Determinants of Graduate Students' Participation in Agricultural Value chain in Benin.

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Abstract

Agriculture employs 70% of the active population but contributes only 32.6% of GDP formation (GoB, 2009), due to low productivity. The low adoption of technological innovations and climate change account for the low productivity and growth of the Beninese agriculture. Several empirical studies have recommended the adoption of technology as an adaptation for climate change, although the level of technology adoption is determined by age. Analysts estimate that only 33% of youth, that is persons between ages 15 and 35 years which account for 30% of Benin's population, are employed against 72.5% adults (RGPH-INSAE, 2002). Youth in agriculture can be the solution for the country's employment problems. This study analyses the factors that may influence youth' participation in agriculture. A total of 180 students were sampled. Majority of graduate students have a good perception of agriculture, they believe that the sector can solve youth' unemployment and are willing to work in this sector, especially in livestock sub-sector. However, access to land, credit, experience and enhanced knowledge in farming and low agricultural mechanization are the main difficulties that hinder the youth desire for a career in agriculture. Also, the presence of a relative in rural areas seems to encourage the choice of agricultural work by youth.

Keywords: Youth, Innovations, Unemployment, Perception, Agriculture and Development.
J.E.L. Classification*: J60– Q160 – O38*

Déterminants de la participation des étudiants dans la chaîne de valeur agricole au Bénin.

Résumé

L'agriculture constitue un secteur clé pour l'économie béninoise. Il emploie 70% de la population active et contribue à 32,6% au PIB (GoB, 2009), une

productivité alors faible. La faible adoption d'innovations technologiques et les changements climatiques expliquent cette faible productivité et croissance de l'agriculture au Bénin. Plusieurs études ont prouvé que l'adoption des technologies tout en étant une solution pour les changements climatiques est déterminée par l'âge. Les analystes estiment que seuls 33% des jeunes, personne ayant entre 15 et 35 ans qui représentent environ 30 % de la population béninoise, ont un emploi rémunéré contre 72,5 % pour les adultes (RGPH-INSAE, 2002). Jeunesse et agriculture peuvent alors être la solution à leurs problèmes respectifs. Cette étude analyse les facteurs qui peuvent influencer la participation des jeunes dans l'agriculture. Les données, recueillies auprès de 180 jeunes étudiants, révèlent que la majorité des jeunes ont une bonne perception de l'agriculture et aimerait exercer directement un métier dans le secteur agricole ou y investir une partie de leur revenu. Mais la plupart aimerait pratiquer l'élevage. Les jeunes pensent que ce secteur peut résoudre le chômage des jeunes. Mais les difficultés d'accès à la terre, au crédit, la faible mécanisation du secteur agricole et la possession de connaissances approfondies et d'expérience en agriculture découragent la participation à la chaine de valeur agricole. Alors que la présence d'un parent en ou la possession de terre milieu rural accroit la probabilité d'embraser un métier agricole.

Mots clés : Jeunesse, Innovations, Chômage Perception, Agriculture et Développement.

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1- Introduction

Agriculture is a vital sector for Benin's economy, employing 70% of the active population and contributes to 32.6 % of GDP (GoB *et al.*, 2009). However, agricultural growth and productivity remains considerably low. The Beninese agriculture sector recorded unstable growth of between 2 and 6 percent from the year 2000 to 2005 while the population is growing regularly at 3% each year since more than 20 years (World Bank, 2009). Analysts suggest that some key contributors to this poor performance of the Beninese agriculture sector are low adoption of technological innovations and the climate variability that has in recent years negatively affected the agricultural production of the country (USDA, 2013; Baco *et al.*, 2010). Agricultural sector in Benin is poorly mechanized (only 1% of croplands are motorized against 75% who are exploited by hand and the other 24% use animal traction) and is highly dependent on natural conditions. Estimates suggest that climate change alone has reduced between 10 to 20 percent of the agricultural yields in Benin during the period 1990-1999 (MEHU, 2001).

In fact, analysts suggest that farm production has become increasingly risky and challenging in Benin due to these two factors mentioned above. They suggest that farmers must be increasingly educated, with a high capacity of absorption of innovations in order to cope with processes of change currently occurring in the

agricultural sector in Benin (Gyimah-Brempong and Kimenyi, 2013). Jibowo (1996) submit that the Beninese youth who represent about 30 percent of the population (RGPH3-INSAE, 2002) in Benin are best placed to save the agriculture sector which is currently in peril. From a policy perspective Jibowo's (1996) opinion may sound quite appealing given the high levels of graduate's unemployment in Benin. Ideally, their human capital may allow them to make use of the enormous opportunities that agriculture offers particularly in agri-business sector. As Ampedu-Ameyau (2012) eloquently postulates, the sub-sector of agribusiness (processing and marketing of agricultural products) which today is the most lucrative and the most generating value added requires young people that can understand the market dynamics; young people with innovative, institutional and financial system knowledge and other qualities that illiterate farmers are not likely to have.

