

APPENDICES

Farmers Questionnaire

INTERNATIONAL INSTITUTE OF TROPICAL AGRICULTURE (IITA), IBADAN

Beyond Spraying: Making Agriculture Sustainable by Commercializing Sprayer Service Providers in Nigeria

Farmers Questionnaire: Project Participant [] or Non-Project Participant []

Hello, my name is **EMMANUEL, Augustine Uke**. I am assisting the International Institute of Tropical Agriculture (IITA) in conducting a study to document the baseline survey for tomato production in Kano state, Nigeria. I would like to ask you some questions related to your tomato production, post-harvest handling, and marketing and challenges in relation to production and bulk marketing of tomatoes. This study includes seven modules, which will all together take approximately 60 minutes. Your participation is voluntary. Your refusal to participate or to withdraw from the study carries no penalty or loss of any benefits. You are free to not answer any of the survey questions. However, your participation will be valuable for the research we are conducting. All information provided by you will be kept confidential including your identity, households name, land size and income etc. Your privacy will be protected to the maximum extent allowable by law. Only the researchers and IITA will have access to the data. Your identity will never be included as part of the published results of this research. If you have any questions or concerns, you can ask me or contact: Dr. Mesay Yami (m.gurmu@cgiar.org), Dr. Didier Kadjo, kadjodid@gmail.com or Prof. Saweda Onipede Liverpool-Tasie (S.Liverpool-Tasie@cgiar.org).

Yours faithfully,

.....
EMMANUEL, Augustine Uke.

Do you have any questions about this study for me?

Kindly tick or fill in the appropriate Spaces Provided.

A0: IDENTIFICATION OF HOUSEHOLD

A. IDENTIFYING INFORMATION

1. Enumerator ID (what your supervisor has given you)	
2. Enumerator Name	
3. Date of the interview	
4. State	
5. Local Government Area	
6. Name of the community	
7. Village of respondent	
8. Control and Treatment groups (C1, C2, T1 & T2)	
9. Name of Respondent (OPTIONAL)	
10. Cell phone number	

A1: SOCIO-ECONOMICS CHARACTERISTICS

Variable	Response	Codes
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11. Gender of the respondent		0=Female, 1=Male
12. Age of the respondent (years)		
13. What is the household structure?		[a]
14. Marital status of the respondent		[b]
15. Highest education level completed by the respondent		[c]
16. Respondent's Household size		
17. How many children did you have in school during the last season (2022/2023)		
18. Number of adults in the household in 2022/23		
19. Primary occupation of the respondent		[d]
20. Secondary occupation of the respondent		[d]
21. What is the historical background of the household?		1. Native, 2= Immigrant
22. How long have you been involved in tomato production? (years)		
23. Do you do any other job apart from crop farming? If yes, what job is that?	Yes [] No []	
24. How much do you earn from this job on monthly basis?		
25. Are you a member of cooperative society? YES [] NO [] b. If yes, for how years have you been a member?	Yes [] No []	
26. In the previous wet season, how often did extension agents visit your farm?	Weekly [] Twice a month [] Monthly [] Bi-Monthly [] Once in six months []	

[a] 1=Male-headed monogamous household, 2=Male-headed polygamous household, 3=Female-headed household

[b] 1=Married, 2=Single, 3=Widowed, 4=Divorced, 5=Other (Specify)

[c] 1=No formal education, 2=Adult/religious (Koran school) school, 3= Primary education, 4= Secondary education, 5= Vocational training, 6=College/Polytechnic education, 7=University education

[d] 1= Civil/public servant, 2=Non-farm related business, 3= Farming, 4=Agriculture trading, 5= Pensioner, 6= Others (specify) Assets?

A2: TOMATO 2022/2023 PRODUCTION (To be repeated for both production systems)

Variable	Response	Codes
27. Which production system did you use to produce tomato in 2022/2023?		1=Rain-fed, 2=Irrigation, 3= Both
28. How did you acquire the land for tomato production in the last production season?		[a]
29. What is the size of your total cultivated farm land area in 2022/23 (in acres)		
30. Total area allocated for tomato production last year in 2022/23 (in acres)		
31. Which seed type did you use last year?		[b]
32. Amount of seed rate applied in 2022/23 production season (in grams)		
33. Source of planting material for tomato		[c]
34. If answer was "purchased" in No. 34; what was the source of purchase?		[d]
35. Amount of seed rate applied in 2022/23 production season		
36. If purchased, what was the price of the seed cost in 2022/2023 season		
37. How many time do you harvest tomato in the 2022/2023 season		

[a] 1=Purchase, 2=Family/inheritance, 3=Rented/leased, 4= Gift, 5=Caretaking, 6=Others (specify)

[b] 1= Open pollinated (OPV), 2= Hybrid, 3=Both

[c] 1=Purchased, 2=Previous harvest, 3=Borrowed, 4=Gift, 5=Other (Specify)

[d] 1=Research Institute, 2=Seed companies, 3= Agro-dealers, 4= Farmers' associations, 5= Extension agents, 6=Others (specify)

A2.1: TOMATO MARKET PRICE INFORMATION

Variables	Response	Codes
38. Are you regularly updated on market prices for your agricultural produce?		Yes (1) /No (0)
39. Have you received any training on accessing or utilizing market price information for tomato in 2022/23 production season?		Yes (1) /No (0)

