Report on consumer acceptability tests of NARITA hybrids in Tanzania and Uganda

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Introduction

Consumer acceptability tests of NARITA hybrids were conducted with a total of 572 randomly selected men and women farmers from 5 sites (average 114 per site) in different agro-ecological zones in Tanzania and Uganda (Maruku, Mitalula and Moshi in Tanzania; Kawanda and Mbarara in Uganda). Evaluations were done between July and November 2018 under the project 'Improvement of banana for smallholder farmers in the Great Lakes Region of Africa'.

In all the sites, we worked closely with food scientists and/or nutritionists from TARI[2] and NARL[3]. At each site, focus group discussions (FGDs) were first conducted with different age groups: young women, young men (<35 years); and older women, older men (>35 years) to ascertain the main products households make using cooking banana cultivars and the preparation method. The most important product was then prepared in each site - steamed *matooke* in both Uganda sites and boiled fingers in all Tanzania sites. On a given day, about 100 farmers were each provided with coded samples of four NARITA hybrids plus one local check and asked to rate each sample on a 5-point hedonic scale for the following attributes: colour, aroma, texture in hand, taste, mouthfeel and overall acceptability.

This report provides results that can help inform the selection of the best NARITAs to take on-farm and subsequent varietal release. Results were corroborated with experiences from data collectors in the field sites who were managing the sites and cooking/tasting the different genotypes since establishment of the trials.

The data presented in this report is from sensory evaluations only, but the recommendation is that sensory data must be combined with agronomic, pest and disease data to make a final decision on the hybrids to be advanced.

Table 1: Sites, products evaluated and dates of evaluations

Country	Region	Site	Total number of NARITAs evaluated	Product evaluated	Dates of evaluations
Tanzania (TZ)	Kagera	Maruku	19	Boiled fingers	17 - 23 Jul 2018
	Mbeya	Mitalula	21	Boiled fingers	06 - 13 Nov 2018
	Kilimanjaro	Moshi	18	Boiled fingers	23 - 29 Oct 2018
Uganda (UG)	Central	Kawanda	15	Steamed matooke	11 - 17 Sep 2018
	Western	Mbarara	16	Steamed matooke	25 - 30 Jul 2018

Methodology

Pilot study: A pilot study was conducted at NARL, Kawanda in Uganda to pre-test the protocol before implementing it in the other sites.

Consent: Before starting any of the activities, informed consent was sought from all participants explaining to them their rights as research participants in the local language. Participants were given as much time as they wanted to consider whether to participate in the study and to ask questions. It was emphasized that they could opt-out of the study anytime without penalty.

Focus group discussions (FGDs): Before conducting evaluations, four FGDs were conducted with: young women; young men (<35 years) and older women, older men (>35 years). The aim was to determine the main products prepared from cooking bananas, preparation method for the products and preferred cultivars to (a) guide and inform the product to evaluate in each site, and (b) verify the local checks. Steamed *matooke* was prepared in Uganda sites and boiled fingers in Tanzania sites.

Harvesting: Harvesting of 'mature' bunches was done a day before the evaluations. This arrangement simulated what normally happens when bunches are taken to the market or when being harvested for home consumption. Maturity at harvest time is an important factor that affects the quality perception and rate of quality deterioration during post-harvest

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[3] National Agricultural Research Laboratories

handling. Visual morphological indicators that the farmers use, were employed to ensure mature bunches were harvested. The indicators include a combination of some or all of the following: fingers lose their angularity, fruits become fuller in size, visible crack on one of the fingers and stylar ends become drier.

Preparation: A group of women volunteers prepared the products using the same procedure they normally use in their homes. Preparers did not participate in the sensory evaluations and had a separate evaluation form for rating traits related to preparation and processing. Some of the evaluated traits were ease of peeling, peel color, pulp color, amount of sap at peeling, and cooking time.

