MARKET ANALYSIS OF ADDED-VALUE CHAIN PRODUCTS AND EMPLOYABILITY OF YOUNG PEOPLE IN NORTH BENIN

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ABSTRACT

The challenge of young people employability in Africa and particularly in Benin continues to rise with acuity. The majority of young people are affected by underemployment, or are without decent jobs. This is the reason why the Netherlands Development Organization (SNV) implemented the Youth Employment project for the Improvement of Food Security in northern Benin (EJASA). This study aimed to analyze the added-value chains (AVC) from different agricultural sectors in order to assess their ability to ensuring the employability or professional integration of young people. This study analyzed six (06) added-value chains divided into three (03) sectors as follows: AVCs from market gardening sector (tomato fruit and fresh chilli pepper), AVCs from soybean sector (soybean grain and soybean cheese) and AVCs from the poultry sector (local chicken and guinea fowl). The results obtained showed that the overall demand of the selected AVC products was generally satisfied only at the level of 10 to 40% in the targeted municipalities, which suggests opportunities for positioning and entrepreneurship for young people. All the AVCs analyzed are profitable with the best rates of return (RNE/CT ratios) recorded for the AVC of guinea fowl (4.7), chilli pepper (1.6), tomato (1.1) and soybean grain (0.9), while the best wealth creation rates (VA/CI) observed for AVC guinea fowl (6.2), chilli pepper (4.5), tomato fruit (2.4) and soybean grain (1.6). The strong demand for AVC products, the existence of sales markets for all AVCs, the permanent support from technical and financial partners, and support structures for access to financing are all opportunities available to young people to ensure their employability and improve their income. The access to a well-paid job in one of the AVCs will help young people to improve their income and consequently to fight poverty and improve their food and nutrition security situation.

Key words: Food value chains, youth employment, Improved income, Food security, Nutrition

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INTRODUCTION

In Benin, as in most West African countries, the access of citizens, in particular young people, to employment remains a real problem. According to statistics from the integrated regional survey on employment and the informal sector, more than 70% of the active population is underemployed [1]. Indeed, according to the same source, the youth underemployment rate, which was 50% in 2011, was close to 70% in 2019 [1]. 15.2% of young people aged between 15 and 34 years are affected by underemployment, or are in indecent employment [1]. They perform precarious jobs in harsh working conditions. Indeed, Benin is much more confronted with the problem of underemployment than that of unemployment, which is estimated at a significant rate of 2.5% according to the same source [1]. The situation remains even more worrying among young people aged between 25 and 34 years, where the invisible underemployment rate is around 75% [1]. The underemployment rate in the districts of Alibori and Atacora are estimated at 77.5% and 78%, respectively, values higher than the underemployment rate at the national level, which is 72% [1]. This situation is exacerbated by the impacts of climate change, rising insecurity and the COVID-19 pandemic in the region. Prospects for obtaining decent jobs are dwindling in the face of the exponential increase in young people seeking opportunities, resulting in rural exodus, rising social tensions and growing risks of radicalization and violent extremism. However, opportunities exist within the agricultural sectors for these young people, who could play the role of driving force in the modernization of agriculture in northern Benin if they receive adequate support.

Aware of the magnitude of the situation, the Government of Benin has also included the creation of new decent jobs within the sectors and in an induced manner through strategic axis "Acceleration of economic growth" of the Program of Beninese Government Action from 2021 to 2026. Indeed, agriculture in Benin is the first source of wealth, which contributes approximately 32.7% to the formation of the gross domestic product (GDP), 80% to export earnings of domestic origin [2, 3]. This sector, which brings together all the activities of production, storage, processing and distribution of basic agricultural products and their by-products, is able to generate numerous jobs for young people [4]. It combines both primary and secondary activity systems on the assembly line that use enough labor [5].

In order to understand the functioning of the value chains to be promoted within the agricultural sectors and to assess their possibility of promoting the professional integration of young people, SNV (Netherlands Development Organization) in line with the priorities of the government and local communities and through the Youth

Employment Project for the Improvement of Food Security in Northern Benin (EJASA) initiated this market study.

The overall objective of this study was to carry out market analysis of the value chains of the market gardening, soybean and poultry farming sectors with a view at improving food security and increasing the employability of young people in the six (06) municipalities of intervention. Specifically, the study allowed to: (i) select the value chains to be promoted within the three (03) sectors selected, (ii) analyze the selected value chains, (iii) identify the specific support needs of young people (M/F) in the selected AVC in terms of new technologies, provision of financial and other services and (iv) determine the actors to be involved and their role in the development of youth-inclusive value chains (M/F) (private companies seeking qualified interns, employees or business partners, business development service providers (BDS suppliers and agro-dealers).

