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Contribution of Mushroom to Actor's Income in the North West Region, Cameroon: A Value Chain Analysis

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Abstract This study was carried out with the aim to analyse the mushroom value chain and its contribution to the actors' income. Data collected from 84 sampled actors in the North West Region of Cameroon was analysed with descriptive statistics and added value calculation. The findings showed that 65.48% of the respondents were farmers, 13.09% were transformers meanwhile 21.43% were retailers. Results also revealed that various actors are involved in the production and commercialisation of fresh mushroom, dried mushroom, mushroom juice and mushroom powder. Analysis showed that the short VC is the most profitable. Also, farmers make an average net margin of 36% for the production of fresh mushroom; transformers make the least profit margin (0.42%) meanwhile retailers make an average net margin of 5.6%. Based on the actors' perceptions, mushroom production and commercialisation offers many opportunities such as; creating employment, increasing income and ameliorating health. Meanwhile they face challenges like; intrusion of pest, high seed prices, lack of finances for expansion, competition with picked mushroom and insufficient production equipment. Mushroom production is very lucrative and as such, is a tool for generating additional income and improving food security. It is recommended that actors should merge in to Common Initiative Groups so as to reduce cost of production and government could invest more on research for more productive species.

Keywords Mushroom, Value chain, Contribution, Income, Value added

1. Introduction

Three out of every four inhabitants in developing countries live in rural areas and about 2.1 billion people live on less than 2 US dollars (1000 CFAF) a day while more than 880 million on less than 1 US dollar a day with a majority of these people considered poor depending on agriculture either directly or indirectly for their livelihoods [1]. The 2008 World Development Report (WDR) stresses the important role agriculture can play in achieving the first Millennium Development Goal (MDG) of reducing by half the number of people suffering from extreme poverty and hunger. The importance of agriculture in reducing poverty is also recognised by [2] who wrote that agricultural development is considered strategic for poverty reduction. Also, the 2008 WDR further draws attention to the fact that agriculture has unique features embedded in its ability to function with other sectors as an economic activity for livelihoods, to produce faster growth, to reduce poverty and to sustain the environment.

According to [1] in agriculture-based economies, agriculture generates on the average 29% of the Gross Domestic Product (GDP) and employs 65% of the labour force. Also an estimated 86% of rural people rely on agriculture for livelihood and it provides jobs for 1.3 billion smallholders and landless workers. In its attribute as a provider of environmental services, agriculture creates good and bad ecological outcomes depending on the ways natural resources and inputs (agrochemicals) are managed on and off agricultural fields. Institutions like the World Agroforestry Centre, the International Fund for Agricultural Development (IFAD), the Centre for International Forestry Research (CIFOR) and the Food and Agriculture Organisation (FAO), have for some years now been researching on agroforestry options as livelihood strategies for millions of poor people all over the world, as well as provision of environmental services. A branch of these agroforestry options is the Non-Timber Forest Products (NTFPs) which comprise medicinal plants, dyes, mushrooms, fruits, resins, bark, roots and tubers, leaves, flowers, seeds, honey and so on [3]. NTFPs (also known as "minor forest products" in national income accounting system) are sources of food and livelihood security for communities living in and around forests. They are also known as Non-wood, minor, secondary, special or specialty forest products [4]. In this light, [5] defines NTFPs as "all goods for commercial, industrial or subsistence use derived from forest and their biomass".

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At global level, more than two billion people are dwelling in and around the forest, depending on NTFPs for subsistence, income and livelihood security [6]. NTFPs are considered to be important for sustaining rural livelihoods, reducing rural poverty, biodiversity conservation, and facilitating rural economic growth [7]. An estimated 80 % of the population of the developing world uses Non-Wood Forest Products (NWFP) to meet some of their health and nutritional needs, [5]. Mushroom suits appropriately well in this scope.