Steamed matooke preparation: The five samples were each peeled, wrapped in banana leaves and tied with a unique colored string to differentiate from other samples. To ensure uniform preparation conditions, samples were steamed in one big cooking pot for about 2 hours, mashed and then simmered for another hour before serving.

Boiled fingers preparation: Fingers from each of the five samples were peeled, placed in a cooking pot and boiled until they were cooked. Adequate boiling time was allowed for each sample. The individual cooking time for each cultivar was recorded. The average cooking time was 40minutes (ranging from 16 to 67minutes) indicating differences between cultivars in the different sites.

Sensory evaluation process: Participants evaluated a total of five cultivars per day - four NARITAs and one local check (a popular cultivar in the area which was used as a reference point). At least 30grams per cultivar was served to each participant. Sequential monadic testing was used i.e. samples were served and evaluated one at a time. This gave participants enough time to critically assess each of the provided samples. Samples were presented in random order. It was emphasized that the samples were independent of each other.

Evaluation tool: A 5-point hedonic scale was used to access acceptability (1 = very bad, 2 = bad, 3 = fair, 4 = good, 5 = very good) and was administered in the local language at each of the sites. Evaluated attributes included colour, aroma, texture in hand, texture in the mouth, taste, and overall acceptability. The preparers had different rating scales depending on the attribute.

Validation exercises: In four of the sites (Mitalula, Moshi, Kawanda and Mbarara), validation exercises were conducted to verify some of the results from evaluations with farmers. Bukoba was the 1st location where evaluations were conducted and at that time no validation exercises were planned. As indicated earlier, in all the sites, also as a form of validation, results were corroborated with experiences from data collectors in the field sites who were managing the sites and cooking/tasting the different genotypes since the establishment of the trials. Refer to Appendix A2 for more information on validation exercises.

Results and discussion

The results and discussion are presented for each site as follows:

a) Average scores per attribute for each evaluated cultivar indicating those not significantly different from local checks using Tukey's tests. Please note 'overall acceptability' was evaluated as an independent attribute and is **NOT** an average score of all attributes
b) List of NARITAs recommended for advancing on-farm based on the table quality criteria in the current breeding profile[4]. The current Matooke profile states, "A general acceptability score of at least 4 (on a hedonic scale of 1 to 6), using 'Mbwazirume' as a check (acceptability is tested after cooking as taste, aroma, colour, texture/mouth-feel)". In the field evaluations, we used a 5-point hedonic scale hence the equivalent i.e. mean score>= 3.3 for all attributes will be used to inform recommendations
c) List of baseline villages recommended for implementing on-farm trials based on the proportion of farmers growing cooking cultivars and the total number of cooking cultivars grown (as a measure of diversity) in these villages
d) Pictures of the bunch, peeled fingers and cooked product for cultivars recommended for advancing on-farm
e) Discussion related to the process and results

[4] http://breedingbetterbananas.org/wp-content/uploads/2018/07. For the Mchare product profile, table quality only has one trait which is texture, "Texture should be comparable to Mchare laini. Need metrics."

Fig 1: Measuring bunch weight in Moshi, Tanzania

Fig 2: Dr K. Nowakunda explaining purpose of research to farmers in Mbarara, Uganda

Fig 3: Preparers evaluating harvested bunches before processing in Mitalula, Tanzania

Fig 4: Bundles of banana fingers wrapped in banana leaves prior to making steamed mashed matooke

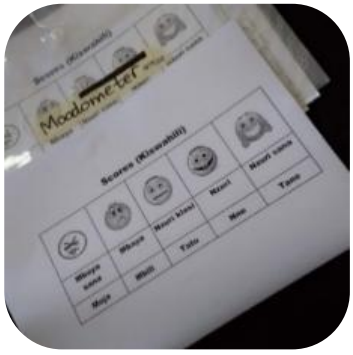

Fig 5: Pictorial scale used for rating by farmers

Fig 6: Prepared sample of boiled fingers, apportioned and ready to serve

Fig 7: Farmers evaluating samples in Mitalula, Tanzania

Fig 8: Group of farmers and research team on the last day of evaluations in Mitalula, Tanzania

