

PROTEIN CALORIE MALNUTRITION (PCM) IN PLATEAU STATE: AN ANALYSIS OF BASIC NUTRITIONAL DETERMINANTS AT THE HOUSEHOLD LEVEL, 2015-2020

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ABSTRACT

This study examines the prevalence of protein-calorie malnutrition among rural households in Plateau State, Nigeria, within the broader context of basic nutritional determinants. Despite being in the Middle Belt region with substantial agricultural potential, rural households in Plateau State continue to face a significant level of Protein deficiencies that manifest in widespread malnutrition. This research analyses the relationship between basic nutritional needs and the incidence of protein-calorie malnutrition, investigating how limited economic resources constrain access to adequate dietary protein and caloric intake. The study employs a qualitative method, drawing primarily on textual and oral interviews to capture the complexity of household income and consumption habits, to understand the nature of malnutrition in Plateau State. Findings indicate a strong correlation between protein-calorie malnutrition and basic nutritional determinants, with vulnerability observed among children under five and pregnant women. The research identifies critical barriers to adequate nutrition, including seasonal food shortages, limited dietary diversity, inadequate nutrition knowledge, restricted access to protein-rich foods, and inadequate access to infrastructural and social amenities. The study concludes with policy recommendations aimed at addressing malnutrition through integrated approaches that combine poverty alleviation strategies, nutrition education initiatives, and targeted social protection interventions.

KEYWORDS: Protein, Calorie, Malnutrition, Poverty, and Hunger.

INTRODUCTION

Protein Calorie Malnutrition (PCM), also referred to as Protein Energy Malnutrition (PEM), remains one of the most pressing public health challenges in Nigeria, with Plateau State bearing a disproportionate burden among its most

vulnerable populations. This condition is characterized by an inadequate intake of protein and energy relative to the body's requirements or composition. Protein Calorie Malnutrition undermines the nutritional well-being, growth, and cognitive development of vulnerable populations, particularly children under five years of age and lactating mothers in rural Plateau State. Empirical evidence from fieldwork reveals that poor consumption of basic nutritional value food and protein energy intake has proven the existence of malnutrition among individuals in households in rural Plateau State. The understanding of the above shows that malnutrition means the denial of basic nutritional value, food, and protein energy intake to live a long, healthy, and creative life, as well as to enjoy a decent standard of health and freedom. Putting the above analysis in context, the question that needs to be asked is whether there is a right and single understanding of malnutrition? The answer is certainly 'No'. What needs to be placed on record is that malnutrition ought to be understood first as a household problem before it can be placed under the structural spectrum.

However, the persistent level of malnutrition at the household level in rural Plateau State elicits a more critical question: why is malnutrition mostly a rural phenomenon? The deficiencies in the imbalance are caused by inadequate basic nutritional value foods at the household level due to low income, poor nutrition, and expenditure, as well as the environmental setup of Plateau State. The rural dwellers depend on the primary industry as their source of livelihood, which is always labour-intensive. The breakdown of muscle fibres and tissues in making ends meet do not complement their general body requirements or compositions with the right number of nutritional diets and rest. The effects of protein deficiencies are obviously seen in their body composition, such as their teeth, flaky, dry, and rough skin, inflamed and reddish eyes, and brown and dry hair.¹ With this, we ask, what constitutes a "basic nutritional need?" The first understanding of "basic nutritional needs" was put forward by the International Labour Organization (ILO), "First Things First", which includes food, water, clothing, and shelter.² Many studies have attempted to understand malnutrition through the indicators of "First Things First". Others tend to identify food, nutrition, health, education, housing, public transportation, potable water, access to information, and the environment as basic nutritional determinants.³ Whatever approach is chosen to analyse the basic nutritional determinants, it is an arbitrary determinant to show the level of inadequacy of nutritional balance at the household level.⁴

With the above analysis, understanding the determinants of PCM at the household level is therefore critical. The household serves as the primary unit through

¹ Dr. Wula Wulla, Interview with Elijah Izang Yusuf, 22nd November, 2021. Evidence from fieldwork attests to the explanation of Dr. Wulla.

² I L O. 1981. "First Things First: Meeting the Basic Needs of the People of Nigeria." *Jobs and Skills Program for Africa*. Addis Ababa, 1981.

³ Canagarajah, Ngwafon, and Thoma, The Evolution, 8.

⁴ Sudharshan Canagarajah, John Ngwafon and Saji Thoma, The Evolution of Poverty and Welfare In Nigeria (1985-92), *Policy Research Working Paper*, (The World Bank Africa Technical Families Human Development 3 And Institutional and Social Policy January 1997), 8.

which food is acquired, distributed, and consumed, and it is within this setting that nutritional decisions are most immediately made. Factors operating at this level include household income, food diversity, maternal education, feeding practices, healthcare access, and sanitation conditions. These factors interact in complex ways to shape the nutritional status of the household members, particularly children. This study seeks to analyse the basic nutritional determinants of protein-calorie malnutrition at the household level in rural Plateau State, drawing attention to the socioeconomic, environmental, and dietary factors that drive poor nutritional outcomes in rural Plateau State. By identifying and examining these determinants, this work aims to contribute evidence that can inform targeted interventions and policies capable of addressing the root causes of malnutrition, rather than its symptoms alone.

