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Agricultural diversities on food security's impact

Hortensia V. ACACHA-ACAKPO

National School of Applied Economics and Management (ENEAM). E-mail: horcacha@yahoo.fr

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The present study has investigated the impact of agricultural diversity on food security in Benin. Agriculture plays a very important role in the Beninese economy and contributes to more than a third of national GDP despite pockets of food insecurity in several municipalities in Benin. Various efforts have been put in place, such as the diversification of the sector, but the crisis persists. Descriptive methods followed by multiple linear regressions were used to understand this impact. The 1985 to 2014 FAO Consumption Standards data, the population size price series for each production and the market were obtained at ONASA by product and by market. The size of Benin's population was obtained at the National Institute of Statistics and Economic Analysis (INSAE). The results of the study has showed that the average caloric intake is estimated at 3288 Kcal / head / day over the period 2005-2014 and the average intake of Protein is estimated at 75.6 g / head / day. The population has increased from 2003 to 2012. Prices have increased and adjusted to the needs of the producer, but the demand for food and nutrition is not covered by production. In other words, the supply of food energy is greater than the needs of the population, but the nutritional demand of the population in animal protein is not covered by the national supply of agricultural production

Key words: Impact, diversity, agricultural, insecurity, food

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INTRODUCTION

Benin country's economy has its basis on agriculture owing to the Ministry of Agricultures survey in 2012, which revealed that agriculture contributes at 32% on the country's GDP, 82,5% on its exports and 15% on its GNP/ For about 60% of male and 35.5% of female of its valid population undertake agricultural activities. The vegetable productivity is more practiced with 22,6% while the breeding and fishing attend respectively 5.7% and 4% according agriculture Ministry survey 2011. Those factors and indicators allow to state that the agricultural section in Benin could help facing food security and boost its economy; however, it is observed some threads which forced to certify in around 11% households in Benin food insecurity. The situation means those families are not able to satisfy their fundamental needs without adapting to foreign strategies.

Moreover, 34% of households are limited in food insecurity because they can afford only one plate of adequate meal a day. This situation is more remarkable in rural areas 15% than urban areas 8%. On the other hand, Benin country has potentiality in agriculture to clap farming insecurity and increase its economy growth through agriculture diversification. According to several analysts in rural agricultures domain, the productivity level, farming and feeding could allow to reinforce the productivity and make it more competitive. But this is still a challenge to overcome through policies. How does Benin national agricultural production allow to satisfy its population's needs in feeding?

LITERATURE REVIEW AND METHODOLOGY OF THE STUDY

Conceptual Clarification

FOOD SECURITY: Food security refers to a situation in which all individuals have, at all times, physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and preferences and allows them to live a life time healthy and active (World Food Summit, 1996). Four fundamental concepts help to better understand the concept of food security: availability, accessibility, use and stability.

⇒ Sufficient availability of food: This is the amount of food available in a country or zone, taking into account all forms of domestic and industrial production, as well as the balance of imports and exports, food aid and stocks.

⇒ Accessibility: It is the possibility for any household to be able to regularly acquire the necessary quantity of food, thanks to the combination of sources such as its own reserve and the production, the purchase, the barter, the gift, the borrowing or food aid.

⇒ Appropriate use of food: This is the use of food within the household and meeting the needs of protein energy and micronutrients individuals. The use of food takes into account such things as the preparation of food, the sanitary situation, hygiene, the variety of the diet, etc. Stability in time of availability, access and use of food.

Impact means the influence of an action seen as the set of repercussions of an action. In the context of this article, it is all significant and lasting positive or negative changes in the food and nutrition sector specifically. In this sense, Graugnard and Heereen (1999) consider these changes as effects having direct relations with action. According to these two authors, the impact is a new situation resulting from the set of effects. The impact is what results from using the results.

Agricultural diversification is a strategy of agricultural policy. For economists like Moustier (1997), Malezieux et Moustier (2004) diversification is seen as a use of various strategies or a wide range of means to develop a sector or to solve a constraint. Malezieux (2004) defines it as the introduction or the development of additional speculation to existing speculations. Nihous (2008) asserts that agricultural diversification takes into account the lucrative activities that can't be dissociated from exploitation, and therefore carried out with the human, heritage and material resources of the farm. Of all these considerations, agricultural diversification takes several dimensions, either vertical by addressing the development of a sector, or horizontal with the introduction of new speculation, additional to existing speculation.

In this case, it is a horizontal diversification in the form of price controls, or to support trade for the benefit of consumers, producers through direct supply of credit, facilitating market access and strengthening the organizational capacity of farmers; the figures below.

The food security sector is exposed to internal and external shocks and risks that define food behavior at the national and household levels. The diversification policy influences the level of food security, but how?

METHODOLOGY

The influence of agricultural diversification on food security requires appropriate data collection. Agricultural production data for all commodity chains and product price levels were examined. Data from 1985 to 2014 about on FAO (Food and agriculture Organization of the United Nations) consumption standards, population size price series about each production and market are obtained at ONASA by product and by market.

FAO's methodological approach to the assessment of the level of food and nutritional cover in Kcalorie, the rate of food and nutritional cover in Kcal in protein, the rate of food self-sufficiency and the rate of food independence was adopted. According to this approach, food security was assessed according to the parameters: consumption needs, equivalent to the product of the total population size by food consumption standards.

