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Impact of Taro Leaf Blight on Rural Livelihoods in Anambra State, Nigeria: A Gendered Perspective

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ABSTRACT

Taro Leaf Blight (TLB), caused by Phytophthora colocasiae, poses a major threat to cocoyam production and rural livelihoods in Nigeria. This study examined farmers' awareness, perceptions, and gendered adaptation strategies to TLB in Anambra State. Using multistage purposive sampling, 64 cocoyam farmers (52% female, 48% male) were selected from two Local Government Areas. Data were collected through semi-structured questionnaires and analyzed using descriptive statistics and mean scores. Results showed high awareness of TLB among farmers, who identified symptoms such as brown patches, leaf drying, and plant death. Female and youth farmers perceived the disease as more severe than males, reflecting their closer involvement in crop care. All respondents reported negative effects of TLB on productivity, income, and living standards. Common indigenous management practices included intercropping, early planting, and the use of wood ash and crop rotation. However, limited extension contact and poor access to resistant varieties hinder effective control. The study recommends strengthening gender-responsive extension services, promoting resistant varieties, and enhancing farmer education on disease transmission and climate-smart practices to build resilient and inclusive cocoyam systems.

INTRODUCTION

Taro (*Colocasia esculenta* (L.) Schott) is an important staple and income-generating crop for smallholder farmers in tropical and subtropical regions. In sub-Saharan Africa, it ranks third among root and tuber crops after yam and cassava (Onyeka, 2014). The plant's corms, cormels, leaves, and petioles are consumed for their nutritional and medicinal benefits (Gupta et al., 2019). However, global taro production has been on the decline, primarily due to plant diseases (FAO, 2018).

The most destructive disease affecting taro is Taro Leaf Blight (TLB), caused by the oomycete *Phytophthora colocasiae*. This pathogen infects leaves, petioles, and corms, surviving up to three months in various forms and spreading rapidly under favorable conditions, leading to significant field and postharvest losses (Lebot, 2009; Otieno, 2020; Quitugua and Trujillo, 1998). In West Africa, TLB was first reported in 2009 and has since caused annual economic losses exceeding USD 1.4 billion, leading to genetic erosion, reduced household income, and increased poverty (Pattnaik et al., 2022; Onyeka, 2014). Yield losses range from 50% to total crop failure, often forcing farmers to abandon taro cultivation (Otieno, 2020).

Despite its devastating impact, information on the incidence, severity, and management of TLB in major taro-growing regions remains limited. Bridging this knowledge gap is vital for food security, rural livelihoods, and reviving taro production (Pattnaik et al., 2022). Recent studies have explored various management strategies, including the use of botanical foliar sprays like neem and garlic extracts, which have shown efficacy in reducing TLB incidence and severity in South East Nigeria (Nwadili, 2022).

Additionally, synthetic fungicides such as copper and metalaxyl have been effective in managing TLB in Ghana (Omane et al., 2020).

In Nigeria, initiatives are underway to confront TLB through genetic analyses aimed at developing resistant taro varieties. The National Root Crops Research Institute (NRCRI) is leading efforts to identify quantitative trait loci (QTL) associated with TLB resistance and yield quality, incorporating women's trait preferences and engaging young farmers in the taro value chain (Innovation Lab for Crop Improvement, 2022).

This study, therefore, examined farmers' awareness, perceptions, and indigenous adaptation strategies to TLB in Anambra State, Nigeria. Specifically, it: (1) assessed TLB awareness by gender; (2) identified local names of TLB and gender variations; (3) evaluated perceived severity among male and female farmers; (4) analyzed the impact of TLB on productivity, income, and food security by gender; and (5) documented indigenous control and adaptation methods, highlighting gender-specific strategies.

METHODOLOGY

The study was conducted in Anambra State, Nigeria, one of the five states in the Southeast geopolitical zone. The state lies between latitude 5°38'N to 6°47'N and longitude 6°36'E to 7°21'E. It consists of 21 Local Government Areas (LGAs) and four agricultural zones and falls within the tropical rainforest region, characterized by two major seasons: dry and rainy.