THEORETICAL FRAMEWORK

Individual Deficiency Theory

This theory belongs to classical traditions (Theorists like Charles Darwin, Herbert Spencer, William Sumner, M. R Rank, and T. S McCaleb), all stated that individuals/households are largely responsible for their own malnutrition, choosing in effect to become poor but can come out of it through good choices. This theory states that talent, virtue, hard work, and good choices can lead to success and that malnutrition is an individual failure due to a lack of good plan.⁵ The individual deficiency theory attributes malnutrition to individual deficiencies.⁶ The theory casts the poor as a moral hazard, with claims that malnutrition persists because the poor are engaged in counterproductive activities.⁷ Islam posited that: “the poor are poor because they don’t work smart, some who do, have zero investment and squander their money on gambling, drinking, and unnecessary luxuries, and they have a disorder of family life. They have no ambitions and suffer from an ‘intractable in-educability.’⁸

Other proponents of this view argued that the family or the household is the cause of malnutrition. Keith Joseph sees the ‘family as the cause of poverty and malnutrition’ a ‘cycle of deprivation’ in which the inadequate parenting, lowered aspirations, and disadvantaged environment of families and communities became internalised as part of the values of some children as they grew up. Thus, when these children reached adulthood, their expectations and their abilities were lowered, and they more readily expected and accepted the poverty, malnutrition, and deprivation of

⁵ Alex Addae-Korankye, “Theories of Poverty: A Critical Review” *Journal of Poverty, Investment and Development*, Vol .48, 2019 DOI: 10.7176/JPID ISSN 2422-846X, 56.

⁶ Victoria Voelwoen Danaan, “Analysing Poverty in Nigeria through Theoretical Lenses”, *Journal of Sustainable Development*; Vol. 11, No. 1; 2018, ISSN 1913-9063 E-ISSN 1913-9071, Published by Canadian Center of Science and Education, doi:10.5539/jsd.v11n1p20 URL: <https://doi.org/10.5539/jsd.v11n1p20> (accessed 20th January, 2020), 25.

⁷ Gwartney & McCaleb, cited in Victoria Voelwoen Danaan, “Analysing Poverty in Nigeria through Theoretical Lenses”, *Journal of Sustainable Development*; Vol. 11, No 1, 25.

⁸ S.A. Islam, *Sociology of Poverty: Quest for a New Horizon*, (accessed 22nd April, 2019, <http://www.bangladeshsociology.org/BEJS-2.1.4-Sardar.pdf>. Pp. 1-10.

their parents and acquaintances.⁹ This problem led Theodore William Schultz in 1979, in his book, *The Economics of Being Poor*, to argue that:

The man who farms as his forefathers did cannot produce much food, no matter how rich the land or how hard he works. The farmer who has access to and knows how to use what science knows about soils, plants, animals, and machines can produce an abundance of food, though the land may be poor. Nor need he work nearly so hard and long. He can produce so much that his brothers and some of his neighbours will move to town to earn their living.¹⁰

The Progressive Social Theory

The second school of thought consists of the proponents of neo-classical theories (Karl Marx, Emile Durkheim, C. Jencks, J. Tobin, W. P. Quigley, J. E Chubb, and T. M. Moe). This school of thought is more wide-ranging and recognises reasons for poverty and malnutrition beyond individuals' control. The theorists stated the lack of or inadequacies in social and infrastructural facilities in an environment for comfortable living. These include lack of social as well as private assets; market failures, barriers to education, poor transportation network, electricity, poor health care facilities, barriers to employment, weak policy, environment, weak access to technology, credit, and a host of others.¹¹ This typology has been defined and characterized by low calorie intake, low life expectancy, high infant mortality, and low income.¹² Theorists in this tradition looked not to the individual as a source of poverty, hunger, and malnutrition, but to the economic, political, and social system, which causes people to have limited opportunities and resources with which to achieve income and well-being.¹³ The progressive social theory is sometimes called the theory of "Economic, Political, and Social Distortions or Discrimination."¹⁴ "Poverty researchers have, in effect, focused on who loses out at the economic game, rather than addressing the fact that the game produces losers in the first place."¹⁵ Much of the literature on poverty now suggests that the economic system was structured in such a way that poor people fall behind regardless of how competent they may be.¹⁶

⁹ Keith Joseph cited in Law and Poverty: Theories of Poverty, www.iiste.org, 14.

¹⁰ W. Theodore Schultz, "Investment in Human Capital", *American Economic Review*, Vol. 51, 1961, 3-4.

¹¹ Olatomide Waheed Olowa, "Concept, Measurement and Causes of Poverty: Nigeria in Perspective," *American Journal of Economics*, 2012, 2(1): 25-36, DOI: 10.5923/j.economics.20120201.04 (accessed 3rd May 2021), 25.

