

## **Nutritional Value of Land Snails (Yoryor): A Case Study of Kaiyamba Chiefdom, Moyamba District, Sierra Leone**

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### **Abstract**

Land snails are a traditional but underutilized food resource in Sierra Leone. In Kaiyamba Chiefdom, Moyamba District, snail harvesting peaks during the rainy season, when communities collect and prepare them as a protein-rich food source. This study assessed the nutritional value of land snails, examined harvesting, cooking, and preservation practices, and explored community perceptions of snail consumption. Data were collected through interviews and focus group discussions with residents of Kaiyamba Chiefdom, supported by a literature review. Results indicate that snails are high in protein and rich in iron, zinc, calcium, and magnesium, while being low in fat. Locally, snails are prepared in vegetable stews, soups, or fried dishes, with preservation methods including smoking and sun-drying. Community members perceive snails as healthy and suitable for children. Findings suggest that integrating snails into community nutrition education and promoting small-scale snail farming could enhance dietary diversity, food security, and household income in rural Sierra Leone.

**Keywords:** land snails, nutrition, Kaiyamba Chiefdom, Moyamba, protein, food security, harvesting, processing

### **1. Introduction**

Malnutrition remains a significant public health challenge in Sierra Leone, with high rates of stunting (26%) and wasting (6%) among children under five (UNICEF, WHO, & World Bank, 2025). Improving dietary diversity through locally available and culturally acceptable foods is critical.

Land snails are terrestrial gastropod mollusks widely distributed across Africa, Asia, Europe, and the Americas, with major families including Achatinidae and Helicidae (Fagbua, Oso, Edward, & Ogunleye, 2006). In West Africa, commonly consumed species include *Archachatina marginata*, *Achatina achatina*, and *Achatina fulica* (Adeola, Olaleye, & Ojebiyi, 2022). In rural Sierra Leone, snails, locally known as *Yoryor*, represent both a traditional food and an underutilized source of animal protein.

Nutritionally, snail meat is a rich source of high-quality protein, essential amino acids, and minerals such as iron, calcium, magnesium, and zinc. It is low in fat and cholesterol, making it a healthier alternative to conventional animal proteins like beef, chicken, and fish (Nkansah, Awuah, & Owusu-Ansah, 2021; Gupta, Kumar, & Shukla, 2024; Fagbuaro et al., 2006). Regular consumption of snails can enhance dietary diversity, support child growth, and help mitigate micronutrient deficiencies in resource-limited settings (FAO, 2019).

Economically, land snails contribute to household income and livelihoods. Wild snails are predominantly collected during the rainy season, while small-scale snail farming (horticulture) has emerged as a sustainable strategy to reduce overharvesting and ensure year-round availability (Ejidike & Morenikeji, 2014; Agbogidi & Okonta, 2011). Snail shells also have applications in animal feed, traditional medicine, and handicrafts, providing additional income opportunities for rural households.

Despite these benefits, snail utilization is constrained by seasonal availability, limited preservation techniques, and cultural perceptions. Common preservation methods include smoking, sun-drying, and boiling, yet the lack of refrigeration often results in spoilage and post-harvest losses (Babalola & Akinsoyinu, 2015). Promoting snail farming, improving preservation technologies, and integrating snails into nutrition education programs could strengthen their contribution to food security, nutrition, and rural livelihoods (Adeola et al., 2022; Global Nutrition Report, 2023).

Although land snails (*Achatina achatina*, *Archachatina marginata*) are widely consumed across West Africa and valued for their high protein and mineral content (Fagbuaro et al., 2006; Nkansah et al., 2021), their nutritional role in rural Sierra Leonean diets remains poorly documented. This study focuses on Kaiyamba Chiefdom, Moyamba District, to examine the nutritional value and utilization of snails in local diets

## 1.2 Aim and Objectives

### 1.2.1 Aim

To investigate the nutritional value, harvesting, preparation, and preservation methods of land snails (Yoryor) in Kaiyamba Chiefdom, Moyamba District, and to assess their potential role in improving household nutrition, food security, and local utilization.

### 1.2.2 Objectives

- I. To analyze the nutritional composition and dietary importance of land snails (Yoryor) consumed in Kaiyamba Chiefdom.
- II. To document local practices of snail harvesting, including seasonal availability, collection, and preservation methods.

- III. To examine traditional cooking methods and utilization of land snails in household diets.
- IV. To explore community perceptions, cultural attitudes, and acceptance of snail consumption as a food source.
- V. To assess the contribution of snail consumption to household nutrition and food security in the Chiefdom.
- VI. To recommend strategies for promoting sustainable harvesting, snail farming, and wider utilization of snails in local nutrition programs.