These characteristics are the prerogative of youth. Youth (defined in Benin between 15-35 years) represents about 30% of the population of Benin (RGPH3-INSAE, 2002) is growing at a high rate (3.5 between 2002 and 2013, while during 1992-2002 was 3.25). Worldwide underemployment and unemployment affects young people than adults (World Bank, 2009). United Nations (2011) estimate that across the world, youth' unemployment is 12.6 percent whereas adult' unemployment is about 4.8 percent in 2010. Also the youth, that represents 25 percent of the active in the world, accounts for 43.7 percent of the unemployed in the world. In Africa, the ratio of unemployment young/adult is one to three (OIT, 2006). The general census conducted in 2002 revealed that in Benin 33% of the youth are employed against 72.5% for the adults (RGPH3, INSAE, 200). Furthermore, the same census revealed that 62 percent of rural youth are working (paid or unpaid) against 35.7 for urban youth. Then, the unemployment is more an urban phenomenon. One of the biggest challenge of today's economic policy in Benin is the inclusion and participation of the youth and especially the graduates in the national economy. The graduates' students have a stock of human capital that can improve the total factor productivity. However the youth participation in agriculture is Benin is lower and declining according to Mangal (2011).

Brooks *et al.* (2012) and Kararach *et al.* (2011) show that only agriculture is the only sector that can be stable source of employment in economies heavily dependent on agriculture in the short and medium term. The value chain of the agricultural sector is very diverse and offers a variety of opportunities with high yields (Abdullah and Sulaiman, 2013). The sub-sector of agribusiness (processing and marketing of agricultural products) which today is the most lucrative and the most generating value added requires young people that can understand the demand and market dynamics, young people with knowledge on innovations and institutional and financial system in general, qualities that rural youth are not likely to have but only young graduates are likely to have.

But several factors impede the youths' involvement in agriculture such as the educational background, access to land, low agricultural productivity, seasonality of agricultural incomes, lack of public investment in agriculture and the low use of innovation and technology according to Njenga *et al.* (2012). Adekunle *et al.* (2009) point out that the low supply of bank credit to the agricultural sector, the lack of agricultural insurance, the low return of agricultural investments, lack of basic knowledge in agriculture and lack of access to tractors and other agricultural inputs are the main constraints on the participation of young people in agriculture. Young people who have ties with rural areas are more able to embrace professional and technical work in agriculture (Aphunu and Atoma, 2010). To attract more young people into agriculture, efforts should be undertaken by governments and agricultural promotion centres to facilitate access (physical and financial) inputs such as improved seeds, fertilizers, mechanization and basic information on agricultural markets according to Mbeine (2012). The perception also is another important factor that determine youth participation in agriculture and most of the studies revealed that youth have a negative perception of agriculture (Ayanda *et al.*, 2012). Suriname (2011) points out that the poor image projected by poor people involved in agriculture must be changed in order to attract young people and at the same time young people represent the ideal catalyst for a change of agricultural sector because they are more prone and willing to adopt new ideas, concepts and technologies that are critical to changing the way agriculture is practiced and perceived. Brooks *et al.* (2013) estimate that agriculture that will attract young people must be dynamic, competitive and profitable.

But, the key question is: are young graduates really interested to establish a career in agriculture even if they face a big challenge of unemployment? The governments of Benin in particular and other governments in Africa has initiated some policies that tried to integrate the young graduates in agriculture in their efforts for tackling the high levels of graduates' unemployment but all these initiatives have failed to achieve the intended results. Hence, I submit to investigate the following important questions: 1) what is it that makes agriculture less appealing to the young graduates in Benin? 2) What kind of agriculture are they interested in if any? 3) What could be the enablers for young graduates to take advantage of the opportunities available in agricultural sector? and 4) How can they be successfully integrated in the sector?

Several studies have identified the range of factors, such as personal work ethic, remuneration, working conditions and career opportunities that influence the decision to embrace or not agricultural job but provide weak evidence on the relative importance of these different factors. Therefore, this study seeks to find and determine the relative importance of the factors that influence the graduate students' involvement in agricultural value chain in Benin and hereby analyse the students' perception of agriculture.

