

Farmers' Knowledge, Awareness, and Planting Material Practices Related to Cassava Mosaic Disease in The Gambia

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ABSTRACT

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Cassava mosaic disease (CMD) is a major viral disease threatening cassava production in sub-Saharan Africa. Farmer knowledge and management practices play an important role in limiting the spread of CMD, particularly in systems where farmers recycle planting materials. Despite the increasing importance of cassava in The Gambia as both food and cash crop, information regarding farmers' awareness and perceptions of CMD remains limited. This study assessed farmers' knowledge of CMD symptoms, causes, spread, and management practices in major cassava-growing regions of The Gambia. Structured interviews were conducted with 44 cassava farmers in West Coast Region (WCR), Lower River Region (LRR), and North Bank Region (NBR) during a nationwide CMD epidemiological survey. The findings revealed that 95.5% of farmers had no knowledge of the causes of CMD, although some farmers could visually recognize diseased plants. Most farmers (65.9%) sourced cassava cuttings from previous harvests, while only 4.5% obtained planting materials from research institutions. Furthermore, 86% of farmers reported having no prior training or technical support on cassava disease management. The widespread recycling and exchange of infected planting materials among farmers likely contributes to the high CMD incidence observed in cassava fields across the country. The study highlights major knowledge gaps among cassava farmers and underscores the urgent need for farmer sensitization, strengthened extension services, and dissemination of clean planting materials to support sustainable cassava production in The Gambia.

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1.0 INTRODUCTION

Cassava (*Manihot esculenta* Crantz) is an important food security crop cultivated widely in tropical and subtropical regions due to its adaptability to harsh environmental conditions and poor soils (Immanuel, et., al. 2024). In many African countries, cassava serves as a staple food crop and contributes significantly to rural livelihoods, employment generation, and household food security (Jarvis et al., 2012). The crop is particularly valued because of its resilience to drought and climate variability, making it increasingly important under changing climatic conditions (Githunguri, 2021).

Despite its importance, cassava production in Africa is heavily constrained by several insect pests and diseases, among which cassava mosaic disease (CMD) is regarded as one of the most destructive (Thresh and Cooter, 2005; Patil and Fauquet, 2009). CMD is caused by cassava mosaic begomoviruses belonging to the family Geminiviridae and is transmitted mainly through infected stem cuttings and the whitefly vector *Bemisia tabaci* (Legg and Fauquet, 2004; Soro et al., 2021). Severe CMD infections may result in

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substantial yield losses ranging from 20% to over 90% depending on cultivar susceptibility and growth stage at infection (Bisimwa et al., 2015).

The movement and recycling of infected planting materials by farmers have been identified as major drivers of CMD spread in other African countries (Chikoti et al., 2013). In many rural farming systems, farmers rely heavily on stem cuttings from previous harvests or from neighboring farmers for planting materials. Consequently, poor awareness of CMD symptoms and transmission pathways may contribute significantly to disease dissemination.

Farmer knowledge and awareness are critical components of integrated disease management programs. Studies conducted in Benin, Ghana, Tanzania, and other cassava-growing countries have shown that low levels of farmer awareness regarding CMD often result in poor disease management practices and increased spread of infected planting materials (Houngue et al., 2018; Chikoti et al., 2019). Effective extension services and farmer training programs are therefore essential for improving disease recognition and promoting adoption of healthy planting materials.

In The Gambia, cassava is being considered recently as both food and cash crop and its production is gradually expanding as part of national strategies aimed at promoting crop diversification and strengthening food security. However, little information exists regarding farmers' awareness, perceptions, and management practices related to CMD. Understanding farmers' knowledge gaps and planting material sources is essential for developing effective CMD management and awareness programs.

Therefore, this study was conducted to assess the level of farmer knowledge and awareness regarding CMD in major cassava-growing regions of The Gambia. Specifically, the study evaluated farmers' knowledge of CMD symptoms and causes, sources of planting materials, and access to extension and technical support services.

2.0 MATERIALS AND METHODS

2.1 Study Area

The study was conducted in three major cassava-growing regions of The Gambia namely West Coast Region (WCR), Lower River Region (LRR), and North Bank Region (NBR). The Gambia has a surface area of approximately 10,120 km² and the country experiences a tropical Sahelian climate characterized by a short rainy season between June and October and a prolonged dry season from November to May (World Bank Group, 2021).