### **1.2.3 Research Questions**

- What are the key nutritional attributes and dietary benefits of land snails (Yoryor) consumed in Kaiyamba Chiefdom?
- During which seasons are snails most abundantly harvested, and what methods are commonly used for collection?
- What traditional cooking and preservation practices are employed for land snails in the community?
- How do community members perceive the cultural, nutritional, and economic value of snails as a food source?
- What potential strategies can support sustainable snail farming and increased consumption to improve household nutrition and food security?

### **1.2.4 Significance of the Study**

This study contributes to the growing body of literature on the role of indigenous and underutilized foods in improving nutrition within resource-limited settings. It provides context-specific evidence from Sierra Leone that can guide district-level nutrition programming, extension services, and small-scale farming initiatives aimed at enhancing dietary diversity and household livelihoods.

Specifically, the study underscores the importance of traditional food sources such as land snails in addressing food and nutrition insecurity in rural Sierra Leone. It further highlights the potential of snail farming and conservation as sustainable strategies for improving protein intake, supporting income generation, and strengthening community nutrition (Ejidike & Morenikeji, 2014; Adeola et al., 2022).

## **2.0 Methodology**

### **2.1 Study Area and Design**

This qualitative descriptive study was conducted in Kaiyamba Chiefdom, Moyamba District, Southern Sierra Leone, where snail harvesting and consumption are integral to local diets.

## **2.2 Participants and Sampling**

Purposive sampling targeted residents involved in snail harvesting, processing, and consumption. Thirty (30) community members—including household heads, farmers, traders, and caregivers—participated in semi-structured interviews, while two focus group discussions (FGDs) were conducted with women caregivers and youth.

## **2.3 Data Collection**

Data were collected during the rainy season (15 May–15 August 2025), when snails are most abundant. Methods included semi-structured interviews, FGDs, and direct observation of market practices, cooking, and preservation techniques.

## **2.4 Data Analysis**

Transcripts were thematically coded into categories: harvesting, nutritional value, preparation, preservation, and cultural beliefs. Findings were triangulated with published nutritional composition data from peer-reviewed studies.

## **3.0 Results and Discussion**

### **3.1 Demographic Characteristics of Respondents**

A total of 30 community members participated in interviews, and two FGDs involved women caregivers and youth. Participants' ages ranged from 20–65 years, with 60% females and 40% males. Most respondents were farmers (53%), followed by traders (27%) and caregivers (20%).