40. How many specialized trainings on market price information for tomatoes did you attend in the 2022/23 production season (Yrs)?		
41. If yes, who provided the training on market price information for tomatoes?	(a)Government extension service (b) Farmer Cooperatives (c) Local market or traders (d) Other (specify) _____	
42. Did you track market prices for your produce in the 2022/23 production season?		Yes (1) /No (0)
43. Where did you obtain market price information for your produce in the 2022/23 production season?		[b]
44. When you accessed market price information, did they explain how to interpret and use this information in the 2022/23 production season?		Yes (1) /No (0)
45. Did you receive training in 2022/23 on how to access and interpret market price information for your produce?		Yes (1) /No (0)
46. How did you utilize market price information after receiving it in 2022/23?	(a) decided when to sell my tomatoes negotiated better prices with buyers (b) planned the timing of my harvest (c) adjusted the quantity of tomatoes sold (d)Other (specify)	
47. Do you verify the authenticity of market price information sources?		Yes (1) /No (0)
48. When making pricing decisions, did you consider information from multiple market sources in the 2022/23 production season?		Yes (1) /No (0)
49. When making pricing decisions, did you consider seasonal market trends in the 2022/23 production season?		Yes (1) /No (0)
50. Did you take market demand and supply information for the 2022/23 production season into account when setting prices?		Yes (1) /No (0)
51. When making pricing decisions, did you consider regional market differences in the 2022/23 production season?		Yes (1) /No (0)
52. What time of the day do you usually check for updated market prices?		[d]
53. At what stage in the production process do you typically check market prices for your produce?		[e]
54. If prices fluctuate, what strategies do you use to mitigate financial loss in the 2022/23 production season?	(a) Stored tomatoes for sale at a later time in dried form (b) Processed tomatoes into value-added products (e.g., sauce, paste) (c) Participated in a cooperative or group sale. (d) Other (Specify)	
55. Which sources did you frequently use for collecting market price information in the 2022/23 production season?		[g]
56. Did you compare market prices from different sources before making sales in 2022/23 production season?		Yes (1) /No (0)
57. Did you regularly update your market price information based on new		Yes (1) /No (0)

market data in the 2022/23 production season?		
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[a] 1=Research Institute, 2=Tomato Growers' Association of Nigeria (TOGAN), 3=Private companies/processors, 3= Agro-dealers, 4= Farmers' associations/cooperatives, 5= FMARD/Extension agents, 6=Others (specify)

[b] 1=Traders/input supplier shop, 2=Distributor/company's sales agent, 3= FMARD/extension, 4= Open market from farmers, 5= Cooperatives, 6=Associations, 7= Others (specify)

[c] 1=Throw away on the farm, 2= Burn, 3 Throw away into the village waste dump, 4= Throw away into nearby bush, 5= Collect & sell them, 6=Re-use for another purpose, 7= Burry, 8= Throw into the drainage canals/streams/rivers

[d] 1=Morning, 2= Afternoon, 3=Late afternoon/in the evening, 4= Others (specify)

[e] 1=stage I, 2= Stage II, 3=Stage III, 4= Stage IV, 5= Stage V, 6=Stage VI

[f] 1=Pre-cooling after harvest, 2= Tree shade, 3=Store in thatched house, 4= Put it in refrigerator, 5= Others (specify)

[g] 1=Raffia, 2= Plastic Crate, 3= Both raffia & plastic crate, 4= Pail/Buckets, 5=Others (specify)

A3: POST-HARVEST HANDLING

Variable	Response	Codes
58. Did you harvest your tomatoes in bulk or batches in 2022/2023		1.Once, 2. Multiple times
59. Have you received any training on tomato storage practices in 2022/23 production season?		Yes (1) /No (0)
60. If yes, who provided the training?		[a]
61. Have you received any training on tomato packaging/handling practices in 2022/23 production season?		Yes (1) /No (0)
62. If yes, who provided the training?		[a]
63. Did you have a place to store your irrigated tomato products after harvest and before sale in 2022/23?		Yes (1) /No (0)
64. Did you have a place to store your rain-fed tomato products after harvest and before sale in 2022/23?		Yes (1) /No (0)
65. What was the most common type of storage practice do you use for your tomato production before sale in 2022/23?		[b]
66. How long did you store your product before sale during the last season (days)?		
67. Did you normally practice pre-cooling before selling in 2022/23?		Yes (1) /No (0)
68. Did you clean, sort and grade your product before marketing in 2022/23?		Yes (1) /No (0)
69. Did you apply disinfectants before storage or selling in 2022/23?		Yes (1) /No (0)
70. Did you use cold room/storage for storing tomatoes before marketing? (it could be cooperatives owned) in 2022/23		Yes (1) /No (0)
71. Are you aware of zero energy cool chambers storage practice?		Yes (1) /No (0)
72. If yes, did you use to store your 2022/23 harvest before selling?		Yes (1) /No (0)

[a] 1=Research Institute, 2=Tomato growers' association of Nigeria (TOGAN), 3=Private companies/processors, 3= Agro-dealers, 4= Farmers' associations/cooperatives, 5= FMARD/Extension agents, 6=Others (specify),

[b] 1=No storage, 2=Thatched house, 3=Shade/tree 4=cool storage, 5= Separate house, 6=Others (specify)

A3.1: POST-HARVEST CHALLENGES

Constraints	Response	Codes	Codes
73. Did you face the challenge of frequent occurrence of pest and disease in 2022/2023?		Yes (1) /No (0)	If Yes, [a]
74. Did inadequate storage facilities on the farm or in the market a challenge in 2022/2023?		Yes (1) /No (0)	If Yes, [a]
75. Did lack of good quality and improved seeds a challenge in 2022/2023?		Yes (1) /No (0)	If Yes, [a]
76. Did lack of ready market/contractual agreement a challenge in 2022/2023?		Yes (1) /No (0)	If Yes, [a]
77. Did the absence of cold storage transportation facilities for long distance trading a challenge in 2022/2023?		Yes (1) /No (0)	If Yes, [a]
78. Did you believe that post-harvest loss was caused by a poor road system in 2022/2023?		Yes (1) /No (0)	If Yes, [a]
79. Did inadequate knowledge of value addition & post-harvest handling procedures present a challenge in 2022/2023?		Yes (1) /No (0)	If Yes, [a]