Fig 9: Peeling of banana fingers in Maruku, Tanzania

Fig 10: Evaluation of samples during validation exercise at NARL Kawanda, Uganda

Fig 11: Farmers evaluating samples in Buwambo village, near Kawanda, Uganda

Fig 12: Field assistant collecting samples with farmers in the background

Fig 13: Samples in food warmers ready for serving

Fig 14: Banana fingers of different genotypes

Fig 15: Participant and facilitator during a focus group discussion in Maruku, Tanzania

Fig 16: List of samples to be tested for the day written on a banana leaf

Fig 17: Mount Kilimanjaro, Tanzania

Fig 18: Field support staff relaxing after a long day's work in Moshi, Tanzania

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1. MARUKU, TZ

N	Genotype	Colour		Aroma		Texture in hand		Taste		Mouthfeel		Overall acceptability[x]		
		mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	Tukey groups
328	**MBWAZIRUME**	**4.22**	**0.77**	**4.25**	**0.69**	**4.18**	**0.68**	**4.28**	**0.68**	**4.13**	**0.78**	**4.35**	**0.70**	**h**
81	**ENYOYA**	**4.07**	**0.59**	**4.12**	**0.48**	**3.80**	**0.66**	**3.95**	**0.61**	**3.65**	**0.73**	**4.04**	**0.63**	**gh**
409	Control*	4.19	0.74	4.23	0.66	4.11	0.69	4.21	0.68	4.03	0.79	4.29	0.70	
81	N20[ns, e]	4.42	0.57	4.35	0.53	4.15	0.63	4.26	0.63	4.09	0.69	4.45	0.60	h
80	N12[e]	3.85	0.64	3.83	0.76	3.54	0.79	3.71	0.77	3.56	0.78	3.86	0.68	fg
80	N14[e]	3.85	0.51	3.79	0.59	3.46	0.76	3.70	0.70	3.44	0.78	3.73	0.83	efg
82	N7	3.61	0.70	3.78	0.82	3.61	0.81	3.68	0.81	3.70	0.83	3.70	0.83	defg
81	N18	3.20	0.71	3.75	0.60	3.77	0.58	3.78	0.61	3.81	0.71	3.70	0.62	efg
85	N22	3.59	0.70	3.73	0.55	3.13	0.86	3.41	0.86	3.09	0.91	3.47	0.80	cdef
82	N23	3.20	0.58	3.54	0.80	3.06	0.88	3.33	0.92	3.17	0.97	3.43	0.84	cdef
85	N6	3.41	0.68	3.62	0.69	3.38	0.74	3.31	0.79	3.33	0.76	3.39	0.68	cde
81	N2	3.58	0.61	3.62	0.62	3.20	0.81	3.28	0.83	2.90	0.62	3.27	0.69	bcd
81	N26	3.71	0.66	3.80	0.63	3.04	0.80	3.32	0.80	2.83	0.82	3.25	0.73	bc
81	N19	3.11	0.72	3.38	0.80	3.06	0.90	3.19	0.87	3.35	0.85	3.22	0.84	bc
84	N4	3.71	0.74	3.73	0.70	2.90	0.90	3.15	0.84	2.73	0.81	3.21	0.80	bc
80	N15	3.26	0.76	3.36	0.77	2.99	0.90	3.19	0.85	3.08	0.87	3.19	0.81	bc
85	N27	2.75	0.60	3.19	0.68	3.26	0.73	3.15	0.70	3.38	0.65	3.14	0.68	bc
82	N11	2.56	0.74	3.11	0.86	3.27	0.83	3.04	0.92	3.59	0.93	3.09	0.90	bc
80	N8	2.36	0.82	3.10	0.79	2.93	0.88	2.81	0.93	3.13	0.93	2.88	0.87	ab
80	N10	2.18	0.59	2.98	0.86	2.65	0.89	2.58	0.85	2.78	0.84	2.51	0.82	a
81	N13	2.07	0.70	3.12	0.86	2.99	0.89	2.69	0.86	3.11	0.91	2.60	0.84	a
82	N21	2.02	0.68	2.91	0.91	3.02	0.90	2.43	0.87	3.20	0.91	2.61	0.80	a