MATERIALS AND METHODS

Study areas and sampling of actors
The study was carried out in the municipalities of Kandi and Banikoara in Alibori district, and Natitingou, Tanguieta, Materi and Boukombe in Atacora district as shown in Figure 1. The study took place in these municipalities because they represent the intervention area of EJASA Project, where the challenge of underemployment of young people is rife.
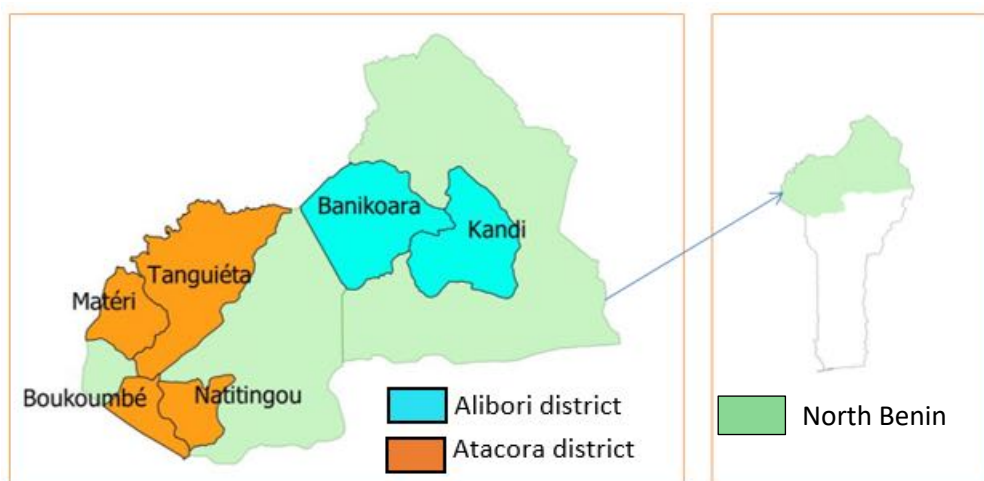

Figure 1: Map of the study area

In these six (06) municipalities, members of socio-professional organizations (OSP) intervening from the national level down to the villages were targeted for the survey as well as actors from public structures (Ministry of Agriculture, Livestock

and Fisheries; Territorial Agricultural Development Agency; Departmental Direction of Agriculture, Livestock and Fisheries; Chamber of Commerce and Industry of Benin) and other support actors (Decentralized Financial Services and Non-Governmental Organizations). The members of socio-professional organizations (OSP) include producers, processors and traders of different value chain products. The number of actors interviewed was determined according to the method of Stukel [6] using the following formula:

$$n = \frac{(z)^2 * (p) * (1-p)}{\delta^2} \left(\frac{90}{100}\right) \qquad (1)$$

With:
- 95% confidence level (alpha = 0.05); z=1.96;
- prevalence of relevant results = 50%; p=0.5
- margin of error δ = 5%;
- overall rate of respondents estimated at 90%

A total of 423 actors including 374 actors from socio-professional organizations (OSP) and 49 others from NGOs, were randomly interviewed in the survey zones. The 374 actors from 122 OSP, were selected in production, processing and marketing links. The breakdown of OSP actors interviewed by sector and by municipality is as shown in Table 1.

Data collection
Data collection was carried out in two phases: an exploratory phase and an in-depth phase. Both quantitative and qualitative data were collected using smartphones or tablets on which digitalized questionnaire under the AKWO FLOW software had been previously deployed. The surveys were carried out with various actors, socio-professional organizations (OSP) including producers, processors and traders, heads of national and departmental public structures, support actors (carriers, collectors), service providers and private companies involved on the relevant value chains.

Method of analysis according to the Inclusive Value Chain Development (IVCD) approach
The Inclusive Value Chain Development (IVCD) approach as recently described by Doherty and Kittipanya-Ngam [7] was followed for the selection of AVC, their analysis and the identification of potential solutions to problems and challenges related to the promotion of the selected value chains.

Selection of AVC
Selection involved analysis of the growth potential and the poverty reduction ability of the AVC and their pre-selection and selection during a workshop in the presence of main and representative stakeholders. Further, in-depth information was then collected on the pre-selected value chains and certain AVCs were prioritized and validated based on some selection criteria such as its high consumption, its contribution to food security in households during the lean season and its contribution to the employability of young people according to the actors.

Analysis of selected AVC
During this phase, the map of each value chain was developed, which allowed to analyze the circulation of goods and the relationships between market actors and the end market. Market information related to AVC demand, trend, growth, competition and competitiveness and the main constraints were also collected.

Identification of potential solutions
Potential solutions to the main problems/constraints and challenges related to the promotion of the selected value chains were identified following three approaches. The first was the development of a vision of the future of the value chain based on the opportunities in the chain; the second was the formulation of solutions based on the constraints identified in the previous phase and the third approach was the prioritization of solutions based on criteria set by the stakeholders.

Financial analysis and calculation of AVC profitability indicators
The financial profitability analysis was made through the determination of certain indicators such as Added-Value (VA), Net Margin (MN) or Net Operating Income (RNE), and the RNE/Total Costs ratio (RNE/TC). The method to determinate these indicators consisted in drawing up operating accounts for each link (production, processing, marketing). These calculations were made using data on the costs and incomes of the different actors in each value chain. To facilitate the consolidation of costs at the level of each AVC, and the comparison between the actors along each value chain, all financial calculations were made on the basis of the common unit, that is Kilogram (kg) for the AVC of vegetable sector and per capita for the AVC of animal sector. The analysis results were based not only on the data collected, but also on the results of the main studies carried out in these sectors and in the project intervention area, in particular the National Sector Development Plans (PNDF) and the Agricultural Development Plans for the Poles (PDAP).

