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Economics

DETERMINANTS ANALYSIS OF TECHNICAL EFFICIENCY IN SOYA PRODUCTION TO THE MUNICIPALITY OF SAVE

KEY WORDS: Soya-Productivity- Stochastic Boarder Production- Technical efficiency

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ABSTRACT

The objective of this article is to analyze the increasing sources of soya production in the municipality of Savč from a production field of stock. a sample has been taken from producers at random, about 66 home producers of soya .The results of the production in stock shows that all the soya producers lack techniques at the rate of 56%.The distribution of the efficiency indices shows that on the sample of 66 producers, 25 of them (37.87%) have registered the best scores (80% to 99%). Such distribution also pointed out that small holders are technically more efficient than real farmers. For more efficient level, concrete actions should be guided to certain factors like industrial system, the training sessions, the sex issue and the sown floor space .Finally the article suggest to soya producers the rationalization of sown floor spaces in order to carry out an optimal result of disposal factors for increasing the yield of soya and improvement of the technical efficiency. **JEL: C51- N57- Q12**

Introduction

Agriculture stands as fundamental to Benin economy .It contributes for about 40% to GNP. It provides more than 50 % of the outgoing and assures relatively the wellbeing of about 70% of the population (PSRSA 2011)

Soya is a strategic culture for human nutrition as in developing countries, for the soya producers and agro-industry. More than 20 percent of the world production of oil and fatty food made from (FAO,1977).After craft industry or industrial oil extract (20% to 25%); the common residual contains 45% to 50% of higher quality of protein composed of acid is closed to optimum defined by nutritionists CIRAD and al (2002).soya constitutes then of a potential source of protein as in animals and human –beings with lower incomes and could not offer genuine proteins from animals .Different ways of transformations of soya is presently observed in villages particularly "cheese made up of soya" commonly called "AMON SOJA" in Nago dialect. In fact, the cheese made up of soya, a consistent paste made from soya milk coagulated is largely consumed by the population at a low level as meat replacement. This practice highly spread is beneficial and deserves to be encouraged because it contributes much in fighting against malnutrition of vulnerable people (children, nourish or pregnant women and old people). The soya seed is a useful source of oil and protein and maybe to improve the nutritional values of traditional food. The seeds are transformed into flour, semolina or soya milk. Some oil can also be extracted and it gives some semolina for animals food .The soya flour prepared in bowl can replace meat in the soup. Soya is also used in Nigerian industries for biscuits .Its production requires a hot climate of winter. Benin is known with such potentials in agriculture, promoting agricultural diversification thanks to other agricultural filed development in order to reduce its dependence regarding to cotton production .The strategic plan of agricultural sector launching (PSRSA) has identified 13 value chains (pineapple, cashew , maize cotton ,cassava, yams, rice, palm tree, orchard, meat ,milk, egg, fish,), should benefit the support of the government 2011 to 2015 in order to build up better economy system (PSRSA, 2011). However its proper to notice that the politics of privileged fields of agricultural sectors does not take soya into account, yet which is firstly a strategic interest to better economic system and reduce poverty -(reduction of poverty to many famers motivated in cultivating soya) and also reinforce the fertility of the soil (agro-economical and environmental advantages) and it finally presents an appropriateness with agro-industry in vegetable oil production , food for animals and many products deriving from craft industry and semi-industrial processings to enrich children nutrition in protein (PAEPARD,2011)

The production of soya has begun in Benin around 1945 (MDRAC,1981 cited by Ogouvide et al, (2004) it was principally cultivated for the purpose of children nutritional recovery towards malnourished children and its consumption was advised to wet nurses in social centers . Therefore, the national demand of soya has increased during the second half of the decade 2000-2010 with the lack of cotton seed used in priority for oil production and tutor at oil production basement such as FLUDOR, SHB and IBCG. In fact the production of cotton seed in Benin which allows to have a reserve of seeds in factories for the production of oil and of tutor has reached 450,000 tons in 2004, 210, 000 tons in 2009 and 150,000 tons in 2010.The down fall has even been confirmed in 2011 with a production of only 137,000 tons which corresponds to a low production 70% between 2004 and 2011 (MAEP.2012). During that period the national production of soya had an exponential increasing of 60,000 tons in 2004 it progresses to 140,000 tons in 2015. Despite that progress of soya spinneret in production, it lately values in the sectorial policy of the government in terms of the promotion of agriculture. Facing such a problem this article notifies a certain number of sensitive questions to apprehend really the technical efficiency of soya producers. There is a possibility of increasing the incomes rate without raising the input. What are the socio-economic and demographic factors that influence the techniques effectiveness of soya production in Savč municipalities? This survey aims to size up the effectiveness of soya production and capital particularly in Savč and to identify the socio-economic and demographic factors which explain that effectiveness in order to bring out suggestions to better the productivity, increasing incomes and reduce poverty in Benin.

