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Herbal Medicine and Livelihoods: Examining the Annual Income of Value Chain Actors for Poverty Reduction in Ghana

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Abstract

In Ghana, income poverty has been a challenging issue in recent times. The efforts made by the government to reduce income poverty have proof futile because the category of employment opportunities needed to reduce income poverty and improve livelihoods is limited. Herbal medicine as a livelihood activity, if supported, is capable of reducing poverty in Ghana. The purpose of this paper is to examine how herbal medicine value chain activities have supported sustainable income poverty reduction among the value chain actors in Ghana.

A mixed method was employed in collecting both qualitative and quantitative data using questionnaires, interview scheduled and focus group discussions. In all, 171 respondents were randomly selected from Tamale Metropolis and Sunyani Municipal. Questionnaires and interview scheduled were administered to nine input providers, 115 herbalists and 47 honey traders in the study areas. Descriptive statistics such as frequencies, line graphs and percentages were employed in the analysis of quantitative data. Recorded voices and quotations were transcribed and used in analyzing qualitative data.

Findings show that herbal medicine activity is sustainable because actors have practiced herbal medicine for many decades. Findings from the study further show that input provider have increased their income levels due to an increase in supply of herbs to the herbalists. Again, the results show that the income levels of herbalists and herbal medicine traders have appreciated significantly over the last five-years.

The study recommends that all stakeholders such as Ministry of Health, Ghana Health Service, Herbal Medicine Association, and other institutions of government as well as Non- Governmental Organizations should give the necessary support to herbal medicine value chain actors to ensure higher production of herbal medicine to reduce poverty and enhance living conditions.

Key Words: Herbal Medicine, Livelihood, Poverty Reduction, Value Chain Actors
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1. Introduction

In Africa, livelihood insecurity remains a major problem in less developed countries, particularly those in West, East and Central Africa (Rob and Cattaneo, 2021). In this case most people living in these communities such as Ghana do not have adequate income to enable them to provide their fundamental needs like clothing, quality meals, better shelter and proper health care. Poverty is a serious perennial problem that these communities have to grapple with (Wang). They further stressed that poverty in these communities is more of rural than an urban phenomenon though urban poverty is critical. In rural areas in Ghana, there are inadequate job opportunities therefore many of the rural poor are now migrating to urban areas thereby making urban poverty significant to consider (Brenton et al., 2022, Rob and Cattaneo, 2021)

Herbal medicine production is seen as an important alternative occupation capable of generating many employments and enough income to support both urban and rural lives in reducing economic stress on people in participation and enhancing their living conditions (Manda et al., 2020). However, due to the high poverty rate in rural and urban communities, getting start-up capital for herbal medicine activities, which could have assisted in reducing poverty in rural and urban communities, is always a big challenge (Sjah and Zainuri, 2020). For an enterprise like herbal medicine production to survive in rural areas in the long term requires income. Income from herbal medicine activity can provide an improved livelihood, more food security and safety in the long term as well as the ability to pay for needed health care and other basic family expenses. More importantly,

income from herbal medicine production enables herbalists to re-invest in the herbal medicine enterprise, improve it and contribute to making it more competitive (Jeyacheya and Hampton, 2020; Varga, 2020).

Income from herbal medicine activities can be a source of valuable strength to countless numbers of both urban and rural people's livelihoods for a long time. In communities where access to income is limited, small scale herbal medicine production can contribute significantly to livelihood security (Varga, 2020) On the contrary, herbal medicine and related trades tend to be underplayed in both policy and planning by their leaders. One reason may be the focus of rural development, where crop production and animal rearing are taken to be the dominant activities in rural areas (Malapit et al., 2020). Crop production and animal rearing as livelihood activities have been practiced in rural areas for a long period. Though crop production and animal rearing provide income to farmers, these farmers have been continuously complaining of insufficient income every year. This means that the income obtained from crop production and animal rearing is not sufficient to meet their needs (Fayiah et al., 2024). Therefore, there is a need to diversify crop production and animal rearing to herbal medicine activities or practicing herbal medicine activities alongside other farming activities to provide the farmers or herbalists with enough income to reduce their poverty levels (Sjah and Zainuri, 2020; Dalir et al., 2024). Theoretically, the influence of herbal medicine activities on the actor's livelihoods was analyzed using concepts from the systems theory. The use of system theory in this research emanated from the fact that systems theory is concerned with the structure of complex systems, with a special emphasis on understanding how herbal medicine value chain actors relate to each other in the herbal medicine industry.

In terms of income sustainability, many researches of herbal medicine have been highlighted in the literature extensively in Ghana (Ndhlovu et al., 2023; Karki, 2020).). For instance, Odubo et al. (2024) compared the percentages and number of years that individuals have engaged in herbal medicine activities in the Northern and Bono regions. It was found that 70% and 52% of herbalists in the rural and urban dwellers respectively had been engaged in herbal medicine activities for at least five (5) years. Furthermore, Kumar et al. (2021) emphasized that the activities of herbal medicine value chain have yielded several benefits including income to the actors. However, the above studies failed to examine quantitatively and qualitatively how the activities of herbal medicine value chain are capable of sustaining value chain actors' livelihoods for income poverty reduction in the Sunyani Municipality and Tamale Metropolis. The study specifically answers the following questions: 1). To what extent has the number of years spent in the herbal medicine industry affected the production of herbal medicine in the study areas? 2). How has the annual income generated influenced the poverty level of the value chain actors in the Sunyani Municipality and Tamale Metropolis? 3. Has the production level pf herbal medicine affected the level of income of the value chain actors in the study areas? The study therefore explored the potentials of herbal medicine as a livelihood activity for reducing income poverty in the Sunyani Municipal and Tamale Metropolis.

2 Methods and Materials

2.1 Profile Dimension of Sunyani Municipality and Tamale Metropolis

In the Bono Region of Ghana, Sunyani Municipality is one of the key Municipalities in the region. Sunyani serves as both the traditional and administrative capital of Sunyani Municipality (Ghana Statistical Service (GSS), 2016). The Sunyani Municipal can be located within latitudes (7^0 20" N and 7^0 05" N) and longitudes (2^0 30" W and 2^0 10" W). The municipality covers a wide range of land area of 642 km^2 and one-third of the land has not been cultivated and inhabited which provides land for future investment in medicinal plants for herbal medicine (GSS, 2016). Sunyani Municipality has the highest population in Bono Region. This makes the production and trading in herbal medicine very lucrative. The size of the total population of the Sunyani Municipality is estimated to be 947,301 with a growth rate of 3.2%.