For each actor, the added-value (VA) was defined as the difference between the Gross Product (GP) and the intermediate consumption (IC).
Added-Value (VA)=Gross Product (GP) – Intermediate Consumption (IC)

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The total Added-Value (VA) of AVC including different links of actors (producers, processers, traders) was obtained as shown:

$$VA_{CVA} = \sum VA_{\text{different links of actors}} \qquad (2)$$

Financial profitability was assessed on the basis of two main indicators such as the Net Operating Income or Profit to Total Costs (RNE/TC) ratio and the Added-Value to Intermediate Consumption (VA/IC) ratio. The Net Operating Income (RNE) was calculated for each actor, then consolidated by link and by value chain. The Net Operating Income (RNE) for a given actor was obtained by taking the difference between Gross Product and total costs (TC).

$$RNE = GP - TC = VA - (MO + FF + IT + Am) \qquad (3)$$

With MO the labor remuneration, FF the financial costs, IT the taxes and duties and Am the depreciation. Occasional and family labors were taken into account for the remuneration of work.

The level of profitability per activity was therefore determined by the ratio between net operating income (RNE) and total costs (TC). It reflects the gain obtained when the actor (producer, processor, traders) invests 100 XOF in his activity. A ratio lower than 1 means that the actor realizes a loss.

$$\text{Ratio} = \frac{RNE}{TC} * 100 \qquad (4)$$

Capital productivity or the benefit/cost ratio is reflected by the ratio of added-value to variable production costs, also called the financial analysis ratio (VA/IC). This ratio means the gain on each monetary unit invested in production and is used to cover fixed costs (depreciation, credit interest) and to remunerate the producer as an entrepreneur.

Data analysis
The data entered was exported to SPSS (Statistical Package for Social Sciences) and then to MS ACCESS for better data management. Based on the data collected, some purification procedures were implemented. Special attention was paid to verifying valid jumps. Thus, after detecting the inconsistencies during the processing, the investigators were called in with the aim of verifying/correcting these inconsistencies. The descriptive statistics (frequencies, means, standard deviations) of the data collected were carried out with Excel or SPSS software.

RESULTS AND DISCUSSION

Presentation of selected added value chains

The added-value chains (AVCs) retained by sector are presented in Table 2. They were selected at the end of the pre-selection, selection and validation process following the Inclusive Value Chains Developing (IVCD) approach. Indeed, for each given sector, a pre-selection matrix allowed to pre-select the value chains having both market demand or high growth potential and high poverty reduction ability. After the selection, six (06) AVCs out of 20, from three (03) sectors out of four (04) were validated and retained during a workshop which brought together the actors of the six municipalities. The approach used was the prioritization of AVC by municipality, the identification and validation of AVC that are found both in the prioritization list of each municipality. These AVCs were selected because of their high consumption and contribution to food security in households during the lean season, and their contribution to the employability of young people.

Supply and demand analysis of some value chain products
Dynamic of supply and demand for AVCs from market gardening sector
Tomato fruit AVC

The tomato supplies from all study areas, estimated from the production statistics of the six targeted municipalities, was 20,223 tons in 2019, nearly 5% of the country's national production [8]. The municipalities with high tomato production in the study area are Natitingou (53%) and Kandi (30%) [8]. The analysis of the evolution of tomato production in the study area over the last five years indicates that production has almost doubled from 10,614.5 tons in 2015 to 20,223 tons in 2019, which testifies to the growing interest of producers for this crop [8]. However, the analysis of production trends crossed with those of areas and yields over the same period (2015-2019) indicates that the observed production growth is explained by the increase in sown areas than the improvement in yields. Indeed, the dynamic of tomato supply in the study area remains characterized by extensive production dependent on increased sown area and dominated by small farms that use low productivity cultivation technologies. Moreover, the analysis of the data showed a downward trend in the average yield, which fell from 7,679.16 kg/ha in 2015 to 7,358.43 kg/ha in 2019 [8]. According to survey data, the low productivity observed is linked to the predominance of extensive production systems. Tomato producers in the area are faced with many constraints, including difficulties related to poor mastery of technical itineraries, erratic use of water and poor access to market gardening inputs and technical support.