Useful production is the quantity of agricultural production actually marketed for consumption; Useful production = agricultural production - self-consumption - loss-donations - other reserves for animal feed Food balance = useful production - consumption needs Self-sufficiency rate (CAS). The self-sufficiency rate expresses the importance of production in relation to domestic consumption. The CAS is defined as follows: TDI and TAS can be calculated for individual products, for groups of products with similar nutritional values and also, after appropriate conversion of product equations, for all products. In the context of food security, the CAS is often used to show how much a country needs from its own productive resources: the higher the SAR, the closer the country gets to self-sufficiency. Although the CAS is the appropriate instrument for assessing the availability of the commodities considered separately, care should be exercised when assessing the overall food situation. Other measures have also been used. KCal per capita energy requirement coverage: This is the ratio of the KCal per capita energy availability to the Kcal energy requirement. Per capita protein requirement coverage: This is the ratio of per capita protein availability to protein requirement.

PRESENTATION AND ANALYSIS OF THE RESULTS

Descriptive analysis of the variables

Food consumption patterns and food expenditures

The Beninese diet is based on roots and tubers (cassava, yam) and cereals. Significant variations can be observed between the north and south of Benin. In the south, the diet is more based on corn and fish in particular, while in the north traditional cereals (especially millet) still occupy an important place and meat / dairy products are more available. Rice is gaining importance in food, both in urban and rural areas. (Table 1 & 2)

EFFECT OF THE PRICE POLICY ON FOODSTUFFS

Fertilizer transfer price

From 1983 to 2012 the fertilizer transfer price remained between 60 and 240 FCFA, ie an average price of 166 FCFA. Between 1993 and 1994 it went from 100 to 200 FCFA; double. This trend was maintained until 2004. However, after 2004, its value has risen to more than 200 FCFA. The analysis of the transfer price of fertilizers (Pce) already suggests an irregularity in the data. Shows a distribution that is only slightly flatter than normal (flattening coefficient of -1.522), but especially strongly shifted to the left (asymmetry coefficient of -0.368) due to a low minimum of 60 FCFA.

The sale price of insecticides

From 1983 to 2012 (Figure 2) the fertilizer transfer price remained between 60 and 240 FCFA, ie an average price of 166 FCFA. Between 1993 and 1994 it went from 100 to 200 FCFA; double. This trend was maintained until 2004. However, after 2004, its value has risen to more than 200 FCFA. The analysis of the transfer price of fertilizers (Pce) already suggests an irregularity in the data. Graph 4 shows a distribution that is only slightly flatter than normal (flattening coefficient of -1.522), but especially strongly shifted to the left (asymmetry coefficient of -0.368) due to a low minimum of 60 FCFA.

The growth in the sale price of insecticides (Pci) over the study period is erratic. It is between 600 FCFA and 4500 FCFA. Overall, we note an exponential growth of 65% of this price from 1983 to 2004 followed by a 21.11% decrease between 2004 and 2012. During these periods, the average prices of insecticides were 2428 FCFA and 3906 FCFA. It was 2803 FCFA over the entire study period. The analysis of the transfer price of insecticides also suggests an irregularity. Indeed, its distribution is only slightly flatter than normal (flattening coefficient of -1.608), and almost centered (asymmetry coefficient of -0.061).

Producer supply price of plant products

The net producer price of cotton during the period from 1983 to 1993 (Figure 3) averages 102 FCFA. This price has seen a drastic change from 1993-1998 with a growth of 12.5%. In the years 1999-2010 its variation was not significant. After 2011, the net price to the producer has progressively changed to a threshold of 260 FCFA in 2012, i.e. a growth of 30% between 2010 and 2012. This average price applied, over the entire study period, was 160 FCFA with a difference more or less low type (50 FCFA or 31.62%). Similarly, the extent of the distribution (165 FCFA) is reasonable. Finally, the distribution is shifted to the left (asymmetry coefficient of 0.68) and has a flatter shape than normal (flattening coefficient of -1.125).

But the price of maize has a growing trend from 1983 to 2012. In fact, the average producer price of corn in the study period is 112 CFA with a relatively average standard deviation (36 FCFA or 32.36%). Similarly, the range of the distribution (118 FCFA) is almost normal. Finally, the distribution is slightly shifted to the left (asymmetry coefficient of 0.02) and has a shape just slightly flatter than normal (flattening coefficient of 0.42).

The price of pineapple meanwhile, has not changed much over the years. However, there is still a growth of 173% over the study period. The average producer price of pineapple during the study period was 82 FCFA with a moderately low standard deviation (25 FCFA or 30.02%). Similarly, the extent of the distribution (95 FCFA) is acceptable. Finally, the distribution is strongly shifted to the left (asymmetry coefficient of 1.78) and has a flat shape that normal (flattening coefficient of 2.6).

The evolution of the yam price is linear over the 1983-1992 period. It has a sinusoidal trend between 1992 and 2012 marked by a very significant peak of 378 FCFA in 2002 and a remarkable decrease in 2004. Overall, its average price is 153 FCFA with a relatively average standard deviation (73 FCFA or 47.43%). Similarly, the extent of the distribution (298 FCFA) is reasonable. Finally, the distribution is very shifted to the left (asymmetry coefficient of 1.66) and has a much flatter shape than normal (flattening coefficient of 2.94).

In addition, that of cassava from 1983 to 2012 has only increased. With an average of 46 FCFA, it is between 30 and 72 FCFA. The few declines observed in 1996, 2001 and 2003 are not significant. There is a small standard deviation (12 FCFA or 25.93%). Similarly, the range of the distribution (49 FCFA) is almost normal. Finally, the distribution is very slightly shifted to the left (asymmetry coefficient of 0.08) and has a sharper shape than normal (flattening coefficient of -0.28).