On the other hand, the Tamale Metropolis can be found between longitude 0.36^0E and 0.57^0W and latitude 9.16^0 N and 9.34^0 N of the equator. The total land area of Tamale Metropolis is nearly 750 Km^2 which is 11% of the entire Northern Region land surface. Tamale is the major city in the Metropolis with minor sub-areas. The Tamale Metropolis has a population of 2,044,074 comprising 422,095 (50.8%) males and 621,979 (49.2%) females with females dominating the population (Noorhosseini et al., 2020). Tamale is the major urban settlement with an average population density of 318.6 persons per Km^2 and more than 67% populace in the city. With this high population in the Tamale Metropolis, the herbal medicine producers will have ready markets for their medicine. According to (Pathak et al., 2024), the Tamale Metropolis has a youthful population making the base of the population pyramid broad. The health system applies both preventive and curative approaches from the areas of orthodox and herbal medicine.

2.2 Research Approach

The research adopted pragmatism as an appropriate research method. Thus, combining quantitative and qualitative methods in collecting data at the same time helps in covering wider areas by reaching out to many respondents within a short time. It assists in solving a research question, limiting the superiority of positivists and interpretivists (Creswell and Hirose, 2019). They lamented that pragmatism is mainly used because it allow the researcher to apply both philosophies at the same time. This informed the choice of pragmatism (mixed approach) over either using a quantitative or a qualitative approach.

2.3 Research Design

The study employed a cross-sectional design. According to Creswell and Hirose (2019), a cross-sectional design gives immediate information for the study at a given point in time. The information of the herbal medicine activities would be obtained once from the Sunyani Municipal and Tamale Metropolis. This strategy assisted in gaining immediate knowledge, information, and data from different actors along the herbal medicine value chain activity in the study areas.

2.4 Sample Size Determination

Table 1: Sample Sze for the Study

Sunyani and Tamale Study Areas	Inputs/ Raw materials Providers	Herbalists/ Producers	Herbal Medicine Traders	Total
Sunyani Municipal	4	54	22	**80**
Tamale Metropolis	5	61	25	**91**
Total	**9**	**115**	**47**	**171**

2.5 Sampling Techniques

A combination of stratified and simple random sampling techniques was employed under probability sampling. The motive behind the use of the stratified sampling technique is that the sampling frame consisted of value chain actors mixed. Therefore, there was a need to select the various value chain actors into homogeneous subgroups so that each stratum contained subjects with similar characteristics such as input providers, herbalists, and herbal medicine traders. Then, the researcher drew samples from each stratum using a simple random sampling procedure which was employed to select the required sample size from the various groups.

In setting up simple random sampling, the list of herbal medicine value chain actors was obtained from their associations, written on pieces of paper, put in a bowl, and mixed them up. After that the researcher picked the paper from the bowl one after the other without replacing it until the required sample size was achieved for each stratum such as input providers, herbalists, herbal medicine traders and users.

2.6 Data Collection Tools

Questionnaire, Interview Schedule, and Focus Group Discussion (FGDs) guides were the instruments used to collect data chiefly from the value chain actors in the study communities. These techniques were used to obtain answers to the research questions in order to achieve the objectives of the study.

2.7 Methods of Data Analysis

The data gathered using the various data collection tools were analyzed using both qualitative and quantitative techniques. The analysis of qualitative data was done through thematic sorting, logical build up and content analysis. Recordings during focus group discussions were transcribed to support the analysis. Quotations were used as they are essential ingredients of analyzing qualitative data. With regards to the quantitative data, descriptive statistics namely; percentages, frequency tables and mean were used to present average annual income data of the herbal medicine actors. Quantitative data were analyzed using percentages, line graphs, alongside cross tabulation. During the data analysis, the respondents' responses were keyed using the 2020 version of Statistical Package for the Social Science Software (SPSS). Then, in order to avoid distortion, data cleanings were done after frequencies have been generated because errors were detected in the data entry.

3. Results

A. Quantitative Results

Table 2: Number of Years Spent in the Herbal Medicine Industry in the Study Areas by the Herbal Medicine Value Chain Actors

Number of Years	Input Provider	Herbalist	HM Trader	Total	Percentage
1-5	1	8	1	**10**	**(6%)**
6-10	2	27	12	**41**	**(24%)**
11-15	1	29	16	**46**	**(29%)**
16-20	5	26	9	**40**	**(23%)**
21-25	0	19	7	**26**	**(14%)**
Above 25	0	6	2	**8**	**(4%)**
Total	**9**	**115**	**47**	**171**	**(100%)**

3.1 Number of Years Spent by Actors

To emphatically declare that the value chain activities of herbal medicine are sustainable, there is a need to critically examine the number of years each actor has spent in the herbal medicine industry. Table 2 provides results on the number of years value chain actors have spent in the herbal medicine industry. It was confirmed by the data gathered from the field that the various value chain actors have been in the industry for a period ranging from 21 to 25 years. Others have spent 16-20 to mention but a few.

Table 3: Annual Income of Input Providers in the Sunyani Municipality from 2018 to 2022

Year	Total Average herbs Sold (Kg)	Average Selling price Per (Kg) (¢)	Average Total Income (¢)	Average Total Expenditure (¢)	Average net Income (¢)	Average Net Per Capita Income (¢)	Average Change Per Capita Income (¢)
2018	61	220	13,420	1,450	11,970	2,992	-
2019	73	250	18,250	1,510	16,740	8,087	5,095
2020	81	320	25,920	1,600	24,320	6,080	-2,007
2021	90	350	31,500	1,660	29,840	7,460	1,380
2022	96	350	33,600	1,690	31,910	7,978	518
Total	**401**	**1,490**	**122,690**	**7,910**	**114,780**	**32,597**	**4,986**

Table 4: Annual Income of Input Providers in the Tamale Metropolis from 2018 to 2022