Mushroom evolves from mere picking in the forest to cultivation. The practice of cultivation for commercialisation dates back as far as 600AD in most Asian countries [8]. Literature reports that there exist more than 38,000 species of wildly grown mushrooms [9] with different characteristics. Nevertheless, only about 2000 species are edible and these species are cultivated in the world depending on the soil (substrate) type.

In Cameroon, mushroom (commonly called *"cocobiaco*") is regarded as meat substitute especially by the rural population. Its picking is very much practiced with the highest region being the Adamawa followed by the West region. With changes in climatic conditions picking becomes difficult bringing forth the alternative of growing mushrooms domestically. In this light, regions like the West, North West, South West, Littoral and Centre regions have pilot centers that coordinate the cultivation of mushroom, especially the production of seeds. Mushroom can be cultivated on very small piece of land (on shelves, bags, logs, bottles etc) and in large quantities using agro waste like rice husk, corn cob, saw dust etc. These substrates after cultivation are returned to soil for cultivation of other crops (biodiversity maintenance and environment friendly, [9]). To help achieve the first and second objective of the Cameroon vision 2035 (according to the GESP for 2010 to 2020 is to; increase supply of quality training, intensify agro pastoral activities as well as upgrade research), the state of Cameroon has initiated a project on mushroom cultivation captioned "*Project de Développement de la Filière Champignon* (PDFC)" with its headquarters at Obala. This project has been propagating the cultivation of mushroom though at a very slow rate. Nevertheless some individual farmers and organisations are greatly engaged in the production and transformation of mushroom in Cameroon especially in the Western highlands (PDFC 2012 annual report). In this light the Mushroom Production, Training and Research Center (MUPTAREC), an NGO is greatly engaged in training of farmers on mushroom growing techniques as well as supervise their activities.

As an emerging market in developing countries, mushroom is very promising in its agribusiness trend but has as constraint low shelf life. To be able to overcome this constraint, the product has to be transformed to more durable products thus adding value to mushroom; this is already practiced in some developing economies. According to [10] value addition of mushroom in India represents approximately 7% (which is lower than some developing countries) and mushroom products are available as bakery products (biscuits, bread, cakes), and fast food items like burgers, cutlets and pizza etc.

With the existence of both picked and cultivated mushroom, marketing the product is uncoordinated as in most local markets mushroom is sold without standard packaging and measurement; unspecified quantities as well as the qualities and the prices vary. Most at times getting the product in the market is a matter of chance, the customers have little or no knowledge as to where to get the product especially when the picking season is over. The channel is not well defined as most of the time the smallholder farmers are those who transform the mushroom and thus get to the final consumer without letting the produce pass through others agents like wholesalers, retailers and transformers who upgrade the product. This poses the problem of insufficient added value to the mushroom sold and lesser job opportunities.

Meanwhile compared to other agricultural products, mushroom can create more working opportunities, help more farmers cope with their vulnerability and reduce poverty thus improving livelihood. Since it can be cultivated on very small pieces of land (According to [11], an average production of 17.5kg of mushroom can be harvested per m^2 surface area) and according to MINADER, Cameroon has a 240 000ha potential of agricultural land. This activity will be a window of opportunity for other economic agents who intervene in the chain thereby adding value to -*/mushroom for the final consumer. Mushroom cultivation could be a profitable agribusiness and its incorporation into existing agricultural systems though a non conventional crop can improve the economic status of farmers as well as that of other actors involved.

This study therefore aims at identifying the main actors in the mushroom value chain and the various marketing channels; determining the value added at each level of the chain and identifying the constraints and opportunities in mushroom production.