2- Materials and Methods

Students choose jobs for different reasons. Some students will choose to work in a sector because of the high wage offered by this sector or because of the prestige attached to this sector whereas others will choose a sector that meet their individual characteristics and desire. Each individual is faced with choosing among the large areas of occupational cluster of work such as agriculture, business, communication and media, health, hospitality and recreation, manufacturing, construction, arts, humanity and sciences, home economics, marketing and distribution, natural resources and environment, personal services, public service, and transportation. Students, acting rationally, prefer to work in the sector where they obtain the highest level of perceived utility.

The theoretical basis for the use of discrete choice models is the random utility model. In this model, the indirect utility function is decomposed into a deterministic component, which is known up to some parameters, and a random component, which is unobservable. Random perceived utility is:

$$U_{ij} = V_{ij}(X_i) + \varepsilon_{ij} = \beta_j X_i + \varepsilon_{ij}$$

where

V_{ij}, represents the deterministic component,

ε_{ij} is the error term,

i denotes individuals,

j represents the alternative, where $j = 1$ (student prefers to start their carrer in the agricultural sector), $j = 0$ (prefer to not start in agricultural sector),

X_i is a vector of explanatory variables including individual characteristics and individuals' perceptions of country attributes, and

β_j is a coefficient vector.

Let us assume that the error terms are independently and identically distributed with a normal, with mean zero and variance σ^2, distribution is estimated. Using preferring to start their careers in a non-agricultural sector as a base (j = 0), the probability of choosing alternative j for individual i in the probit model is:

$$P_i = [1 - \varphi(-\beta X_i)]^{Y_i} \cdot [\varphi(-\beta X_i)]^{1-Y_i}$$

The log likelihood of an individual observation is therefore:

$$Log(P_i) = Y_i \log[1 - \varphi(-\beta X_i)] + (1 - Y_i)\log[\varphi(-\beta X_i)]$$

The log likelihood of the entire sample is just the sum, over i, of the individual contributions above.

The categorical dependent variable indicates whether a student prefers to work in agriculture or not. Independent variables include university, farming and individual characteristics. Without any doubt, unobserved heterogeneities among graduate students may affect their stated choices. The survey asked for information on individual characteristics to help reduce potential impacts of unobserved heterogeneity. This information is also used to identify those individual characteristics that affect participation of graduate students in agricultural value chain.

The qualitative variable "school or faculty enrolled in" indicate University-related variables. Socio-demographic characteristics consist of number of years living in rural areas, household size, and binary variables indicating gender. Faming variables are whether the students has relatives living in rural areas, whether the student found it difficult to get credit or land, parent's opinion about agriculture, the low wage rate in agriculture and the rudimentary character of agriculture in Benin.

The regression model is specified as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_1$$

where: Y= decision to participate or not in agricultural value chain;
X_1 = Sex, (male = 0, female=1)
X_2 = Household size (number)
X_3 = Farming experience (yes=1 and No=0)
X_4 = Scholl or faculty enrolled in (Agricultural Background=0 and 1 otherwise)
X_5 = Availability of at least one parent in rural areas (Yes=1 and No=0)
X_6 = Possession of family lands (Yes=1 and No=0)
X_7 = Parent's opinion about agriculture (Bad=1 and Good=0)
X_8 = Mother's education (At least primary school=1 and 0 otherwise)
X_9 = Father's education (At least primary school=1 and 0 otherwise)
X_{10} = Low mechanization of agriculture (Yes=1 and No=0)
X_{11} = Unavailability of credit (Yes=1 and No=0)
X_{12} = Difficulties to access land (Yes=1 and No=0)
X_{13} = Low wage rate in agriculture (Yes=1 and No=0)
U = Error term

The Likert scale was also used to analyse the students' perception of agriculture as means of future livelihood. The perception was measured using a five point Likert scale type of response ranging from strongly disagree (SD) = 1point, disagree (D) = 2 points, undecided (UD) = 3points, Agree (A) = 4 points and strongly agree

(SA) = 5 points. The data collected were analysed using descriptive statistics (percentages, frequency distribution, mean, standard deviation, etc.).

This study is conducted in Benin, specifically in the main university of Benin. The University of Abomey-Calavi (UAC) was founded in 1970 and has four major faculties in the fields of law, economics, literature and social sciences and eighteen professional schools. The number of students was multiplied by three in just ten years. From 26,801 students in 2002, the number of students was estimated at 69,688 in 2012 by the university statistical services. From the target population, a sample of 200 students were randomly sampled (exit pool technique) and care was taken to make sure that there is gender balance in the sample. After administration and analyse of questionnaires, 18 questionnaires were dropped out and the final size of the sample are 182.