Year	Total Average herbs Sold (kg)	Average Selling price Per (kg) (¢)	Average Total Income (¢)	Average Total Expenditure (¢)	Average net Income (¢)	Average Net Per Capita Income (¢)	Average Change Per Capita Income (¢)
2018	123	200	24,600	1,850	22,750	4,550	-
2019	136	200	27,200	2,110	25,090	5,018	460
2020	142	250	35,500	2,200	33,300	6,660	1,642
2021	161	300	48,300	1,960	46,340	9,268	2,608
2022	184	350	64,400	2,450	61,950	12,390	3,122
Total	**746**	**1,300**	**200,000**	**10,570**	**189,430**	**37,886**	**7,832**

Table 3 revealed that the total average herbs sold within the five years period were 401 kg which corresponded to an average net income of GH¢114,780 at an average selling price of GH¢1,490. Similarly, the highest average supply of 96 kg of herbs was recorded in 2022 with its average selling price of GH¢ 350. The total net income for 2022 was GH¢ 31,910. The average per capita income for the nine input providers stands at GH¢12,754 as the main or supplementary income from 2018 to 2022. Contrary to the above, input providers supplied the lowest number of herbs in 2018. They supplied an average of 220 kg of herbs and obtained an average total income of GH¢13,420.00 in 2018 at the selling price of GH¢220.

It was revealed from Table 4 that in 2022, total average herbs sold was 184 kg which was the highest among all the years at the cost of GH¢350 per kg. Nonetheless, a significant quantity of herbs was sold in the previous years. It was observed from Table 3 that input providers in Tamale metropolis were able to realize an average net income of GH¢189,430.00 within five years. For instance, in 2021 alone, a total average net income of GH¢46,340.00 was obtained by the five input providers in Tamale Metropolis. The average net per capita income was GH¢9,268.00. For input providers to earn this amount per annum either as supplementary or actual income, is quite substantial to assist in providing household items, hence improving their standard of living and reducing their poverty level.

Table 5: Income Analysis of Herbalists of Sunyani Municipal

Year	Total Average herbal drugs Manufactured (kg)	Average Selling price Per (kg) ¢	Average Total Income ¢	Average Total Expenditure ¢	Average Total net Income ¢	Average Net Per Capita Income ¢	Average Change Per Capita Income ¢
2018	850	625	531,250	2,060	529,190	9,799	-
2019	1,450	786	1,139,700	3,340	1,136,360	21,044	11,245
2020	1,500	910	1,365,000	3,850	1,361,150	25,206	4,162
2021	1,800	1,150	2,070,000	4,365	2,065,635	38,253	13,047
2022	2,200	1,360	2,992,000	4,820	2,987,180	55,318	17,065
Total	**7,800**	**4,831**	**8,097,950**	**18,435**	**8,079,515**	**149,620**	**45,619**

Table 6: Income Analysis of Herbalists of Tamale Metropolis

Year	Total Average herbal drugs Produced (kg)	Average Selling price Per Kilogram ¢	Average Total Income ¢	Average Total Expenditure ¢	Average Total net Income ¢	Average Net Per Capita Income ¢	Average Change Per Capita Income ¢
2018	1,850	825	1,526,250	2,260	1,523,990	24,983	-
2019	2,450	986	2,415,700	2,750	2,412,950	39,557	14,574
2020	2,500	1,010	2,525,000	3,150	2,521,850	41,342	1,785
2021	2,800	1,150	3,200,000	3,760	3,196,240	52,397	11,055
2022	3,200	1,360	4,352,000	3,450	4,348,550	71,288	18,891
Total	**12,800**	**5,331**	**14,018,950**	**15,370**	**14,003,580**	**229,567**	**46,305**

It is obvious from Table 5 that there has been a gradual boost in herbal medicine production from 2018 to 2022 in the Sunyani Municipality. What accounted for this upward adjustment was attributed to the herbal medicine efficacy, demand for herbal medicine and the population growth in the study areas. Table 5 shows that out of the five years of data, 2022 recorded the highest average number of quantities of herbal medicine produced. On average, they produced 2,800 kg of herbal products. This matches up with an average total net income of GH¢37,663,365 at an average total selling price of GH¢4,831. This amount of money accrued is quite considerable for poverty reduction and can subsequently improve livelihoods among herbalists in the Sunyani Municipality.

In 2018, out of 850 kilograms of herbal drugs manufactured, the herbalists were able to sell them at GH¢625 per kilogram and earned an average net income of GH¢529,190. On the other hand, 2022 recorded the highest average net income of GH¢2,987,180.00 at an average selling price of GH¢1,360. One prominent difference in income that exists between the two years (2018 and 2022) was because prices of herbal medicine were different each year. The prices were GH¢850 and GH¢2,200 for 2018 and 2022 respectively. These prices were set up by the interactions of demand and supply each year.

The income pattern of herbal medicine producers in the Tamale metropolis is shown in Table 6. From Table 6, it was indicated that a total of 61 herbalists produced a total average herbal drug of 12,800kg within the five-year

working experience. The herbalists had an average total net income of GH¢14,003,580.00 at an average total selling price of GH¢5,331.00. This signifies that getting an appreciable price for herbal medicine is a major contributing factor to the total annual income. There may be other reasons contributing to the large or low production of herbal medicine in the Tamale metropolis such as getting a license to operate, and not having adequate knowledge about some diseases that affect human beings.

Table 7: Income Sustainability of Herbal Medicine Traders in the Sunyani Municipal

Year	Average Selling Price Per Kg	Total Average Herbal Drugs Sold Kg	Average Total Income ¢	Average Total Expenditure ¢	Average Net Income ¢	Average Net Per Capita Income ¢	Average Change Per Capita Income ¢
2018	750	95	71,250	920	70,330	3,197	-
2019	980	1,050	1,029,000	1,150	1,027,850	46,720	43,523
2020	1,150	1,120	1,288,000	1,400	1,286,600	58,482	11,762
2021	1,250	1,240	1,550,000	1,350	1,548,650	70,393	11,911
2022	1,560	1,480	2,308,800	1,700	2,307,100	104,868	34,475
Total	**5,690**	**4,985**	**28,364,650**	**6,520**	**28,358,130**	**283,660**	**101,671**

Table 8: Income Sustainability of Herbal Medicine Traders in the Tamale Metropolis