Table 1: Value chain contribution to food security

Value chain	Consommation par tête (kg/tète/an)*	Consumption needs			Useful production			Bilan alimentaire			Moyenne
		1985-1994	1995-2004	2005-2014	1985-1994	1995-2004	2005-2014	1985-1994	1995-2004	2005-2014	
Rice	37	141 019	250 487	369 404	10 762	63 219	195 424	-130 258	-187 268	-173 980	-163 835
Maize	**58**	**253 080**	**392 655**	**579 065**	**390 368**	**797 496**	**1 291 614**	**137 288**	**404 841**	**712 549**	**418 226**
Yam	**128**	**558 520**	**866 549**	**1 277 937**	**944 188**	**2 151 452**	**2 999 154**	**385 667**	**1 284 903**	**1 721 217**	**1 130 596**
Cassava	**127**	**554 157**	**859 779**	**1 267 953**	**810 407**	**3 154 910**	**3 427 999**	**256 250**	**2 295 131**	**2 160 046**	**1 570 475**
Tomato	19	82 905	128 628	189 694	52 974	134 820	244 742	-29 931	6 192	55 048	10 436
Onion	2	8 727	13 540	19 968	Nd	14 178	227 345	nd	638	207 377	104 008
Compea	10	43 634	67 699	99 839	45 604	95 332	93 216	1 969	27 633	-6 623	7 660
Peanut	7,6	33 162	51 451	75 878	54 556	130 008	121 510	21 394	78 557	45 633	48 528
Rabbit	1	4 363 441	6 769 914	9 983 884	Nd	69 852	nd	nd	-6 700 062	nd	-6 700 062
Poultry	**1**	**4 363 441**	**6 769 914**	**9 983 884**	**944 800**	**9 920 000**	**12 051 150**	**-3 418 641**	**3 150 086**	**2 067 266**	**599 571**
Pork	10	43 634 405	67 699 140	99 838 840	3 080 400	3 427 140	4 776 000	-40 554 005	-64 272 000	-95 062 840	-66 629 615
Sheep and goat	3	13 090 322	20 309 742	29 951 652	972 800	2 155 574	8 064 000	-12 117 522	-18 154 168	-21 887 652	-17 386 447
Cattle	1	4 363 441	6 769 914	9 983 884	9 698 500	27 795 952	35 887 000	5 335 060	21 026 038	25 903 116	17 421 405
Eggs	3	13 090 322	20 309 742	29 951 652	Nd	nd	11 551 000	nd	nd	-18 400 652	-18 400 652
Milk	1	4 363 441	6 769 914	9 983 884	44 794 546	87 845 000	104 576 000	40 431 105	81 075 086	94 592 116	72 032 769
chilli pepper	10	43 634	67 699	99 839	11 540	36 624	67 760	-32 094	-31 075	-32 079	-31 750
chilli pepper	**12**	**52 361**	**81 239**	**119 807**	**28 000**	**98 256**	**259 867**	**-24 361**	**17 017**	**140 060**	**44 239**
Palmier à huile	4	17 454	27 080	39 936	Nd	nd	70 449	nd	nd	30 514	30 514
Fish	**14**	**61 088**	**94 779**	**139 774**	**0**	**40 668**	**40 362**	**-61 088**	**-54 111**	**-99 412**	**-71 537**
Cashew	0	nd	nd	Nd	Nd	nd	nd	nd	nd	nd	nd

According to the EMICOV 2011 report, most Beninese spend 42% of their expenditure on food and non-alcoholic beverages. The most consumed products are: raw maize (12.9%), other smoked or dried fish (05.9%), fresh tomato (05.6%), local rice (05.3%), yam (05.2%), Dry beans (04.0%), Rice imports (03.5%), Peanut oil (03.5%), Tapioca / gari (03.4%) and chilli (02, 7%). These products make up 52% of the population's food expenses.

Table 2. Value chain contribution to economic growth

Filières	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Moyenne
Corn	0,40	0,31	0,46	0,14	0,14	0,36	- 0,11	0,34	0,25	0,22	0,12	0,23987
Paddy rice	0,02	0,01	0,02	0,01	0,01	0,02	- 0,01	0,02	0,01	0,01	0,01	0,01102
Mil et Sorgho	0,09	0,06	0,10	0,02	0,03	0,09	- 0,04	0,08	0,05	0,05	0,03	0,05166