2. Theories review and empirical work

The concept of effectiveness in term of agriculture becomes more and more important, the economic basis of developing countries and particularly African countries in south Sahara. This is identified throughout many works done in almost every continent ,those different works inclined either agricultural products (cereal ;cassava ;cotton; rice ; bananas) either on raising cows breeding and pigs, a lot of works have evaluated the effectiveness of the farmers even the determining factors .The first studies on the necessary measures starting from Farrel (1957) which is inspired by the works of Debreu (1951) and Koopmas (1951) cited by Nyemeck (1999), propose the idea of effectiveness of two components exploitation : the technical efficacy which represents an exploitation skill to produce a maximal output from a certain level of inputs in optimal proportions since their respective price and the technology of disposal. The combination of the two measures give the economical efficacy level. During many studies on producers size and rural agricultural household. Despite that Farrel has been the pioneer of borders production structures and some indexes measure of efficacy Aigner and Chu (1968) have been the precursors of production borders parametric. This function of parametric production is represented by a type of Cobb-Douglas function or the translog ones. The production functions parameters can be determining or stochastic relating to one's introduction or not which stands as the uncertain term. The non-parametric methods had been introduced by Charnes , Cooper and Rhodes (1978) who defined a technical efficacy ratio based on the approach called Data Envelopment Analysis (DEA). This approach allows to spread out the measures of Farrel (1957)