Year	Average Selling Price Per Kg	Total Average Herbal Drugs Sold (Kg)	Average Total Income ¢	Average Total Expenditure ¢	Average Net Income ¢	Average Net Per Capita Income ¢	Average Change Per Capita Income ¢
2018	950	1,015	964,250	2,720	961,530	38,461	-
2019	1,080	1,120	1,209,600	3,900	1,205,700	48,228	9,767
2020	1,450	1,220	1;769,000	4,200	1,764,800	70,592	22,364
2021	1,650	1,340	2,211,000	4,750	2,206,250	88,250	17,658
2022	1,760	1,580	2,780,800	5,800	2,775,000	111,000	22,750
Total	**6,890**	**5,055**	**34,828,950**	**21,370**	**34,807,580**	**1,392,303**	**72,539**

Table 7 indicates that the highest total number of 4,985kg of herbal medicine were sold by 22 herbal medicine traders in the Sunyani Municipality. In 2019, the traders were able to sell 1,480 kilograms of herbal products. They were able to maximize average net profit of GH¢104,868.00 at an average selling price of GH¢1,560.00. In the same way, the lowest quantity of herbal medicine sold was witnessed in 2018. In 2018, herbal medicine traders in Sunyani Municipality sold a total of 95kg of herbal products and made a total net profit of GH¢3,197.00 in 2018. The mean total income accrued from trading in herbal medicine in the remaining years was far higher than in 2018.

Table 8 depicts the income sustainability of 25 herbal medicine traders in the Tamale Metropolis. The traders in the Tamale Metropolis were able to sell 1,120 kilograms of herbal products in 2020 at an average selling price of GH¢1,080.00. It is therefore not surprising that within the same year (2020), the traders were able to record an average income of GH¢1,205,700. The data indicate that herbal medicine trading activities in the Tamale metropolis were very conducive because there was a progressive increase in an average net profit from one year to another signifying that demand for herbal medicine is high. In 2021, for example, a total of 1,340kg of herbal products were sold in Tamale metropolis. The traders were able to record an average net income of GH¢2,206,250.00 in the same year.

B. Qualitative Results

A question was posed during the focus group discussion regarding the property or properties acquired so far about the number of years spent in the herbal medicine industry. A 48-year-old male herbalist from Tamale said:

"I have achieved a lot ever since I started producing herbal medicine for the past 15 years. For instance, money received was used in supporting the building of my house, establishing my pig farm, and buying my motorbike"
(A 48-year male herbalist in FGD at Tamale, 2022).

Another male respondent of 52 years from Sunyani who is also a teacher in a similar focus group discussion reiterated:

"It is twenty-three years now since I started herbal medicine production *and the income obtained after selling my medicine was quite substantial to enable me to pay my ward's school fees. It has also assisted me in establishing a small provision store for my wife. I believe in a few years to come, I will be able to expand my Cashew farm, build my house and acquire more wealth" (A 52-year male herbalist in FGD at Tamale, 2022).*

These different expressions suggest that the longer one practices herbal medicine activity the more properties he/she is likely to acquire to improve his/her living standard as well as reduce his/her financial burden. The income obtained by the actors (input provider, herbalist, and herbal medicine trader) upon engaging in the herbal medicine value chain activities has been presented in the subsequent paragraphs.

It was discovered during the survey that input providers' income was sustainable because they have shown an increase in production for the past five years. The input providers have done this work, in some cases, for the past twenty years. There was regular payment of herbs ordered by herbalists and they can save part of their money for future expenses. About this, a male input provider in Tamale said:

"S*upplying herbs is a good business because every year herbalists from Tamale Metropolis and other areas come here to place orders. I have been receiving a significant amount of money from this and it is my prayer that more herbalists will develop interest in my business so that I can get more orders from them" (A 43-year old male in FGD at Tamale*, 2022).

The input providers admitted that even though there was regular demand for herbal inputs throughout the year, they hardly saved a greater part of the money accrued. Nevertheless, they quickly added that some managed to save money through mobile bankers. It is important to emphasize that the supply of herbs is a male-dominated activity because it involves much strength. These findings in Figure 1 mean that the income earned by the input providers were used to support their family's expenditure such as providing shelter, cloths, and other essential services because the total average expenditure for producing input was far lower than the total average income accrued as indicated by Figure 1.

4. Discussion

4.1 Years Spent In Herbal Medicine Industry

The data depict that most value chain actors have working experience ranging from six to ten and eleven to fifteen years and above. The work done by (Shamna, 2022) endorsed this finding that having cumulative knowledge of supplying herbs to herbalists, producing herbal drugs, and trading in herbal medicine products for more than 25 years are prerequisite for reducing the risk involved in herbal medicine. The input providers are the initial node of the herbal medicine value chain activities and their contributions to sustain the industry cannot be over-emphasized. It is evidenced from Table 2 that most of the input providers have been supplying herbs, cooking utensils and other materials to the producers for more than twenty years now. For example, the herbal medicine traders attributed their sustainability in the herbal medicine trading to the fact that customers come from other cities and communities in Ghana to regularly buy herbal medicine from them (Booker et al., 2022) and (Walusansa et al., 2022) affirmed that there is a regular supply of herbal medicine and trading in herbal medicine is a profitable business in Ghana because about 65% of the indigenes depends on herbal medicines for their healthcare, They further highlighted that fertility, sexual enhancement, and general well-being of the body were the main reasons for herbal medicine utilization.

Moreover, it is also indispensable to highlight that herbalists in the study communities have practiced the manufacturing of herbal medicine for at least 25 years. This finding is line with the research conducted by (Mhlanga et al., 2021) that as herbalists gain more experience in the herbal medicine industry, the probability of increasing production, producing quality medicine, and supplying them to the market would be high. The aggregate knowledge obtained so far, has assisted the herbalists in reducing, controlling, and managing challenges related to the work. This assertion further agrees with (Booker et al., 2022) that herbal medicine has been in existence since the early 17th century. People have been using it both domestically and internationally since then. Domestic users mostly use herbal medicine as a purgative, appetite, and sex enhancing drug.