Table 2. Continuation

Other cereals	0,00	0,00	0,00	0,00	0,00	0,00	- 0,00	0,00	0,00	0,00	0,00	0,00116
Igname Yam	0,31	0,22	0,34	0,07	0,10	0,32	- 0,14	0,30	0,19	0,16	0,09	0,17882
Cassava	0,17	0,12	0,18	0,04	0,05	0,17	- 0,07	0,17	0,10	0,09	0,05	0,09733
Other tubers Other tubers	0,02	0,01	0,02	0,00	0,01	0,02	- 0,01	0,02	0,01	0,01	0,01	0,01132
Dry Cough Vegetables	0,11	0,08	0,12	0,03	0,03	0,11	- 0,04	0,10	0,07	0,06	0,03	0,06155
Fresh vegetables and spices	0,19	0,13	0,21	0,04	0,06	0,20	- 0,08	0,19	0,12	0,10	0,05	0,10978
Ananas	0,53	0,55	0,72	0,34	0,22	0,31	0,07	0,29	0,36	0,35	0,21	0,35881
Other fruits	0,03	0,02	0,03	0,01	0,01	0,03	- 0,01	0,03	0,02	0,02	0,01	0,01698
Cotton	0,28	0,32	0,40	0,18	0,08	0,17	0,02	0,13	0,17	0,16	0,10	0,18280
Cashew	0,02	0,01	0,02	0,00	0,01	0,02	- 0,01	0,02	0,01	0,01	0,01	0,01132
Shea	0,01	0,01	0,01	0,00	0,00	0,01	- 0,00	0,01	0,01	0,01	0,00	0,00653
Noix de palme Palm nuts	0,03	0,03	0,03	0,01	0,01	0,02	- 0,00	0,01	0,02	0,01	0,01	0,01621
Arachides Sugar cane	0,05	0,05	0,06	0,03	0,01	0,03	0,00	0,02	0,03	0,03	0,02	0,02903
Canne à sucre	0,02	0,02	0,03	0,01	0,00	0,00	0,01	0,00	0,01	0,01	0,01	0,01105
Other agricultural products	0,06	0,06	0,08	0,03	0,02	0,04	0,00	0,03	0,03	0,03	0,02	0,03519
Total subsector agriculture	**2,33**	**2,02**	**2,84**	**0,98**	**0,79**	**1,90**	**- 0,42**	**1,76**	**1,46**	**1,32**	**0,76**	0,35881
ed Cattle on foot	0,02	0,02	0,03	0,02	0,02	0,01	0,02	0,01	0,02	0,02	0,02	0,01848
Lait de vache Cow milk	0,03	0,03	0,05	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,05	0,04044
Other animals on feet	0,05	0,04	0,07	0,06	0,05	0,04	0,05	0,04	0,05	0,05	0,05	0,05053
Volail Poultry Poultry	0,06	0,05	0,09	0,08	0,07	0,06	0,08	0,07	0,08	0,08	0,08	0,07218
Other products of animal origin	0,03	0,02	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,03687
Total sousbreeder	**0,19**	**0,16**	**0,27**	**0,24**	**0,22**	**0,19**	**0,23**	**0,20**	**0,23**	**0,23**	**0,24**	**0,21851**
Hunting products Hunting products	0,09	0,12	0,08	0,13	0,02	0,07	0,15	- 0,02	0,10	0,06	0,08	0,08055
PECHE	0,14	0,21	0,15	0,22	0,03	0,08	0,23	- 0,04	0,15	0,10	0,12	0,12601

Source MAEP 2012

Supply price of fish producers

The price of fish remained almost stable during the first 11 years of the study (1983-1993) (Figure 4). We observe an exponential growth of 42.72% of this price between 1994 and 2012. This price was an average of 1174 FCFA over the study period with a standard deviation that is not low (359 FCFA or 30.56 %). Similarly, the extent of the distribution (1100 FCFA) is acceptable. Finally, the distribution is shifted to the right (asymmetry coefficient of -0.162) and has a sharper shape than normal (flattening coefficient of -1.56).

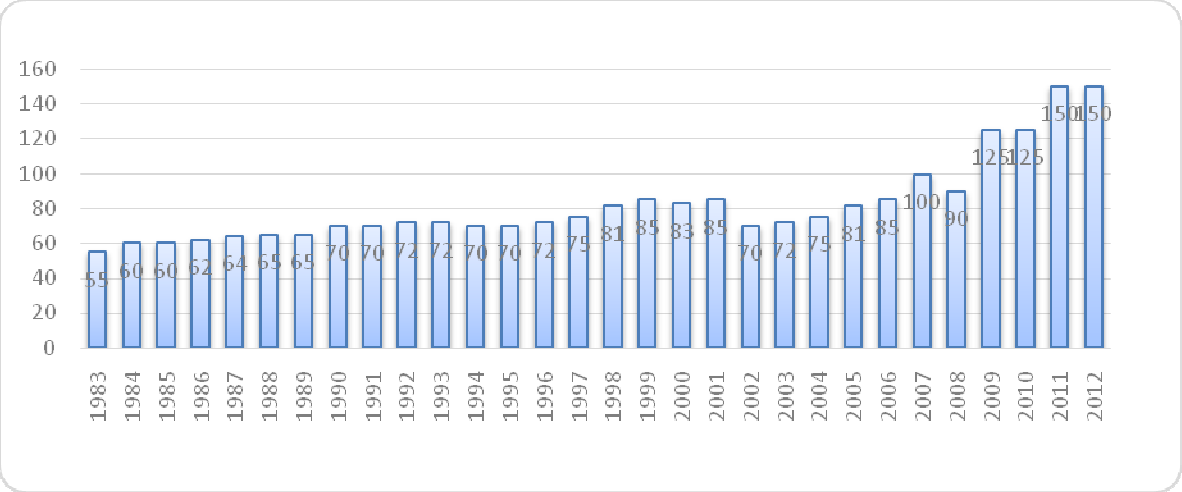
Supply price of poultry producers

Overall, the average producer price of poultry in the study period is 1262 FCFA with a relatively small standard deviation (444 FCFA or 35.17%) (Figure 5). Similarly, the extent of the distribution (1400 FCFA) is reasonable. Its distribution is shifted to the right (asymmetry coefficient of -0.27) and has a sharper shape than normal (flattening coefficient of -1.38).