In addition, the analysis of the evolution of production by municipality (Figure 2) indicates a high variability of supply from one year to another at the level of

municipalities with high production. The years 2017 and 2019 were marked by sharp drops in tomato supply in the municipalities of Natitingou and Kandi.
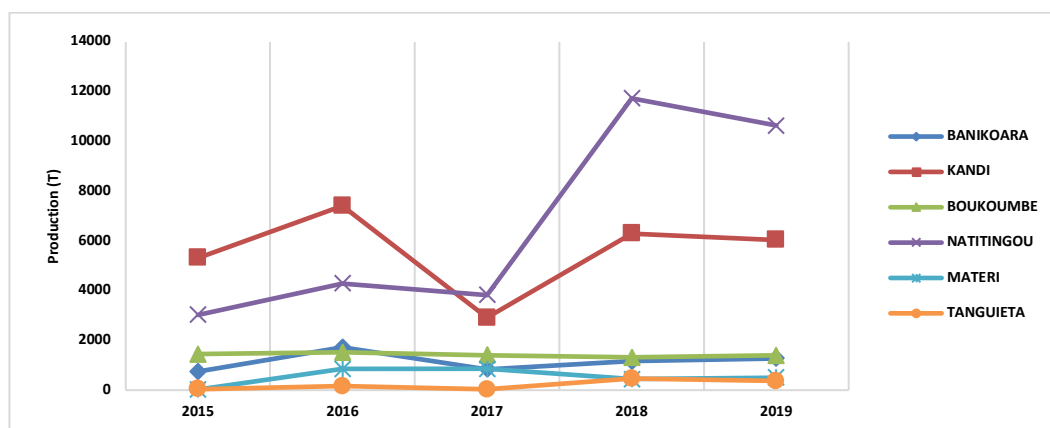

Figure 2: Evolution of tomato production by municipality

To date, official statistics have not yet allowed to quantify the real potential for demand for market garden products (tomato and chilli pepper) either at the national level or in the study area. However, recent studies carried out as part of the Market Gardening Sector Development Support Program (PADMAR) have estimated the annual per capita consumption needs of the main market gardening products in Benin [9]. Tomato is the most consumed market garden product in Benin. Tomato consumption needs in Benin are estimated at 25 kg per capita per year [9]. The average demand for tomatoes in the study area, estimated from the population numbers in the area and individual consumption needs, is 20,430 tons over the period 2015-2019. The cross-analysis of demand and supply of tomatoes actually available (taking into account post-harvest losses) in the study area reveals a notorious deficit of 9,500 tons/year between 2015-2019 in terms of coverage of demand by local supply in the area. This deficit constitutes a significant market share to be won at the level of tomato AVC on the local market, not to mention the unmet tomato needs at national and regional level. At the national level, Benin has a tomato deficit estimated at around 55,245 tons each year [9]. The inability of the area's local supply to meet market needs is further confirmed through surveys of producers in the study area. These surveys show that producers are able to market their production easily. The balance between the quantity of tomato put on the market and the quantity of tomato actually sold by the producers is nil at the level of all the municipalities. Also, the producers estimate that they cannot honor around 29% of the tomato requests sent to them. The main customers of tomato producers in the study area are local households (76%), local retailers (16%) and wholesalers from markets in neighboring municipalities (9%). These customers come to stock up on local markets.

Fresh chilli pepper AVC

Like tomato, chilli pepper is one of the most produced market garden crops in Benin and in the study area. Over the period 2015-2019, the average of chilli pepper production for all study areas was estimated at around 2,922 tons per year [8]. The analysis of available agricultural statistics indicates a stagnant trend in chilli pepper production in the study area. The evolution of chilli pepper production remains correlated to that of plantings area. The trend is also downward in the average chilli pepper yield, which went from 2108.2 kg/ha in 2015 to 1858.1 kg/ha in 2019 (data not shown). The municipalities with high chilli pepper production in the study area are the municipalities of Tanguieta, Kandi and Boukoumbe, which provide about 80% of the total supply in the area. The potential demand of the study area was estimated on the basis of individual needs and the size of the population of the area under the assumption that the consumption of children aged 0-5 years is zero due to their inability to consume significant amounts of chilli pepper. The average potential demand of the study area over the period 2015-2019 is therefore estimated at 7,676 tons of chilli pepper (data not shown). Data analysis shows that only 35% of this demand is covered by the locally available chilli pepper supply. The average deficit over the period 2015-2019 was estimated at more than 5,000 tons of chilli pepper (data not shown). These estimates are further confirmed by trends observed during producer surveys. The survey results indicate that, with the exception of a few producers in Tanguieta and Natitingou, all the producers were able to sell all their production. This therefore means that chilli pepper production of most municipalities is completely absorbed by the market. The producers surveyed were unable to satisfy 36% of the requests sent to them over this period, thus confirming the estimates made from national statistics. Unsatisfied requests have also increased by 37% over the same period. This justifies the existence of non-negligible market share at the level of this AVC.