3- Results and Discussion

3.1- Socio-economic characteristics

The sample consisted of 182 students currently in training at the University of Abomey-Calavi was randomly drawn. The average age of the sample is 21.45 or about 21 years and half. Moreover the majority of respondents (74.1%) are between 20 and 25 years. The study reveals that 70 percent of the respondents were male, while 30 percent were female. Almost all the respondents (98%) are unmarried without children (93%). Also most of the students (77%) come from rural areas and mostly attended to private school (53%) for their secondary schooling. In average the students are from a large family (8 members). The students, that parent's own house (93%), television (90%), refrigerator (52.7%), have access to electricity (88%) and drinking water (52.2%), live in majority in urban and peri-urban areas (68% against 32% in rural areas). There is a wide disparity of parent's access to education and wealth possession. Most mothers has no education (46.7%) and has no moving means (69.2%), while fathers have an average secondary education and own either motorcycle (45.6%) or vehicle (40.7%) for moving. The large majority of students (80%) reveals that their direct family own land in rural areas but most of students frequent rarely rural areas. In fact almost halve of the selected sampled visit their home town less than once per year.

3.2- Perception of the agricultural sector

The youths are aware of the importance of the agricultural sector in the Beninese economy. Almost quarter of the respondents think that agricultural sector is vital for the economy while 60% think that it is an important sector. Furthermore, half of the respondents imagine that the weight of this sector in the economy will increase with the time and will make this sector a promising stable source of employment (62% against 3%). Globally three-quarters of the respondents have a good perception of agriculture and this justifies the decision of 70% of the students to

embrace an agricultural job at the end of their studies (table 1). This good perception is certainly determined by the fact that majority of respondents (69%) having been involved in agricultural activities and have at least one parent engaged in agriculture. This good perception observed in Benin is contrary to results observed by Ayanda *et al.* (2012) in Nigeria. They found that three-quarters of the students have a bad perception of agriculture and do not think embrace agricultural career in the future.

Table 1: Perception of agriculture

	Agricultural career	Good perception of agriculture	Agriculture as solution for youth' unemployment
	Proportion (%)	Proportion (%)	Proportion (%)
Strongly Disagree	3,3	4,9	4
Disagree	1,1	4,9	3
Undecided	11	14,3	11
Agree	23,1	29,7	25
Strongly agree	61,5	46,2	57
	100	100	100

The main factors that can impede youth' involvement in agriculture are: access to land (76%), access to credit (79%) and low agricultural mechanization. Agricultural risks and administrative inefficiencies (extension services and others) and social barriers (point of view of parents and society about agriculture) do not represent an obstacle for the youths and this is certainly linked with the unique characteristics of youth (risk-lover, lack of experience, desire of self-employment) and by the fact that most of the graduates students surveyed are interested by cattle farming (breeding) and not crop framing. Indeed, (53%) of respondents have chosen animal breeding against just 47% who have opted for crop farming (Table 2). The vast majority of the students is not interested in selling (84%) or processing (82%) of agricultural products because of the unavailability of market.

Table 2: Choice of agricultural sub-sector of interest by Youth

	Frequency	Percentage
Type of agricultural sub-sector :		
Animal breeding	97	53.3
Cereal Farming	38	20.9
Cash crop farming	15	8.2
Fruit Farming	21	11.5
Horticulture	8	4.4

Forestry	3	1.6
Involvement in Agricultural production		
Yes	114	62.6
No	68	37.4
Involvement in processing		
Yes	33	18.1
No	149	81.9
Involvement in Selling		
Yes	29	15.9
No	153	84.1
Parent's involvement in Agriculture:		
Directs parents	36	20
Grand-parents	44	24
Other members of the family	60	33
Nobody	42	23

*3.3- **Youth' motivations to participate in Agricultural value chain***

Most of the young students (60%) aspires to practice a liberal profession and in that agriculture is consistent with their desire and dreams. Having their own business is the main motivation of most young people (71.4%) in deciding to make career in agriculture. Furthermore, 75.3% of young people think that agricultural sector can generate enough resources to feed themselves and their family. Lack of experience is another factor that does not seem to affect the motivation of young people to practice agriculture. Most of them (70%) think that the lack of knowledge (experience) in agriculture is not a problem that can hamper their willingness to embrace agricultural career.