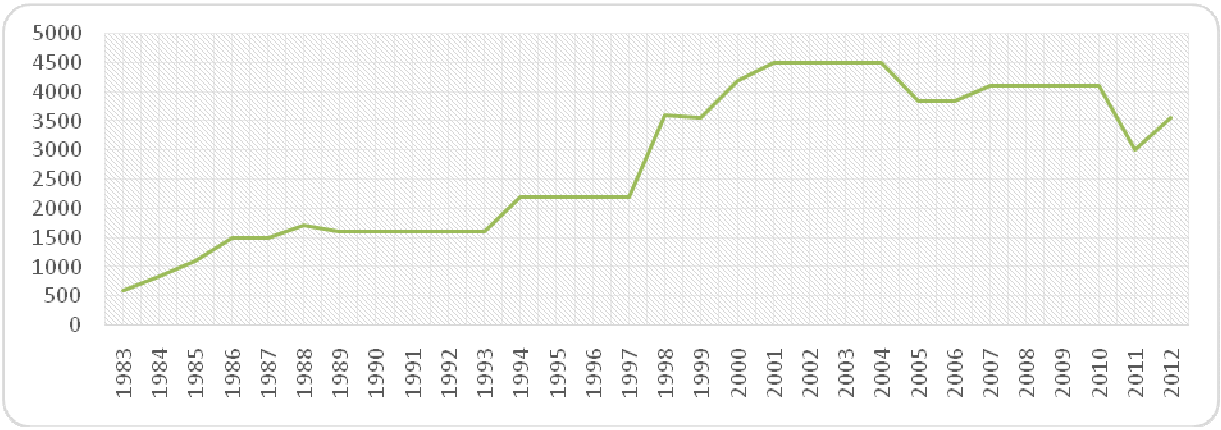
FOOD SELF-SUFFICIENCY

According to Table 1, Benin is self-sufficient for several crops, namely maize, cassava, yams, soya and chili. Species to be strengthened to make them self-reliant in the short term are millet / sorghum, sweet potato, cowpeas and the like, peanuts, tomatoes, vegetables and eggs. On the other hand, for products such as rice, potatoes,

This figure analyses the Evolution of the transfer price of fertilizers.

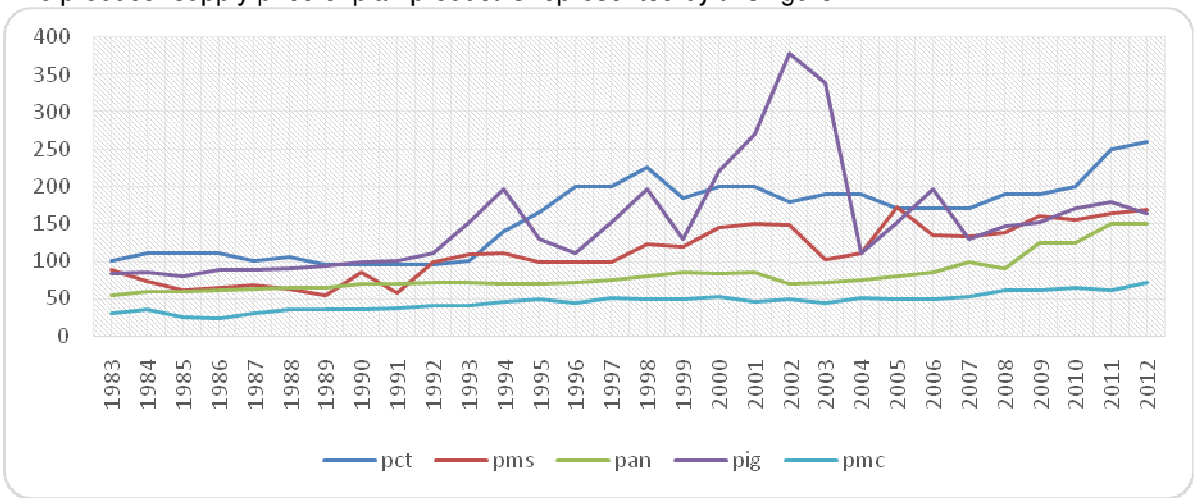


Source: author from Excel 2010 and contrystat Benin
Figure 1: Evolution of the transfer price of fertilizers



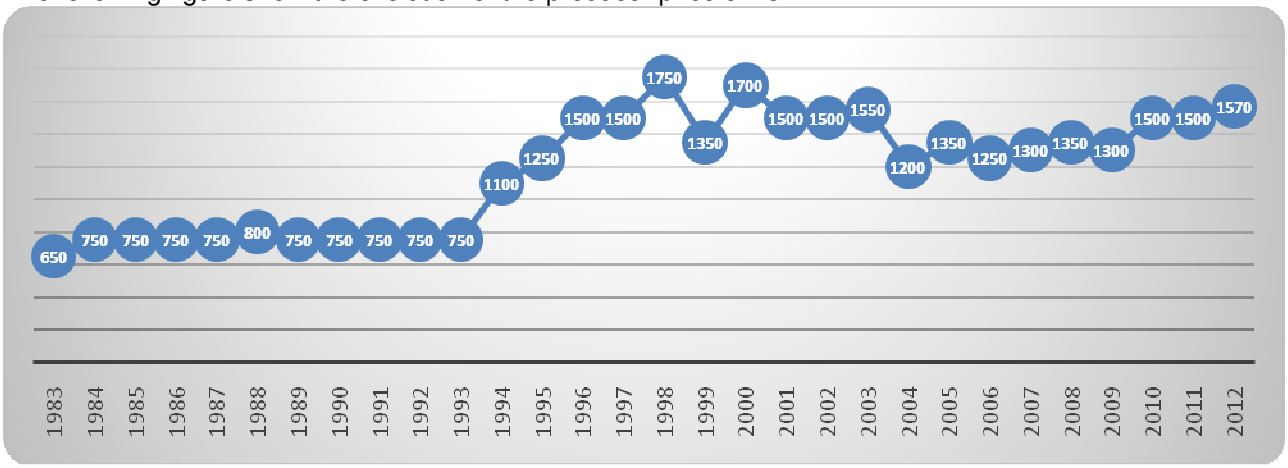
Source: author from Excel 2010 and contrystat Benin
Figure 2: Evolution of the sale price of insecticides

The producer supply price of plan product is represented by this figure.