80. Do you believe that the widespread adoption of conventional means of storage like raffia played a part in post-harvest loss?		Yes (1) /No (0)	If Yes, [a]
81. Unavailability of access to formal agricultural credit limited the use of improved post-harvest such as plastic crate?		Yes (1) /No (0)	If Yes, [a]
82. Do weather conditions, such as a drought or heavy rain, contribute to post-harvest loss?		Yes (1) /No (0)	If Yes, [a]
83. Has availability of ineffective and counterfeit pesticides in the market contributed to post-harvest loss?		Yes (1) /No (0)	If Yes, [a]

[a] 1=Very severe, 2=Severe, 3=Not Severe

A4: PLASTIC CRATE ADOPTION AND USE

Variable	Response	Codes
84. What did you use to store and transport your production (tomato) from farm to your aggregation point before sale during the last season (click all that apply)?		[a]
85. If plastic crates were not used, why did you not use plastic crates during the last season?		[b]
86. If plastic crates were not used during the last season, have you ever used plastic crate?		Yes/No
87. If yes when was the last time you use plastic crates (Number of years ago)		
88. If plastic crates were not used, did you receive a lower price because of the quality of your produce by the time it got to the market during the last season?		Yes (1) /No (0)
89. If yes how much less than the expected market price did you sell your produced (Naira/kg)		
90. If raffia were used, what proportion of your total quantity of tomato did you store and transport to your point of storage with raffia (%)?		
91. If raffia were used, what proportion of tomato did you transport to your point of sale/marketing with raffia (%)		
92. If raffia baskets were used, how do you source the raffia?		[c]
93. If raffia were used, how much did you buy it, on average (Naira/crate)?		
94. What is the size of the raffia basket (kg)		
95. If raffia were owned, where did you buy it?		[d]
96. If plastic crates were used (including both crate and raffia), what proportion of quantity of tomato did you store and transport to your point of storage with the crates (%)?		
97. If plastic crate (including if you use both crate and raffia), what proportion of tomato did you transport to your point of sale/marketing with the crates) (%)?		
98. If you use plastic crates (including both), what do you use the plastic crates for?		[e]
99. If plastic crate (including both), what is the main benefit of using plastic crates?		[f]
100. If use of plastic crates (including both), have you ever received a price premium because of the quality of your product when packed in the crate?		Yes (1) /No (0)
101. If plastic crate (including both), how do you source the crate?		[g]
102. If owned, how much did you buy it at the time of purchase (Naira/crate)?		
103. If owned, where did you buy it?		[h]
104. If owned, whom did you buy from?		[i]
105. If owned or both (owned and rented) how many plastic crates did you have during the last season 2022/2023		
106. How long have you owned your plastic crates on average		
107. If rented, where did you rent it from most frequently?		[j]

108. If rented, from whom did you rent most frequently?		[k]
109. If rented, how much did you pay per day, on average, during the last season (Naira/crate)?		
110. If rented, how did you get the crates during the last season?		[l]
111. If rented, how long did it usually take to receive the crates after placing an order during the last season (days)?		
112. If rented, what percentage of your desired sale (using plastic crates) were you not able to sell in plastic crates because the service providers run out of stocks during the last season?		

[a] 1= Raffia basket, 2= Plastic crate, 3= Polythene bags, 4=Both raffia and plastic crate, 5= Pail/Buckets, 6. Plastic crate & Pail/Buckets, 7=others (specify)

[b] 1=Unavailable when I needed, 2=Not affordable to own, 3=Don't know about it, 4=Not affordable to rent, 5=Buyers don't demand for it, 6= It is expensive and there is no premium price for tomatoes sold in crate, 7= I don't see the difference with other kinds of storage, 8=Others (specify)

[c] 1=Traders, 2=other farmers in the market, 3=Associations (women groups/cooperatives), 4=Manufacturers, 5=Other (specify)

[d] 1=Community/village market, 2=Nearby market (retail/wholesale in LGA), 3= Distance wholesale market (another LGA/state), 4=Nearby motor park (within LGA), 5= Distance motor park (another LGA/state)

[e] 1=Sale in local market, 2= Sale in wholesale market (Lagos), 3=Storing for home consumption, 4=Others (specify)

[f] 1=Post-harvest loss reduction, 2=Price premium, 3= Both post-harvest reduction & price premium, 4= No special benefit, 5= my buyers require the use of plastic crates 99=Others (specify)

[g] 1=Rental, 2= Rental with a deposit, 3=Returnable without fee, 4= Owned, 5= Borrowing, 6=Other (specify)

[h] 1=Community/village market, 2=Nearby market (retail/wholesale in LGA), 3= Distance wholesale market (another LGA/state), 4=Nearby motor park (within LGA), 5= Distance motor park (another LGA/state)

[i] 1=Traders, 2=Manufacturers, 3= Farmers, 4= Associations, 5= Others (specify)

[j] 1=Community/village market, 2=Nearby market (retail/wholesale in LGA), 3= Distance wholesale market (another LGA/state), 4=Nearby motor park (within LGA), 5= Distance motor park (another LGA/state)

[k] 1=Traders, 2=Manufacturers, 3= Farmers, 4= Associations, 5= Crate renting company, 6=Others

[l] 1= Delivered to my community/farm by the renter, 2= Delivered to my community/farm by the buyer, 3= I arranged for transport to pick it up from the market & deliver to my farm

A5.1.1 TRANSACTION COST (DISTANCE TO MARKET & PURCHASING/RENTING SHOPS)