4.2 Input Production and Income

The manufacturing of aluminum pans, cylinder, burner, sodium benzoate, and sales of herbs as raw materials, and other herbal medicine equipment in the Sunyani Municipality and Tamale Metropolis have remained one of the essential main and supplementary occupations to the input providers. (Nautiyal et al., 2020) stressed that the role input providers play in the herbal medicine industry is significant, without them, distortion of the industry will take place. To further assess the sustainability of income of input providers, a summary of income generated for the past five years through the sale of inputs to herbalists have been provided in Tables 3 and 4 respectively.

There are disparities in the supply and sales of herbs to the producers in the study communities. This was due the number of input providers, variation in production, and differences in herbal medicine sold. The result is comparable to the findings of (Lindberg et al., 2023 who lamented that as a result of climatic variations in Ghana, in every one hundred and fifty kilometers covered, the price of herbal medicine and marketing of production equipment differ from one location to another in the same country. Ironically, the price of inputs in Sunyani Municipal was on the higher side compared with the price of inputs in Tamale metropolis. These disparities arise due to many factors. Firstly, one may notice that Tamale is within the savanna belt and it is strategically located in Ghana. The respondents testified that a lot of people from many surrounding towns and villages come to Tamale to market and do business in the Central Business District (CBD). Added to the above, the high population of Tamale has influenced the price. Finally, other neighboring countries like Burkina Faso do come to Tamale to buy herbal products. All these factors have contributed to the differences in prices of herbal medicine between Tamale Metropolis and Sunyani Municipality.

Throughout these years there was a progressive increase in both demand and supply of herbs and other materials every year in Sunyani Municipality and Tamale Metropolis respectively. This was however supported by (Booker et al., 2022) who claimed that there has been an increase in inputs supply which constitutes the initial node of the value chain, and they comprise organizations and individuals who are involved in the collection of herbs, manufacturing of processing plants, production of benzoates for preservation and other processing equipment such as cooking utensils for sale to interested herbalists. The reason given by the input providers for the appreciable increase in both supply of herbs and income over the five years was that a lot of new people are now joining the herbal medicine industry and those already in it are expanding their activities by establishing branches in other areas.

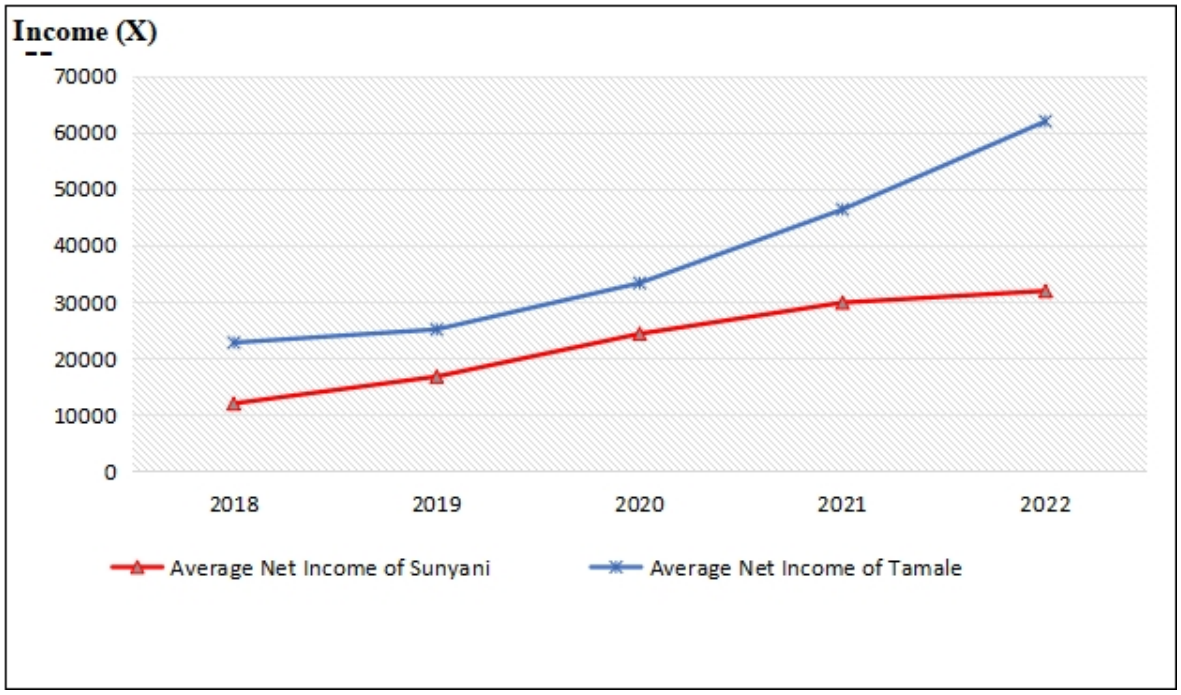

Figure 1: Annual Income Trend of Input Providers in the Tamale Metropolis and the Sunyani Municipal

The lines in Figure 1 show an increasing trend of input production. The trend for each component shows a positive slope indicating that as the year moved from 2018 to 2022, the total average net income appreciated because of an increase in input production. It is imperative to highlight that the average net per capita income

rises from 2018 to 2022. Though it kept increasing every year, it was increasing at a decreasing rate. This means that the input producers were expecting a higher average increase than what they experienced. From the same Figure 1, there was a drastic proliferation in the average net income. On the other hand, the average total income less expenditure from 2018 to 2022 shows a sharp positive slope. Consequently, the income accrued is quite substantial to sustain their lives and aid them in reducing their poverty level as well as improving their standard of living. It could be inferred from the results that input providers earned enough income to provide their household needs such as food, rents, cloths, building houses and paying other utility bills because the total expenditure of providing inputs in all cases was far lower than the average total income. Consequently, the income accrued was reasonably significant to reduce their poverty level and improve their living standards.

4.3 Herbal Medicine Production and Income of the Herbalists in the Study Areas

It is crucial to establish that the discussions of the income sustainability of the value chain actors have incorporated all the issues required for sustainable income. In the herbal medicine industry, for instance, (Lindberg et al., 2023) stated that the herbalist is the controller of herbal medicine industry in the sense that the herbalist organizes all equipment such as herbs, aluminum pans, cylinders, burners, plastic bottles, and sodium benzoate to mention but few needed to produce herbal medicine. He further highlighted that herbal medicine production is mainly done through ownership. In the study areas, though females were more than the males, males have the highest individually owned herbal clinics at the community level than women. There was one cooperative processing center at Sunyani where those herbalists without a place to process their herbal drugs mostly used it.