Anambra Agricultural Zone was purposively selected due to its high intensity of cocoyam production, with a population of 469,959 distributed across four LGAs: Oyi, Anambra East, Anambra West, and Ayamelum (Ume et al., 2016; Onumadu, Ekwugha & Osahon, 2014). The zone comprises four extension blocks and 45 circles (Ajani & Igbokwe, 2012) and is regarded as the food basket of Anambra State, supporting crops such as yam, rice, cassava, maize, cocoyam, and potatoes.

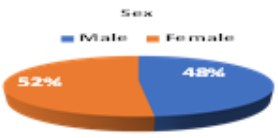
Two LGAs (Oyi and Ayamelum) were purposively selected based on the intensity of cocoyam production. From each LGA, two communities were also purposively selected: Nteje and Awkuzu (Oyi LGA), and Igbakwu and Omo (Ayamelum LGA). A total of 64 cocoyam farmers (16 per community) were purposively selected.

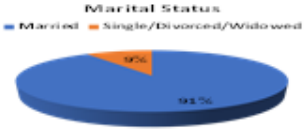
Data were collected using a semi-structured questionnaire, where respondents provided information on the local name of the disease, its symptoms, perceived impact on productivity and income, and indigenous control measures based on gender. The data were analyzed using descriptive statistics such as percentages and mean. The level of TLB severity was measured using a 5-point scale (1 = Not severe to 5 = Very much severe), with a benchmark of 3.

RESULTS AND DISCUSSION

Chart 1: Socioeconomic Characteristics of the respondents

Variable	Mean
Age	51
Educational level	11
HHS	6
Yrs of farm experience	12
Cocoyam farm size	1.97









The charts show that cocoyam farming is dominated by middle-aged and older individuals (average age 51), with balanced gender participation (52% female, 48% male) and predominantly married farmers (91%), indicating a family-based system reliant on household labor. Farmers are well-educated, averaging 11 years of schooling, which supports the adoption of improved practices. Households are relatively large (average 6 members), offering labor but increasing financial demands. With an average of 12 years of farming experience and farm sizes averaging 1.97 hectares, most farmers operate at a medium scale. However, limited extension contact (52%) and low cooperative membership (42%) hinder access to new technologies, credit, and markets. Enhancing extension services and cooperative participation could improve productivity, resilience to Taro Leaf Blight (TLB), and farmers' income.

Table 2: Awareness of Taro Leaf Blight (TLB) (by gender)

	Adult Male		**Adult Female**		**Youth**	
Awareness	**Yes (Freq)**	**%**	**Yes (Freq)**	**%**	**Yes (Freq)**	**%**
Have you heard of Taro Leaf Blight	29	100	31	100	4	100

High awareness of TLB among farmers indicates its long-term prevalence and significant impact on cocoyam production, leading to economic losses and food security threats (Laha et al., 2023). This aligns with Lum and Takor (2021), who reported that 88.1% of farmers identified taro leaf blight as the major disease affecting taro cultivation.

Table 3: Local Names of TLB as perceived by the respondents (by gender).

		Adult Male		**Adult Female**		**Youth**	
S/N	**Local Name**	**Freq**	**%age**	**Freq**	**%age**	**Freq**	**%age**
1	Mgbu ede/Mgbu ede ofe	8	27.6	5	16.1	1	25.0
2	Ntupu akwukwo ede/	9	31.0	17	54.8	2	50.0
3	Nkpowu akwukwu ede	2	6.9	2	6.5	-	-
4	Onwu ede/Onwu ede ofe	10	34.5	7	22.6	1	25.0
		29	100.0	31	100.0	4	100.0

The results on table 3 show distinct gender and age differences in how farmers perceive and describe Taro Leaf Blight (TLB). While men focus on plant destruction and yield loss, using terms like "Onwu ede" (death of cocoyam), women emphasize early leaf symptoms such as leaf decay ("Ntupu akwukwo ede") due to their roles in crop care. Youth farmers, though less involved in farming, recognize both early and late symptoms, indicating knowledge gained through indirect exposure. These findings highlight the importance of integrating local knowledge into extension services and targeting women and youth for early disease detection and management to minimize cocoyam production losses.