¹² G.D. Olowononi, "The Social Responsibility of Nigerian Women to the Advancement of Basic Human Needs. In Basic Needs Approach to Development Planning," A Fadaunsi et al, eds. Centre for Social and Economic Research, A.B.U. Zaria, 1982, 4.

¹³ R. Asen, *Visions of Poverty: Welfare Policy and Political Imagination*, (East Lansing: Michigan State University Press, 2002), 29-34., 30.

¹⁴ *Ibid.*

¹⁵ Asen, *Visions of Poverty*, 31.

¹⁶ *Ibid.*

Ogwumike added that this type of poverty and malnutrition is long term and persistent and can be transmitted from one generation to another and it is very persistent.¹⁷ According to Azariadis and Stachursk, the poor are more vulnerable to events they cannot control. They are less able to diversify their income sources.¹⁸ Many of the extremely poor are caught in a poverty trap, unable on their own to escape from extreme material deprivation. They are trapped by malnutrition, disease, physical isolation, environmental degradation, and extreme poverty itself.¹⁹ The attributes of the above theories explain the individual and the structural dislocation in rural households in Plateau State. The individuals and structural problems were characterized by bad choices, a bad transportation network, poor health care facilities, poor and limited electricity, clean drinking water, poor education, poor housing conditions, the absence of financial and credit facilities, poor feeding conditions, and a host of other deficiencies.

SOME FACTORS RESPONSIBLE FOR POVERTY IN RURAL PLATEAU STATE

Malnutrition in rural Plateau State is deeply rooted in the persistent poverty shaped by structural, geographical, and agricultural challenges that have limited the capacity of households to achieve adequate nutrition. One of the foremost factors driving this poverty and, by extension, malnutrition, is the prevalence of smallholding agriculture. The long-term experience in smallholding agriculture in rural Plateau State has shown slow growth and minimal transformation, making it a significant setback to poverty alleviation. The smallholder agricultural practices handed down from pre-colonial generations have remained largely unchanged, keeping rural communities trapped in cycles of low productivity.²⁰ Gollin observed that this type of smallholder practice has long served as the dominant economic activity for people in Sub-Saharan Africa and will remain enormously important for the near future.²¹ This was further confirmed through an interview with Thomas, who revealed that smallholder farmers in rural Plateau State relied on simple farm tools, cultivated small

¹⁷ F.O., Ogumike, *The Effects of Macro Level Government Policies on Rural Development and Poverty Alleviation in Nigeria*, Ibadan, Social Science Journal 1. (1), 1995, 6.

¹⁸ Costas Azariadis and John Stachursk, "Poverty Traps" In Philippe Aghion and Steven N. Durlauf (eds), *Handbook of Economic Growth*, Volume 1A. Edited by ©2005 Elsevier B.V. All rights reserved, (accessed 2nd January, 2019), Available at: DOI: 10.1016/S1574-0684(05)01005-1, 302.

¹⁹ Jeffrey D. Sachs, *The End of Poverty Economic Possibilities for our Time*, (New York: The Penguin Press, 2005), 20.

²⁰ *Ibid.*

²¹ Douglas Gollin, "Smallholder agriculture in Africa An overview and implications for Policy," *Working Paper*, (Published by IIED, October 2014), 2014<http://pubs.iied.org/14640IIED>, (accessed 5th April, 2021), 3.

²¹ Thomas Pate, Interview by Sambo Ajang, Fobur, 19th January, 2019.

pieces of farmland, depended on family labour, and operated under a rigid land tenure system.²² Their narrow agricultural resource base chains them in persistent poverty, as growth in the agricultural sector remains consistently slow, limiting their income and savings. The poor level of savings, as Wieliczko, Kurdyś-Kujawska, and Sompolska-Rzechuła argued, further limits their development possibilities, creating a cycle that directly undermines households' ability to access and sustain adequate nutrition.²³

Compounding this agricultural limitation is the nature and topography of Plateau State, which is characterized by undulating hills and rocky terrain that hinder large-scale agricultural production and restrict market access. The geographical setting of Plateau State, particularly in communities such as Jos East, Pankshin, and Kanke, is defined by rocky hills that make the construction of accessible roads extremely difficult, thereby limiting farmers' contact with other businesspeople and markets. Maoying averred that mountains are often regarded as barriers to communication and development, and that people living in mountain regions are disproportionately poor, with general antipoverty strategies proving less effective in such environments.²⁴ Kraay and McKenzie similarly acknowledged that poverty trap mechanisms are observable in mountainous localities, where individuals become locked in unfavourable conditions they cannot escape.²⁵ The production and marketing constraints arising from this topography result in poor capacity to save, which in turn reduces real income among smallholder farmers and further diminishes their ability to provide nutritious food for their households. The cumulative effect of these structural and geographical constraints is most vividly captured by Onimode, whose observation reflects the lived reality of rural Plateau State.