Herbal medicine production is an important source of household income in the study areas. For an enterprise like the herbal medicine industry to survive in the long term, it requires income. Income can provide an improved livelihood, more food security and safety in the long term. Also, the income gained from herbal medicine value chain activities can support providing good health care and other basic family expenses. More importantly, the income received enables herbalists to re-invest in the herbal medicine enterprise, improve upon it, and contribute to making it more competitive (Ouko et al., 2022). According to (Bassett et al., 2021), income from herbal medicine activity can be a source of valuable strength to a countless number of rural people's livelihoods. Herbal medicine is seen as an important occupation for both urban and rural life worldwide, which can reduce the economic stress on herbalists and enhance their household income. In communities where access to income is limited, small-scale herbal medicine production can contribute significantly to livelihood security.

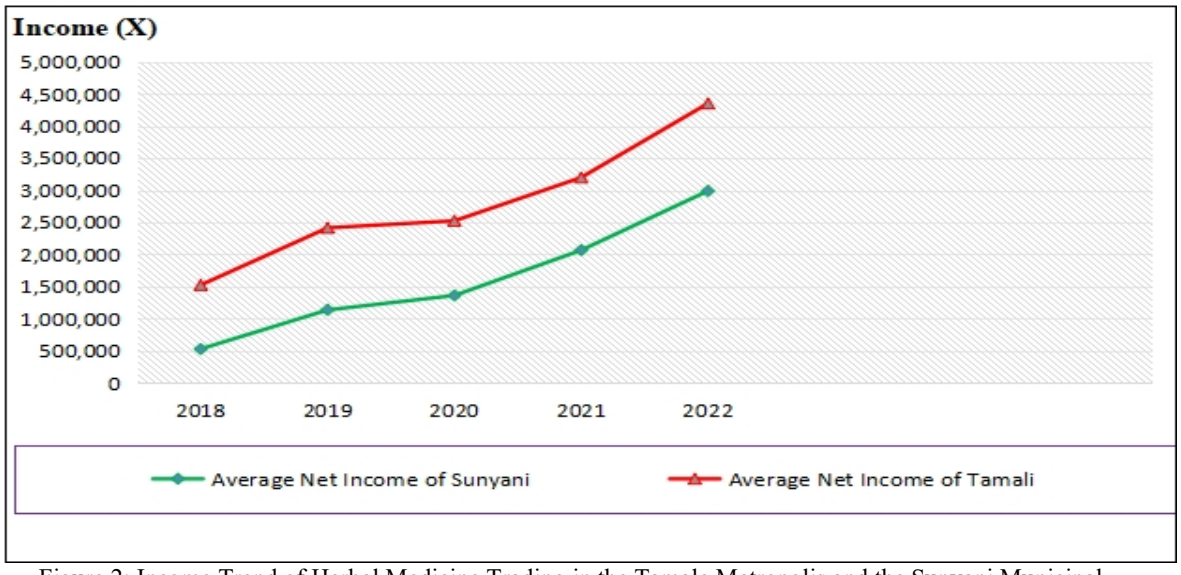

Figure 2: Income Trend of Herbal Medicine Trading in the Tamale Metropolis and the Sunyani Municipal

It is very clear from Figure 2 that herbal medicine is very sustainable in the sense that herbal medicine production shows an increasing trend in production and income because herbalists have been in this work for the past twenty-five years. Due to experience, they can work on their errors and improve production in subsequent years. Etuk and Ayuk (2021) confirmed that herbal medicine activities have existed for the past 5,000 years in Ethiopia and China.

Notwithstanding the respondents' success in production, the production of herbal medicine was far below their expectations. They justified this low production to low patronage of herbal drugs, lack of trust in the use of herbal medicine and inadequate funds to produce more to meet the demand of the consumers. Another essential reason indicated by the herbalists was that there was prolonged drought that year, especially Tamale Metropolis which lies in Savanna Belt, hence their inability to harvest most herbs to produce enough. Whenever the rain delays, harvesting herbs for drug production becomes difficult and affects the quantity of herbal medicine supposed to be manufactured. It is therefore advisable for herbalists to produce enough and stock. They should start domesticating seasonal herbs or plants for a constant supply of raw materials. If this practice is not done at the right time, it will eventually reduce their income levels because taking the price of herbal medicine constant and all other things being equal, the lower the production, the lower the income and vice versa. Nevertheless, for herbalists to receive an average per capita income of GH₵10,271 in 2018 as a full or supplementary income was enormous. It can equally support the herbalists by improving their living standards in the study areas.

4.4 Income of the Herbal Medicine Traders

Herbal medicine trader is another vital value chain actor in the herbal medicine value chain activities; hence it is crucial to discuss issues surrounding herbal medicine trading in the Sunyani Municipality and the Tamale Metropolis. Herbal medicine trading in some situations serves as a supplementary or main job to the traders in the Sunyani Municipal and Tamale Metropolis. It was observed during the survey that herbal medicine trading is done by both men and women who are herbalists and non-herbalists. Considering Tables 7 and 8 critically, there are several disparities among prices, quantity of herbs sold, average total expenditure and average total income as well as average net income. The disparities that exist between profits made by traders in the Tamale Metropolis were relatively higher than traders in the Sunyani Municipality. Another disparity exists between herbal medicine prices because herbal medicine traders sell their items at different prices in different seasons to different customers. This confirms the study done by (Singh and Chudasama, 2020). who reiterated that herbalists sell their herbal medicine to different buyers at different prices at the village, town, or city market centers. For this reason, there is no uniform price on the market hence different profits are made. It was deduced from the findings that the income accrued was reasonably significant to lessen the poverty level and improve the standard of living of the traders.

