was obtained for each of the districts from the database of the Ministry of Agriculture, the Breeding and the Fishing (MAEP, 2014). The data collection bases on a polling method in two degrees. Choices consisted of two random drawings having allowed the selection of a sample of primary unit (the villages of districts). Of these primary units, secondary units (the dregs rice producer) were pulled in a random way. Of the sample of rice producer detaining one or several dregs, a sub-sample 52 on 60 (86.67 %) rice producer, for whom the meditative data are the most complete, was pulled. They are distributed as follows:Dani (45 % of rice of the municipality), Ouoghi (25 % of the municipality) and of Oké-Owo (45 % of rice of the municipality) .The data concerning the socioeconomic characteristics, the agricultural productions, the cultivated surfaces, the factors of production (capital, labor), the quantities of inputs and seeds, healthcare costs, educational and of accommodation. This collection of the information covers the period of July-September, 2015. The nine investigators are retained in every district on the basis of their control of the local languages such Idacha and Yoruba. They were trained during 3 days by the researchers of the INRAB. At least two passages took place to notify the quantity of produced rice and confirm the collected data. Other meditative information concerns the quantities of inputs used on cultivated surfaces, variables of the human resources and institutional data.

Model's Specification

This section is centred on the specification of the model used in this article. To verify the level of technical efficacy of rice producers we use a stochastic production frontier. The advantage of this kind of model is it allows explaining the observed deviation between maximal production and effective production and the random factor which is not retained by the farmer. The stochastic production frontier is represented as that:

$$\mathbf{Ln\ Yi = \beta 0 + \beta 1 Ln\ (K) + \beta 2 Ln\ (Eng) + \beta 3 Ln\ (Sem) + vi\text{-}ui}$$

$$\text{Avec } ui = \alpha 0 + \alpha 1 Age + \alpha 2 Sexe + \alpha 3 Form + \alpha 4 Educ + \alpha 5 Crédit + \alpha 6 Groupe + \alpha 7 Sup + \alpha 8 Eng + \alpha 9 Sem + Wi$$

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With,

I: representsrice produser, it varies from 1 to N,

N: Represent the size of the sample;

Ln: the natural logarithm

Yi: the production of the farmer I

ß is the vector of the parameters to be estimated; it represents the elasticity of Cobb-Douglas the production function;

αi Is the set of efficacy determinant parameter,

vi is the random error

ui is the error term of the technical inefficacity of farmer,

Wi is the usual error term

Two hypotheses are to be considered concerning the errors terms: we suppose that ui follows a normal law of parameters N (μ ; σ2u) and vi follows a normal truncated distribution that is N (0 ; σ2v). On the basis of its hypotheses, we obtain from the Coelli(1996) version 4.1 of software Frontier, the coefficients and $\sigma 2 = \sigma 2u + \sigma 2v$; $\gamma = \sigma 2u / (\sigma 2u + \sigma 2v)$. γ Measure the technical ineffectiveness part in the total variation observed between points on the production border and the data. The procedure of estimation of the production function border is the one adopted by Coelli (1996) by means of the software Frontier 4.1.it consists in maximizing the natural logarithm of the likelihood function and in calculating the ratio of likelihood LR. The method frequently used to explain the ineffectiveness takes place in two stages. it consists first of all in estimating the levels of efficiency of the various farmers, then in making a regression of its efficiency levels according to certain specific factors such as: the size of the exploitation, the age and the educational level of the farmer, the access to the credit, the received training by the farmer and his membership in a rustic grouping. So, the regression made during this second stage, can follow the method the Ordinary Least Squares (OLS) or the Tobitmodel to take into account the interval of definition [0, 1] of the dependent variable (technical efficiency). This approach presents several advantages: it is indicated well when we suppose that more than a variable can explain the level of efficiency of an exploitation; it takes into account well variables so quantitative as qualitative; it is of very easy application; she allows to test the impact of the various variables on the level of efficiency.

Definitions and measures of variables

This section proposes a synthesis of definitions and the measures of variables used in this article.

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Table 1. Definition and measures of the variables of the model

Variables	Definitions	Unity/Type
Variables dépendantes		
Cultivated Superficies (sup)	The surface of land used to produce rice	Hectares (ha)
Capital (K)	Financial means	FCFA/ ha
Seed (sem)	The quantity of rice use	Kg/ha
Fertilizer (Eng)	The quantity of fertilizer	Kg/ha
Age (ag)	The age of the famer	Ans
Sex (sex)	The sex of the famer	Dummy; 1 forManand 0 for woman
Formations (form)	Training	1 if the producerhas been trained and 0 if not
Educations (Educ)	Educational level	1 if the producer is educated and 0 if not
Credit (Créd)	Obtained financement	1 if producer has obtained credit and 0 if not
Group (Group)	Belong to an agricultural association	1 if the producer belong et 0 if not

Source: author; 2015

For a sustainable growth of the rice production in the municipality of Savè whose enormous potentialities remain still unemployable, the article thus suggests measuring the technical efficiency of this production of dregs in the municipality of Savè. This measure of technical efficiency is centered the estimation of the stochastic function of the rice production. The results of the estimation by the software Frontier 4.1 are recorded in the picture2 below.