**Table 1. Demographic characteristics of respondents (n = 30)**

**Characteristic Frequency Percentage (%)**

#### **Gender**

Male	12	40
Female	18	60

### **Characteristic Frequency Percentage (%)**

#### **Occupation**

Farmer	16	53
Trader	8	27
Caregiver	6	20

#### **Age group**

20–35	10	33
36–50	12	40
51–65	8	27

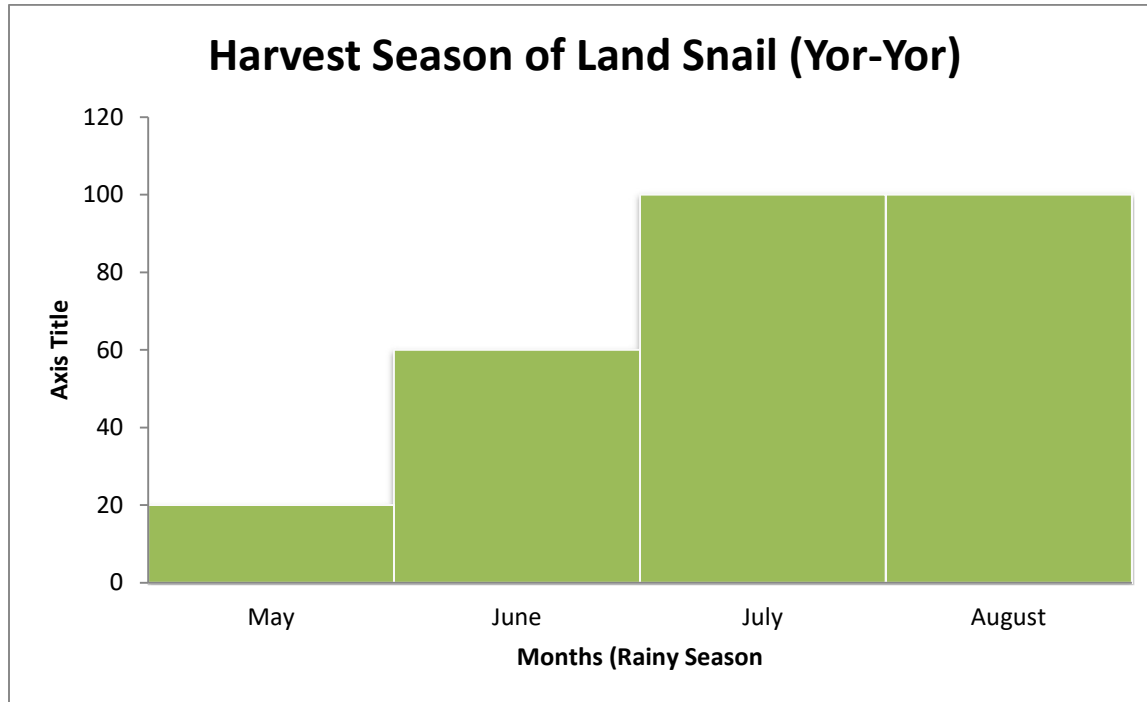
### **3.2 Harvesting Practices**

Snail harvesting occurred primarily during the rainy season (May–September), coinciding with peak snail abundance. Moist soil conditions stimulate snail movement, making collection easier. Harvesting was manual, taking place in farms, forests, riverbanks, and bush areas, mostly at night or early morning after rainfall. Both men and women participated, although women dominated post-harvest processing. Snails were collected from the ground, under leaves, fallen logs, and soil burrows. Some harvesters reported using human feces to attract snails. For bulk collection, baskets lined with leaves were used to reduce damage.

These findings align with regional studies highlighting the importance of snail harvesting for both nutrition and income generation (Oluwole et al., 2021).

**Figure 1. Seasonal snail harvesting in Kaiyamba Chiefdom**

Bar chart showing peak harvesting during May–September and minimal collection in dry months.



**Table 2. Harvesting, cooking, and preservation practices in Kaiyamba Chiefdom**

Theme	Practice observed/reported	References
Harvesting period	Rainy season (May–August), night/early morning after rainfall	Field interviews & FGDs, 2025
Harvesting sites	Farms, bushes, riverbanks	Field interviews, 2025
Cooking methods	Boiled and added to <i>plasas</i> (vegetable stews), soups, frying, baking	FGDs, 2025
Preservation	Smoking (1–2 weeks), sun-drying, baking	FGDs, 2025

Theme	Practice observed/reported	References
Perceptions	“Healthy,” “strength-giving,” “lighter than beef,” affordable but seasonal	FGDs, 2025

### 3.3 Nutritional Importance

Respondents emphasized that snails are a key source of protein, iron, and other micronutrients. Households consuming snails regularly reported reduced reliance on purchased protein sources. Literature supports these claims, showing snail meat contains 12–16 g protein/100 g, ~1 g fat, and high levels of calcium, iron, and zinc (Fagbuaro et al., 2006; Nkansah et al., 2021; Gupta et al., 2024).

**Table 3. Proximate composition of edible land snails compared with fish and chicken (per 100 g fresh weight)**

Nutrient	Snail ( <i>Achatina</i> spp.)	Tilapia (fish)	Chicken (broiler)	References
Energy (kcal)	80–90	96	143	Fagbuaro et al., 2006; Nkansah et al., 2021; USDA, 2023
Protein (g)	12–16	18–20	21–23	Fagbuaro et al., 2006; Nkansah et al., 2021
Fat (g)	1.0–1.5	2.0–3.0	3.0–5.0	Nkansah et al., 2021; Gupta et al., 2024
Carbohydrate (g)	2–3	0	0	Fagbuaro et al., 2006
Calcium (mg)	170–250	10	15	Nkansah et al., 2021
Iron (mg)	3–4	0.9	1.3	Nkansah et al., 2021; Gupta et al., 2024
Zinc (mg)	1.5–2.0	0.5–1.0	1.0	Nkansah et al., 2021

### 3.4 Preparation Methods

Snails were typically washed with lime, ash, or hot water to remove slime and gut contents before boiling with seasonings for 20–30 minutes. Women primarily managed preparation. Preservation through smoking and sun-drying was common, with smoking extending shelf-life up to two weeks. Some households fried or baked snails with palm oil or spices for flavor. These practices are consistent with other West African studies (Kamara et al., 2020).

**Table 4. Common snail preparation methods (n = 30)**

Preparation method	Description	Frequency of use
Boiling	Boiled 20–30 minutes	High
Smoking	Smoked over low fire, preserved	Moderate
Sun-drying	Sun-dried for storage	Low

### 3.5 Preservation Techniques

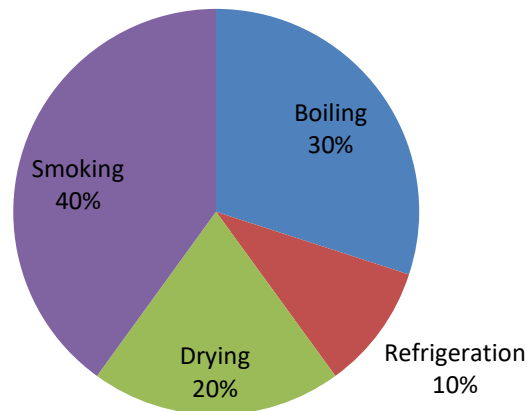
Smoking, sun-drying, and limited refrigeration were reported. Smoking was most widely used, extending shelf-life to 1–2 weeks. Limited access to refrigeration restricted storage, highlighting the need for improved technologies.