2.2 Farmer Selection and Interview Procedure

A total of 44 cassava farmers were interviewed during CMD epidemiological field surveys conducted across the three regions. Interviews were administered directly to owners or managers of surveyed cassava fields using structured questionnaires.

Questionnaires were administered in local languages to facilitate better understanding and improve the quality of responses. In some cases, questions were rephrased to ensure clarity and comprehension among respondents.

Photographs showing different CMD symptoms were displayed to farmers to assist in assessing their ability to recognize diseased cassava plants.

2.3 Data Collected

The questionnaire collected information on following:

- Farmer demographic characteristics
- Educational level
- Years of experience in cassava production
- Knowledge of CMD symptoms and causes
- Sources of cassava planting materials
- Access to extension services and training
- Awareness of CMD transmission pathways

2.4 Data Analysis

Data collected from interviews were entered into Microsoft Excel for organization and descriptive analysis. Frequencies and percentages were calculated for categorical variables. Graphs were generated to illustrate demographic distributions and farmer responses.

3.0 RESULTS

3.1 Demographic Characteristics of Respondents

Among the 44 farmers interviewed, 86.4% were male and 13.6% were female showing clearly that cultivation of cassava in the survey regions is a male dominated activity. Most respondents (50%) were between 18 and 40 years old, while 43.2% were between 41 and 64 years old.

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In terms of educational background, 38.6% attained primary education, 36.4% attained secondary education, 13.6% had tertiary education, and 11.4% had no formal education.

Regarding farming experience, 43.2% of respondents had between 3 and 5 years of cassava production experience, while 31.8% had more than 5 years of experience.

Table 1: Demographic characteristics of interviewed cassava farmers

Characteristic	Frequency (N = 44)	Percentage (%)
Sex		
Male	38	86.4
Female	06	13.6
Age		
Below 18	2	4.5
18-40	22	50
41-64	19	43.2
Over 64	1	2.3
Level of Education		
Primary	17	38.6
Secondary	16	36.4
Tertiary	6	13.6
None	5	11.4
Experience in Cassava production		
1-2 Years	11	25
3-5 Years	19	43.2
Over 5 Years	14	31.8
Regions		
WCR	17	38.6
LRR	9	20.4
NBR	18	41

3.2 Farmer Knowledge of CMD

The study revealed a very low level of farmer awareness regarding CMD causes and transmission pathways. Out of the 44 interviewed farmers, 42 farmers (95.5%) indicated that they did not know the causes of CMD, while only 2 farmers (4.5%) reported having some knowledge about the disease.

Although some respondents were able to visually recognize diseased cassava plants from photographs presented during interviews, most farmers could not identify the causal agents or explain how the disease spreads.