According to him, the wealth smallholder farmers create becomes, ironically, the source of their deprivation. They produce rich food products yet consume the poorest diets, are condemned to isolated village settings, live in deteriorating housing, wear tattered clothing, and suffer from emaciated and prematurely aged bodies, with life expectancy falling well below the national average (41 years in 1975), and their per capita income is barely half of the national level.²⁶

Field interviews also reveal that rural settlements in Plateau State were historically marked by severe infrastructural deficiencies. This characterization aligns

²² Thomas Pate, Interview by Sambo Ajang, Fobur, 19th January, 2019.

²³ Barbara Wieliczko, Agnieszka Kurdyś-Kujawska and Agnieszka Sompolska-Rzechuła, "Savings of Small Farms: Their Magnitude, Determinants and Role in Sustainable Development. Example of Poland" In *Agriculture*, Received: 9 October 2020; Accepted: 2 November 2020; Published: 4 November 2020, 1.

²⁴ Shen Maoying, "Poverty and Anti-Poverty In China Mountain Region" *Institute of Economy, Sichuan Academy of Social Sciences*, Paper Submitted to the XII World Forestry Congress, 2003, Chengdu City, 610072, P.R. China, 2&6.

²⁵ Kraay A., McKenzie D. "Do poverty traps exist? Assessing the evidence", *Journal of Economic Perspectives*, 28.3, (2014), 127, 48.

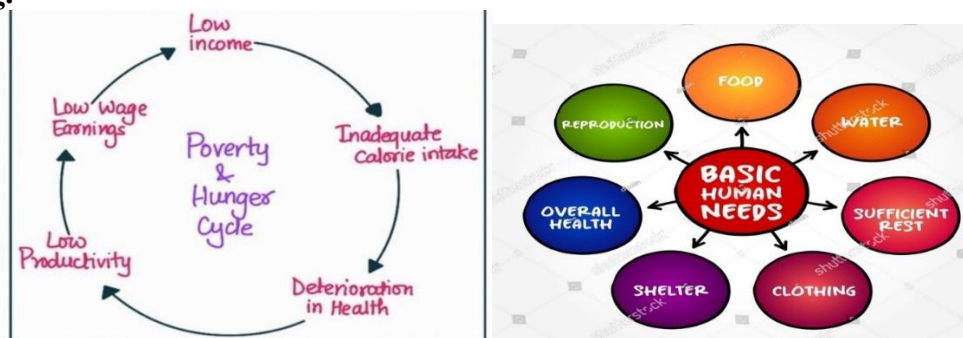
²⁶ Bade Onimode, *Imperialism and Underdevelopment in Nigeria: The Dialectics of Mass Poverty*, (London: Published by Zed Press, 1982), 167.

closely with conditions observed in surrounding villages of rural Plateau State, where communities are isolated by mountains, housing consists largely of mud blocks and thatched roofs, and the diet is dominated by carbohydrates with little nutritional diversity. A group interview further confirmed that social and infrastructural amenities in these communities are nearly non-existent, with inadequate access to clean drinking water, poor road conditions, substandard healthcare services, limited schools, and a total absence of electricity.²⁷ These deprivations collectively and directly undermine nutritional balance at the household level, reinforcing the cycle of malnutrition that continues to afflict the underage and vulnerable populations of rural Plateau State.

THE NATURE OF HOUSEHOLD POVERTY

Rural Poverty is dedicated to identifying poverty indicators at the household level of society. Such analysis at the household level is anchored on the nature of food consumed, clothing, expenditure, condition of housing, drinking water, and sanitation to represent all basic needs. If these basic needs are insufficient or lacking, it is an indicator to conclude that poverty and malnutrition exist at the household level. The diagrams below give a breakdown of poverty and malnutrition, as well as the basic human needs.

Diagram 1: Showing the circle of poverty and the basic human needs for healthy living.



Source: www.google scholar.com

The above is a presentation of the persistent level of poverty and malnutrition at the household level in rural Plateau State, which ignites a more critical question: why is poverty and malnutrition a rural phenomenon? The answer to this question depends on households' choices and the scale of preference. The concept of headcount or per capita is often casually understood because members of the same household have different needs and wants based on sex and age grades. Distributing this income per capita unit of household is difficult to measure because of individual wants and needs. What we intend to bring to light here, to address the question of household

²⁷ Group Interview with Malam Ezra Yusufu, Kaka Kushim, and Ada Abok Azi, interview by Elijah Izang Yusuf, Shere, 21st April, 2021.

poverty, is to look at the nutritional energy-calorie intake of the household per capita to understand the existence of poverty.