Table 2: result of estimation of the stochastic production function.

Variables	Coefficients		Standard deviation	t-ratio
Constante	β0	1,62	2,32	0,70*2
Ln(K)	β1	0,42	0,20	2,06*
Ln(Sem)	β2	0,105	0,029	3,62*
Ln(Eng)	β3	0,48	0,23	2,08*
Parameter of variance				
σ2		0,022	0,0065	0,034
γ		0,92	0,081	11,33

Source: author; Frontie4.1, 2015

The results of the Table2 stemming from the estimation, the rice production function of the sandbank in the Municipality of Savè can spell in the following way:

[2]Significativity level of parameters : *Significative at 5%

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Ln(Yi) = 1,62 + 0,42Ln(K) + 0,105Ln(Sem) + 0,48Ln(Eng)

The yield on scale is equal to the sum of the elasticities of the significant production factors. It amounts to 1,005. This figure is appreciably equal to the unit. The conclusion is that the yields on scale are constant at the level of the producers of the rice of sandbank in the Municipality of Savè. The parameter γ Is significant and different from zero. What allows to deduct that any deviation of the real production with regard to that potential is partially due to an ineffectiveness of the agent. In this situation, the determination of the scores of technical efficiency of the rice production is thus necessary to arrest better the determining rice production factors of the dregs in the municipality of Savè. The scores of technical efficiency are recordedin the Table 3 below.

Table 3: distribution of the technical efficiency scores

Efficacity level in %	Number	Percentage
[70 – 80[	4	7,69
[80 – 90[	19	36,54
[90 – 100[	29	55,77
Total		100
Average		90
Minimum		72,01
Maximum		98,25
Standard deviation		5,26

Source : Author,Frontier 4.1 , 2015

The results of the Table 3 show that the distribution of the individual technical efficiency scores shows that no rice producer is situated on the border of production, their technical efficiency scores is lower than 100%. The most effective farmer produces n°25 and the least effective producer produces n°32 with their level of respective efficiency of 98, 25 and 72, 01 %. The average technical level of efficiency of the producers is 90 %. The variation between the observed production and the potential production is 5, 26. In the agro-economic literature, certain variables are relevant in the agricultural production and in the technical efficiency. In the case of this article certain variables are connected to the production of the rice and to the technical efficiency of rice producer. The description of these variables connected to the production is recorded in the Table 4 below.

Table 4: description of certain variables connected to the production and to the efficiency

Variables	minimum	maximum	Average	Standard deviation
Age	27	68	41,8846	11,00206
Production in kg by ha	2500	4200	3319,2766	350,51840
Fertilizer in kg by ha	0	250	191,1187	44,76536
Seed in kg by ha ha	25	26	12,6035	0,86419
Sample	52			

Source: Autor, SPSS 20, 2015

Table 4 shows that in the municipality of Savè, the average age of rice producer is estimated around 42 years while the youngest producer has 27ans and the oldest is 68 years old. This

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average age varies from a producer to other one of the neighborhood 11 years. The result of estimation of technical production score is record in the table 6.

Variables	Coefficients		Standard deviation	t-Statistic	Prob
constante	α0	1,013	0,169	5,992*	0,000
Age	α1	8,62	0,002	0,50	0,960
Sex	α2	0,010	0,023	0,430	0,669
Form	α3	-0,006	0,020	-0,309	0,759
Educ	α4	-0,009	0,017	-0,532	0,597
Credit	α5	0,041	0,19	2,164*	0,036
Groupe	α6	0,041	0,018	3,320*	0,002
Sup	α7	0,004	0,007	0,515	0,609
Eng	α8	0,001	0,00	2,320*3	0,025
Sem	α9	0,023	0,011	2,090*	0,044
R2 = 0,485					

Source: Author, SPSS 20, 2015

The Table 6 shows that the coefficient of determination R2 is equal to 0,485. This value confirms that the explanatory variables of this article explain to 48,5 % the explained variable. To confirm the strong of our results stemming from the estimation an analysis of the variance and the test of global meaning of the regression is of a necessary and essential utility. The results of the analysis of the variance are in the table 6 below.