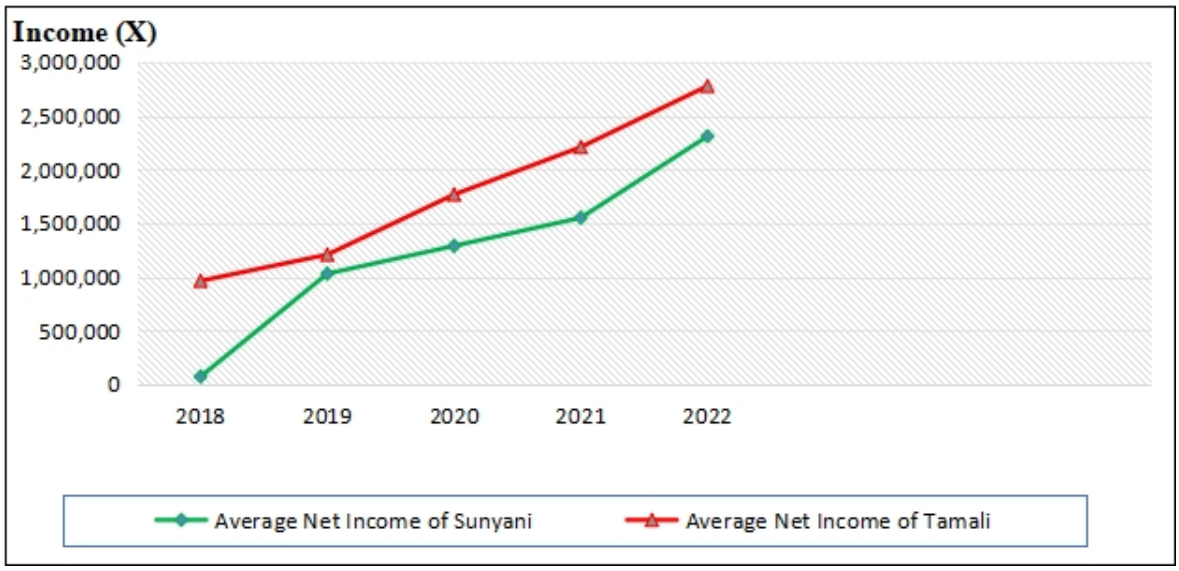

Figure 3: Income Trend of Herbal Medicine Trading in Tamale Metropolis and Sunyani Municipal

Figure 3 shows that over five years, the average total net income of Tamale Metropolis was far higher than the average total net income of Sunyani. More interestingly, the trend displays that except for 2019, the total income for the remaining years was higher. It was revealed in the data gathered during a field survey that some of the herbal medicine buyers get exceptional services from the producers; like giving the herbal medicine to them on credit. The finding is in support of the research work done by (Winter and Kim, 2021). that the difference established in herbal medicine trading across the years may also be due to other factors such as cleanliness and quality of herbal medicine that cannot be easily measured. Regarding the trend of herbal medicine trading activities, most of them have experienced an increasing trend in their financial resources over the past five years.

Generally, there has been a growing trend in herbal medicine trading throughout the years. The income realized from selling herbal medicine has remained sustainable because most traders have been in the business for the past twenty years.

Using herbs in managing and treating diseases has been with Africans and for that matter Ghanaians since time immemorial. In those days, the use of herbal medicine was purely on a household basis. In recent times, the application of herbal medicine to diseases and others has been modernized and commercialized (Etuk and Ayuk, 2021). So, there is a need to motivate most of these herbalists to use the modern ways of herbal medicine preparation so that the side effects or complications that mostly develop after consuming herbal medicine will be minimized if not eradicated.

In general, the survey testified that herbal medicine activities generate appreciable income in the sense that throughout the five years of data gathered, total average expenditure is always less than the total average income. The respondents reiterated during a field survey that HM activity generates sustainable income to support family livelihoods since the income generated was appreciable, secured, and regular. The market for HM is very vibrant. Lindberg et al. (2023), reinforced the above survey that HM activity is a very sustainable and a crucial avenue towards poverty reduction and enhancing the quality of life.

5 Limitations of the Study

Overall, two settlements were purposely selected from the two regions (Northern and Bono Regions) based on their involvement in herbal medicine value chain activities. Sunyani and Tamale were the main urban settlements selected because the geographical location is critical for herbal medicine manufacturing. The spatial association of the nominated settlements and physical differentiation were taken into consideration. The superseding motive in the selection of the settlements is the impartial and adequate coverage of the municipalities to ensure the precision and generalizability of the research findings.

6 Conclusion

Herbal medicine plays a pivotal role in the livelihoods of many individuals, particularly in rural and economically disadvantaged regions. The examination of the annual income of various value chain actors within the herbal medicine sector reveals significant potential for poverty alleviation. From gatherers and cultivators to processors, traders, and retailers, each segment of the value chain contributes to the economic fabric of their communities. The study underscores that equitable and sustainable practices in the herbal medicine value chain can enhance income levels, thereby improving living standards and fostering economic resilience. Moreover, the integration of traditional knowledge with modern business practices can create new market opportunities and enhance the competitiveness of herbal products in both local and global markets. Policies that support infrastructure development, access to credit, and regulatory frameworks that protect traditional knowledge and biodiversity are crucial for the sustained growth of this sector. The herbal medicine value chain holds considerable promise for poverty alleviation. Strategic interventions and supportive policies can maximize the benefits for value chain actors, thereby contributing to broader socio-economic development goals. By harnessing the full potential of herbal medicine, communities can achieve greater economic independence and improved quality of life.

7 Reflexivity/Acknowledgment Statement

We acknowledged the contributions of the executive body of the herbal medicine association and the health director of Sunyani regional hospital as well as other opinion leaders in the study communities. These individuals did not play any role in designing this research, analyzing data and manuscript preparation or decision to publish the paper.

Reference

- Bassett, H. R., Lau, J., Giordano, C., Suri, S. K., Advani, S., & Sharan, S. (2021). Preliminary lessons from COVID-19 disruptions of small-scale fishery supply chains. *World development*, *143*, 105473.
- Booker, A., Johnston, D., & Heinrich, M. (2022). New perspectives on value chains of herbal medicines—Ethnopharmacological and analytical challenges in a globalizing world. In *Evidence-Based Validation of Herbal Medicine* (pp. 43-58). Elsevier.
- Brenton, P., Ferrantino, M. J., & Maliszewska, M. (2022). *Reshaping global value chains in light of covid-19: Implications for trade and poverty reduction in developing countries*. World Bank Publications.