Dynamics of supply and demand for AVC from soybean sector
Soybean grain AVC

Soybean grain production was estimated at 20,384 tons in 2019 in the study area [8]. Compared to 2015, this production has almost quadrupled over the past five (5) years (2015-2019) with an average annual growth rate of more than 20% per year. This growth is explained by the increase in sown areas and yields. Indeed, the average growth rate in yield increased by 60% between 2015 and 2019. Soybean grain is one of the few products whose increase in supply is significantly explained by the improvement in production techniques showed by productivity. This improvement is induced by the use of improved production techniques such as the use of inoculum. However, the average absolute yield recorded in the study area is still low (1350 kg/ha in Banikoara against 2837.5 kg/ha) [8]. The low yield observed in 2017 is explained by the low availability of soybean seeds and poor

access to inoculum. The upward trend in soybean grain production is observed in all the municipalities targeted by EJASA project. Margins of progress still remain and constitute challenges to be met. Soybean grain production in the area is more concentrated in the municipalities of Banikoara (31%), Materi (23%), Boukoumbe (17%) and Kandi (15%). The period of abundance of soybeans on the market extends from December to March. Soybean grain is the third most consumed legume in Benin. Its consumption has increased dramatically, especially with the advent of soybean cheese used as a substitute for animal protein. The current statistics available at the central level do not provide information on soybean consumption needs. However, field surveys carried out with producers indicate that the volume of soybean sold by them on the markets increased by 15% between 2019 and 2020 (Table 3). In addition, the producers surveyed were unable to satisfy 37% of the requests sent to them over the same period. This testifies to the existence of a market for the sale of soybean produced in the area. Apart from the increase in local and national demand, there is also an increase in the demand for soybean on international market. This attests the existence of a significant market share both nationally and internationally for soybean produced in the municipalities concerned by the study.

Soybean cheese AVC

In the absence of official statistics on the volume of soybean cheese produced by municipality, the study was limited to survey data to assess the dynamics of supply in the targeted municipalities. Table 3 shows the volumes of soybean cheese put on market and the quantities sold at the level of respondents in each municipality. From the trends observed at the level of the survey units, the municipality of Kandi has a large supply of soybean cheese with fairly large quantities sold (282,510 kg in 2020). After it, comes the municipality of Materi then that of Natitingou which offers moderately. As for Banikoara and Boukombe, small volumes of soybean cheese are put on market.

Dynamics of supply and demand for AVC from the poultry sector
Local chicken AVC

Despite the emergence of innovative practices for the production, local chicken supply in the targeted municipalities comes mainly from traditional poultry farming. Several subsystems stood out, namely the traditional subsystem with veterinary care, the strict traditional subsystem without veterinary care or even village poultry farming, the semi-traditional subsystem. This supply is provided by the small farms in the municipalities (local breeders). The total number of heads of local chicken put on market by the surveyed breeders amounted to 104,413 heads, all species and farming methods combined (Table 4). The municipalities of Kandi (Alibori) and Boukombe (Atacora) are the largest local chicken production areas. These two

municipalities offer the greatest number of chicken heads. The overall trend is more or less a stagnation in the supply of local chickens in almost all municipalities with slight increases observed in the municipalities of Natitingou and Materi. The period of high availability of local chickens on the markets extends from December to April, coinciding with the festive periods when demand is also very high, but also at the start of the lean periods among breeders (March-May). The shortage of local chickens is high between June and October, a period of heavy farming activities and the first harvests.

Like the situation at national level, characterized by a high import of poultry, the districts of North Alibori and Atacora remain highly dependent on poultry imports, synonymous with non-satisfaction of the needs of the populations. This situation is further confirmed by field data through which it is clear that the current supply of local chicken is completely absorbed by the market. The balance of the number of chickens put on market by breeders and the number of chickens sold is nil in almost all the municipalities with the exception of Tanguieta and Materi where the balances are negligible. The proportion of demand for local chicken not satisfied by breeders has increased significantly over the past two years (average equal to 32%) in all municipalities, according to producers.

Guinea fowl AVC

The production of guinea fowl is particularly more developed in the municipalities of Atacora, particularly in Boukombe (1st producing municipaliy of guinea fowl at the departmental and national level) where it benefits from a strong tradition and a particular regional anchorage. This, combined with the growing demand from urban areas, explains, among other things, the upward trend observed in the municipalities of Atacora. The production of guinea fowl in the municipalities of Alibori is still low even if a craze for this AVC is observed in Banikoara. Overall, the guinea fowl supply from the surveyed breeders increased by 40%, going from 7,181 heads in 2019 to 10,066 heads in 2020 (Table 4).

Guinea fowl production is ensured by small breeders, mostly local chicken breeders. The number of guinea fowl represents 25 to 50% of the number of poultry held by breeders in the study area [10]. Its breeding is intimately linked to that of the hen. Indeed, because of the poor incubator and leader performance of guinea fowl, its eggs are recovered by the breeders as soon as they are laid and then entrusted to the hens, which ensure the incubation, as well as the management of the guinea fowls until the age 2 to 3 months, when the keets stop following the leader hen [11]. The period of high availability of guinea fowl more or less coincides with that of local chicken, which extends from December to May.

The number of guinea fowls put on market by the breeders and the number of guinea fowls actually sold is nil in almost all the guinea fowl producing municipalities with the exception of Materi and Tanguieta where sales are low. The proportion of unmet demand for guinea fowl by breeders was estimated at 32% from 2019 to 2020 (survey data). Over the same period, the number of guinea fowl sold on market increased by 90%, proof of the growth in demand for guinea fowl (survey data). This trend will continue in the coming years due to the strong growth in demand from urban centers. Guinea fowl meat is increasingly popular with city dwellers.