Empirical evidence from fieldwork revealed that poor consumption of basic nutritional value food and protein energy intake in rural Plateau State has proven the existence of malnutrition at the household level. Moria posits that the insufficiency or lack of nutritional foodstuffs and ignorance of available substitutes are causal factors. However, the bottom line is the inability to purchase other nutritive commodities to add to one's consumption basket show the presence of poverty. Low nutritional levels can result in stunted growth amongst small children, poor resistance to diseases, low energy levels, and low productivity.²⁸ The above tells the situation in rural Plateau State, where local farmers produced high-nutrient-value food crops but consumed less of them. Even when they consumed more, they did not consume the right diet intake to go with the hard work they engaged in.²⁹ The way their diets were arranged shows malnutrition, due to the high consumption of starchy carbohydrates and less protein. For example, the mostly consume *Kunu* as breakfast, *Gwote* as lunch, and *Tuwo* as dinner. Localities (Jos East) with no access to a source of water for irrigation hardly consume vegetables during the dry season because of the absence of irrigable water that can produce vegetables. The absence of greens creates a vitamin deficiency. Timothy argued that vegetables contain lots of vitamins.³⁰ The absence of these basic nutrients means depriving the body of the absorption of food that is rich in vitamins, minerals, and iron, when compared with hard work.

Nutritionists classify a good, balanced diet as carbohydrates, fats, proteins, minerals, vitamins, and water. Nutritionists generally recommend that a person eat at least one serving of food from each of the basic classes of food or a balanced diet.³¹ The U.S. Department of Agriculture has developed a plan with four food groups called 'A Daily Food Plan'. These groups are (1) Milk, (2) Meat, (3) Vegetables and Fruits, (4) Bread and Cereal. Three to four daily servings from each group were recommended for a healthy diet.³² It is important to emphasise that, everywhere in the world, the food eaten by various communities differs a great deal, but all these different foods are actually made up of the same substances or nutrients.³³ The farming communities produce what can also be classified as a balanced diet, but they consume or eat little of the balanced diet every day. Out of the abundance of agricultural endowments, what they consumed were mostly starchy carbohydrates made of maize and guinea-corn. Traces of malnutrition seen among some farming households in

²⁸ C. L. Moria, "Better Nutrition for Africa's families", *African Farmer*, (No. 8), March 1993, 5-10.

²⁹ This data was collected from fieldwork.

³⁰ Dr. Timothy, Able Davou Yusuf, Angware, 19h May, 2022.

³¹ The World Book Encyclopedia, N-O, Volume 14, (United States: Printed by Field Enterprises Educational Corporation, 1964), 468.

³² The U.S department of Agriculture, cited in the World Book Encyclopedia, N-O, Volume 14, (United States: Printed by Field Enterprises Educational Corporation, 1964), 466.

³³ Monica Byrne and F. J Bennett, *Community Nursing in Developing Countries: A Manual for Auxiliary Public Health Nurse*, (London: Oxford University Press, 1973), 34.

Plateau society were the nature of their body structures, the nature of their teeth, their flaky, dry, and rough skin, inflamed and reddish eyes, and brown and dry hair.³⁴ The symptoms of malnutrition found among the children were similar to those of their parents and the elderly. The evidence of malnutrition found in Plateau society was related to a deficiency in protein-calorie malnutrition (PCM).³⁵

The above made Beck to emphasise that, “there is a high level of deficiency in PCM in many developing countries, adequate amounts of foods high in proteins, especially proteins of high biological value, cannot be obtained by a large part of the population.”³⁶ Beck refers to biological protein to mean protein out of animal like meat, egg, and milk.³⁷ These types of protein are a bit expensive in rural communities in Plateau State.³⁸ The other type of proteins is the plant proteins. Plant proteins are soybeans, red beans, white beans, and groundnuts. The rural farmers in Plateau communities consume less of these proteins because they prefer to sell them at city markets for income returns.³⁹

MALNUTRITION AMONG THE AGED

The deficiencies in fats, vitamins, and most importantly, proteins lead to a high level of unnoticed malnutrition among rural farmers, except when observed closely.⁴⁰ The activities the rural farmers engage in demand high consumption of proteins. They work 12 hours with little rest a day (during farming season), which leads to muscle tears, tissue damage, and general body breakdown, which requires quick recovery from proteins and rest.⁴¹ Byrne and Bennett argued that protein is necessary for the growth and repair of all body cells.⁴² To bring this analysis into the lens of our argument, the farmers are supposed to consume more protein compared to office workers because they break down calories for energy quickly. The table below shows detailed amount of calorie intake per day a farmer per capita is expected to consume when compared to a clerk in an office. If the amount of calories does not meet the daily requirement of energy intake, such farming households are malnourished.

³⁴ Dr. Wula Wulla, Interview with Elijah Izang Yusuf, 22nd November, 2021.

³⁵ *Ibid.*

³⁶ Mary E. Beck, (Sixth Edition), *Nutritional and Dietetics for Nurses*, (Edinburgh London: Published by Churchill Livingstone, 1980), 8.

³⁷ *Ibid*

³⁸ Baba Gideon Moses, Interview by Elijah Izang Yusuf, Lamingo, 2nd December, 2021.

³⁹ *Ibid*

⁴⁰ Saratu Babale, Interview by Elijah Izang Yusuf, Angware, 20th December, 2021.