2. Methodology

Study area description

The study was carried out in The North West region of Cameroon. This region was chosen because there exists a focal point that coordinates mushroom cultivation activities in the region (MUPTAREC), which trains individual in mushroom cultivation technique, supervises and follows up mushroom farmers in the North West region. The North West Region is found in the western highlands of Cameroon. It is made up of thirty five sub divisions in seven divisions which are; Boyo, Bui, Donga Mantung, Mezam, Menchum, Momo, and Ngoketungia. This region covers a surface area of 17,300km^2 and has an approximate human population of 1,845,695 thus giving a population density 105 per km^2

(2010 National Census). It lies between latitudes 5° 40' and 7°, to the north of the equator, and between longitudes 9°45' and 11°10', to the east of the meridian. It is bordered to the southwest by the Southwest Region, to the south by the West Region, to the east by Adamawa Region, and to the north by the Federal Republic of Nigeria. It experiences two major seasons: A long, wet season of nine months, and a short, dry season of three months. During the wet season, humid, prevailing monsoon winds blow in from the west and lose their moisture upon hitting the region's mountains. Average rainfall per year ranges from 1,000 mm to 2,000 mm. High elevations give the region a cooler climate than the rest of Cameroon. The economy of the region is predominantly rooted in agriculture. More than 80% of the rural population depends solely on agriculture, including a strong livestock sub-sector. Food crops include rice (planted mostly in the Ndop Plain), potatoes (found in the Bui Division and Santa in the Mezam Division), beans, maize, plantains, cocoyams, cassava, groundnuts and yams are produced, and these are food staples for the region.

Sample, data collection and analysis techniques

The population (P) was the total number of actors in the mushroom value chain in the North West region who have been carrying out the activity for at least two years and also work in collaboration with the Mushroom regional pilot centre MUPTAREC. The purposeful multistage sampling technique was used in this study which permitted us to choose the group of respondents to whom questionnaires were administered. With this, out of the seven divisions, five were chosen (Mezam, Bui, Ngoketungia, Momo and Donga Mantung), from these five divisions, sub divisions with more than two actors were selected, this gave a total of 13 sub divisions with more than two actors and in this 13 sub divisions, a total of 84 actors were identified. In this study the sample size equaled the total population because the total population identified was not large thus all the actors identified were chosen. The primary data was collected by the administering of structured questionnaires to the different groups of actors as well as by field observation and discussion. Data was analysed using descriptive statistics, value added and net margin analysis show below as follows:

The value added at each stage of the chain

$$VA_{ij} = Y_{ij} - IC_{ij} \quad (1)$$

Where;

- **i** represents a product
- **j** represents a group of actors involved in the chain
- **VA** is the value added at each stage and for each product
- **Y** is the total sales of the product. It is calculated as such
  - Y= quantity produced or sold (Q) X unitary price (P):

$$\mathbf{Y = Q*P} \quad (2)$$

- **IC** is the intermediary consumption used for the production of good. It covers all the cost in acquiring consumables like seed, substrate material for farmers, fresh mushroom, packaging for transformers etc.

The total value added for each chain was calculated using the formula;

$$\mathbf{TVA = \Sigma\, VA_{ij}} \quad (3)$$

Where TVA is the Total Value Added

The Net Margin (NM):

The net margin is the VA minus the VAT expressed as a fraction of sales or cost [12]

$$\mathbf{NM_{ij}} = \frac{\mathbf{VA_{ij} - VAT_{ij}}}{\mathbf{Y_{ij}}} \quad (4)$$

Where;

- NM is the net margin
- VAT is the value added tax.

3. Results and Discussion

Socioeconomic characteristics

As any value chain has different groups of actors, so does the mushroom value chain in the North West region of Cameroon. From data collected in the field, three main groups of actors were identified and these were farmers, transformers and retailers. A total number of 84 actors were identified and surveyed. Results show that 65.48% respondents were farmers, 13.8% transformers and 21.43% retailers. A majority of the respondents were of the masculine sex with a proportion of 59.5%. It is observed that the male sex dominates in this activity because mixing the substrate requires physical strength and as such more men are involved in the growing process, nevertheless, filling of substrate and picking can be carried out by women. Results also shows that 79.8% of the respondents were married while 20.25% were not. This could be due to the fact that married people have more financial responsibility to their families and as such get involved in income diversification activities (as the case of the mushroom) to cope with their financial vulnerability. At least 40.5% of the respondents had at least a primary education. The mean age of the mushroom actors in the North West region of Cameroon was 49 years with the minimum aged actor being a farmer of 23years and the maximum 70 years. The average household size of the actors was seven (7) with the minimum being one (that is the actor has no other member in his household but himself) and the maximum 18.