'N' denotes NARITA hence **N**20 is NARITA 20

[ns]Not significantly different from Mbwazirume (the universal local check) at the 5% level using Tukey tests; for all attributes

[e] Not significantly different from Enyoya (second local check) at the 5% level using Tukey tests

*Combination of the average scores for Enyoya and Mbwazirume

[x] For **overall acceptability,** means followed by the same letter are not significantly different at the 5% level using Tukey tests

List of NARITAs recommended to take on farm at Maruku site: N20, N12, N14, N7, N6

NARITAs with overall acceptability score >=3.3 at Maruku site: N20, N12, N14, N7, N18, N22, N23, N6

List of villages recommended for on farm trials in Bukoba: Some of the baseline study villages have very little cultivar diversity with most households growing FHIA hybrids (Refer to Appendix Table A1). Targeting the villages (listed below) that grow only 4 or 5 cooking cultivars can improve and increase cultivar diversity. In these proposed villages, only 1 or 2 households indicated that they grow other cooking cultivars besides FHIAs.

SUBCOUNTY	PARISH/WARD	**Village**
Bugabo	Kishanje	**Bumai**
Bugabo	Rubafu	**Bushasha**
Bugabo	Rubafu	**Rubafu**

Fig 19: Maruku pictures ***(N20, N12, N14, N7, N6)***

	N20	N12	N14	N7	N6	Mbwazirume	Enyoya
boiled fingers							
peeled uncooked fingers							
bunch							