97. # Harvest	Harvested amount	Which production system 1=Rain-fed, 2=Irrigation 3= Both	Where did you sell this harvest in 2022/23 production season?	Who was your buyer?	Did you have market information before selling?	If yes, what were the major sources of market price?	Who determined the market price?	Distance to the sales point (walking minute) in 2022/23	Quantity sold using raffia (kg)	Quantity sold using crate (kg)	Distance of the farm to the buying point of raffia (walking minutes) in 2022/23	Distance of the farm to the renting point of raffia (walking minutes) in 2022/23	Total cost of transporting the purchased raffia basket from buying to farmers' gate in 2022/23 (Naira)?	Distance of the farm to the buying point of plastic crate (walking minutes) in 2022/23	Distance of the farm to the renting point of plastic crate (walking minutes) in 2022/23 (Naira)?	Did you incur transportation costs when selling your tomato last year?	If yes, total quantity transported in kg	What was the total transportation costs incurred from the farm to the main bulk selling point in 2022/23 (Naira)?	Costs paid for transportation (vehicle etc.)
1 st harvest			[a]	[b]	Yes (1) /No	[c]	[d]									Yes (1) /No			
2 nd harvest			[a]	[b]	Yes (1) /No	[c]	[d]									Yes (1) /No			
3 rd harvest			[a]	[b]	Yes (1)	[c]	[d]									Yes (1) /No			

t					/No														
4 th har ves t			[a]	[b]	Yes (1) /No	[c]	[d]											Yes (1) /No	
5 th har ves t			[a]	[b]	Yes (1) /No	[c]	[d]											Yes (1) /No	
6 th har ves t			[a]	[b]	Yes (1) /No	[c]	[d]											Yes (1) /No	

Note: The harvested amount (shaded) (good if the total should be automatically displayed here for ease, but not sure if the unit change (different basket size) affect the coding. We will find out from Yinka): Any suggestion is welcome

[a] 1= On farm, 2=Aggregation point in the local community (LGA), 3=village market, 4=Local retail/wholesale market (within my LGA), 5= Retail/wholesale market outside of my LGA but within the state, 6= Wholesale market in another state, 7=Outside of Nigeria

[b] 1= Agent/ Aggregator, 2=Retailer in the local market, 3= Local wholesale market (within my LGA), 4= Wholesale market outside of my LGA but within the state, 5= Wholesale market in another state, 6=Exporter, 7= Processor, 8=Other (specify)

[c] 1= TOGAN, 2= Traders, 3= Other farmers, 4= Cooperatives, 5= Communication asset & social media (phone, radio...)

[d] 1= TOGAN, 2= Traders, 3= Other farmers, 4= Cooperatives, 5= Communication asset & social media (phone, radio...)

A5.1.2 TRANSACTION COST

Variables	Response	Codes
114. Where did you sell the bulk of your tomato product in 2022/23?		[a]
115. Name your top buyers (select up to 3) in the 2022/23 production?		[b]
116. What share of your 2022/23 total produce did you sell to first top buyer (percent)?		
117. What share of your 2022/23 total produce did you sell to second top buyer (percent)?		
118. What share of your 2022/23 total produce did you sell to third top buyer (percent)?		
119. Did you sell the bulk tomato production in 2022/23 on contractual basis?		Yes (1) /No
120. If yes, to whom?		[c]
121. How did you get the bulk tomato production in 2022/23 to the buyer/market?		[d]
122. How did you choose where to sell your bulk product in 2022/23?		[e]
123. How do you choose whom to sell your bulk production to in 2022/23?		[f]
124. Did you have market price information before selling the bulk of your tomato product in 2022/23?		Yes (1) /No
125. If yes, what are the major sources of market price information for the 2022/23 harvest?		[g]
126. How would you rate the information about market price?		[h]
127. Who determined the market price for the bulk sale in 2022/23?		[i]
128. Distance of the farm to your storage unit (walking minutes)		

[a] 1= On farm, 2=Aggregation point in the local community (LGA), 3=village market, 4=Local retail/wholesale market (within my LGA), 5= Retail/wholesale market outside of my LGA but within the state, 6= Wholesale market in another state, 7=Outside of Nigeria

[b] 1= Agent/ Aggregator, 2=Retailer in the local market, 3= Local wholesale market (within my LGA), 4= Wholesale market outside of my LGA but within the state, 5= Wholesale market in another state, 6=Exporter, 7= Processor, 8=Other (specify)

[c] 1= Agent/ Aggregator, 2=Retailer in the local market, 3= Local wholesale market (within my LGA), 4= Wholesale market outside of my LGA but within the state, 5= Wholesale market in another state, 6=Exporter, 7= Processor, 8=Other (specify)

[d] 1= I deliver myself, 2= Hire a trucking firm/transport service to deliver, 3=The buyer arranges transport to collect the product, 4= Other (specify)

[e] 1= Closest market/sales point to my farm, 2=Market/sales point with the best price, 3= Market/sales point that I am used to selling, 4= Market/sales point where I am sure I can find a buyer, 5= Other (specify)

[f] 1=I sell to any random buyer/no choice available, 2= Buyer with long relationship, 3=Buyer offers high price, 4= Whom I can get immediate cash payment 5= Buyer who is willing to come and pick up the product, 6=Other (specify)

[g] 1= TOGAN, 2= Traders, 3= Other farmers, 4= Cooperatives, 5= Communication asset & social media (phone, radio...)