- Creswell JW, Hirose M. (2019). Mixed methods and survey research in family medicine and community health. Family Medicine and Community Health *7*(2): e000086.
- Dalir, M., Choobchian, S., Abbasi, E., Fauconnier, M. L., Dogot, T., Värnik, R., & Azadi, H. (2024). Impact of medicinal plants cultivation on rural livelihoods: the case of South Khorasan Province in Iran. *Environment, Development and Sustainability*, 1-27.
- Etuk, E. A., & Ayuk, J. O. (2021). Agricultural commercialisation, poverty reduction and pro-poor growth: evidence from commercial agricultural development project in Nigeria. *Heliyon*, *7*(5).
- Fayiah, M., Fayiah, M. S., Saccoh, S., & Kallon, M. K. (2024). Value of herbal medicine to sustainable development. In *Herbal Medicine Phytochemistry: Applications and Trends* (pp. 1429-1456). Cham: Springer International Publishing.
- Ghana Statistical Service (GSS) (2016). Population and Housing Census, 2010 Summary of report of final results,
- Jeyacheya, J., & Hampton, M. P. (2020). Wishful thinking or wise policy? Theorising tourism-led inclusive growth: Supply chains and host communities. *World Development*, *131*, 104960.
- Karki, M. B. (2020). Harnessing the potential of medicinal, aromatic and non-timber forest products for improving the livelihoods of pastoralists and farmers in Himalayan mountains. In *Conservation and utilization of threatened medicinal plants* (pp. 93-106). Cham: Springer International Publishing.
- Kumar, M., Rawat, S., Nagar, B., Kumar, A., Pala, N. A., Bhat, J. A., & Kunwar, R. (2021). Implementation of the use of ethnomedicinal plants for curing diseases in the Indian Himalayas and its role in sustainability of livelihoods and socioeconomic development. *International journal of environmental research and public health*, *18*(4), 1509.
- Lindberg, K., Martvall, A., Lima, M. G. B., & Franca, C. S. (2023). Herbal medicine promotion for a restorative bioeconomy in tropical forests: A reality check on the Brazilian Amazon. *Forest Policy and Economics*, *155*, 103058.
- Malapit, H., Ragasa, C., Martinez, E. M., Rubin, D., Seymour, G., & Quisumbing, A. (2020). Empowerment in agricultural value chains: Mixed methods evidence from the Philippines. *Journal of Rural Studies*, *76*, 240-253.
- Manda, S., Tallontire, A., & Dougill, A. J. (2020). Outgrower schemes and sugar value-chains in Zambia: Rethinking determinants of rural inclusion and exclusion. *World Development*, *129*, 104877.
- Mhlanga, S., Matshidze, P. E., Cebekhulu, E., Kugara, S. L., & Makoni, T. (2021). Exploring the utilisation of indigenous knowledge by medicinal plant vendors as a livelihood strategy: a case study of Thohoyandou, Vhembe District, South Africa. *African Journal of Religion, Philosophy and Culture*, *2*(2), 59.
- Nautiyal, S., Smitha, K. C., & Kaechele, H. (2020). Medicinal plant biodiversity in India: harnessing opportunities for promoting livelihood and food security. *Socio-economic and Eco-biological Dimensions in Resource use and Conservation: Strategies for Sustainability*, 135-169.
- Ndhlovu, P. T., Omotayo, A. O., Olagunju, K. O., Otang-Mbeng, W., & Aremu, A. O. (2023). Assessing the impacts of commercializing medicinal plants on livelihood outcomes: evidence from indigenous knowledge holders in South Africa. *Environment, Development and Sustainability*, 1-23.
- Noorhosseini, S. A., Fallahi, E., & Damalas, C. A. (2020). Promoting cultivation of medicinal and aromatic plants for natural resource management and livelihood enhancement in Iran. *Environment, Development and Sustainability*, *22*, 4007-4024.
- Odubo, T. C., Iyiola, A. O., Adetola, B. O., Kolawole, A. S., Izah, S. C., Raimi, M. O., & Ogwu, M. C. (2024). Socioeconomic values of herbal medicine. In *Herbal Medicine Phytochemistry: Applications and Trends* (pp. 1109-1139). Cham: Springer International Publishing.
- Ouko, K. O., Ogola, J. R. O., Ng'on'ga, C. A., & Wairimu, J. R. (2022). Youth involvement in agripreneurship as Nexus for poverty reduction and rural employment in Kenya. *Cogent Social Sciences*, *8*(1), 2078527.
- Pathak, A., Gupta, A. P., & Pandey, P. (2024). Herbal Medicine and Sustainable Development Challenges and Opportunities. *Herbal Medicine Phytochemistry: Applications and Trends*, 1-26.
- Rob, V. O. S., & Cattaneo, A. (2021). Poverty reduction through the development of inclusive food value chains. *Journal of Integrative Agriculture*, *20*(4), 964-978.
- Shamna, N. (2022). *Inter generational role of ethnic medicines in the livelihoods of tribes people in Malappuram* (Doctoral dissertation, Department of Agricultural Extension, College of Agriculture, Vellanikkara).

- Singh, P. K., & Chudasama, H. (2020). Evaluating poverty alleviation strategies in a developing country. *PloS one*, *15*(1), e0227176.
- Sjah, T., & Zainuri, Z. (2020). Agricultural supply chain and food security. In *Zero Hunger* (pp. 79-88). Cham: Springer International Publishing.
- Varga, M. (2020). Poverty reduction through land transfers? The World Bank's titling reforms and the making of "subsistence" agriculture. *World Development*, *135*, 105058.
- Walusansa, A., Asiimwe, S., Ssenku, J. E., Anywar, G., Namara, M., Nakavuma, J. L., & Kakudidi, E. K. (2022). Herbal medicine used for the treatment of diarrhea and cough in Kampala city, Uganda. *Tropical Medicine and Health*, *50*, 1-21.
- Wang, H., Wang, X., Sarkar, A., & Qian, L. (2021). Evaluating the impacts of smallholder farmer's participation in modern agricultural value chain tactics for facilitating poverty alleviation—a case study of kiwifruit industry in Shaanxi, China. *Agriculture*, *11*(5), 462.
- Winter, T., & Kim, S. (2021). Exploring the relationship between tourism and poverty using the capability approach. *Journal of Sustainable Tourism*, *29*(10), 1655-1673.