Since the mushroom value chain activities are considered and carried out as income diversification activities, most of the actors if not all have primary occupations. The main occupation of most actors was farming. The farmers (55.9%) were mainly involved in cultivation of crops like maize, rice Irish potatoes, cocoa, while some were involve in poultry and pig rearing.

Actors of the mushroom value chain and channels

Farmers form the main group in this value chain and are at the forefront of mushroom production. Their activity is to grow mushroom from spawn (mushroom seed), to fruit body (mushroom itself). They are the ones who convey mushroom to transformers (which is used as raw material for another production), retailers and most of the times to the final consumer (either in the fresh or dried state). Cultivating mushroom takes at least four months (from substrate colonization to at least three harvest sessions); 43.6% of our respondents cultivated 3 season per annum, 25.5% cultivated twice a year meanwhile 30.9% practice just one cultivation season. This is partially in line with by [13] who found out that the average number of cultivation seasons per year in Bangladesh was 3 giving an average of 4 months. This difference can be due to the fact that the climate of the study area is very cold. With the given farm space, the mean quantity of mushroom harvested per season was 218Kg of fresh mushroom. Therefore a bag of substrate (approximately 1Kg) produces an average of 200grams of fresh mushroom per harvest. This product gets to the market either fresh or dried. The farmers sold 44.8% of their produce directly to the final consumer meanwhile 44.8% sold to the different transformers and 10.4% sold to retailers who later convey the product to final consumers.

The main activities of transformers include; buying of raw material (mushroom) from farmers; change the state and the sell to customers (Retailers and consumers). In the field, there exist specificities pertaining to this group of actors. Results shows that all the transformers (100%) got their mushroom (raw material or intermediate consumption) directly from the farmers. A greater proportion (90.9%) of transformers purchased mushroom in the fresh state meanwhile 9.1% purchase in the dry state. By this, the transformers are involved in Gereffi's GVC 'upgrading' dimension which has product upgrading as one option since they transform the perishable fresh mushroom to dried mushroom which has a longer shelter life. The conversion ratio for fresh- dried mushroom is 5: 1, this implies that the transformers dry 5kg of fresh mushroom to get approximately 1Kg of dried mushroom; this gives a proportion of 0.2. In the same light 1Kg of dried mushroom produces at least 17 bags of 50g each of mushroom powder.