[h] 1=Very reliable, 2= Reliable, 3=Moderately reliable, 4=Slightly reliable, 5= Not reliable

[i] 1= TOGAN, 2= Traders, 3= Farmers, 4= Cooperatives, 5= Negotiation, 6= Other (specify)

A6: INSTITUTIONAL SUPPORT

Variables	Response	Codes
129. How frequently did extension agents visit your farm last season in the rainy season?		[a]
130. How frequently did extension agents visit your farm last season in the rainy season?		
131. Are you a member of Tomato Growers' Association of Nigeria (TOGAN)		Yes (1) /No (0)
132. Do you belong to any farmers' association?		Yes (1) /No (0)
133. If yes in (132), how long have you been a member? (Years)		
134. Did you have access to formal credit for tomato production last season?		Yes (1) /No (0)
135. If yes in (134), what was the source of the credit?		[b]

136. Did you buy tomato production inputs collectively with other farmers in 2022/2023?		Yes (1) /No (0)
137. Did you sale tomato production collectively with other farmers in 2022/2023?		Yes (1) /No (0)

[a] 1=Weekly, 2= Fortnightly (every two weeks), 3=Monthly, 4= Bi-monthly, 5=Annually, 6= Never

[b] 1=Banks, 2=Family members, 3= Money lender, 4=Farmers associations

A7. ASSET

Social assets		
138. How long have you been living in your community (Nb. years)		
139. Do you have any position in your community?		Yes (1) /No (0)
140. Did you have your own mobile phone?		[a]
141. Do you have access to the internet via the phone?		[b]
142. For which purpose did you mainly use the internet last season? (Please tick at maximum three)		[c]
Financial assets		
143. How much cash did you have in saving at the start of the irrigation season during 2022/2023? (Naira)		
144. How much cash did you have in saving at the start of the rain-fed season during 2022/2023? (Naira)		
Physical assets		
145. Did you own transport equipment (motorbike/ bicycle) in 2022/23 production seasons?		Yes (1) /No
146. How many pack animals (e.g. donkey, horse, oxen, camel, mule) did you own during the last 2022/23 production season?		
147. What is your estimated value of your physical assets (TV, radio, motorbikes, bikes, livestock, main house, etc) (Naira)		

[a] 1= Yes, feature phone, 2= Yes, Smartphone, 3=I share a feature phone with others, 4=I share a smartphone with others, 5=No

[b] 1= Yes via wifi at home, 2=Yes via wifi at other places (e.g. public hotspots), 3=Yes via mobile internet (regularly), 4=Yes via mobile internet only occasionally, 5=No internet access

[c] 1= To stay in contact with buyers and input providers, 2=Finding information about agricultural issues, 3=Reading the news (e.g. political news), 4=Purchase of tomato inputs (via WhatsApp, telegram...), 5=Sale of tomato production (via WhatsApp, telegram...), 6=Receive/exchange agricultural information (via WhatsApp, telegram...), 7=Listening to or watching music

SECTION B: AWARENESS AND ADOPTION OF INTEGRATED PEST MANAGEMENT (IMP)

148. What type of pest challenges do you experience in your tomato farm a. Insect pest b. Fungi disease c. Nematode disease d. Viral disease e. Other

149. What control methods do you use? a. Cultural b. Chemical method c. Indigenous practices d. others

150. Are you familiar with integrated pest management (IPM) practices	Yes (1) /No (0)
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151. Have you received training on IPM? (CODE, Yes/No)

152. Who are the IPM training providers in your area?

- NGO's
- Government
- Agro-dealers
- Cooperatives
- Processors
- Exporter
- Others (mention)

153. What are the reasons for adopting IPM practices? (multiple answers)

- High level of pest infestation
- Inadequate knowledge of IPM methods

- c) IPM is too expensive
- d) IPM results are not good enough
- e) others (mention)

154. What are the reasons for not adopting IPM practices? (multiple answers)

- a) High level of pest infestation
- b) Inadequate knowledge of IPM methods
- c) IPM is too expensive
- d) IPM results are not good enough

155. Why do you mainly use IPM?

- a) For prevention of pests and diseases
- b) For monitoring of pests and diseases
- C) For Intervention

156. What device(s) do you use in applying pesticide? a. Knapsack sprayer () b. Hand sprayer () c. Motorized sprayer () d. others (specify)

157. What is your source of labour? Family labour [] Hired labour [] Communal labour [] SSP [] others (specify)

Different IPM practices	Awareness (CODE, Yes/No)	If yes , who introduced you to this IPM practices? CODE A	Have you used this IPM practices (CODE, Yes/No)
158. Early planting			
159. Collection and destruction of larvae and eggs masses by handpicking			
160. Use of light trap			
161. Crop rotation			
162. Intercropping			
163. Regular field inspection or scouting for pest identification and infestation			
164. Perching in the field to control insect			
165. Weed management			
166. Use of improved seeds			
167. Spraying of ashes, sand or neem water			
168. Use of synthetic pesticides as last option			
169. Use of bio-pesticides as last option			
170. Use of scarecrow			
171. Other (specify)			

CODE A [1] NGO's [2] Government [3] Agro-dealers [4] Cooperatives [5] Processors [6] Exporter

SECTION C(a): AGROCHEMICALS APPLICATION AND USE KNOWLEDGE

Variables	Codes
172. Did you apply fertilizer on tomato	Yes (1) /No (0)
173. Did you use pesticides on on tomato	Yes (1) /No (0)
174. How many times did you normally spray pesticides for a season on tomato	[a]
175. Do you use insecticides to your tomato farm?	Yes (1) /No (0)
176. 7. How many times do you spray insecticides per year?.....	[a]
177. 7. How many litres of insecticides do you use per year?.....	