⁴¹ Azi Tanko and Kennedy Chukuemeka, Group Interview by Elijah Izang Yusuf, Body Talk-opposite P.R.T.V, 3rd February, 2022.

⁴² Byrne and Bennett, *Community Nursing*, 35.

Table 1
Kilo-Calorie Needed Each Day for a Healthy Life

Time	Clerk	Farmers
8 hours sleeping	2,160	2,160
8 hours of free time	4,800	4,800
8 hours' work	3,600	9,600
Total	10,600	16,560

Source: from the work of Maurice H. King, Felicity M.A King, David C. Morley, H. J. Leslie Burges, and Ann P. Burgess, P. 6.2

The table above shows that the difference in calories between a farmer and a clerk is 5,960. It shows that farmers need more calories than clerks because of their active labour, but the reverse is the case, as clerks consume more calories than farmers. Farmers in Plateau State, especially the hilly farmers in Jos East, Pankshin, and Kanke Local Government areas, work 12 hours a day, from 6.00 am to 6.00 pm, or to 8.00 pm.⁴³ The amount of body energy breakdown during this period is very massive. What they breakdown in 12 hours or more in hard labour is not up to the amount of 2,160 and 4,800 kilo-calories needed during 8 hours sleep and free time in the table above. If the rural farmers need such calories in 8 hours, then what would be the number of calories needed in each minute? The table below explains the men's calorie needs for doing different activities.

Table 2
65kg of Calorie Reference Men Need for Doing Different Things

Activity	Kilo-Calories needed each minute.
Sleeping in bed	4.5
Sitting quietly	5.8
Standing quietly	7.3
Walking	15.5
Bricklaying	15.9
Walking carrying 10kg	16.7
Chopping wood	18.0
Cutting grass by hand	18.8
Loading sacks	22.6
Clearing bush	26.0
Shovelling	27.2
Working with pick	28.9
Sawing by hand	36.0
Cutting a tree with an axe	36.0

Source: from the work of Maurice H. King, Felicity M.A King, David C. Morley, H. J. Leslie Burges, and Ann P. Burgess, P. 6.2. Restructured by the authors.

⁴³ Group interview with Azi-Gwom Pate, Ayuba Pate, Atang Chiroma, Kaze Ibrahim, Shere, 30th October, 2021.

The above table shows the different activities the rural farmers perform every day and the amount of calories needed for each activity. The question is, are they consuming the right amount of calories in a minute in the table above? The answer is No. Analysis from the column of clearing bush, cutting trees with axes, sawing by hand, working with a pick, pictures the high-intensity performance of the rural farmers in Plateau State. Engaging in such heavy and difficult labour means that a high level of energy is put into doing these jobs. If the amount of hard labour put into performing the hardest farming jobs is not compensated with the right amount of calorie intake, the farmers' bodies suffer from the deficiencies highlighted above.

Table 3

DAILY ALLOWANCES OF CHIEF FOOD ELEMENTS

							VITAMINS					
	Age	Weight (lbs.)	Calories	Protein (gm.)	Calcium (gm.)	Iron (mg.)	A (I.U)	C (mg.)	D (I.U)	Thiamine (B1) (Mg.)	Riboflavin (B2) (mg.)	Niacin (B3) (mg.)
Men												
Inactive	25	154	2,400	70	0.8	10	5,000	75		1.2	1.8	16
Active	25	154	3,200	70	0.8	10	5,000	75		1.6	1.8	21
Very Active	25	154	4,500	70	0.8	10	5,000	75		1.8	1.8	30
Women												
Inactive	25	128	2,200	58	0.8	12	5,000	70		1.0	1.5	13
Active	25	128	2,300	58	0.8	12	5,000	70		1.2	1.5	17
Very Active	25	128	3,000	58	0.8	12	5,000	70		1.5	1.5	20
Children												
	1-3	27	1,300	40	1.0	7	2,000	35	400	0.7	1.0	8
	4-6	40	1,700	50	1.0	8	2,500	50	400	0.9	1.3	11
	7-9	60	2,100	60	1.0	10	3,500	60	400	1.1	1.5	14
	10-12	79	2,500	70	1.2	12	4,500	75	400	1.3	1.8	17
Boys												
	13-15	108	3,100	84	1.4	15	5,000	90	400	1.6	2.1	21
	16-20	139	3,600	100	1.3	15	5,000	100	400	1.8	2.5	25
Girls												
	13-15	108	2,600	80	1.3	15	5,000	80	400	1.3	2.0	17-
	16-20	120	2,400	75	1.3	15	5,000	80	400	1.2	1.9	16

SOURCE: National Research Council

Key words: gm.=grams; mg. milligram; I.U.=International Units.