with a context of multi-product of various incomes; an overview of more detailed on this approach is contained in the works of Fare, Grosskopf and Lovell (1994).The approach of DEA requires the usage of linear program method .A lot of works that lead to developing countries notifies that farmers Arouna and al ., (2005) have analyzed the technical effectiveness ; allocative and economic production units of cashew in Benin from a parametric stochastic production model .It comes out from the result of their studies that it reveals inner the different classes some production units technically and economically effective . The studies conclude that the big farmers are not effective than the small one .Those actors suggest the cultivation of cashew in Benin obtained by Venkataramani and al (2006) in a technical efficacy study of specific input in each district of India linked to a function of production Cobb –Douglas. They only get better health care and associated to a significant increase of technical efficacy. According to Loureiro (2009), does he find the differences between farmers health that explains the variance in the effectiveness of agricultural production in Norway ,therefore the increase of input access would liable to the raising of the productivity and reducing the poverty, furthermore, Costa and al (2013) study the relation between agricultural productivity and food security of homes in underground regions in Brazil regarding to other individual factors .They notice that the productivity profit are associated to a greater food security of houses in low proportions caused by a high influence of particular characteristic such as education and the benefits . In Benin Adegbola and al (2008)and Adegbola (2010) analyze the technical efficacy level ,allocative and economic respectively in the rice production system which are competitive from the Northeast -Center; production units and the processing of cashew using stochastic production function. It turns out that rice producers are among the ineffective; 62% of the variant incomes in rice is mostly caused by technical inefficacy, 77% of rice producers have a higher index of efficacy of 50% ; 97% of rice producers concerning allocative efficacy and 50% for economic efficacy .They conclude that the most effective rice producers are characterized by the use of insecticide ;animal traction and from improved varieties on small spaces .Those results are deepened very later by other actors like Mounirou ,(2015) in a perception study and agriculture innovation techniques adoption in a cotton basin of Banikoara (Benin) reveal only variables like age ; education level and instructions risk and doubt do not help with a good perception of adoption of agricultural innovation technics in the production of cotton and producing-food (maize cassava groundnut) he suggests only program and policy focus on training intensification in agricultural basis; technical agricultural co-operative promotion are some appropriate condition to increase efficiently the best rates of a good perception in the adoption of agricultural technical innovation to the ornamental lake. Also, in the different class of producers, it exists some departments of production that are technically and economically inefficient and that the big farmers are not more efficient than the small ones. Labiyi and al, (2012) have evaluate the technical efficacy, allocative and economical part of resources in the production of soya in Benin precisely in the municipalities of Oučsse and Savč at the center. They show that the average of the technical efficiency signs, allocative and economic are respectively about 0.640; 0.747 and 0.476. finally they conclude that the access to credit, teaching of literacy, the level of education, the sex, the training and the number of experience years are the determining factors of the technical and economical level of producers of soya in the commune of Oučsse and Savč and that the improvement of the level of economic efficiency of production should necessarily pass through targeted action on such variety. This result is conformed to Yves-Roland Konan and al (2014) ones on << analysis of the technical efficiency of rice producers toward the infestation of cultivation by the parasite species Striga in Côte -d'Ivoire>>. These results show that the infestation's frequency by the species Striga and the level of rice producers' education has positive impact on rice producers' efficiency. Studies realize by Mouzoun in 2010, on the determinants analysis of technical efficiency of producers of irrigated rice in the South west of Benin with stochastic approach productions borders, have shown that the medium efficiency level of producers of the study is about 83.55% with a lower variability. The less efficient producer has registered an efficiency score of 18.18% whereas the most efficient has presented the score of 99.99%. He concluded that the micro-credit, the cultivate variability and the size of the exploitation will also increase the technical level of efficiency. Kane (2010) analyses the productive performance of Family Agricultural Exploitation (FAE) of Zoé telé locality in the south Cameroun. He gets interest to cultivation systems made of groundnut and maize. The analysis is center on the partial productivity of production factors uses related to statistics analysis, an analysis of multiples correspondence and an hierarchical efficacy, they use the DEA methods << Data Envelopment Analysis>> and a Tobit censored to generate and identify the factors of efficiency of EFA. About these works, the result obtained on sample of 62 Family Agricultural Exploitation can be set up as such: the fixed assets, which is obsolete, and the factor is the less productive compare to land and work factors. So in medium, productivity of land is about 194, 606, 25 fcfa/ha; the one the work about 1212. 08 man/day and the fixed assets one's 3.88 fcfa per unity of fixed assets; technical efficiency level of FAE's are estimate 0.446 when the scape yield are constant and at 0.678 when the scape yield are variable, whereas the surface in cultivation and the destination of production affected negatively technical efficiency, belonging to a farming organization and the age improving the latter. Uliwengu (2009) uses stochastic border production functions to estimate agricultural efficiency indication in rural Ethiopia. He shows the negative impact of farmers' health rate at the same time on agricultural efficiency and to the decrease of poverty. He concludes that the improvement of agricultural consecutive efficiency to an investment in farmers' health may not lead the decreasing of poverty because supplementary strategies are necessarily to reach simultaneously the increase of the productivity and the reduction of agricultural poverty rate. Finally Ndegue and al.(2011) in their study on<<efficient techniques, efficient environment and agricultural >> show that more the producer length of service increase, less they are inefficient in technical and environmental domain, consequently the experience plays an important role on deficiency. An element that also comes again in Moshein and Lovell, (2009) in their analyses about economy efficiency scape in American's milk industry. This review, though it is exhaustive, allows us to set vis-ŕ -vis the actual method which favored technical unity of production efficiency. Two approaches are appropriate to tackle this type of analysis: it then has to do with para-metrical approach and non-parametric. The parametric approach deals with production of specification, of cost or profit (in type of Cobb-Douglas) and allows defining the boundary of the whole production. Which can, then take two forms: determinist functions or stochastic functions<<stochastic frontier>> (stochastic frontier). The maximum method of likelihood allows making this assessment through data of the sample. Talking about the non-parametric approach, it passes through an analysis by wrap data methods (Data Envelopment Analysis, DEA), which don't need any hypothesis about the kind of production function, cost function or profit. It looks back for lineal program and get particularly fit to measuring efficacy relative to firm or optimizations decisions of cost or profit none being a priority. This approach is limited in our research domain, and consequently, will not be used because our first worry is to practice the determinants that allow cost minimization and production maximization (the output). Our choice in the study of this domain has to do with the first approach, the parametric ones. It is all the same with stochastic frontier method of production which must guide us in getting expert result.

3-Presentation of the study zone and framework methodology analysis

This session deals with the study zone with its agro-ecological potentialities and methodological problems (choice of models, specification, and choice of technical variable estimation).