178. Do you apply fungicides?	Yes (1) /No (0)
179. How many times do you spray fungicide per year?.....	[a]
180. 12 How many litres of fungicide do you use per year?.....	
181. Do you spray herbicides?	Yes (1) /No (0)
182. How many times do you spray herbicides on your tomato farm per year?.....	[a]
183. How many litres of herbicides do you use per year?.....	
184. Where do you normally buy pesticides?	[b]
4(a). Why do you buy from that place	[c]
185. Where do you store pesticides?	[d]
186. Do you read the pesticide labels before use	Yes (1) /No (0)
187. When you buy pesticides, did they explain to you how to store, use it and disposal after use?	Yes (1) /No (0)
188. Did you receive training on how to use and dispose pesticide waste after use?	Yes (1) /No (0)
189. How did you dispose pesticide container after use?	[e]
190. Do you distinguish counterfeit pesticides in the market?	Yes (1) /No (0)
191. Who typically applies pesticides on your farm?	[f]
192. Do you use hired spray service providers for spraying pesticides?	Yes (1) /No (0)
193. If No, how much are you willing to pay per hectare?	Naira/hectare
194. Are you willing to pay for pest identification and advisory services on pesticide application?	Yes (1) /No (0)
195. If yes, how much are you willing to pay per hectare?	Naira/hectare
196. When spraying pesticides (family/hired labour) do they wear personal protective clothing	Yes (1) /No (0)
197. Are you willing to pay for additional sprayer service providers services for linking you up with pesticides agro-dealers to buy effective pesticides?	Yes (1) /No (0)
198. If yes, how much are you willing to pay per hectare?	Naira/hectare
199. When spraying pesticides (family/hired labour), do they wear over all?	Yes (1) /No (0)
200. When spraying pesticides (family/hired labour) do they wear protective rubber boots?	Yes (1) /No (0)
201. When spraying pesticides (family/hired labour) do they wear masks?	Yes (1) /No (0)
202. When spraying pesticides (family/hired labour) do they wear goggles?	Yes (1) /No (0)
203. Do you know the meaning of pre-harvest interval?	Yes (1) /No (0)
204. How many days/week do you wait before harvesting tomato after pesticide application?	[g]

[a] 1= once, 2= Twice, 3=Three times, 4=Four times, 5=Over four times, 6=Others (specify)

[b] 1=Local market, 2=Agro-dealers, 3= Other farmers, 4= Government supply, 5= Cooperatives, 6= Others (specify)

[c] 1= Only option, 2=Cheapest option, 3= My contract arrangement with a buyer requires it, 4= I trust their quality, 5=Most convenient option, 6=Other (specify)

[d] 1= In the living room, 2=In the farm, 3= In a special store, 4= In the store where I keep my food stuff, 5=Other (specify)

[e] 1=Throw away on the farm, 2= Burn, 3 Throw away into the village waste dump, 4= Throw away into nearby bush, 5= Collect & sell them, 6=Re-use for another purpose, 7= Burry, 8= Throw into the drainage canals/streams/rivers

[f] 1= Self, 2=Local Sprayer service providers, 3=agro-dealer 4=Others (specify)

[g] 1= Less than 3 days, 2=Three days, 3=One week, 4= Two weeks,

SECTION D : Awareness and Perception of Sprayer Service Providers (SSPs)

	Questions	Response Options
205.	What are the key factors that influence your decision to use or not use SSP services on your farm?	(a) Cost of the SSP service (b) Availability of SSP services in your area (c) Timing and convenience of SSP provider (d) Availability of alternative pest control methods (e.g., manual spraying) (e) Other (Specify)
206.	Are you aware of Sprayer Service Providers (SSPs) in your area?	Yes [] No []

207.	Have you ever used the services of an SSP on your farm?	Yes [] No []
208.	How did you first learn about SSP services?	a. Extension agent [] b. Other farmers [] c. Advertisements/media [] d. Directly approached by an SSP [] e. Others (please specify).....
209.	What kind of SSP services have you received before?	(a) Spraying advisory [] (b) pest assessment [] (c) purchasing pesticides [] (d) other (specify)_____
210.	On a scale of 1 to 5, how would you rate your overall understanding of the services provided by SSPs?	1 = Very poor [] 2 = poor [] 3 = Average [] 4 = Good [] 5 = Very good []
211.	To what extent do you agree with the following statements about the benefits of using SSP services?	a = Proper and safe application of pesticides (1 = Strongly disagreed, 5 = Strongly agreed) [] b = Reduced exposure to pesticides (1 = Strongly disagreed, 5 = Strongly agreed) [] c = Improved crop yields (1 = Strongly disagree, 5 = Strongly agree) [] d = Time savings (1 = Strongly disagree, 5 = Strongly agree) [] e = Reduced overall costs (1 = Strongly disagree, 5 = Strongly agree) []
212.	To what extent do you agree with the following statements about the challenges of using SSP services?	a = There is Availability of SSPs in my area (1 = Strongly disagree, 5 = Strongly agree) [] b = Affordability of SSP services (1 = Strongly disagree, 5 = Strongly agree) [] c = I trust the Reliability of SSP services (1 = Strongly disagree, 5 = Strongly agree) [] d = Lack of trust in SSP service quality (1 = Strongly disagree, 5 = Strongly agree) [] e = Preference for using my own or village sprayers (1 = Strongly disagree, 5 = Strongly agree) []
213.	What are the main sources of information you rely on to learn about new agricultural technologies and services like SSPs?	(a) Government extension services (b) Farmer cooperatives or associations (c) Agricultural workshops or seminars (d) Social media or online platforms (e) Printed materials (e.g., brochures, pamphlets) (f) Other (specify)
214.	Can you describe your experience (if any) with using SSP services on your farm?	(a) Very positive – SSP services greatly improved my crops yields (b) Positive – SSP services were helpful and met my expectations (c) Neutral – SSP services were average, with no significant impact (d) Negative – SSP services did not meet my expectations (e) Very negative – SSP services caused issues or led to crop losses (f) No experience – I have not used SSP services on the farm. (g) Other (specify)