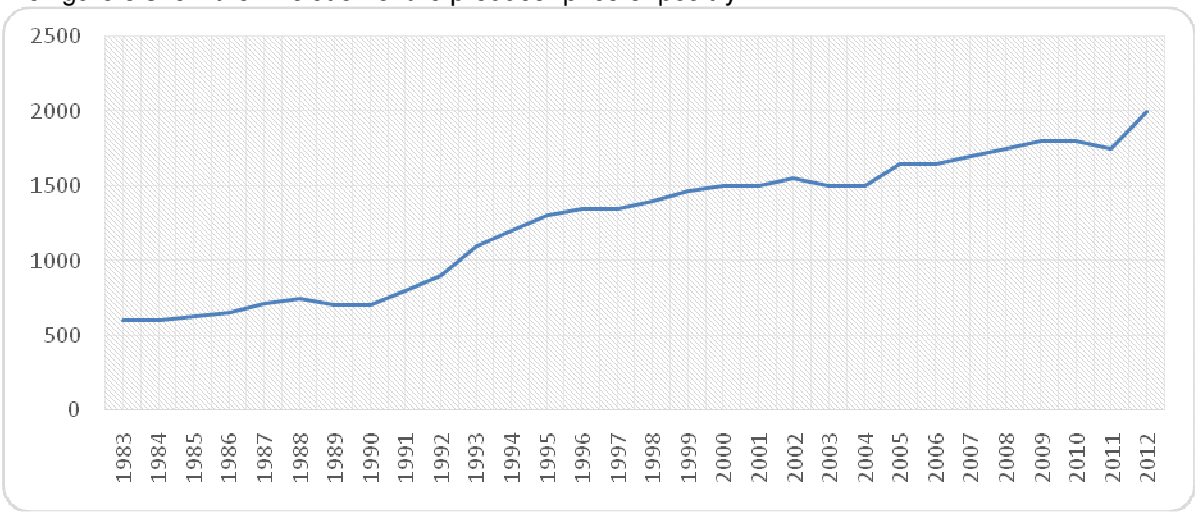
Source: author from Excel 2010 and contrystat Benin
Figure 3: Evolution of the producer price of plant products

The following figure show the evolution of the producer price of fish.



Source: author from Excel 2010 and contrystat Benin
Figure 4: Evolution of the producer price of fish

The figure 5 show the Evolution of the producer price of poultry



Source: author from Excel 2010 and contrystat Benin
Figure 5: Evolution of the producer price of poultry

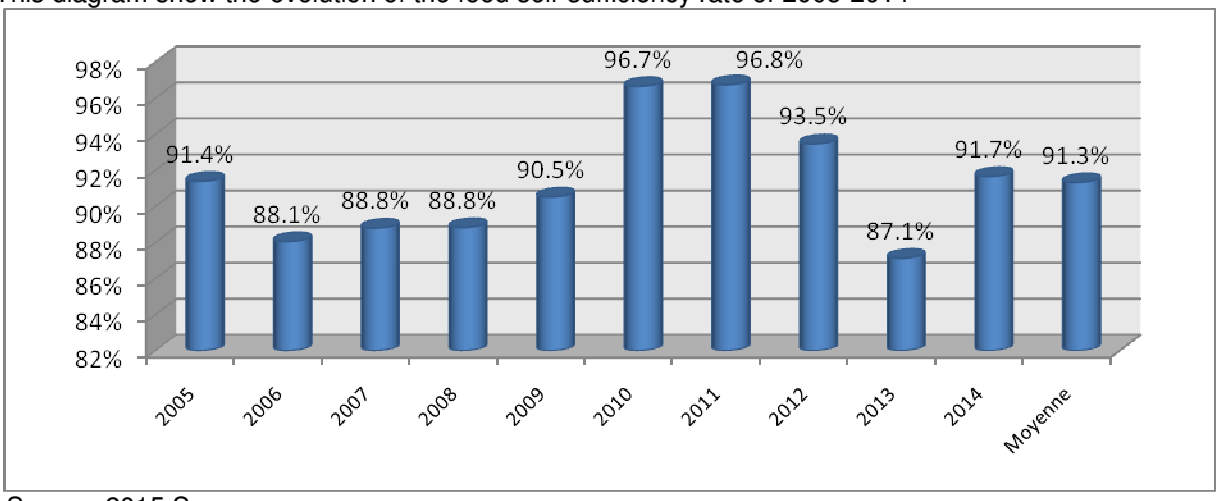
meats in general, milk and fishery products, there is a greater dependency on imports. These sectors need new policies to improve their performance and make them self-sufficient. Indeed, the self-sufficiency rate of these products is below 70% over the period from 2005 to 2014 (Figure 6), despite all the productive potentialities available to Benin. For all agricultural products we obtain on average over the last ten years a CAS of 91.3% as shown in the graph below. This shows that about 91.3% of the national supply of agricultural products comes from the country's own production. The country is sufficient for its own productive resources and is getting closer to self-sufficiency