3.1- Presentation of the study zone

Colline Department has many agro-ecological potentialities. The choice of commune of Save is based on the fact that it is part of the three productive Communes of soya in the Department of Collines (DEDRAS, 2012). The commune of Savč is located in Collines department. It is limited in the north by the commune of Oučsse, in the south by the commune of Kétou, in the east by the Republic of

Nigeria and in the West in the commune of Dassa and Glazoué. Save, is a municipality located at around 255km to Cotonou. It is crossed by the National inter-state road n°2 and the National inter-state road n°5 (Savč-oké-owo). The climate is sub-equatorial and characterized by two raining seasons (the biggest and the smallest) and two dry seasons (the biggest and the smallest). But recently, this climate has been influenced by the tropical climate in Sudanic kind marked by raining and dry seasons. The middle heights of rains are 1100mm/year. The territory of the commune belongs to the crystalline pene-plain wave and of low altitude varying between 200 and 300 meters. It is marked by the presence of many cocky outcrops with appearance in form of Dom called then<<mamelles>> a name given to the hills. The soils we meet there are ferruginous tropical soils which are leaving place to infertile lateritic soils because of human exploitation. We also see in shallows and valleys streams and hydromorphic soils. Altogether, the different types of soils are relatively fertilized. Population of the commune of Save is estimated at, according to the third General Census of the Population and the settlement (RGPH3) of February (2002); 67, 753 inhabitants about 12.64% of Colline's department population. Women were estimated to 33,795 inhabitants or 49.87% of the total number of the communal population. We count 11,688 households with a medium size of 6 members, 9472 households are led by men. The density of the population is 30 inhabitants in average per km2 (Capo chichi, 2006).

3.2- Methodological analysis framework

The data used in this study comes mainly from an investigation made on the field during the period of (August 2016) in the commune of Savč. Many forums with groups have been done in 11 villages identified as soya producers in the commune (Okunfo, Gogoro, Alafia, Dégue -dégue, Ouoghi, Diho, Katakou 1 and 2, Dani,Boubou-carričre,Boubou-pompe), with the help of CARDERS's leaders who guides us in these meetings. Then, an individual investigation has been made on a total 66 producers. This investigation is in one hand based on quantitative variable (Production, the number of years' experience, the surface area sow of cotton, the quantity of seeds, chemicals and insecticides). Let's notice that these pieces of information are for the past agricultural campaign (2015). After the step of data collection on the field, we made the computerizing mask of the investigation before we proceed to the computerizing of the collected data. The ACCESS software version 2013 is used for this step. This software allows us to make tables, requests, also formulas of quantitative and qualitative data. The evaluation degree, of an agricultural exploitation of a production boundary function. Many approaches are elaborated to estimate the boundary of production, size and its level of efficiency. These approaches can be classified according to the presumed form of the boundary, according to the kind and the presumed properties of the distance between the observed production and the maximum production.

The first distinction helps to classify two categories of non-parametric approach. The parametric approach through two methods: inferential methods (statistics) and descriptive methods. The latter distinguish the stochastic boundary from determinist boundary. The estimation of production boundary and the calculation of technical efficiency score are done based on the boundary program of Stata software 11. In contrast, for the linear regression and the descriptive statistics, SPSS software version 16 is exploited. Taken into account the reason which has been evoked above, the approach through stochastic boundary is used for the estimation of production boundary of soya producers in Savč commune. This approach is proceeded by the estimation of a production boundary

Derived from the Cobb-Douglas type. Mathematically speaking, let's consider a producer named; who combines factors of production (seed, fertilizer, insecticide, labor, capital, sown surface) for the production of soya. The functional form generates the following model:

ln (prod

$$Ln\,(Prod1) = \beta 0 + \beta 0 + Ln\,(seed\ i) + \beta 2\ Ln\,(Fert\ i) + \beta 3\ Ln\,(Insec\ i) + \beta 4\ Ln\,(Labo\ i) + \beta 5\ Ln\,(capi\ i) + (Surf\ i) + Vi - ui \quad (1)$$

i Represents soya producers i=1.....n

n: the size of the sample; β_i is the vector of the parameter to estimate, it represents the elasticity because the function of production is from Cobb-Douglas type, prod;: Production of soya in (kg/ha); inseci : quantity of seed used in (kg/ha); fret: total quantity of fertilizer NPK and used urea (kg/ha); insect : the quantity of fertilizer used in liter (l/ha); labor: quantity of work force capi: this is the fixed capital that groups together the equipment which have a life duration superior to one year and the value of the acquisition for the materials that have a life duration inferior or equal to one year used in the production of soya for the considered campaign (in fcfa/ha); Suf: the sown surface of soya in (ha); Vi; is the risky error term; Ui is the error term which explains the technical efficiency of the farmer I.