SECTION E: Willingness to Pay (WTP) for SSP Services

	Questions	Response Options
215.	How much do you currently pay for spraying services on your farm?	a. Less than ₦1,000 per hectare [] b. ₦1,000 - ₦2,500 per hectare [] c. ₦2,501 - ₦5,000 per hectare [] d. More than ₦5,000 per hectare [] e. I do not hire spraying services []
216.	What is the typical frequency of spraying services you use on your	a. 1-2 times []

	farm per season?	b. 3-4 times [] c. 5 times or more [] d. I do not use spraying services []
BDM auction-style questions: Imagine a Sprayer Service Provider (SSP) offers the following services: a. Pest scouting only b. Pest scouting and advice on pesticide use and purchase c. Spraying services [Present a range of pre-determined bid amounts in a BDM auction format for each service offering. Record the respondent's bids and their responses to the follow-up bids.]		
217.	For each of these services, what is the maximum amount you would be willing to pay per hectare?	
218.	How do you perceive the value of SSP services compared to your current pest management practices?	a. Much better – SSP services offer significantly more value b. Better – SSP services provide more value than my current practices c. About the same – SSP services and my current practices have similar value d. Worse – my current practices provide more value than SSP services e. Much worse – SSP services are less valuable than my current practices f. Unsure – I'm not sure how to compare SSP services to my current practices g. No opinion – I do not have enough experience with SSP services to compare
219.	What factors do you consider most important when deciding whether to use SSP services on your farm?	a. Cost of SSP services b. Past experience with SSP services c. Availability of SSP service when needed d. Health and safety considerations for workers and the environment e. Recommendation from other farmers or agricultural experts f. Other (Specify) _____
220.	What suggestions do you have to improve the services offered by SSPs to better meet the needs of farmers like yourself?	a. Lower the cost of SSP services b. Improve the quality and effectiveness of spraying c. Offer training or demonstrations on proper spraying techniques d. Offer package deals or discounts for regular users e. Provide better customer support and follow up services f. Other (specify) _____

SECTION F: Factors affecting Willingness To Pay For Sprayer Service Providers

NO	VARIABLE NAME	QUESTIN/RESPONSE	CODES
221.	Farm Size	Size of Farm (hectares)	
		Less than 1	1
		1-2	2
		3-5	3
		6-10	4
		Above 10	5
222.	Crop Type	Type of Crops Grown	
		Cereals (e.g., maize, rice)	1

		Vegetables (e.g., tomatoes, peppers)	2
		Cash crops (e.g., cocoa, coffee)	3
		Others (please specify)	4
223.	Farming experience	Number of Years in Farming	
		Less than 5 years in farming	1
		5-10 years	2
		11-20 years	3
		Over 20 years	4
224.	SSP Awareness	Are you aware of the existence of sprayer service providers?	
		Yes	1
		No	2
225.	SSP Usage	Have you ever used the services of an SSP?	
		Yes	1
		No	2
226.	SSP Usage Frequency	If yes, how often do you use SSP services?	
		Always	1
		Often	2
		Sometimes	3
		Rarely	4
		Never	5
227.	Importance of SSP	How important is the use of sprayer services to you?	
		Very Important	1
		Important	2
		Neutral	3
		Not important	4
		Not Important at all	5
228.	Main Reason for SSP Usage	What is your main reason for using or not using SSPs?	
229.	WTP Amount	How much are you willing to pay per hectare for SSP services?	
		Less than N1000	1
		N1000 – N2000	2
		N2001 – N3000	3
		N3001 – N4000	4
		Above N4000	5
230.	Cost Influence	Cost of services	
		Very high	1
		High	2
		Moderate	3
		Low	4
		Very low	5
231.	Quality Influence	Quality of services	
		Very high	1
		High	2
		Moderate	3
		Low	4
		Very low	5
232.	Availability Influence	Availability of SSPs	
		Very high	1
		High	2
		Moderate	3
		Low	4
		Very low	5
233.	Trust Influence	Trust in SSPs	
		Very high	1
		High	2

		Moderate	3
		Low	4
		Very low	5
234.	Credit Influence	Access to credit	
		Very high	1
		High	2
		Moderate	3
		Low	4
		Very low	5
235.	Farm Size Influence	Farm size	
		Very high	1
		High	2
		Moderate	3
		Low	4
		Very low	5
236.	Other Influences	What other factors influence your WTP for SSPs?	
237.	Perception of SSPs	Do you believe that SSPs can improve your farm productivity?	
		Strongly agree	1
		Agree	2
		Neutral	3
		Disagree	4
		Strongly disagree	5
238.	Recommendations	What improvements would you suggest for SSPs?	

SECTION G: Tomato Market Support and Incentives

	Questions	Response Options
239.	Do you currently have access to premium prices for your tomatoes produce?	a. Yes [] b. No [] c. I don't know []
240.	Have you received any government or other subsidies for your agricultural activities in the past 2 years?	a. Yes [] b. No [] c. I don't know []
241.	If you have access to premium prices or subsidies, what type of support do you receive?	a. Price premium for certified/organic products [] b. Input subsidies (e.g., fertilizers, seeds, pesticides) [] c. Equipment/machinery subsidies [] d. Other (please specify)
242.	To what extent do premium prices or subsidies influence your willingness to pay for Sprayer Service Provider (SSP) services? (1 = No influence, 5 = Significant influence)	
243.	How important are the following types of market incentives in enhancing your willingness to pay for SSP services?	a. Price premiums for sustainably-produced crops (1 = Not important, 5 = Extremely important) [] b. Input subsidies for sustainable farming practices (1 = Not important, 5 = Extremely important) [] c. Guaranteed markets for sustainably-produced crops (1 = Not important, 5 = Extremely important) [] d. Access to credit or financing for sustainable investments (1 = Not important, 5 = Extremely important) []

244.	What types of market support or incentives would be most effective in encouraging you to use SSP services on your farm?	a. Access to High - Quality inputs b. Improved Market Access for produce c. Discounts for farmer Groups or cooperatives d. Incentives for sustainable practices e. Insurance for SSP – related Risks f. Others (specify)
245.	How can the government or other stakeholders design market-based programs to promote the adoption of sustainable agricultural practices, including the use of SSP services?	a. Market access programs b. Financial incentives c. Public – private partnerships d. Training and capacity building e. Credit and loan schemes f. Research and development g. Others (specify)
246.	What challenges do you currently face in accessing premium prices, subsidies, or other market-based incentives for your tomatoes produce?	a. Inadequate storage facilities b. Lack of Market Information c. Limited Access to Credit d. Low Bargaining power e. Lack of Access to buyers f. Inconsistent to Government support g. Others (Specify).....