Analysis of the profitability of the added value chains from different sectors
Table 5 presents the analysis of the profitability of the priority AVC selected by EJASA project in the study area.

The tomato fruit AVC for the local and national market generates a total Added Value (VA) of 196 XOF per kg of tomato with a variation of more or less 72 XOF depending on shortage or abundance period (Table 5). This VA of tomato fruit is significantly higher than that of 160 XOF/kg reported in 2019 in the intervention area of PADMAR project [9]. Producers contribute more than 67% to this VA while traders only contribute 33% to the added-value created at the chain level. The average rate of return (RNE/TC ratio) at the chain level is 0.9. This means that 100 XOF spent in this AVC generates an additional 90 XOF, value located between 69 and 178 XOF represented the gross gain generated in periods of plenty and scarcity, respectively as reported in 2019 for tomato production in rainfed systems [12]. The rate of return at the level of the production link is very high (110%). Producers derive the most benefit at the level of this AVC (64.5% of the total RNE generated at the level of the AVC). The production of one kg allows the producer to have an operating income of 116 XOF without deduction of the opportunity cost of family labor.

The fresh chilli pepper AVC for the local and national market generates a total VA of 477 XOF per kg with a variation of more or less 37 XOF depending on shortage or abundance period. This very high VA for chilli pepper confirms the results obtained within the framework of PADMAR project, in which the estimated VA was at 355 XOF/kg of chilli pepper [9]. The net operating income generated for the whole value chain is positive (422 XOF/KG). The VA/IC ratio for the whole chain is equal to 1.3, this implies that 100 XOF spent in intermediate consumption allows to create a wealth of 130 XOF at the level of the fresh chilli pepper AVC. This value is close to those located between 128-190 XOF reported by ProCaR in 2019 in the technical-economic benchmark for chilli peppers produced in rainfed systems [13]. The average RNE/TC ratio is positive at all the links and for the whole chain. The

average RNE/TC ratio for the whole chain is equal to 0.8. This implies that 1 XOF spent in the "fresh chilli pepper" value chain yields a benefit of 0.8 XOF. This ratio (RNE/TC) is higher among producers who testify to the high level of profitability of chilli pepper production. It would therefore be beneficial to guide and support young people to invest in the production of chilli pepper. The current level of profitability can be further improved with the support of EJASA project.

With regard to soybean AVC, the lack of data on the marketing link does not allow the calculation of performance indicators for the whole value chain. However, the operating account established for the production link indicates that soybean production is a profitable activity. One (1) kg of soybean produced generates an added-value of 129 XOF and a net operating income equal to 99 XOF (Table 5). The rate of return (RNE/TC) is equal to 0.9, which means that 100 XOF spent on the activity generates an additional 90 XOF. Soybean production is a recommendable activity for young people because of the high income it provides.

The soybean cheese AVC for the local market generates a total VA of 350 XOF per kg of soybean cheese produced and processed. The operating income generated for the entire value chain is positive (264 FCFA). The rate of return (RNE/TC) is positive at the level of all the links and for the whole of the chain. The average rate of return for the entire chain is equal to 0.4. This implies that 1 XOF spent in the "soybean cheese" value chain yields an additional benefit of 0.4 XOF. Processors are those who create more wealth at the level of this AVC (63% of the total VA of the AVC). They derive the best Operating Income at the level of the value chain (63% of the total RNE of the AVC). Soybean processing is a very profitable and attractive activity for young people, especially young women. Such an activity would require a minimum of working capital for young people, particularly for the supply of raw materials at the start of their activity.

The production of one kg of soybean creates 129 XOF of added-value and the processing of one kilogram of soybean creates 221 XOF of added value. Cheese processing alone creates 63% of the overall added-value compared to the production link which only creates 37%. Similarly, the net operating income at the processing level (165 XOF/kg) is much higher than that achieved by the production link (99 XOF/kg).

The summary of performance indicators at the level of the production link of the local chicken AVC is also presented in Table 5. The lack of data on the marketing link does not allow the identification of indicators for the entire chain. However, Table 5 shows that the production of local chicken can create an added-value of 684 XOF per head of chicken. The Net Operating Income (RNE) generated by the

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activity is positive and equal to 553 XOF per head of chicken produced. The ratio (VA/IC) which is equal to 0.7 indicates that 100 XOF spent on intermediate consumption by farmers in local chicken production creates an added value of 70 XOF. The rate of return (RNE/TC) is equal to 0.5, which indicates an acceptable level of profitability for the activity. Support interventions for this AVC should focus on reducing production costs, particularly the cost of feed and veterinary care, in order to improve the current level of profitability.

Guinea fowl production is a high added value activity. The VA generated at the level of the guinea fowl production link is equal to 2,560 XOF per animal of poultry produced. The Net Operating Income (RNE) generated by the activity is positive and equal to 2,105 XOF per guinea fowl animal. The ratio (VA/IC) indicates that 1 XOF invested by farmers in guinea fowl production generates 6.2 XOF of added value. The rate of return (RNE/TC) indicates that 100 XOF spent on guinea fowl production generates an income of 470 XOF for producers.