Note that the calculation of work times is carried out by choosing as basic unitary human/day. For this, we made use of applied level-headness coefficient by the FAO. These coefficients are expressed in equivalent human/day. Then we would determine the number of hours carried out by 8 (a man/day amounts to 8 hours duration work time per day). We would consider two hypotheses concerning the terms of error: We suppose that Ui follows a normal law of parameters N (0,6 $\frac{2}{u}$) and Vi follows a normal distribution truncated meaning Vi _N (0,6 $\frac{2}{u}$). Basing on those hypotheses, we get from the frontier the Coelli (1996) program, the coefficient and $6^2 = 6\ \frac{2}{u} + 6\ \frac{2}{u}$;

l= 6u/ (6*u*+6*v*). l measures the part of the technical efficiency in the total variation observed between the points on the production border and the ones of data. The estimation procedure of the border function of production is the one adopted by Coelli, (1996). It consists in maximizing the Naperian logarithms of the likelihood function and to calculate the likelihood ratio LR.

The frequently used method to explain the effectiveness levels happens into two steps. It first of all consists in estimating the effectiveness levels of the different farmers, and then to make a regression of the effectiveness levels depending on certain specific factors such as: the size of exploitation, the age and the level of instruction of the farmer, access to credit, training received by farmer and his membership to a grouping, the sown surface of cotton, the sex. So the regression carried out during this second step, can follow the model of the linear regression or the Tobit model to take into account the truncated character (between 0 and 1) of the variable explained (technical effectiveness). categorized the model goes as followed:

$$\mathbf{Te_i = \alpha_0 + \alpha_1 Age + \alpha_2 Sex + \alpha_3 Inst + \alpha_4 Sup + \alpha_5 Height + \alpha_6 Form + \alpha_7 Group + \alpha_8 Access + \alpha_9 Supcotton + \alpha_{10} ACSEC + \alpha_{11} APPLI + \alpha_{12} EXP + W_i \ (2) \qquad (2)}$$

TE: Technical effectiveness score of the producer; a1 is the vector of the unknown parameter of the determinants of the technical effectiveness to estimate; W_i is the usual term of error; Inst: the producer's instruction level: binary variable (1 if instructed and 0 if not); *Age*: the age of the producer; *Sup*: the sown surface of soya in ha; *ACSEC*; secondary actively and 0 if not); *APPLI*:

The inoculation application: binary variable (1 if the producer applies the inoculation and if not); EXP: Number of years of experience in the soya farming: quantitative variable (in year) SEX: the sex of the producer: binary variable (1 if the producer is male and 0 if female) size: the size of the exploitation: binary variable: (1 if the producer is member of a group and 0 if not). Aces: the variable access to the chemical and spices credits of the producer. Binary variable (1 if yes; 0 if not); Supcotton: the sown surface of cotton in (ha). This approach presents several advantages: it is well pointed out when we suppose that more than a variable can explain the level of effectiveness of exploitation; it really takes into account the variable not only quantitative but also qualitative. It is very easily applied and allows testing the impact of the different variable on the effectiveness level. It is important to signal that several variables can explain the production of soya out of the chosen explanatory variables. Some explanatory variables restrained here in our study are the one that we tackled about in

the review of the literature; some people can suspect of influencing the production of soya. The choice of the variable sown surface of cotton as determinant of the technical effectiveness of soya producers is justified by the fact that the farming of same period and observe the same technical itinerary just as the same treatments so, the more the sown surface of cotton by the producer is higher and the less it will be available to take care of the farming of soya. And that could negatively affect the income of soya and as an indirect result on the effectiveness of the producer.

4-Results and economic implications

We present the descriptive statistics, the results of economical results.

Table n1: Descriptive statistics of qualitative of variables

Variable	Description	N	Min	Max	Mean average	Gap-type
Prod	Soya production (kg/ha)	66	85	5000	1243.17	1404.13
Sup	Sown surface (ha)	66	1	20	5.66	4.11
Capi	Fixed capital (FCFA/ha)	66	2400	200000	51646.97	54430.5
Seed	Seed quantity (kg/ha)	66	20	175	107.5	48.30
Insect	Insecticide quant (kg/ha)	66	0	10	3.54	2.41
Fert	Fertilizer quantity (kg/ha	66	0	500	141.89	123.69
Lab	Quant of lab (M/d)	66	45	265	136.19	67.68
Supcoton	Coton surface (ha)	66	0	15	3,68	4.22
Age	Production age (year)	66	20	75	36	14.72
Exp	Nbre of years of exp in the farming of soya (year)	66	0	35	5	7.06

Source: Realized by the authors based on the 2016 investigation data.