With this analysis, it is important to note that people based on age, grade, and gender differ from one another. So different categories of people need different amounts of energy food each day, which depends partly on their body size, and partly

on how hard they work.⁴⁴ Making perfect sense of the above analysis revealed that the consumption of energy-giving food like proteins was below average in the farming households because their bodies did not take the required amount of calories, which made them suffer from PCM and other related nutritional disorders.⁴⁵ The above analyses show that the smallholder farmers were poor because they could not afford or combine the basic required energy intake for healthy growth. This shows that malnutrition occurs when the body is not supplied with the correct amount of nutrients, compared to the amount of work.⁴⁶ These rural farmers need proteins because they break down food very fast, and their bodies need to recover very quickly to take care of the next hard labour. If the body does not replenish itself, the farmer is said to be malnourished. An example of the amount of calories energy intake an active person by gender and age grade needs to consume is shown below to support the table above.

The table above shows that the calories, protein, calcium, iron, and vitamins intakes of inactive, active, and very active persons are different. In addition, they are also different according to gender and age grade. From the above table, we can see clearly that the calorie intake is not close to the amount of the Nigerian absolute poverty lines, the incidence of a 2100 to 2900-calorie limit, plus that of an active and very active person.⁴⁷ According to Chundung, the calorie energy intake of most rural farming households in rural Plateau state is between 1500 and 2200, and for children less than 5 years it is less than 1000.⁴⁸ However, these estimations depend on the capacity of the households, but the majority are between these ranges. Odey also opined that the food crop farmers in the Benue-Plateau region take between 1500 and 2100 calories, as opposed to 3500 and about 50 grams of protein requirements per day, while a year-old child requires less than 1000 calories and 15 grams of protein per day.⁴⁹ The above evidence has shown that rural households per capita consume fewer proteins. Nutritionists believe that proteins are a vital part of each cell in our bodies. The body uses protein to build, refine, and repair broken tissues and to form substances called antibodies that fight infections.⁵⁰ The low intake of calories perhaps indicated why there are malnutrition and nutritional disorders among farming communities in rural Plateau State.

⁴⁴ Maurice H. King, Felicity M.A King, David C. Morley, H. J. Leslie Burges, and Ann P. Burgess, *Nutrition for Developing Countries*, (Nairobi/London: Oxford University Press, 1972), p. 62.

⁴⁵ Dr. Wula Wulla, Interview with Elijah Izang Yusuf, 22nd November, 2021.

⁴⁶ Byrne and Bennett, *Community Nursing*, 36.

⁴⁷ National Bureau of Statistics, *Poverty Profile of Nigeria*, (Federal Republic of Nigeria, 2005).

⁴⁸ Ruth Chundung Solomon Yusuf, Interview by Elijah Izang Yusuf, Jos North, 1st November 2021.

⁴⁹ Mike Odugbo Odey, "A History of Food Crop Production in the Benue Area; 1920-1995: The Dialectics of Hunger and Rural Poverty," (A Thesis of the Department of History, Faculty of Arts, University of Jos, Nigeria, 2001), p. 314.

⁵⁰ The World Book Encyclopedia, N-O, p. 466.

MALNUTRITION AMONG THE UNDER-AGED

Another important area to consider is the level and incidence of malnutrition, hunger, and poverty among the underaged children. One of the early cases of under-nourishment among infants in the rural areas of Plateau State sprang from insufficiency of the right protein-calorie-intake by their mothers during breastfeeding. Infants do not get the right amount of nutritional breast milk from their mothers because it is what their mothers consume, and they also consume from breast milk. The high consumption of parents results in the malnutrition of children.⁵¹ Children above the age of 6 months to 10 years were introduced to high consumption of carbohydrates. According to Byrne and Bennett, protein-calorie malnutrition (PCM) usually affects children in the first 4 years of life while they are growing rapidly.⁵² The dreaded consequences of this malnutrition were the high rate of infant and child mortality. Kings et al stressed that high consumption of carbohydrates with little protein affects the growth of children; they become ill, many die, even when they grow, they are not as smart and healthy as their counterparts in cities.⁵³

Another devastating aspect of child malnutrition can be found in the Ghanaian proverb that calls it “the illness of the displaced child.”⁵⁴ The explanation of this proverb means that an infant is taken away or displaced from his mother's breast milk because the mother is pregnant again. Beck buttressed that the above action causes malnutrition to occur in infants and children up to 5 years of age and is associated with cessation of breastfeeding.⁵⁵ This emanates from the high rate of sex, marriage, and divorce amongst young teenagers.

An example of sex, marriage, and divorce amongst young teenagers is clearly seen in Shere district of Jos East L.G.A, where early marriage and school dropout among young people in Afizereland have been identified as key contributing factors to malnutrition among underaged children. Most teenage boys under 21 and teenage girls under 18 already have children at home, a situation that places enormous nutritional pressure on young, often unprepared households. An interview with Joshua Izang, a student in SS2, illustrated this reality vividly. Izang, at just 21 years of age, had been married to three wives, divorced one, and was effectively fathering three children from different fathers. At the time of the interview, his second wife was pregnant with her second child, and his third wife was pregnant with her third, both wives being under 20 years of age. Notably, the children of his first and second wives were not biologically his, yet the burden of their care fell on the household. With no stable income and limited resources, the only means of survival available to these young families was subsistence farming. Small portions of farmland were carved out from larger plots and given to them to feed their families. This arrangement, however, was

⁵¹ Ruth Chundung Solomon Yusuf, Interview by Elijah Izang Yusuf, Jos North, 1st November, 2021.