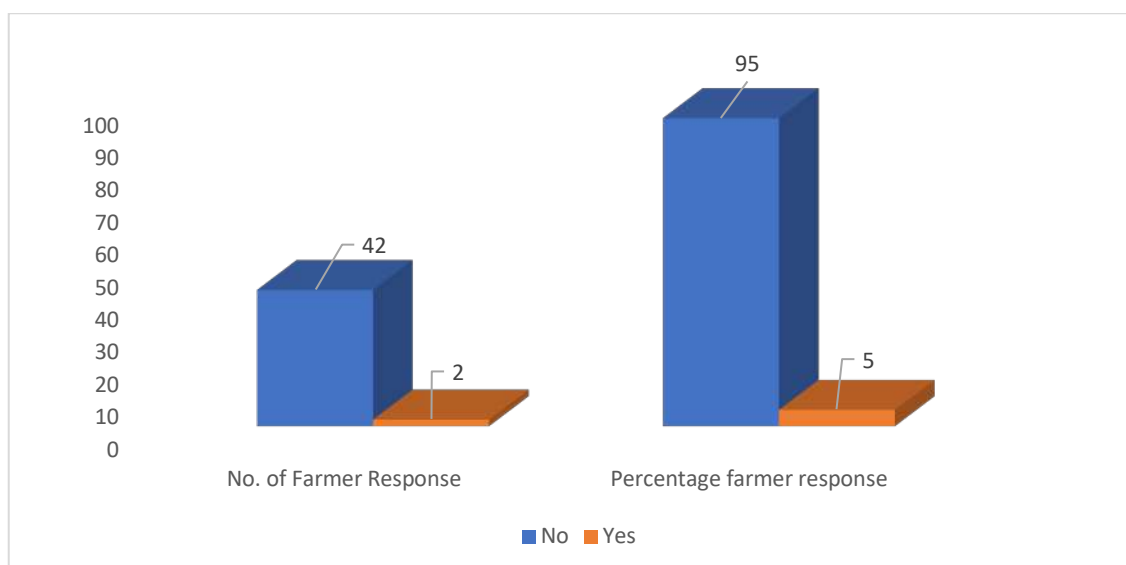


Figure 1: Farmers' knowledge of CMD causes.

3.3 Sources of Cassava Planting Materials

The majority of farmers (65.9%) reported sourcing cassava cuttings from their previous harvests. Additionally, 15.9% obtained cuttings from local markets, while 13.6% acquired planting materials from fellow farmers. Only 4.5% sourced cuttings from research institutions.

These findings indicate heavy reliance on informal planting material systems and recycling of cassava cuttings among farmers.

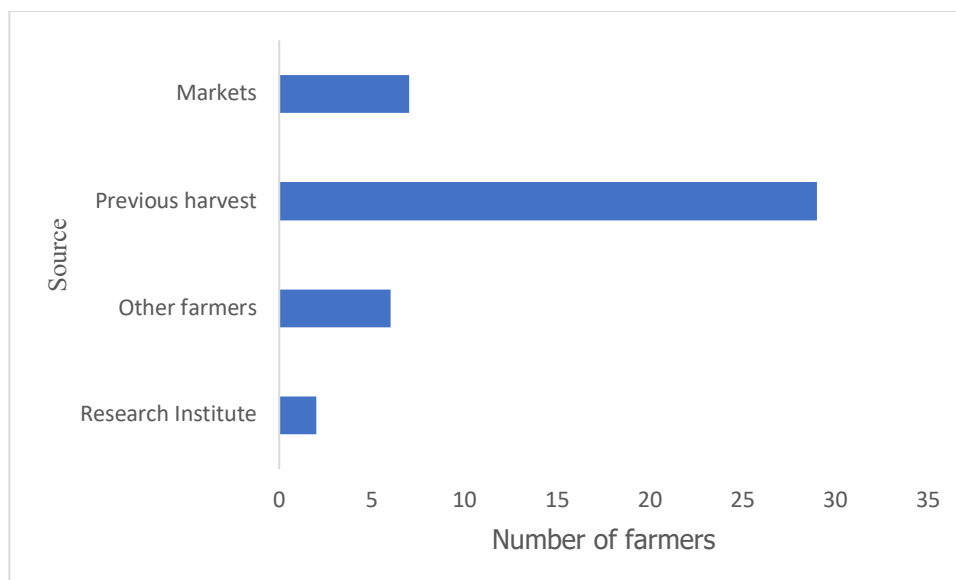


Figure 2: Sources of cassava planting materials among farmers.

3.4 Access to Training and Extension Services

Most farmers (86%) indicated that they had never received training or technical advice regarding cassava disease management from agricultural extension officers or plant protection services. Only 14% reported receiving some form of technical guidance on cassava production practices.

The low level of contact between farmers and extension services may partly explain the poor awareness of CMD observed among respondents.