An analyses of this table shows that in general the average production of soya per producer is 1243. 17 kg/ha with a strong variation of 1404. 13 kg/ha between the producers of the study area. Those producers sow an average surface of 5.66ha of soya and from 0 to 15ha for the cotton. Concerning the fixed capital, Note that producers of the study area constitute an average 51646. 97 fcfa for the renewal of the equipments and materials of work with a strong variation of 54,430.5 fcfa between them. For the semi, the produces use in average 107.5kg of seed per hectare with a low variation of 48.30 kg from a producer to another. This quantity varies between 20 and 175kg depending on the varieties and area of the farmer. To upgrade their yield, some producers use in average respectively 3.54l/ha and 141.81kg/ha of insecticides and fertilizers (NPK and Uree) with a strong variation of 123.69 kg noticed at the level of fertilizers. Let us note also that the average age of the producers is 36 years old with an average age of experience of 5 years in the soya farming. Whereas some are very experienced, some have none in the matter of soya farming. The younger producer is 20 years and the older is 75 years. It is use in average 136.19 many days in the area of the study with a variation of 67.48 from a producer to another.

The estimation results of the stochastic function of the production of soya.

The results of the estimation of the para-metric and stochastic border of the production of soya by the method of the maximum of likelihood are presented in the table below.

Table n2: Result of the estimation of the stochastic production function.

Variable	Coefficients	z	P > z i
(Steady)	-2.71** (1.003)	-2.70	0.007
Incapi	0.290** (0.0475)	6.34	0.000
Insup	-0.240** (0.0693)	-3.46	0.001
Lnenger	0.157 (0.0693)	1.45	0.147
Lnsem	0.176 (0.33917)	0.52	0.604
Intrav	1.102** (0.1821)	6.05	0.000
Ininsect	0.523** (0.23558)	2.22	0.026

	Efficiency parameters	
a^2	1.472** (1.382)	2.13
Λ	0.9807** (0.56975)	1.721

Log of the maximum of likelihood function=-56. 0557; test of the likelihood ratio = 40. 95.

Freedom degree=6; N=66; ( ): numbers into brackets are the error-types; Prolo > = chibar2= 0, 00. ** Significant at 5%. Source: Calculated based on 2016 investigation data's.

After estimation of the model parameters, the stochastic border of the production of soya in the town is the following:

The yield ladder is equal to the amount of the factors elasticity to significant production. It adds up to 1,675. This number is superior to the unit. The conclusion is that the yield of ladder is steady at the level of Soya producers in the town of Save. The parameter is significant and different from zero. That permits to reject the hypothesis of the absence of producer's technique ineffectiveness effects absence.

Distribution of technique effectiveness level in the area of the study.

Table N° 3: Distribution of technique effectiveness levels.

Effectiveness level (%)	Number	Percentage
[05-25[	17	25.76
[25-50[	11	16.67
[50-80[	13	19.70
[80-100[	25	37.87
Total	66	100
ET Medium	-	56
Minimum		5.82
Maximum		99
Gap-type		0.3399
Big farmers	26	54
Small farmers	40	60

Source: Calculated by the authors based on 2016 investigation data

The results of the estimation of the technical effectiveness levels inform us that the level of the technical effectiveness of Soya producers varies from 05 to 99% in the area of the study with an average of 56%. That score indicates that the producers are inefficient up to 44% and that none of the producers has scored 100%. The effectiveness frequencies distribution indicates that 37.87% of the specimen recorded some better scores (including between 80 to 99%). 19.70% with acceptable scores (including between 50 to 80%) whereas 25.76% did not record sufficient scored (less than 50%). The technical effectiveness frequencies distribution according to the farmers categories reveal that big farmers have an average level of technical effectiveness of 54% and small farmers have 60%. Therefore, the big producers are less reliable than the small ones. Let us also note a low variation of the technical effectiveness levels from one producer to another.

4-2. Technical effectiveness levels determinants analysis.

The descriptive statistics of the qualitative variables introduces in the model are presented in the following table:

Table N°4: Socio-economic characteristics of the producers.