2. MITALULA, TZ

	Genotype	Colour		Aroma		Texture in hand		Taste		Mouthfeel		Overall acceptability[x]		
		mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	Tukey groups
68	**ITOKI (MZUZU)**	**3.79**	**0.74**	**3.90**	**0.50**	**3.71**	**0.60**	**4.07**	**0.61**	**3.74**	**0.66**	**4.32**	**0.70**	**l**
132	**MBWAZIRUME**	**4.27**	**0.54**	**3.99**	**0.52**	**3.70**	**0.65**	**4.02**	**0.68**	**3.85**	**0.64**	**4.11**	**0.67**	**kl**
131	N18[ns, b, z]	4.10	0.48	3.92	0.56	3.76	0.71	3.85	0.69	3.76	0.63	3.98	0.72	jkl
126	**ENJUBO/BUKOBA**	**4.08**	**0.50**	**3.89**	**0.48**	**3.80**	**0.52**	**3.83**	**0.64**	**3.87**	**0.53**	**3.95**	**0.60**	**jkl**
68	N25[ns, g, b, z]	3.87	0.45	3.78	0.52	3.63	0.60	3.62	0.71	3.65	0.57	3.85	0.74	ijkl
131	N4	3.76	0.56	3.77	0.54	3.55	0.64	3.68	0.68	3.47	0.61	3.71	0.65	hij
67	N22[g]	3.54	0.77	3.76	0.58	3.58	0.61	3.62	0.76	3.75	0.64	3.70	0.85	ghijk
127	**MSHARE**	**3.09**	**0.92**	**3.61**	**0.72**	**3.50**	**0.73**	**3.65**	**0.77**	**3.50**	**0.71**	**3.68**	**0.83**	**ghij**
68	N20 [g, b]	3.78	0.57	3.76	0.56	3.50	0.68	3.61	0.72	3.60	0.65	3.65	0.71	ghij
215	N7 [g]	3.48	0.72	3.67	0.72	3.55	0.67	3.50	0.80	3.56	0.64	3.60	0.82	ghi
346	**UGANDA GREEN**	**3.70**	**0.78**	**3.71**	**0.71**	**3.53**	**0.74**	**3.51**	**0.90**	**3.57**	**0.70**	**3.59**	**0.84**	**ghi**
127	N19	3.60	0.68	3.58	0.67	3.44	0.74	3.36	0.79	3.44	0.66	3.48	0.83	fghi
131	N6[g]	3.43	0.74	3.54	0.75	3.27	0.79	3.40	0.87	3.34	0.75	3.38	0.87	efgh
86	N23	3.05	0.85	3.38	0.80	3.30	0.75	3.14	0.95	3.14	0.71	3.37	0.89	efghi
127	N26	3.33	0.74	3.52	0.73	3.41	0.68	3.32	0.90	3.28	0.61	3.34	0.82	efgh
127	N14	3.34	0.81	3.52	0.72	3.43	0.67	3.20	0.93	3.39	0.66	3.31	0.86	efg
89	N11	3.13	0.87	3.48	0.77	3.35	0.72	2.91	0.95	3.48	0.76	3.11	0.92	def
127	N2	3.09	0.90	3.37	0.84	3.19	0.80	2.97	0.88	3.25	0.70	3.07	0.80	de
132	N12	3.18	0.73	3.34	0.79	3.21	0.78	2.90	0.84	3.22	0.88	3.02	0.88	de
132	N15	3.05	0.83	3.29	0.80	3.30	0.74	2.85	0.82	3.24	0.63	3.02	0.87	de
126	N16	3.10	0.87	3.45	0.87	3.17	0.84	2.62	0.88	3.16	0.79	2.75	0.90	cd
68	N13	3.04	0.98	3.25	0.88	3.06	0.90	2.57	0.96	3.04	0.98	2.69	0.97	bcd
132	N10	2.58	0.89	2.90	0.92	2.82	0.88	2.28	0.75	2.96	0.87	2.41	0.87	abc
131	N27	2.51	0.78	2.84	0.86	2.75	0.85	2.12	0.61	2.80	0.90	2.27	0.67	ab
88	N21	2.53	0.95	2.86	0.90	2.63	0.94	1.90	0.89	2.97	0.96	2.23	0.97	ab
132	N8	2.34	0.77	2.71	0.90	2.61	0.89	2.01	0.84	2.74	0.97	2.12	0.84	a

'N' denotes NARITA

[ns] Not significantly different from Mbwazirume (the universal local check) at the 5% level using Tukey's tests; for all attributes

[b, g, z] Not significantly different from other local checks evaluated on site at the 5% level using Tukey's tests: [b]Enjubo/Bukoba, [g]Uganda green, [z]Mzuzu

[x] For **overall acceptability,** means with the same letter are not significantly different at the 5% level using Tukey's tests

List of NARITAs recommended to take on farm at Mitalula site: N18, N25, N4, N22, N20, N7, N19

NARITAs with overall acceptability score >=3.3 at Mitalula site: N18, N25, N4, N22, N20, N7, N19, N6, N23, N26, N14

List of villages recommended for on farm trials in Mbeya: All baseline villages had little cultivar diversity with the total number of cooking cultivars mentioned by farmers ranging from 2 to 4 (Refer to Appendix Table A3). Majority of farmers grow 'Uganda'. A few farmers grow other cultivars, however, it's only one or 2 households. This could be because the other varieties not grown are less yielding, produce small bunches, take longer to mature, are susceptible to pests and diseases, have a low market or have low suckering ability.

SUBCOUNTY	PARISH/WARD	**VILLAGE(S)**
Pakati	Kisondela	**Mpuga**
Pakati	Mpuguso	**Isajilo, Mibula**
Ukukwe	Ibigi	**Ilinga**
Ukukwe	Lufingo	**Simike**
Ukukwe	Lupepo	**Lupepo**
Ukukwe	Makandana	**Makandana**
Ukukwe	Nkunga	**Ibililo, Nkunga**

Fig 20: Mitalula pictures ***(N18, N25, N4, N22, N20, N7, N19)***

	N18	N25	N4		N22	N20	N7
boiled fingers							
peeled uncooked fingers							
bunch							

Mitalula pictures (cont.)