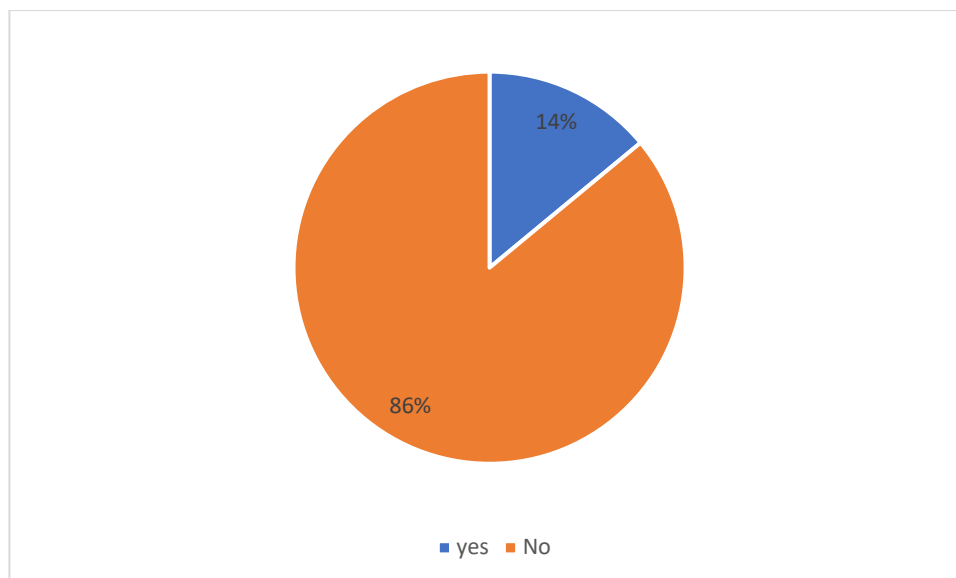


Figure 3: Access to training and extension services among cassava farmers.

4.0 DISCUSSION

Although most respondents had attained some level of formal education reflecting recognition of cassava's importance as both a food and economic crop the study revealed that farmer awareness of cassava mosaic disease (CMD) causes and management in The Gambia remains very limited. This gap can largely be explained by the fact that cassava is cultivated mainly on smallholder plots and is not prioritized among the country's major food or cash crops, with national production estimated at only 12,200 tons (World

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Population Review, 2026). Comparable patterns of limited awareness have been documented across several African countries, where farmers were able to visually identify CMD symptoms but lacked knowledge of its transmission pathways and management strategies (Houngue et al., 2018; Chikoti et al., 2019).

The widespread practice of recycling cassava cuttings from previous harvests observed in this study is a major phytosanitary concern because infected planting materials are recognized as the principal pathway for CMD dissemination across sub-Saharan Africa (Thresh and Cooter, 2005; Torkpo et al., 2018).

The very low proportion of farmers sourcing planting materials from research institutions indicates weak formal seed systems for cassava in The Gambia. Similar challenges have been reported in other cassava-growing countries where limited access to certified disease-free planting materials contributes significantly to CMD persistence (Mivedor et al., 2020).

The low level of extension support reported by farmers also highlights major institutional gaps in farmer education and disease management outreach. Effective CMD management requires regular farmer sensitization on disease recognition, sanitation practices, and the importance of using healthy planting materials (FAO, 2013).

Strengthening extension services and establishing clean seed multiplication systems will therefore be essential for reducing CMD spread and improving cassava productivity in The Gambia.

5.0 CONCLUSION

This study revealed major gaps in farmer knowledge and awareness regarding cassava mosaic disease in The Gambia. Most farmers lacked knowledge of CMD causes and transmission pathways despite being able to recognize symptomatic plants visually.

The widespread recycling and exchange of cassava cuttings among farmers likely contributes significantly to CMD spread within cassava-growing regions. Furthermore, limited access to training and extension services restricts farmers' ability to implement appropriate disease management practices.

The findings emphasize the urgent need for farmer sensitization programs, strengthened extension support, and establishment of clean cassava planting material systems to support sustainable cassava production in The Gambia.

RECOMMENDATIONS

- Farmers should be trained to identify CMD symptoms, understand transmission pathways, and apply preventive management practices.
- Massive sensitization programmes should be conducted through media outlets and farmer field schools to raise awareness of CMD causes, control, and management.
- Outreach campaigns by agricultural extension services should be strengthened to ensure consistent farmer engagement and knowledge transfer.
- Capacity development initiatives should target researchers, extension staff, and farmers across agro-ecological zones, focusing on CMD identification, management, and control.
- Research institutions should promote multiplication and dissemination of disease-free cassava planting materials.
- Investments should be directed to National Agricultural Research System for the development of CMD-resistant varieties.
- National cassava improvement and clean seed systems should be established to reduce reliance on recycled, infected cuttings.
- Promotion of Good Agricultural Practices (GAP), including crop rotation and sanitary/phytosanitary (SPS) training, should be prioritized to minimize disease spread and improve resilience.
- Further studies should investigate socio-economic factors influencing farmer adoption of healthy planting materials, ensuring that interventions are tailored to local realities and constraints.