ANALYSIS OF AGRICULTURAL DIVERSIFICATION POLICIES ON FOOD AND NUTRITION SECURITY

KCal per capita energy requirement coverage rate

For Benin as a whole, the average calorie intake is estimated at 3288 Kcal / head / day over the period 2005-2014. During the whole period, domestic production, although insufficient for some products, proved above the CePED food standards (2652 Kcal per adult-equivalent per day or 123.68%) and international institutions as IFPRI (2680 Kcal per adult-equivalent per day or 122.39%) and FAO for Benin (Benson 2004, FAO 2004). Recall that, according to FAO, the energy requirement is estimated at 2100 kcal per adult equivalent per day,

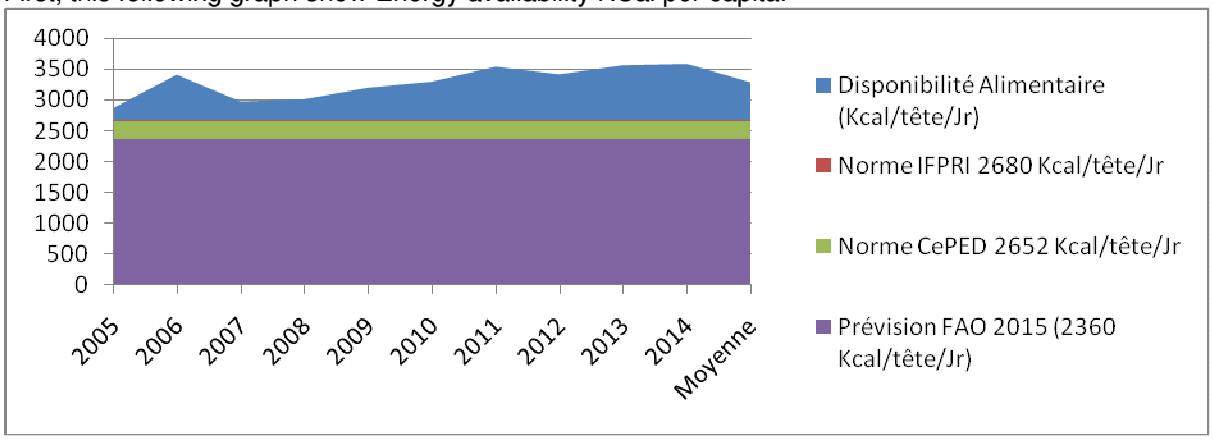
This diagram show the evolution of the food self-sufficiency rate of 2005-2014



Source: 2015 Survey

Figure 6. Evolution of the food self-sufficiency rate of 2005-2014

First, this following graph show Energy availability KCal per capita.



Source: 2015 Survey

Figure 7. Energy availability KCal per capita

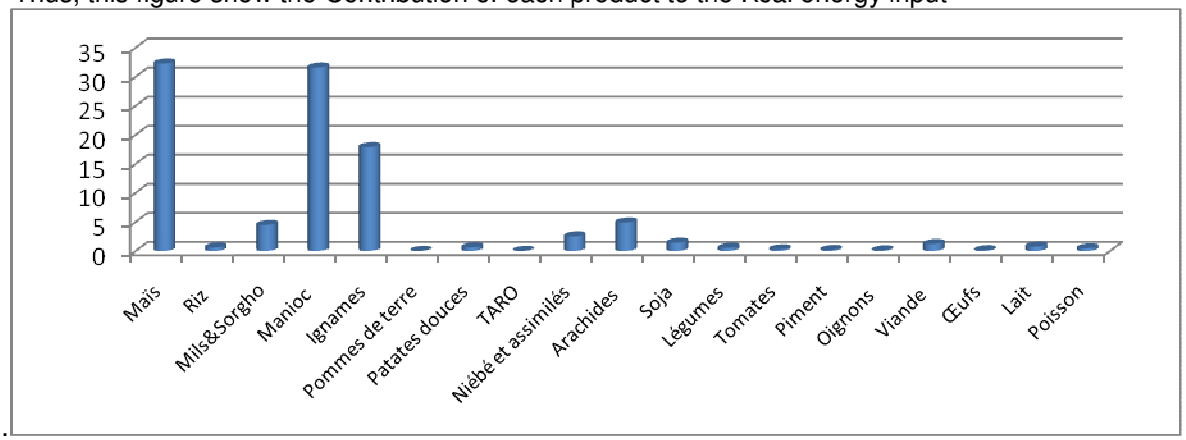
giving a coverage rate of 156.19%. Food energy availability is greater than the needs of the population. (Figure 7)

The analysis by sector shows that per capita availability of roots and tubers is very high; their share of food energy supplies has declined slightly over the past four decades in favor of cereals. The country is relatively self-sufficient in cereals (with the notable exception of rice) and roots and tubers, but is heavily dependent on imports of animal products for which per capita supplies are very limited (Figure 8)

Nutrient Requirements for Protein per capita

For Benin as a whole, the average protein intake is estimated at 75.6 g / head / day over the period 2005-2014. During the whole period, domestic production, although still insufficient for some products, proved to be above the usual household consumption reported by the study conducted by CePED in 2010 (67 g / head / day, a rate 112.84%) and WHO forecasts (70 g / head / day) for which we have a coverage rate of 108%. Although opinions differ on the average daily intake of animal protein needed to have a satisfactory diet, most international institutions assume an average of 40g per capita per day. The average daily consumption of animal protein in the Beninese population is 7.38 g per head per day. We note that the diet of Beninese is not satisfactory. If the human capacity of the planet is defined as the number of people who can consume 40g of animal protein per day, then the average human capacity of