**Figure 2. Snail preservation methods observed**

(Pie chart showing households using boiling, smoking, drying, refrigeration).



### Pie Chart Showing Snail Preservation Methods



### 3.6 Precautions in Harvesting Snails

- Avoid harvesting from polluted areas (near chemical farms or roads) to reduce contamination risks.

Collect snails of sufficient size (usually mature snails) to ensure sustainability and allow for population regeneration

### 3.7 Cultural Beliefs and Perceptions

Snails were culturally accepted and often consumed during social events. Some households restricted consumption among pregnant women or children due to taboos. Snail meat was described as “healthy,” “strength-giving,” “soft,” and “sweeter than beef.” Literature confirms its nutritional advantages as low-fat, protein-rich meat with essential minerals (Agbogidi & Okonta, 2011; Babalola & Akinsoyinu, 2015).

### 3.8 Discussion

This study demonstrates that snail harvesting, preparation, and consumption are integral to both nutrition and culture in Kaiyamba Chiefdom.

- **Nutritional significance:** Snails provide affordable, high-quality protein and essential minerals, supporting dietary diversity and food security.
- **Cultural relevance:** Consumption is culturally embedded, suggesting that nutrition interventions should align with traditional practices.
- **Preservation challenges:** Limited refrigeration restricts long-term storage, underscoring the need for improved preservation methods and promotion of small-scale snail farming.

Findings show that snails are nutritionally rich and culturally valued, but underutilized due to seasonal availability. Compared with chicken and fish, snails have lower fat and higher calcium, making them particularly suitable for children and women of reproductive age. Expanding snail farming (“snaileries”), introducing improved smoke-drying, and integrating snail promotion into nutrition education could enhance year-round availability and reduce malnutrition. This aligns with global calls for diversifying animal-source foods to address micronutrient deficiencies (Global Nutrition Report, 2023).

## 4.0 SUMMARY AND. RECOMMENDATIONS

### 4.1 SUMMARY

Land snails represent an underutilized but nutritionally significant food resource in Kaiyamba Chiefdom. They are rich in protein and essential micronutrients, yet their consumption remains largely seasonal, with peak availability during the rainy months. Findings from this study highlight that snails are widely consumed, prepared using diverse culinary methods, and in some cases preserved for off-season use. Despite their demonstrated nutritional and economic potential, their utilization is constrained by factors such as seasonal scarcity, limited preservation technologies, and persistent cultural taboos. Promoting improved preservation strategies and small-scale snail farming could enhance year-round availability, strengthen household food security, and provide supplementary income for rural households.

### 4.2 RECOMMENDATION

**The researcher may like to recommend the following for the attention of the Nutrition Directorate, ministry of Agriculture and marine resources and other Nongovernmental Organizations that deal with nutrition**

### **1 Nutrition Education and Awareness**

- Integrate snail meat into community-based nutrition education programs, highlighting its high protein, iron, and calcium content as a low-cost alternative to conventional animal protein sources.
- Conduct cooking demonstrations to show diverse and culturally acceptable ways of preparing snails.

### **2 Snail Farming (Horticulture) Promotion**

- Encourage small-scale snail farming to ensure year-round availability and reduce reliance on seasonal harvesting.
- Provide training and starter kits for youth and women's groups as an income-generating activity.

### **3 Improved Preservation and Processing**

- Support communities with improved smoking, drying, and refrigeration methods to extend the shelf life of snail meat.
- Promote value addition by processing snails into ready-to-cook or packaged products for local and regional markets.

### **4 Market Development and Value Chains**

- Strengthen market linkages for snail farmers by organizing cooperatives and women's groups.
- Promote snail products in local and regional markets, emphasizing their nutritional and cultural value.

### **5 Policy and Research Integration**

- Advocate for the inclusion of snail farming and consumption in national food security and nutrition policies.
- Support further research on the nutritional profile, medicinal properties, and economic potential of land snails.

## 6 Environmental and Biodiversity Conservation

- Promote sustainable harvesting practices to prevent overexploitation of wild snail populations.
- Encourage integration of snail farming with agroforestry and home gardening systems

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