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REFERENCES

1. Cassava Production by Country 2026. (2026-08-02). World Population Review. <https://worldpopulationreview.com/country-rankings/cassava-production-by-country>
2. Chikoti, P. C., Mulenga, R. M., Tembo, M., & Sseruwagi, P. (2019). Cassava mosaic disease: A review of a threat to cassava production in Zambia. *Journal of Plant Pathology*, 101(3), 467–477. <https://doi.org/10.1007/s42161-019-00255-0>

3. Chikoti, P.C., Ndunguru, J., Melis, R., Tairo, F., Shanahan, P. and Sseruwagi, P. (2013) Cassava Mosaic Disease and Associated Viruses in Zambia: Occurrence and Distribution. *International Journal of Pest Management*, 59, 63-72. <https://doi.org/10.1080/09670874.2012.752887>
4. Food and Agriculture Organization of the United Nations. (2013). *Save and grow cassava: A guide to sustainable production intensification*. FAO. URL: <https://www.fao.org/3/i3278e/i3278e.pdf> ([fao.org in Bing](#))
5. Githunguri, C. M., & Njiru, E. N. (2021). Role of cassava and sweetpotato in mitigating drought in semi-arid Makueni County in Kenya. In N. Ogue, D. Ayal, L. Adeleke, & I. da Silva (Eds.), *African handbook of climate change adaptation* (pp. 241–259). Springer. https://doi.org/10.1007/978-3-030-45106-6_11
6. Houngue, J. A., Pita, J. S., Cacaï, G. H. T., Zandjanakou-Tachin, M., Abidjo, E. A. E., & Ahanhanzo, C. (2018). Survey of farmers' knowledge of cassava mosaic disease and their preferences for cassava cultivars in three agro-ecological zones in Benin. *Journal of Ethnobiology and Ethnomedicine*, 14, Article 29. <https://doi.org/10.1186/s13002-018-0228-5>
7. Immanuel, S., Jaganathan, D., & Prakash, P. (2024). Cassava for food security, poverty reduction and climate resilience: A review. *Indian Journal of Ecology*, 51, 21–31. <https://doi.org/10.55362/IJE/2024/4191>
8. Jarvis, A., Ramirez-Villegas, J., Campo, B. V. H., & Navarro-Racines, C. (2012). Is cassava the answer to African climate change adaptation? *Tropical Plant Biology*, 5(1), 9–29. <https://doi.org/10.1007/s12042-012-9096-7>
9. Legg, J. P., & Fauquet, C. M. (2004). Cassava mosaic geminiviruses in Africa. *Plant Molecular Biology*, 56(4), 585–599. <https://doi.org/10.1007/s11103-004-1651-7>
10. Mivedor, A. S., Dansou-Kodjo, K. A., Adjata, D. K., & Pita, J. S. (2020). Identification and incidence of cassava mosaic begomoviruses in Togo. *Asian Journal of Plant Pathology*, 14, 11–20. <https://doi.org/10.3923/ajppaj.2020.11.20>
11. Patil, B. L., & Fauquet, C. M. (2009). Cassava mosaic geminiviruses: Actual knowledge and perspectives. *Molecular Plant Pathology*, 10(5), 685–701. <https://doi.org/10.1111/j.1364-3703.2009.00559.x>
12. Soro, M. S., Tiendrébéogo, F., Pita, J. S., Traoré, E. T., Somé, K., Tibiri, E. B., Néya, J. B., Mutuku, J. M., Simporé, J., & Koné, D. (2021). Epidemiological assessment of cassava mosaic disease in Burkina Faso. *Plant Pathology*, 70(9), 2207–2216. <https://doi.org/10.1111/ppa.13459>
13. Thresh, J. M., & Cooter, R. J. (2005). Strategies for controlling cassava mosaic virus disease in Africa. *Plant Pathology*, 54(5), 587–614. <https://doi.org/10.1111/j.1365-3059.2005.01282.x>