Table 6: analysis of the variance

Model	Sum of squares	Liberty Degree	Average of squares
Regression	0,110	9	0,012
Resid	0,116	42	0,003
Total	0,226	51	

Source: Author, SPSS 20, 2015

Test of global significativity of the regression.

Calculate of Fisher (Fcal) by the following formula:

$$\mathbf{F_{cal}} = \frac{\boldsymbol{R^2/K}}{\boldsymbol{(1-R^2)/(N-K-1)}}$$

With R^2 the coefficient of determination, K the number of parameter and N the size of the sample.
Let be Ftab to Do it read in the table.

Fcal = 4,39 et Ftab = 4,072

[3]Significativity level of parameters : *significative at 5%

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The Fcal>Ftab. In addition the explained variance the model of regression is upper to the residual variance thus is globally significant.

INTERPRETATION OF THE RESULTS

This section makes an analysis and an interpretation of the socioeconomic characteristics which determine the production of the rice in the municipality of Savè. The table 6 shows that certain characteristics seem to have a decisive effect on the rice production of in the municipality of Savè.
The elasticity of the access to the cash credit turns out to be positive and significant for rice producer in a global way of the order of 0,041. In additional application of a monetary additional unit infers an increase of 0.41kg / Fcfa. This result explains suggest a strong availability of the cash credit in the production of the rice of dregs in the municipality of Savè. The institutions of micro-credits and the state supports thus work at the valuation of the rice sector and can increase of the production for the use of cash credits additional; where from an elasticity of the offer of rice of dregs is positive in this municipality of Savè. Also, the elasticity of the membership in a group of cooperative of rice growing impact positively and significantly this production (0,041). It seems that the offer of production of the rice of dregs in the municipality of Savè is greater with an effective and regular participation of rice producer to the agricultural cooperatives. The additional application an additional unit of rice producer infers an increase of 0.41kg / H. These agricultural cooperatives benefit from supports of the agents of technical vulgarizations and other technical supports in the optics of the increase of the production and especially the productivity. In the agro-economic theory, the effects and the shares of the agricultural technical vulgarization lead a positive answer of the offer of production.

The elasticity of the organic and mineral quantity of fertilizers (Eng) for the production of the rice of dregs in the municipality of Savè is positive and significant (0,001). This result shows that a dosage and a continuous application some organic manure, cetearis paribus, have a positive effect on the offer of production of the rice of dregs in the municipality of Savè. The additional application of a ton of fertilizer increases the production of the rice of 0.01 kg / ha dregs. The elasticity of the quantity of seed (Sem) for the production of the rice of bottoms-leaps,stockings-jumps in the municipality of Savè is positive and significant at the threshold of 5 % 0,023. This result shows that marginal of a kilogram

CONCLUSION

This article estimates the technical efficiency scores of the rice producer of the villages of Dani, Ouoghi, Oké-owo and Tchintchin in the municipality of Savè. In the term of this article, appears clearly the existence of possibility of increase of the production of rice of the order of 10 % on average in the municipality of Savè. It is necessary to notice however that this technical inefficacitycannot be only the fact of the low level of instruction and training, then the age of rice producer. Besides, the research for the socioeconomic determiners of the technical efficacy of the producers of the pluvial rice in the municipality of Savè ended in the divergent results according to the number of variables introduced into the model of production border of the rice. By considering the variable yields on scale, the results of the estimation of the border of production of the rice of dregs reveal an average score upper to those of the work of Fall(2008)

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and Diagne and al (2013). These authors obtain (90 % against 63 % and 55 in 60 %). All in all, the producers of the rice of the municipality of Savè have an average level of technical efficiency of 90 %. That is their degree of ineffectiveness is 10 %. They can again increase the production of the 10 % rice without additional cost. The reduction of 10 % of technical ineffectiveness would be beneficial in rice producer and in the State in the measure it will allow to increase probably the income of rice producer and would so reduce the imports of the rice. Although the influence of the training is not significant, it urge that their mode of supervision of the departments of vulgarization is continuous and actual to reach a technical efficiency more better. The participation in the activities of agricultural technical trainings through the agricultural cooperatives is a necessary and sufficient (self-important) condition for a reduction of technical ineffectiveness of the rice producer of the municipality of Savè. The implementation of these recommendations can allow the farmers to operate in the optimum of their production (better agricultural technical training, access to the mechanical, agronomic, biological and chemical technical innovations). In this condition, the continuous application of the agricultural technical trainings and the adoption of the agricultural technical innovations to set of rice producer of the municipality of Savèshould allow to reassure the agricultural income and to guarantee the susceptible investments of increase the performance of the rice production in the municipality of Savè.

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