	N19	Mbwazirume	Enjubo	Mzuzu	Mchare*	Uganda green
boiled fingers						
peeled uncooked fingers						
bunch						

*bunch picture missing, included picture of clusters so one can at least see the shape and size of clusters and fingers

3. MOSHI, TZ

N	Genotype	Colour		Aroma		Texture in hand		Taste		Mouthfeel		Overall acceptability[x]		
		mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	
116	N18 [ns, g]	3.90	0.58	3.91	0.53	3.96	0.58	3.95	0.59	4.04	0.50	4.04	0.57	hi
126	**UGANDA GREEN**	**3.99**	**0.62**	**3.95**	**0.58**	**3.86**	**0.63**	**3.93**	**0.71**	**3.96**	**0.64**	**4.04**	**0.59**	**i**
371	**MBWAZIRUME**	**4.14**	**0.65**	**3.82**	**0.75**	**3.81**	**0.76**	**3.79**	**0.83**	**3.90**	**0.70**	**3.98**	**0.77**	**hi**
	Control*	**4.05**	**0.71**	**3.80**	**0.77**	**3.77**	**0.76**	**3.76**	**0.89**	**3.86**	**0.72**	**3.94**	**0.78**	
125	N4 [o]	4.12	0.53	3.92	0.50	3.41	0.76	3.85	0.80	3.57	0.76	3.82	0.72	ghi
116	N20 [g, o]	3.82	0.49	3.75	0.49	3.61	0.62	3.66	0.62	3.73	0.62	3.78	0.61	fghi
125	**NDIZI NG'OMBE**	**3.87**	**0.92**	**3.62**	**0.91**	**3.58**	**0.85**	**3.47**	**1.11**	**3.66**	**0.81**	**3.69**	**0.95**	**efgh**
125	N12 [o]	3.62	0.72	3.46	0.77	3.53	0.76	3.43	0.85	3.74	0.74	3.66	0.71	defg
126	N26	4.01	0.57	3.87	0.68	3.13	0.75	3.73	0.79	3.27	0.73	3.60	0.74	defg
130	N11[o]	3.68	0.60	3.52	0.67	3.32	0.75	3.40	0.82	3.46	0.67	3.49	0.86	cdefg
125	N27	3.45	0.78	3.51	0.78	3.71	0.66	3.25	0.94	3.75	0.69	3.49	0.86	cdefg
125	N19	4.04	0.56	3.66	0.66	3.00	0.75	3.49	0.74	3.22	0.69	3.46	0.84	cdef
130	N7	3.72	0.60	3.66	0.72	3.13	0.72	3.43	0.81	3.23	0.69	3.41	0.79	cde
125	N2	3.66	0.82	3.68	0.73	3.01	0.81	3.60	0.79	3.13	0.73	3.41	0.76	cde
116	N15	3.60	0.67	3.54	0.67	3.11	0.77	3.39	0.79	3.34	0.79	3.40	0.82	cde
125	N6	3.50	0.75	3.54	0.70	2.94	0.78	3.34	0.79	3.14	0.78	3.30	0.80	bcd
126	N14	3.21	0.83	3.34	0.80	3.13	0.81	3.14	0.86	3.20	0.82	3.20	0.81	bc
130	N23	3.18	0.96	3.30	0.92	2.72	0.93	3.15	0.89	2.84	0.90	3.02	0.96	b
125	N8	2.72	0.85	3.06	0.82	3.13	0.75	2.84	0.91	3.33	0.72	3.01	0.76	b
125	N10	2.76	0.89	2.89	0.82	2.58	0.84	2.56	0.93	2.66	0.82	2.55	0.84	a
130	N21	2.78	1.00	2.88	0.93	2.60	0.91	2.40	1.03	2.64	0.86	2.49	0.93	a
116	N13	2.30	0.93	2.72	0.93	2.44	0.78	2.27	0.82	2.50	0.84	2.28	0.88	a