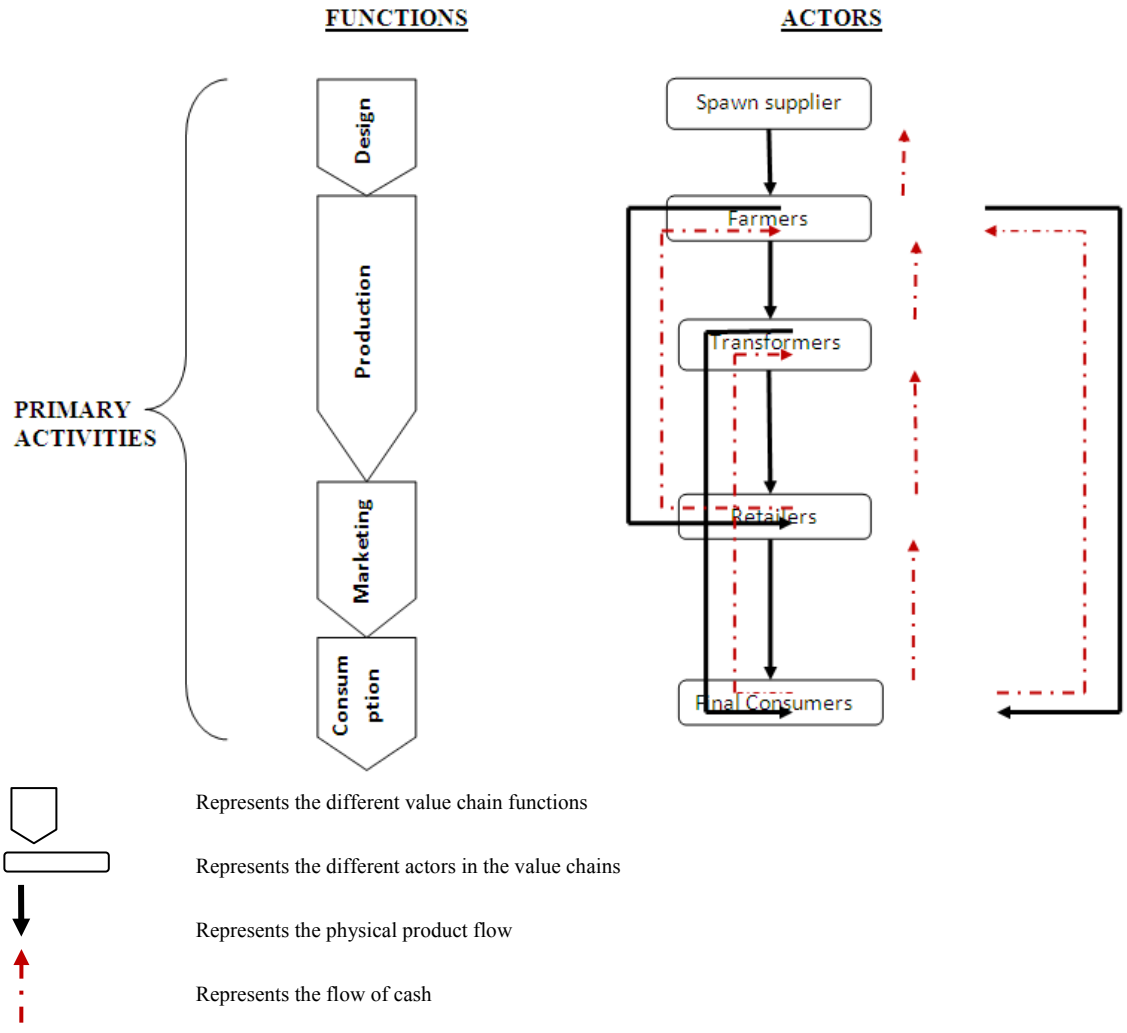

Figure 1. Marketing channels and actors of the mushroom value chain

The retailers get products from mushroom farmers and transformers and then sell the product to the final consumer without any modification in the product. Their main function is to facilitate distribution of the mushroom products. Mushroom juice and dried mushroom were the two main mushroom products in which the retailers trade, 62% trade in dried mushroom meanwhile 38% trade in mushroom juice. Since this activity is mainly used to diversify income, most of the retailers trade in other products.

The mushroom value chain structure identified in the study area is the simple value chain. Figure 1 shows the marketing channel and distribution structure of mushroom.

This structure brings out the different value chain and their respective chain phases as outlined by [14] and following Michael Porters' points of view, all the activities identified and presented are primary activities. In the study support activities (Firm infrastructure, human resource management, technology etc) were not looked into.

The seed supplier in the structure is MUPTAREC who supplied the seed to the farmers at a unitary price of 1000 CFAF per litre. Also from this structure we identified three types of value chain; the long, medium and short value chain. The Long value chain is that which entails all the actors of the value chain (Farmers – Transformers – Retailers – Final consumers), the medium is that which does not include one of the middle actor (either transformers or retailers), meanwhile the short chain is that which does not include either of the middle actors (transformers and retailers) this implies the final consumer deal directly with the producer.