All of the AVCs analyzed in the present study are all profitable at variable thresholds, depending on the factors of production as well as the structure of production costs. Indeed, the added-value garnered for all the actors is positive even if more efforts are worth making at the production level. In terms of ranking of the VA/IC ratio, it was noted in descending order of importance that the AVC guinea fowl (6.2), chilli pepper (4.5), tomato fruit (2.4) and soybean grain (1.6) show the best rates of wealth creation. In terms of profitability, the same AVCs show in the same order the best ratios of RNE/TC estimated to 4.7 (guinea fowl), 1.6 (chilli pepper), 1.1 (tomato fruit) and 0.9 (soybean grain).

The positioning of young people on one or other of these AVCs gives no doubt on improvement of their income, in addition to their contribution to food security in the targeted municipalities. It is important to consider taking into account an allocation to cover the possible risks and contingencies at the level of all the AVC targeted, in particular the AVC from poultry, market garden and soybean sectors.

Analysis of youth employability opportunities in the different value chains
The analysis of the profitability of the added value chains from different sectors shows that the CVAs guinea fowl, chilli pepper, tomato fruit and soybean grain are very profitable and can interest young people to ensure their employability in order to alleviate poverty and ensure their food security. Apart from the guarantee of ensuring a good income, there are also enormous advantages and opportunities relating to each CVA. These opportunities can contribute to strengthen the integration of young people and the competitiveness of basic products in the value chains of the priority sectors selected.

In general, there are strong demands for AVC products, disposal markets for all AVC, technical and financial partners and support structures for access to financing such as Territorial Agricultural Development Agency (ATDA), National Agricultural Development Fund (FNDA) and Local Agricultural Credit and Microfinance Fund (CLCAM). Specifically, the advantages and opportunities related to tomato and chilli pepper AVCs for the local, national and sub-regional market are: the existence of market (local market with high consumption of market garden products; national market through supply by traders from other regions of Benin and sub-regional market); the existence of strong unmet demands for market gardening products from February to April; the favorable climatic and physical conditions; existence of lowlands in the municipality and possibility of water control for off-season crops, presence of processors of market garden products in the municipality; and the proximity to livestock units allowing organic production. The opportunities of soybean sector for the local, national and sub-regional markets are related to the unmet demand for soybean grain, the technical support for producers through program projects, the existence of agribusiness clusters (ABC) for soybean sector, the existence of soybean cheese disposal market and existence of national plan for the development of soybean sector. In case of guinea fowl egg value chain, there are high demands for eggs by users of modern incubators, organoleptic quality highly appreciated by consumers, existence of local market and strong demand for local guinea fowl and chickens, technical support to producers by Technical and Financial Partners (TFP), good accessibility, existence of support structures for access to financing (ATDA, FNDA, CLCAM).

All these opportunities are fundamental reasons that should motivate young people to embark on these sectors to ensure their employability.

CONCLUSION, AND RECOMMENDATIONS FOR DEVELOPMENT

This market study allowed to analyze the value chains from the market gardening, soybean, small ruminants and poultry sectors. The selection method of the value chains from the four sectors, the analysis of the supply and demand of the AVC, their respective profitability as well as the possibilities of employability that these AVCs offer to the young beneficiaries of the EJASA project are reported. The analysis of supply and demand shows that the products of the selected AVCs are very popular on the local, national, sub-regional and international markets. This observation is justified by the fact that the quantities/volumes of various products of these AVCs are totally sold in the sense that they contribute not only to increasing farmers' incomes, but also to food security. Only 10 to 40% of the overall demand

for the products of the selected AVCs is satisfied in the targeted municipalities, which suggests positioning opportunities for young people. All AVCs are profitable at various thresholds. Indeed, the added-value garnered for all the actors is positive even if more efforts need to be made at the production level. The positioning of young people on one or another of the AVC targeted by the EJASA-NB project gives no doubt as to the improvement of their income, in addition to their contribution to food security in the targeted municipalities. The study also showed that there are many opportunities that can promote the integration of young people into AVC and in particular their employability to ensure a good income and contribute to the food security of their respective families.

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Competing Interests Statement
The authors declare no conflict of interest.

Table1: Number of OSP managers met during the market study

Municipality	Market gardening	Soy beans	Poultry	Total
Banikoara	22	24	20	67
Production	11	7	11	29
Processing	-	10	-	10
Marketing	11	9	8	28
Boukombe	22	22	20	64
Production	15	6	8	29
Processing	-	9	-	9
Marketing	7	8	11	26
Kandi	20	22	17	59
Production	10	6	7	23
Processing	-	8	5	13
Marketing	10	8	5	23
Materi	20	20	41	81
Production	10	7	18	35
Processing	-	9	-	9
Marketing	10	7	20	37
Natitingou	20	20	20	60
Production	10	6	8	24
Processing	-	8	-	8
Marketing	10	8	10	28
Tanguieta	22	-	21	43
Production	11	-	9	20
Processing	1	-	-	1
Marketing	11	-	11	22
Total	126	108	140	374