'N' denotes NARITA

[ns] Not significantly different from Mbwazirume (the universal local check) at the 5% level using Tukey's tests; for all attributes

[g, o]Not significantly different from other local checks evaluated on site at the 5% level using Tukey's tests: [g]Uganda green, [o]Ndizi ng'ombe

*Combination of scores for Mbwazirume, Ndizi ng'ombe and Uganda green

[x] For **overall acceptability,** means followed by the same letter are not significantly different at the 5% level using Tukey's tests

List of NARITAs recommended to take on farm at Moshi site: N18, N4, N20, N12, N11

NARITAs with overall acceptability score >=3.3 at Moshi site: N18, N4, N20, N12, N26, N11, N27, N19, N7, N2, N15, N6, N14, N23

List of villages recommended for on farm trials in Meru and Moshi: All villages that were part of the baseline surveys in Meru and Moshi districts can be considered for on-farm trials (Refer to Appendix Table A2). The total number of cooking cultivars grown ranged from 7 to 11. As expected, almost all households grow Mchare cultivars as the main cooking banana type. Fewer households grow 'Uganda', 'Uganda ndefu' and 'Ndizi ng'ombe'. Mchare is the cooking type mostly used to make *machalari.* Other food products such as *mtori* and *kiburu* are made from the soft matooke types.

Fig 21: Moshi pictures *(N18, N4, N20, N12, N11)*

	N18	N4	N20	N12	N11	Mbwazirume
boiled fingers						
peeled uncooked fingers						
bunch						

4. KAWANDA, UG

N	Genotype	Colour		Aroma		Texture in hand		Taste		Mouthfeel		Overall acceptability[x]		
		mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	Tukey groups
81	N14[ns]	4.35	0.64	4.10	0.82	4.42	0.65	4.28	0.75	4.36	0.69	4.49	0.62	g
397	**MBWAZIRUME**	**4.25**	**0.80**	**4.06**	**0.85**	**4.09**	**0.90**	**4.13**	**0.87**	**4.09**	**0.93**	**4.28**	**0.80**	**g**
88	N7	3.90	1.03	3.69	1.02	3.69	1.20	3.63	1.15	3.76	1.09	3.84	0.96	f
144	N24	3.73	0.66	3.67	0.80	3.74	0.87	3.55	0.76	3.73	0.83	3.74	0.75	f
88	N23	3.01	0.97	3.34	1.00	3.53	0.98	3.32	0.88	3.60	1.05	3.56	0.85	ef
144	N18	3.04	0.88	3.43	0.90	3.59	0.83	3.45	0.80	3.64	0.74	3.47	0.75	def
144	N4	3.69	0.93	3.33	0.87	3.17	1.01	3.36	0.88	3.29	0.95	3.35	0.90	de
81	N2	3.57	0.71	3.51	0.87	2.93	1.01	3.22	0.87	2.89	0.94	3.30	0.92	de
88	N11	3.31	0.96	3.48	1.13	2.87	1.06	2.87	0.98	2.90	1.02	3.18	0.90	de
228	N12	3.17	0.96	3.31	0.96	3.11	0.99	3.05	0.96	3.13	1.03	3.17	0.87	d
84	N15	2.43	0.94	2.70	1.04	2.35	1.00	2.48	0.97	2.51	0.95	2.53	0.94	c
84	N8	1.62	0.79	2.36	1.04	2.85	1.03	2.25	0.96	2.94	1.05	2.41	1.05	c
81	N6	2.52	1.05	2.65	1.04	2.11	0.88	2.36	1.00	2.14	0.88	2.38	0.90	bc
88	N21	1.33	0.64	2.05	0.96	2.90	1.05	1.78	0.89	2.47	1.11	1.92	0.82	a
81	N16	1.44	1.28	1.91	0.81	1.98	0.95	1.56	0.57	1.85	0.81	1.76	0.80	a
84	N10	1.33	0.65	1.75	0.82	2.25	1.07	1.68	0.83	1.99	0.93	1.76	0.85	a