Added Value at each Stage of the Mushroom Value chain and the Net margin of each group of actors

The cost (table 5) considered in the primary or production stage is intermediate consumption. Likewise farmers' cultivation surface area and quantity harvested, the cost of production was not normally distributed (p-value = 0.0 and 0< 0,1). In the same light, the test of correlation between the costs of production, the quantity harvested and the surface area was conducted using Kendall's tau-b correlation coefficient. The cost of production is negatively correlated with the cultivation surface area (r = -0.143) as well as with the quantity produced (r = -0.046). This implies cost of production reduces as the cultivation surface area increases, meanwhile it has little or no effect on the quantity of mushroom produced. Nevertheless, the quantity produced increases as the number of production bags increases (with r = 0.785). Discussions with the respondents show that the average weight of the fresh mushroom / bag per season is 0.6 kilograms (taking in to account that harvest per bag is averagely 200g and that the least number of harvesting session is 3).

Our cost is elaborated per kilogram of fresh mushroom and the choice of substrate material (sawdust, corn flour). This is due to the fact that a greater proportion (55%) of the farmers used these substrate types as they are readily available as well as produce more. This is in line with [13] who found out that sawdust yield more mushroom than other substrates in the cultivation of Pleurotus ostreatus in Pakistan.

The cost of the infrastructures is got from the linear amortisation of the assets. Taking in to onsideration that building and other assets depreciate over a period of 20 and 5 years respectively. The fixed cost of the farmers represents 10.2% of the total direct cost (intermediate consumption), meanwhile variable cost represents the greater part (89.8%). Also, it is observed that mushroom seed is very expensive as it represents 81.2% of the total.

The minimum selling price (SP) per kilogram of fresh mushroom was 1,500 CFAF (by 12% of the farmers dealing in fresh mushroom), the maximum SP / Kg was 2,500 CFAF (by 6%) meanwhile 54.5% of the farmers sold a Kg at 2,000 CFAF, then 21% had a SP of 1,800 CFAF. This gave a mean selling price of fresh mushroom of 1,800 CFAF / Kg and an added value for fresh mushroom of 1,142.5 CFAF. (table 1)

Table 1. Presentation of the average added value (in CFAF) at each stage of the value chain

Product	Variable	Production	Transformation	Marketing	Total
Fresh to Dried Mushroom	IC	657.5	1,800	2,200	-
	Other cost	-	206.25	-	
	Sales	1,800	2 200	2,400	-
	$VA_{(B)}$	1,142.5	193.75	200	1,536.25
Dried to Mushroom Powder	IC	853.75	2,200	-	-
	Other cost	-	160		
	Sales	2,200	3,400	-	-
	$VA_{(B)}$	1,346.25	1,040	-	2,386.25

$VA_{(B)}$ represents the value added on each product before payment of support activities like labour, transport, tax etc.
Note: 1CFA = 0.0016338US Dollars (BCEAO Converter, 2016)

In the transformation stage two main products are taken into consideration; dried mushroom (from farmers who sell their mushroom dry, transformers who buy fresh mushroom and dried as well) and mushroom powder. Fixed cost of the transformers represents 22.4% of the total intermediate cost (TIC), meanwhile 77.6% is variable cost. It is seen that the transformer incur high cost for packaging (73.7%), this might be so because priority is given to the physical presentation of the final product. From analysis it was discovered that the conversion ratio from fresh mushroom to dried mushroom is 5:1. This implies that 1Kg of fresh mushroom gives 200g of dried mushroom. Also, 1Kg of dried mushroom gives 17 packets of 50g of mushroom powder.