SECTION H : Irrigation and Rainfed Farming Systems

	Questions	Response Options
247.	If you have an irrigated farming system, what is the main source of irrigation water?	a. Surface water (river, lake, etc.) [] b. Groundwater (borehole, well, etc.) [] c. Combination of surface and groundwater []
248.	Compared to rainfed farming, how would you rate the following aspects of pest management in your irrigated farming system?	a. Frequency of pest and disease outbreaks (1 = Much lower, 5 = Much higher) [] b. Reliance on pesticide use (1 = Much lower, 5 = Much higher) [] c. Effectiveness of pest control measures (1 = Much lower, 5 = Much higher) [] d. Overall complexity of pest management (1 = Much lower, 5 = Much higher) []
249.	Compared to irrigated farming, how would you rate the following aspects of pest management in your rainfed farming system?	a. Frequency of pest and disease outbreaks (1 = Much lower, 5 = Much higher) [] b. Reliance on pesticide use (1 = Much lower, 5 = Much higher) [] c. Effectiveness of pest control measures (1 = Much lower, 5 = Much higher) [] d. Overall complexity of pest management (1 = Much lower, 5 = Much higher) []
250.	How do the pest management challenges and practices differ between your irrigated and rainfed farming systems (if applicable)?	a. Frequency of pest outbreaks b. Cost of pest management c. Effectiveness of pest control d. Impact of yield e. Soil and Water – Related Pest Issues f. Pest pressure g. Others (Specify)
251.	Do you perceive any differences in your willingness to pay for Sprayer Service Provider (SSP) services between your irrigated and rainfed farming systems? If yes, please explain.	a. Yes, willing to pay more for irrigated systems b. Yes, willing to pay more for rainfed systems c. Yes willing to pay the same for both d. Yes, willing to pay less for irrigated systems e. Yes, willing less for rainfed systems

		f. No, no differences g. Not applicable
252.	What factors influence your choice of farming system (irrigated, rainfed, or mixed)? (check all that apply)	Availability of water resources [] Soil type and fertility [] Rainfall and temperature [] Crop type and suitability [] Market demand and profitability [] Government incentives or policies [] Other (please specify).....

SECTION I : Policy and Regulatory Environment

	Questions	Response Options
253.	Are you aware of any government policies or regulations related to sustainable agricultural practices in Nigeria?	a. Yes [] b. No [] c. I'm not sure []
1b	If yes, which of the following policies or regulations are you aware of?	a. Pesticide regulation and management [] b. Subsidies or incentives for adopting sustainable practices [] c. Certification programs for organic or eco-friendly products [] d. Extension services and training programs [] e. Other (please specify)
254.	Have you participated in any government or NGO programs related to sustainable agriculture in the past 2 years?	a. Yes [] b. No [] c. I'm not sure []
255.	How effective do you think the existing policies and regulations are in promoting the use of Sprayer Service Providers (SSPs) and sustainable pest management practices?	(1 = Not effective at all, 5 = Extremely effective)
256.	To what extent do you agree that the current policy environment supports the commercialization and adoption of SSP services in your area?	(1 = Strongly disagree, 5 = Strongly agree)
257.	What are the key challenges or barriers you face in accessing government programs, policies, or regulations related to sustainable agriculture and the use of SSP services?	a. Lack of awareness b. Limited access to resources c. Lack of local support d. Poor communication channels e. Limited training and education f. Others (Specify)
258.	What suggestions do you have for policymakers to better support the adoption of SSP services and promote sustainable agricultural practices among farmers like yourself?	a. Increase awareness and education b. improve access to resources c. Provide financial Incentives d. Facilitate Market Access e. Support research and innovation f. Others (Specify)
259.	How can the government or other stakeholders design policies and programs to incentivize the use of SSP services and encourage the transition to more sustainable farming practices?	a. Offer financial subsidies b. Create grant programs c. Develop training programs d. Implement tax incentives e. Enhance extension services f. Others (Specify)

260. Provide information below

NO	QUESTION	RESPONSE OPTIONS	CODE
1	In the past four weeks, did you worry that your household would not have enough food?	0 = No (skip to Q2) 1=Yes	
1a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
2	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No (skip to Q3) 1=Yes	
2a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
3	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	0 = No (skip to Q4) 1 = Yes	
3a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
4	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	0 = No (skip to Q5) 1 = Yes	
4a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
5	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No (skip to Q6) 1 = Yes	
5a	How often did this happen?	1 = Rarely (once or twice in the past four weeks)	

		2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
6	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food	0 = No (skip to Q7) 1 = Yes	
6a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
7	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	0 = No (skip to Q8) 1 = Yes	
7a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
8	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	0 = No (skip to Q9) 1 = Yes	
8a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
9	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0 = No (questionnaire is finished) 1 = Yes	
9a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	

261. Please fill the information below regarding your coping strategies

S/No.	Identified constraints	SA	A	U	D	SD
1.	Join farmers' cooperative to supplement family income					
2.	Engage in hired labour to get paid to increase income					
3.	Use savings and pay for goods to protect consumption and sharp declines in income					
4.	Save little income and spend savings only during critical need					
5.	Access to government incentives to reduce financial burden					
6.	Access to loan from Friends and Relatives help to cope with high interest rate from commercial banks					
7.	Sale part of farm produce to get more income					
8.	Sale livestock owned to get more income					

KEY: Strongly Agree = SA, Agree = A, Neither Agree Nor Disagree (Undecided) = U
Disagree = D, and Strongly Disagree = SD.

Thank you for your time and patience