Table 4: Farmers' perception of the symptoms of TLB (by gender).

		Adult Male		**Adult Female**		**Youth**	
S/N	**Perceived symptoms of the disease**	**Freq**	**%age**	**Freq**	**%age**	**Freq**	**%age**
1	Black/Brown spots/patches on the leaves	18	62.1	28	90.3	3	75.0
2	Drying up of the leaves	7	24.1	3	9.7	-	-
3	Holes on the leaves	3	10.3	-	-	-	-
4	Death of the plant	1	3.5	-	-	1	25.0
		29	100.0	31	100.0	4	100.0

The findings on table 4 show that most farmers, especially women (90.3%) and youth (75%), recognize Taro Leaf Blight (TLB) through early symptoms like black/brown patches on leaves, while a few associate it with plant death. This highlights the need for extension services to strengthen farmer education on the disease's progression from leaf damage to plant destruction to enhance early intervention and control efforts.

Table 5: Farmers' perception of the causes of TLB (by gender)

		Adult Male		Adult Female		Youth	
S/N	**Perceived cause(s) of the disease**	**Freq**	**%age**	**Freq**	**%age**	**Freq**	**%age**
1	Adverse weather condition (extreme tempt, excessive rainfall & high humidity)	20	70.0	25	86.3	2	50.0
2	Infected soil	5	17.2	2	6.9	1	25.0
3	Disease-borne flies	4	13.8	4	13.8	1	25.0
		29	100.0	31	100.0	4	100.0

The findings table 5 reveals that most farmers attribute Taro Leaf Blight (TLB) to adverse weather conditions like heavy rainfall and high humidity, with limited awareness of infected soil or insect transmission. While this aligns with scientific knowledge on humidity-driven fungal growth, the knowledge gap on other transmission pathways highlights the need for farmer education on both environmental and biological causes to strengthen TLB management strategies.

Table 6: Farmers' perception of the level of severity of TLB (by gender)

	Mean	**SD**	**Decision**
Adult Male	2.68	0.67	Severe
Adult female	2.97	0.54	Severe
Youth	3	0	Severe

Benchmark = 3.00.

The findings on table 6 show that female and youth farmers perceive Taro Leaf Blight (TLB) as more severe than male farmers, with women scoring 2.97 and youth 3.00, while the men scored 2.68. This suggests women's closer involvement in crop care and youth's reliance on visible damage influence their perceptions, reinforcing the need for urgent intervention as farmers view TLB as a serious threat to cocoyam production.

Table 7: Respondents' perceived impact of TLB (by gender)

	Adult Male		Adult Female		Youth	
Impact	**Yes (Freq)**	**%**	**Yes (Freq)**	**%**	**Yes (Freq)**	**%**
Productivity	26	100	31	100	4	100
Income	26	100	31	100	4	100
Standard of living	26	100	31	100	4	100

The findings show that all farmers perceive TLB as a major threat to productivity, income, and standard of living, with 100% of respondents reporting negative impacts. This highlights the severe socioeconomic consequences of TLB, especially for smallholder farmers, underscoring the need for targeted interventions like resistant varieties, improved monitoring, and financial support.