As earlier mentioned, 40% of the farmers sell their mushroom in the dried state and as such the cost incurred is both the cost for production and transformation. For the 90.9% of transformers who get their mushroom in the fresh state, the cost of their raw material is the selling price of the farmers (1,800CFAF). The rest of the transformers who purchased in the dried state did so at 10,000CFAF per Kg of dried mushroom (Converted to a Kg of fresh we have 2,000CFAF), this brings us an average IC for the transformers of approximately 1,818CFAF (approximately 1,820CFAF). As for the sales of dried mushroom, 50% of the transformers sold at 10,000CFAF (minimum) and the rest sold at 12,000CFAF. This gives a mean SP / Kg of 11,000CFAF (thus 2,200CFAF for a Kg of fresh). Meanwhile for mushroom powder, the IC / Kg of dried mushroom was 10,000CFAF meanwhile its total SP was 17,000CFAF (sold at 1,000CFAF / 50g). The Value added for dried mushroom (with respect to a Kg of Fresh) is 193.75CFAF meanwhile that for mushroom powder is 1,040CFAF.

Results show that there is no direct cost involved (fixed and variable cost) in the marketing stage. The main product in this stage is dried mushroom and data analysis show that 27% of the retailers buy their product for 10,000CFAF (minimum purchase price), 55% buy for 11,000CFAF meanwhile 18% buy for 11,500CFAF (Maximum purchase price) giving the mean and modal cost price for dried mushroom for this VC stage to be 11,000CFAF which is equal to the selling price of a Kg of dried mushroom of the transformation stage. The minimum selling price for the retailer was 11,500CFAF (by 18% of the retailers) meanwhile the maximum SP was 12,500CFAF (by 36%). This gives a mean selling price of 12,000CFAF dried mushroom. The average value added at this stage is 1,000CFAF (200CFAF for a Kg of fresh mushroom).

Net margin calculation for each actor group

The VA at each stage is used to pay for support activities before the net margin is gotten [15], table 2 shows the distribution of the net value added per Kg of fresh mushroom.

Theoretically, all products in the economy are supposed to be subject to value added tax (VAT) but in this study, it was not taken into consideration since the actors were smallholder and as such not subject to this tax in reality. This make the Value added after payment of support activities to be equal to the net margin (income).

Farmers get the highest net margin for both fresh and dried mushroom of 36% and 30.4% respectively (Table 3). Meanwhile transformers of fresh mushroom to dried mushroom receive the lowest net margin (0.42%), nevertheless, those who transform dried mushroom to mushroom powder receive a net margin percentage of 25.7. Also dried mushroom retailers perceive a net margin of 5.6%. This is in line with the studies carried out by [16] on Pakistan's Food Value Chain where it was proven that farmers made a net margin of 30% per unit on peach production meanwhile retailers perceived 15% and transformer 7%.

Table 2. Presentation of the net value added at the different stages of the value chain

Product	Variable	Production		Transformation		Marketing	
Dried Mushroom	**$VA_{(B)}$**	**1 142.5**	**100%**	**193,75**	**100%**	**200**	**100%**
	Labour	393.85	34.5%	164.5	84.9%	-	
	Transport	100	8.7%	20	10.3%	41.3	20.7%
	Council tax	-		-		25	12.5%
	VA	**648.65**	56.8%	**9.25**	4.8%	**133.7**	66.8%
Mushroom Powder	$VA_{(B)}$	**1 346.25**	**100%**	**1040**	**100%**	-	
	Labour	558.35	41.5%	164.5	15.8%	-	
	Transport	120	8.9%	-		-	
	Council tax	-		-		-	
	VA	**667.9**	**49.6%**	**875.5**	**84.2%**	-	

VA is the net value added after payment of support activities

Table 3. Presentation of the net margin accrued to the different actors per product

Product	Variable	Farmer	Transformer	Marketer
Dried Mushroom	Sales	1800	2200	2400
	VA	648.65	9.25	133.7
	NM in value	648.65	9.25	133.7
	NM in %	**36**	**0.42**	**5.6**
Mushroom Powder	Sales	2200	3400	-
	VA	667.9	875.5	-
	NM in value	667.9	875.5	-
	NM in %	**30.4**	**25.7**	-