Characteristics	Absolute frequencies	Relative frequencies %	Characteristics	Absolutes frequencies	Relatives frequencies %
Sex			Inoculation application		
Male	39	59.1	Yes	18	27.27
Female	27	40.90	No	48	72.73
Total	66	100	Total	66	100
Instruction			Secondary activity		
Yes	23	34.85	Yes	33	50
No	46	65.15	No	33	50
Total	66	100	Total	66	100
Access to credit			Size of the exploitation		
Yes	31	47	Big	26	34.44
No	35	53	Small	40	60.60
Total	66	100	Total	66	100
Training			Membership		
Yes	32	48.48	Yes	36	54.54
No	34	51.58	No	30	46.46
Total	66	100	Total	66	100

Source: 2016 investigations

The study of this table shows that in the town of Savč, men and women devote to Soya farming, respectively with ratios of 40. 90% and 59. 1%. Out of the 66 producers of the sample, only 18 apply the inoculation technic (27.27%). This result reveals a low perception of the agricultural technical innovations in the area of the study. It is easy to notice that a majority of producers did not receive a formal education (65.15%), and 53% do not have access to credit. Even if more than the half of the producers belongs to a group (54.54%), only (48.5%) received a training concerning the Soya farming. Let us also notice that the sample is dominated by the small exploitations (less than 6 ha) with a ratio of 60.6% and the half of the investigated producers are practicing secondary activities.

The determinants factors of the producer's techniques effectiveness.

The estimation results of the determinants factors, the ethnic efficiency of the producers by the Tobit model are confined in the table below.

Table N° 5: The technique efficiencies determinant factors.

Variables	Parameters	value	Gap-type	Probability
Steady	α_0	0.43096**	0.0295096	0.000
Floor space of the Soya	α_1	-0.0252**	0.0047756	0.000
Floor space of the cotton	α_2	0.0115156	0.014204	0.418
The age	α_3	-0.001392	0.0033647	0.679
The sex	α_4	0.16183*	0.1400046	0.029
The training	α_5	-0.1787**	0.0357276	0.000
Experience	α_6	0.0000294	0.00526112	0.996
Secondary activity	α_7	-0.2518**	0.0865775	0.004
Inoculation application	α_8	0.0480769	0.2120322	0.821
The instruction	α_{90}	0.72841**	0.3173755	0.022
The exploitation height	α_{10}	0.38590**	0.0477114	0.000
Group belonging	α_{11}	0.0778077	0.12251	0.525
Access to credit	α_{12}	-0.1796**	0.0556806	0.001
Log likelihood sigma		5.5207** 0.221033	0.0347119	

Source: The estimated results. *= significant to 10%, **= significant to 5%

The estimation of the production function has been done by the border function of production, type Cobb-Douglas. The decline results show that the model is globally significant to the brink of 5% (picture n4). The decline results show that the model is globally significant to 5%. This means that 98% of the output variation is due to the techniques of the producers and that 2% of this variability is then attributing to the risky effects. It is noticeable that the statistics of distribution of student, which allows testing the hypothesis of the non-existence of the technical inefficiency of the production, is rejecting because λ is significantly different from 0 to the brink of 5%. The specification in terms of border of production (λ 0) is then appropriate in this study. This stochastic formulation of the boundary, confirmed by the test of student, shows that in this study, besides the technical inefficacy, we should take in account the factors purely risky (non-existent). The variables as the fixed capital, the quantity of insecticide, and the quantity of the labor used are positively significant. It resulted that the quantity of soya in (Kg/ha) is positively correlate by the fixed capital, the quantity of insecticide, and the quantity of the Labor. An increase of those factors would lead to the increase of the produced soya quantity. Those results are in harmony with those of Amoussouhoui (2013) concerning the fixed capital (the absorption of the equipments) and the quantity of labor for the production of rice seed in the South Benin. Those results are also similar to those of many authors (mainly Kassimou, 2002). According to the latter, the labor has sometimes positive signification on the technical efficacy. Let remember that the labor in the case of including species as well as the family labor and the salaries one. Nevertheless, this result is contrary to Labiyi et al…'s one, (2012) according to which, only the variable quantity of seed is positively significant in the production of soya in the Collines Department and that the other variables have no impact on the production. Concerning the other variables of our model, only the variable "sown floor space" reveals itself significant to brink of 5% with a negative effect, the others are non-significant. This negative sign of the floor means that the increase of the sown floor space thy producer move it away from the production border. Though it is astonishing, this result is just the confirmation of the fact that the small producers are more efficacy technically that the big producers found higher. It has its explanation by the fact that the producers operate in a risky environment and which the increasing of the floor space increases the risk of technical inefficacy. We should note that the output scales are ascending at the producers point, meaning that the increase of the productions factors (the fixed capital, the quantity of labor and of the insecticide) of a supplementary unit will increase the production more than proportionally. The technical efficacy indications have been directly obtained with the program Border (Coelli and al, 1998). Those results show that the whole producers of soya in the municipality of Savč have a medium level of technical efficacy of 56% (picture n5), meaning that their degree of inefficacy is 44%. There are still possibilities of production increase up to 44% without having a resort to supplementary inputs. It still exists wide worker to increase the production of Soya in the zone of study based on the resources actually used. So the interest of the study and identification of the determinants of the Soya producer's efficacy in Savč locality.