Table 8: Farmers' Indigenous Method(s) of Controlling/Adapting to TLB (by gender)

		Adult Male		Adult Female		Youth	
S/N	Indigenous knowledge/Adaptive Strategies	Yes	No	Yes	No	Yes	No
A	Intercropping	29 (100)	0	31 (100)	0	4 (100)	0
B	Mulching	26 (90)	3 (10)	26 (84)	5 (16)	2 (50)	2 (50)
C	Early planting with first rainfall	29 (100)	0	31 (100)	0	4 (100)	0
D	Treatment of corm with wood ash before planting	29 (100)	0	31 (100)	0	4 (100)	0
E	Use of wider planting distance to reduce disease spread	12 (41)	17 (59)	19 (61)	12 (39)	1 (25)	3 (75)
F	Combination of organic and inorganic fertilizer	26 (90)	3 (10)	18 (58)	13 (42)	1 (25)	3 (75)
G	Planting cocoyam in a well drained soil	24 (83)	5 (17)	29 (94)	2 (6)	2 (50)	2 (50)
H	Burning of the whole plant residues immediately after harvesting	12 (41)	17 (59)	11 (35)	20 (65)	1 (25)	3 (75)
I	Crop rotation	28 (90)	1 (10)	31 (100)	0	4 (100	0
J	Quarantine practices	22 (76)	7 (24)	24 (77)	7 (23)	4 (100)	0
K	Fallowing practice to reduce infestation	27 (93)	2 (7)	31 (100)	0	4 (100)	0
L	Planting of resistant varieties	1 (3)	28 (97)	0	31 (100)	0	4 (100)
M	Removal of whole infected plant	2 (7)	27 (93)	4 (13)	27 (87)	0	4 (100)
N	Removal of infected leaf part during the early stage of disease infestation	25 (86)	4 (14)	25 (81)	6 (19)	4 (100)	0
O	Selection of sites surrounded by forest as a barrier to disease spread	27 (93)	2 (7)	22 (71)	9 (29)	3 (75)	1 (25)
P	Pruning and thinning to eliminate sources of infection	21 (72)	8 (28)	26 (84)	5 (16)	2 (50)	2 (50).
Q	Fumigating the soil few weeks before planting	28 (90)	1 (10)	30 (97)	1 (3)	4 (100)	0
R	Use of Irrigation	3 (10)	26 (90)	4 (13)	27 (87)	0	4 (100)
S	Planting of cocoyam during dry season	3 (10)	26 (90)	4 (13)	27 (87)	0	4 (100)

Note: Figures in parentheses are percentages

The findings on table 8 show that while indigenous practices like intercropping, early planting, and crop rotation are widely adopted by adult male and female farmers, youths have significantly lower adoption rates, reflecting limited exposure or interest. Low use of resistant varieties, plant removal, and irrigation highlights access challenges, while gender differences influence specific practices, underscoring the need for youth training, gender-inclusive strategies, and promotion of resilient cocoyam farming methods.

SUMMARY/CONCLUSION:

The study on the socioeconomic impact of Taro Leaf Blight (TLB) in Anambra State, Nigeria, reveals that the disease severely affects cocoyam farmers' productivity, income, and standard of living. Cocoyam farming is mainly practiced by middle-aged and older farmers, with significant female involvement. Despite their experience and educational background, farmers struggle with limited access to extension services and cooperatives, hindering the adoption of improved disease management practices. While farmers can identify TLB symptoms, knowledge gaps exist regarding the disease's transmission. Most attribute TLB to adverse weather, overlooking other factors like soil infection and vectors. The findings emphasize the need for targeted interventions to build farmers' capacity and resilience against TLB.

- Way Forward:
- Strengthen gender-sensitive agricultural extension services.
- Educate farmers on TLB transmission and promote resistant varieties.
- Improve access to inputs, credit, and cooperative support.
- Encourage climate-smart practices like proper spacing, drainage, and soil health management.
- Support research, favorable policies, and farmer knowledge-sharing platforms.

The study recommends strengthening gender-responsive extension services, promoting resistant varieties, and enhancing farmer education on TLB transmission and climate-smart practices. These findings contribute to efforts on building resilient and inclusive food systems in disease-prone tropical agriculture

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