Table 4. Opportunities and challenges involved in the Mushroom value chain

Elements	Farmers	Transformers	Retailers
Opportunities			
- Improves nutrition (insuring food security)	100%	100%	100%
- Improves income (insures income security)	100%	100%	100%
- Enhances health	60%	27%	27%
- Progressive adhesion of population to consumption	45%	9%	18%
- Substrates recycles agricultural waste	40%	-	-
- Used substrate serves as manure for farms	26%	-	-
- Offers employment	13%		5%
Challenges			
- Difficulty in Seed acquisition	73%	-	-
- Insufficient finances to expand farms (fixed assets)	66%	54.5%	-
- Price instability	66%	-	-
- Disease and pest intrusion into farms	33%	9%	27%
- Inadequate packaging	-	-	55.5%
- Harsh weather conditions	6%	-	-

Opportunities and challenges of mushroom cultivation

In this study, some of the opportunities and challenges faced by the different actors in the chain were identified. Table 4 summarizes the opportunities and challenges faced by the respondents involved in mushroom cultivation in the North West region.

The respondents outlined their different views with respect to the opportunities involved and challenges faced in their activities along the chain.

4. Conclusions

This study was carried out with the aim to analyse the mushroom value chain and its contribution to the actors' income. The findings of the study showed that 65.48% of the respondents were farmers, 13.09% were transformers meanwhile 2.43% were retailers. The respondents were within the ages of 23 and 70 years of whom 59.5% were males. The results also showed that 79.8% of the respondents were married meanwhile only 2.4% of the respondents were uneducated and the rest having at least primary education. Also only 5.9% of the respondents had mushroom production as sole activity.

The study revealed that actors are involved in the production and commercialisation of fresh mushroom, dried mushroom, mushroom juice and mushroom powder. Based on observation from the study area, there exist three main marketing chains; the short, medium and long with the most profitable being the short chain.

The study shows that that farmers make the highest net margin of an average of 36% for producing fresh mushroom and 30.4% for dried mushroom, transformers make the least net margin of 0.42% for transforming fresh mushroom to dried and 25.2% for transforming dried mushroom to powder meanwhile retailers made an average net margin of 5.6% in commercializing dried mushroom. This shows that mushroom production and commercialization is profitable and as such suitable to be carried out as an income diversification activity in Cameroon. The farmers in the study area were smallholder farmers with an average production of mushroom per farm of 218Kg and added value per Kg of fresh mushroom of 654.65 CFAF. Therefore, the net profit per farm / season of 142 713.7 CFAF at the average unitary price being 1 800 CFAF was profitable.

Appendix

Table 5. Average Cost per 100 kilograms of fresh mushroom

Cost	Production		Transformation		Marketing	
	Amount (CFAF)	%	Amount (CFAF)	%	Amount (CFAF)	%
Fixed						
-Building	3,125	*4.75*	3,125	*15.2*	-	-
-Shelves	2,500	*3.8*	-	-	-	-
-Sterilisation drum	1,500	*2.3*	-	-	-	-
-Dryer	-		1,500	*7,3*	-	
Total Fixed Cost	**6,625**	***10.2***	**4,625**	***22.4***	-	-
Variable					-	-
-Seed	54,000	*82.1*	-	-	-	-
-Sawdust (subst.)	1,000	*1,5*	-	-	-	-
-Cornflour (suppl)	500	*0.75*	-	-	-	
-Slack lime ($CaCO_3$)	500	*0.75*	-	-	-	-
-Firewood	2,000	*3*	-	-	-	-
-Milling	-	-	1,000	*4.8*	-	-
-Water	125	*0.2*	-	-	-	-
-Paper	1,000	*1,5*	-	-	-	-
-Packaging	-	-	15,000	*72,7*		-
Total VC	**59,125**	***89.8***	**16,000**	***77.6***	-	-
Total IC	**65,750**	**100**	**20,625**	**100**	-	-
Total IC / 1Kg fresh	**657.5**		**206.25**			

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