Young people do not seem to be motivated to develop an agricultural activity because of a passion for working in a natural environment (67.7%) or love for agriculture (97.3%). They do not seem motivated by the perspective of reconciling work and family life. Half of respondents (53%) want to develop farming in order to produce and provide their own food and consequently contribute to the realization and reinforcement of food security of the country (Table 3). The youth are aware of the risky nature of agriculture and just 45% are willing to enter in the sector because of its profitability (Table 3). Nearly half of the youth think that agriculture meet their expectation of employment against 28% of them thinking that agriculture does not meet their expectation of employment.

Table 3: Youth' motivations to participate in the agricultural value chain

	Food security in Benin		Profitability of the agricultural sector	
	Frequency	Percentage	Frequency	Percentage
yes	103	56.6	82	45.1
No	79	43.4	100	54.9
	182	100	182	100

3.4-Regression analysis

The regression was used to identify the relationships between participation and explanatory variables. She identified the strength of these relationships and help to know the proportions in which these factors explain participation and which of them are significant.

The results of the regression analysis (Table 4) show that the people who have educational background in agriculture (students in agronomy) or have a parents directly involve in agriculture are less willing to embrace in the future to agricultural carer. Indeed the variables educational background in agriculture (agronomy), farming experience and a parent directly involve in agriculture are significant and positive as found by Aphunu & Atoma (2010). The probability to participate in the agricultural value chain decrease as a student have farming experience, a parent directly involved in agriculture or studies agronomy. These findings are similar to the results obtained by Jones & Larke (2001). This can be explained by the facts by they have better knowledge of agricultural risks and low agricultural returns.

Table 4: Regression coefficients of factors influencing youth' participation in agriculture

Variables	Marginal effects	Standard Error	Prob
Agric educational background	0.1707265*	0.06585	0.097
Agric Risk	-0.0259072	0.08424	0.765
Agric Wage	0.0669709	0.07725	0.367
View of parent	-0.0028868	0.09467	0.976
Mechanization	-0.0266819	0.06521	0.680
Access credit	0.113951*	0.06025	0.099
Access land	-0.1957616**	0.08686	0.015
Farming Experience	-0.1372054*	0.07665	0.058
Presence of parent in rural areas	-0.1122201*	0.06078	0.091
Possession of Family lands	0.1931909***	0.04997	0.002

Mother's education	0.0334447	0.14427	0.826
Father's education	0.0472181	0.071036	0.522
Household size	0.0081041	0.0056287	0.150
Sex	0.0137193	0.0730694	0.850
Number of observations =	182;	Wald chi2(14) =	33.50;
Prob > chi2 =	0.0025	R-squared =	0.1352

Notes: *** significant at 1%, ** significant at 5%; * significant at 10%

At the other hand the possession of rural land by the student' family increase the probability to embrace agricultural job in the future whereas the difficulties to have access to land and credit lower the probability to participate in the future to the agricultural value chain. In fact the variable possession of land by parents in rural areas is significant at 1% and positive whereas the land and credit access are negative and significant at 5% and 10% respectively. These results are conform to those obtained by Adekunle *et al.* (2009) and Njenga *et al.* (2012). The proportion in which the possession of land by parents increase the probability of participation in agriculture is almost equal to the proportion in which lands' difficulties will impede youth' involvement in agriculture.

4- Conclusion

Agriculture is the main source of income for populations in Benin. But this sector is characterised by low and instable growth rate that impede the reduction of poverty in Benin. The challenges faced by the sector are numerous and are worsening with the time. Some analysts suggest that youth can be a solution to some of problems faced by agriculture in Benin. Following these analysts, Government of Benin set up different programs that aimed to involve youth in agriculture. These programs also aimed to solve the youth' unemployment. But unfortunately these programs were not successfully and we undertook this study to analyse if the youth are or not interested by agricultural carer.

In the aim to find a response to our interrogation, a sample of 182 graduates' students currently schooling at the main university in Benin (University of Abomey-Calavi) was randomly selected. The choice of the graduates' students was done because of their ability to master quickly innovations, to analyse risks and made rational choice. Descriptive statistics, Likert scale and probit model were used to analyse the data.

The results show that youths have a good perception of agriculture. Most of them are more in keeping livestock than farming crops. In the future, more emphasis must be put on the livestock sub-sector during the design of agricultural policies

that intend to involve youths in agriculture. However, access to land, access to credit and low agricultural mechanization are the main difficulties that youths state as obstacles for a participation in agriculture. The regression results confirmed the negative relationship between participation to agriculture and the aforementioned factors. The possession of experience in farming through formal educational system or by practising directly or not decrease the chance to be involved in agriculture in the future. Only the possession of lands by the students' family increase the probability to participate to agriculture. Land appear as a key factor in youth' involvement in agriculture and land reform is advised.

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