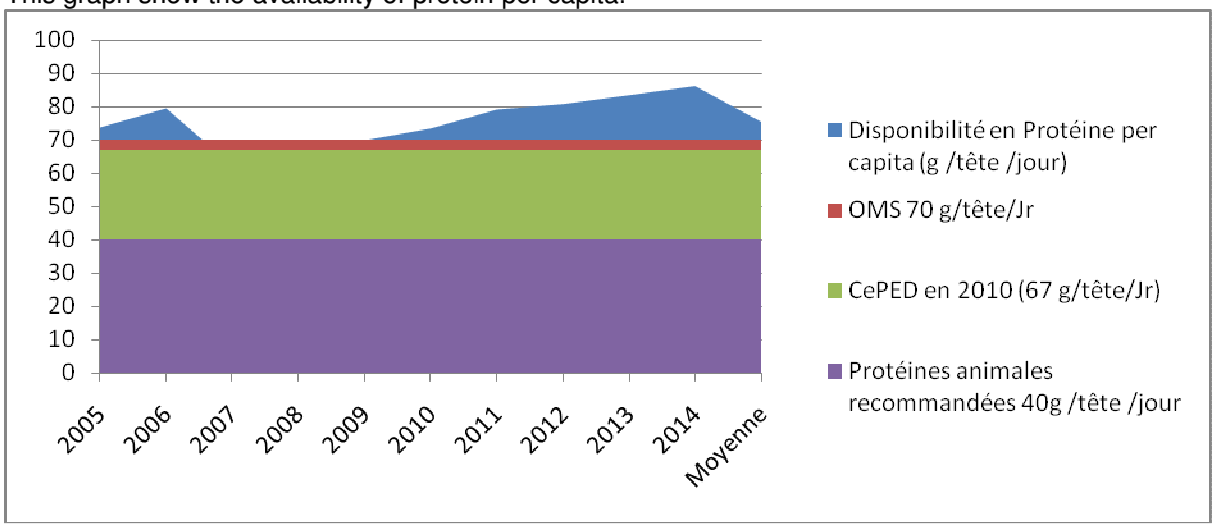
Thus, this figure show the Contribution of each product to the Kcal energy input



Source: 2015 Survey

Figure 8: Contribution of each product to the Kcal energy input

This graph show the availability of protein per capita.



Source: 2015 Survey

Figure 9: Availability of protein per capita

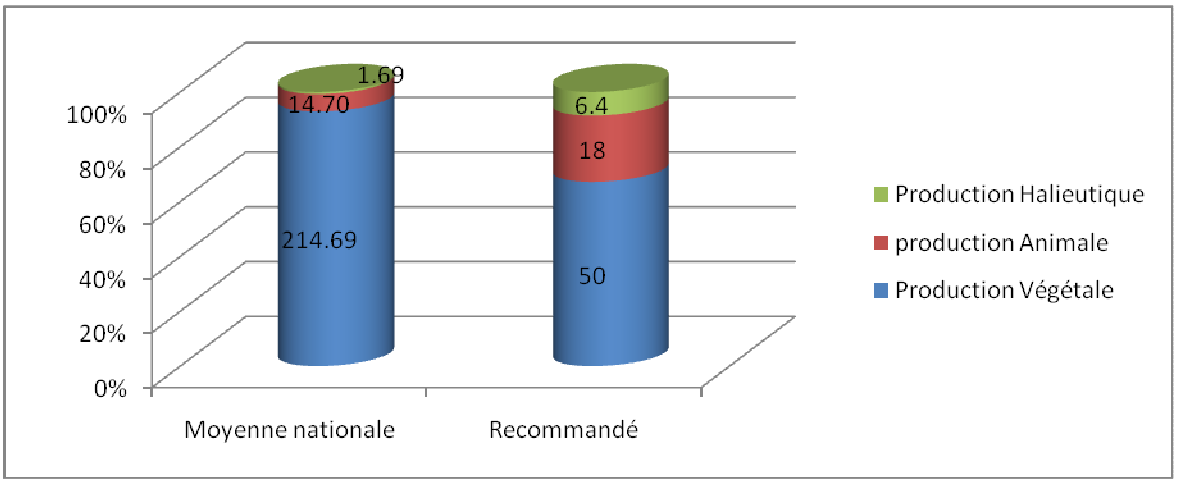
Benin is 1541535 people, or 18% of its population. Much effort needs to be made at the level of the livestock, fisheries and aquaculture sub-sectors in order to improve the country's human capacity on the basis of these own resources. (Figure 9)

The calorie / protein ratio (kcal / g of protein)

Figure 10 reveals that the diet of the Beninese population is unbalanced. Plant production has filled the deficit of animal protein found. The calorie / protein ratio of plant production is 214.69 kcal / g protein against a recommendation of 50 kcal / g protein. The calorie / protein ratio of animal production is 14.7 kcal / g of protein, a deficit of 3 points compared to the 18 kcal / g of recommended protein. Fisheries production is far from closing the gap with the normal (1.69 against a need of 6.4 points).

CONCLUSION

In² the present study, it was question of assessing the level of coverage of the food and nutritional needs of the Beninese population on the basis of the national effort of agricultural production. In order to measure this impact, a descriptive analysis of our variables and a multiple linear regression is done. At the end of the study, it was



Source: 2015 Survey

Figure 10: Ratio calorie / protein (kcal / g of protein) by subsector.

revealed that for Benin as a whole, the average calorie intake is estimated at 3288 Kcal / head / day over the period 2005-2014 and the average intake in Protein is evaluated at 75.6 g / head / day. The population increased from 2003 to 2012. Prices have increased and adjusted to the needs of the producer, but the demand for food and nutrition is not covered by production. In other words, the food energy supply is greater than the needs of the population, but the population's nutritional demand for animal protein is not covered by the national supply of agricultural production.

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