Table 2: List of leading AVCs selected by sector

Subsectors	Promising value chains selected
Market gardening	Tomato fruit (i); chilli pepper (ii)
Soybean	Soybean grain (iii); Soybean cheese (iv)
Poultry	Local chicken (v); Guinea fowl (vi)

Source: Results from field data processing, 2021

Table 3: Volumes of soybean grain and soybean cheese marketed and sold (Kg) and uncovered demand

AVC	Municipalities	2019			2020			GRVM (%)	GRVS (%)	Uncovered demand (%)
		VM	VS	Balance	VM	VS	Balance			
Soybean grain	Banikoara	-	8,400	-	-	8,000	-	-	-5	50
	Boukoumbe	-	4,275	-	-	3,225	-	-	-25	29
	Kandi	-	6,600	-	-	9,600	-	-	45	41
	Materi	-	12,000	-	-	18,200	-	-	52	32
	Natitingou	-	9,000	-	-	9,400	-	-	4	26
	Tanguieta	-	8,055	-	-	9,685	-	-	20	44
	Ensemble	-	48,330	-	-	58,110	-	-	15	37
Soybean cheese	Banikoara	13,800	13,800	0	14,100	14,100	0	2	2	-
	Boukoumbe	13,740	13,180	0	19,260	18,810	450	40	43	-
	Kandi	264,970	264,970	0	282,510	282,510	0	7	7	-
	Materi	60,613	34,158	26,455	66,140	35,220	30,920	9	3	-
	Natitingou	25,110	25,110	0	25,845	25,845	0	3	3	-
	Total	378,233	351,218	27,015	407,855	376,485	31,370	0,6	0,6	-

*VM= Volume put on Market; VS= Volume sold; GRVM= Growth Rate of Volume put on market; GRVS= Growth Rate Volume Sold

Source: Field data, 2021

Table 4: Number of local chicken and guinea fowl marketed, sold and unmet demand

AVC	Year		Banikoara	Boukoumbe	Kandi	Materi	Natitingou	Tanguieta	Total
Local chicken		AM	685	15,325	86,450	1,755	750	1,146	106,111
	2019	AS	685	15,325	86,450	1,709	750	913	105,832
		Balance	0	0	0	46	0	233	279
		AM	1,225	17,560	82,042	1,631	650	1,305	104,413
	2020	AS	1,175	17,550	82,042	1,615	650	1,064	104,096
		Balance	50	10	0	16	0	241	317
		GRAM (%)	79	15	-5	-7	-13	14	14
		GRAS(%)	72	15	-5	-6	-13	17	13
	% Unmet demand (2019-2020)		17	47	20	47	30	32	32
Guinea fowl		AM	122	5,175	-	145	500	1,239	7,181
	2019	AS	122	5,175	-	138	500	1,035	6,970
		Balance	0	0	-	7	0	204	211
		AM	257	7,245	-	492	850	1,222	10,066
	2020	AS	257	7,245	-	462	830	1,003	9,797
		Solde	0	0	-	30	20	219	269
		GRAM(%)	111	40	-	239	70	-1	92
		GRAS(%)	111	40	-	235	66	-3	90
	% Unmet demand (2019-2020)		12	56	-	35	20	35	32

AM= Number of animals put on market; AS= Number of animals sold; GRAM= Growth Rate of number of animals put on market; GRAS= Growth Rate of number of animals Sold
Source: Field data, 2021

Table 5: Parameters for analyzing the performance of the AVC from different sectors in local and national market

AVC	Category of actors	GP (XOF/kg or animal)	IC (XOF/kg or animal)	Added value (XOF/kg or animal)	Part VA (%)	RNE (XOF/kg or animal)	Part RNE (%)	VA/IC	RNE/TC
						Indicators			
Tomato fruit	Producers	187.9 (±60)	56	131.9 (±60)	67.3	116.1 (±60)	64.5	2 .4	1.1
	Traders	231 (±85)	167	64 (±85)	32.7	64 (±85)	35.5	0.4	0.3
	All actors	419 (±72)	223	196 (±72)	100	180 (±72)	100	0.9	0.6
Fresh chilli pepper	Producers	395.5 (±40)	72	323.5 (±40)	67.7	268 (±40)	63.5	4.5	1.6
	Traders	446 (±34)	292	154 (±34)	32.3	154 (±34)	36.5	0.5	0.4
	All actors	841 (±37)	364	477 (±37)	100	422 (±37)	100	1.3	0.8
Soybean	Producers (grain)	209	80	129	37	99	38	1 .6	0.9
	Processors (cheese)	675	454	221	63	165	63	0.5	0.3
	All actors	884	534	350	100	264	100	0.7	0.4
Local chicken	Breeders	1,710	1,026	684	-	553	-	0.7	0.5
Guinea fowl	Breeders	2,973	413	2,560	-	2,105	-	6.2	4.7

GP: Gross Product; VA: Added Value; IC: Intermediate Consumption; RNE: Net Operating Income; TC: Total Costs; RNE/TC: rate of return

Source: Survey data, 2021

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