The results of the factors analysis determine the level of the technical efficacy of the producers are obtained through the model Tobit of the Software Statta II (picture n5).

Those results reveals that the variables like the sown surface, the instructions' level, the training, the access to credit, the secondary activities, the exploitation height are significant to the brink of 5% as well as the variables are supposed to explain this level of technical efficacy of the producers but we should note that the variables sown surface, the access to credit, the training and the secondary activity have negative effects on the technical efficacy level.

As far as the sown surface is concerned, it negative effect is nothing else than a confirmation of the previous results. This result is conformed to Arouna and al's one (2005) for the analysis of the technical efficacy, allocative and economical aspects of the production units of cashew nut in Benin. Those authors conclude that the great exploitations are fewer efficacies than the small exploitations and then, all action for the production of the Cashew

timber must be direct not only to the great units but also the smalls. The positive effect of the instruction is conforming to the one expected.

In fact, the instruction allows the producer to assimilate the training that is given to him and to control the technique required. It is true that most of the campaign of training and development are made in local language, therefore, the instruction arises the mental faculties of the individual to assimilate in a rapid way the new knowledge received. It allows the individual to have a spirit of opening and judgment; which goes in favor to the adoption of new technologies. The instruction allow the producer of Soya to choose the quantities of appropriate inputs and to make a good choice taking in account the cultural techniques available Ahmadou and al., (2012).

The negative significance of the training shows that the producers do not apply the instructions given by the trainers. Remembering that more than 50% of the producers have never attended training on the Soya. The secondary activity reveals a negative effect on the technical efficacy level. This result is justified by the fact that the producers exercising other secondary activities have not sufficient time to oversee the Soya. The negative effect of access to credit reveals a bad management of the credit obtained by the producers. These results confirm the fact that the great exploitations are technically less efficacy than the small exploitations. The variable just like the membership of a group, the experience year number the inoculation application and the entrepreneur age are all non-significant. That result reveals that the actions must be directed to the organization of the firm in order to contribute to the producers' technical efficacy. Talking about the entrepreneur's sex, it is passively significant; so it's clear that men are more efficient than women. The sown surface of cotton, contrary to what we expected, has no influence on the production of Soya. This result is understandable because the producers make a good distribution of the labor for their different cultures.

CONCLUSION AND SUGGESTIONS

This article has involved in evaluating the technical level of efficacy of Soya production in the urban district of Savč and to identify exogenous factors which explain that level of technique efficiency. The result of this study shows that producers have 56% of technical efficacy score. That result points out a sign of technique inefficacy of 44%. In other way Soya producers of Savć urban district can increase their yield up to 44% with the level of unchanged. That score is less to the one noticed by Labiyi and al, (2012) (56% versus 64%). That difference is justified by the fact that the study has to do only with the producers of Savč urban district but Labiyi and al urban district a reading of those results also show that the yields scale are increasing. It would be interesting to suggest some methods at different level in order to the increase of the technical efficacy level. Relating to the justified factors of that efficacy level, the study reveals that the sown surface (negative effect), the access to credit (negative effect), the farmer's sex (male), the instruction level, the training (negative effect), the carrying out of secondary activity and the size of the exploitation are main points of that technical efficacy level. From the different results obtained, it is an emergency to suggest approaches of solutions to the different firms' stakeholders.

Awareness raising service

Though the influence of the training are negative, it urge to increase the campaign of awareness toward the producers to let them understand the essential of the subject before moving to the modules of the appropriate training. In fact, it is found that the level of instruction contributes to the improvement of the efficacy level. That is why it is desirable to increase the sections of training and awareness for the producers in order to let them know the utility of the itinerary technique and answer to the cultural calendars' requirements. Due to the advancement of the middle age (36 years), it seems absurd to propose the schools put up, the college or secondary schools in order to raise the level of instruction of the zone. The training then, can pass only by the work groups, useful and pragmatic for the farmers not to lost most of their time.

The Soya producers

The producers must give original information for research purposes because the study shows that 98% of the real productions' deviation compare to the border production was almost irremovable to their inefficacy. Since then, they must no more wait for the government, because the great part of the production is used either to pay their debt, or to feed the family or any other issues. So, the producer must abandon a certain behavior and search for means which will help him to increase their production. The rationalization of the sown surface must lead the producers in the combination of factors because the surface has a negative yield according to the study's findings.

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