⁵² Byrne and Bennett, *Community Nursing*, p. 36.

⁵³ King et'al, *Nutrition*, introductory page.

⁵⁴ King et'al, *Nutrition*, 2.4c-5.

⁵⁵ Beck, (Sixth Edition), *Nutritional*, p. 21.

far from adequate to meet the nutritional needs of growing children, leaving them vulnerable to malnutrition. The story of Izang is not an isolated one but rather reflects the numerous cases of early marriage and school dropout that define the lives of young people in Afizereland, with underage children bearing the heaviest nutritional consequences.

The implication of this is that infants suffer from the effects of broken homes and early pregnancy. Many grow up under single parents and the absence of a stable job to derive income at home, leading most children to suffer and become malnourished under the custody of their mothers.⁵⁶ These types of cases were rampant and prevalent in the rural areas. What became of these infants was nothing but malnutrition and sickness. Examples of symptoms of malnutrition are what experts reveal to be dry, reddish hair, big red eyes, dry and rough skin, general body weakness, and a host of others. Malnutrition is often precipitated by repeated attacks of diarrhoea, malaria, vomiting, and intestinal parasites.⁵⁷

The foregoing analysis speaks volumes about the existence of malnutrition among children in rural Plateau communities. Infants were malnourished because they did not consume the right amount of protein energy intake required for healthy living, growth, bodybuilding, muscles, skin, and blood.⁵⁸ The deficiencies in protein, vitamins, fats, minerals, and water in the bodies of the rural tomato farmers and their children in Afizere society were a causal factor of the increase in high rates of diseases.⁵⁹ Elliott argued that,

...in Africa, low nutrition levels could result in stunted growth amongst small children, poor resistance to disease, low energy levels, and low productivity. For example, the period of rain (just before harvest) is the period of the hunger season and the most intensive farm work. Without enough to eat, rural people are caught in persistent poverty.⁶⁰

This signifies that poverty exists in this epoch. Our analysis has shown the under-consumption and the nutritional imbalance among the farmers, which favours the spread of diseases because their immune system is very weak to fight foreign antibodies.

CONCLUSION

The analysis of Protein Calorie Malnutrition (PCM) in Plateau State reveals a deeply entrenched public health crisis that continues to undermine the nutritional well-being, growth, and cognitive development of vulnerable populations, particularly children under five years of age and lactating mothers. The findings from this study

⁵⁶ Ajik John, Interview by Elijah Izang Yusuf, Shere-Ridem, 20th March, 2022.

⁵⁷ *Ibid.*

⁵⁸ Ponkap B. Zinkat, Interview by Elijah Izang Yusuf, Angware, 7th December, 2021.

⁵⁹ *Ibid.*

⁶⁰ C. Elliott, *Patterns of Poverty in the Third World: A Study of Socio-Economic Stratification*, (London: Prager Publication, 1975), 355, cited in Mike Odugbo Odey, "A History of Food, 311.

demonstrate that PCM in Plateau State is driven by individual and structural factors. Poverty, inadequate dietary diversity, poor infant and young child feeding practices, food insecurity, low maternal education, and limited access to quality infrastructural and social amenities services have been identified as the principal determinants fuelling the high prevalence of PCM across rural communities in the State. If left unaddressed, PCM will continue to perpetuate intergenerational cycles of poverty and underdevelopment in Plateau State. Tackling PCM in Plateau State requires a coordinated, multisector, and sustained response that targets the root causes of malnutrition while strengthening the capacity of health systems to deliver effective nutritional interventions at all levels. Based on the findings, the paper proffers recommendations for strengthening Nutrition-Sensitive Agricultural Programmes (NSAP), Community-Based Nutrition Interventions (CMAM), and Maternal and Child Nutrition Education (MCNE): The Plateau State Government, in collaboration with the Federal Ministry of Agriculture, should intensify efforts to promote nutrition-sensitive agriculture by encouraging the cultivation and consumption of protein-rich crops such as legumes, soybeans, and cowpeas, as well as livestock rearing. This will improve household food security and dietary diversity, thereby reducing the incidence of PCM. Subsequently, scaling up Community-Based Nutrition Interventions: CMAM programmes should be expanded to cover underserved local government areas. Community health workers and village health volunteers should be trained and deployed to identify, refer, and monitor malnourished children at the grassroots level. In addition, Maternal and Child Nutrition Education should be encouraged to robust nutrition education programmes targeting mothers, caregivers, and adolescent girls. Health facilities, community groups, and schools should serve as platforms for promoting exclusive breastfeeding for the first six months of life, appropriate complementary feeding practices, and dietary diversification.

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