'N' denotes NARITA

[ns]Not significantly different from Mbwazirume (the universal local check) at the 5% level using Tukey's tests; for all attributes

[x] For **overall acceptability**, means with the same letter are not significantly different at the 5% level using Tukey's tests

NARITAs 13 and 17 did not have mature bunches and hence were not included in the evaluations with farmers. N13 is a juice type according to the 1st and 2nd NARITA reports and information from the site managers and data collectors. NARITA 17 was evaluated later during a validation exercise and had the highest rating for all evaluated attributes. It is therefore recommended for advancing on-farm. We can also draw insights from results from the Mbarara site.

List of NARITAs recommended to take on farm at Kawanda site: N14, N7, N24
Note: N7 (syn. Kabana 6H, M9, Kiwangaazi) was released in Uganda in 2010. It is recommended to be included as a hybrid check

NARITAs with overall acceptability score >=3.3 at Kawanda site: N14, N7, N24, N23, N18, N4, N2

List of villages recommended for on farm trials in Luwero: All villages in Luwero district that participated in the baseline surveys had relatively high cultivar diversity with the total number of cooking bananas grown ranging from 18 to 24 (Refer to Appendix Table A4). The recommendation is to choose villages in the central region that were not in the baseline study. There are some areas which seem to have much lower diversity (e.g. Kiwoko, Nakaseke district), a target area for the RTBfoods projects. Parts of the central region with relatively low productivity can also be targeted.

Fig 22: Kawanda pictures ***(N7, N14, N24, N17, N4)***

	N14	N7	N24	N17*	Mbwazirume
steamed mashed matooke					
peeled uncooked fingers					
bunch					

*picture from validation exercise, there was no mature bunch of N17 when evaluations were conducted with farmers. During a validation exercise at the Kawanda site, NARITA 17 had a mature bunch and had the highest scoring for all evaluated attributes.

5. MBARARA, UG

N	Genotype	Colour		Aroma		Texture in hand		Taste		Mouthfeel		Overall acceptability[x]		
		mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	Tukey groups
103	N17[ns]	4.62	0.59	4.38	0.81	4.41	0.80	4.53	0.60	4.47	0.65	4.61	0.56	g
87	N7[ns]	4.59	0.61	4.48	0.67	4.45	0.73	4.46	0.67	4.46	0.73	4.56	0.60	g
398	**MBWAZIRUME**	**4.39**	**0.78**	**4.29**	**0.81**	**4.38**	**0.76**	**4.33**	**0.76**	**4.37**	**0.80**	**4.48**	**0.72**	**g**
103	N24[ns]	4.00	0.75	3.97	0.82	4.12	0.77	4.12	0.77	4.18	0.76	4.19	0.76	fg
87	N23[ns]	4.04	0.85	3.95	0.95	3.97	0.97	4.02	0.86	4.01	0.97	4.16	0.87	fg
103	N4	4.09	0.80	3.86	0.90	3.82	0.98	3.91	0.94	3.90	0.95	4.05	0.87	fg
109	N14	3.87	0.94	3.75	0.99	3.68	1.09	3.90	0.93	3.69	1.02	3.93	0.93	f
103	N18	3.47	0.94	3.88	0.80	3.50	0.86	4.12	0.80	3.52	0.82	3.91	0.88	f
100	N12	3.68	0.89	4.00	0.91	4.02	0.85	3.81	0.99	3.91	0.97	3.90	0.94	f
87	N11	3.90	0.89	3.92	0.87	3.72	1.01	3.68	0.97	3.67	1.14	3.87	0.88	f
109	N2	2.99	1.10	2.96	1.04	2.59	1.10	2.79	0.98	2.62	1.05	2.91	1.14	e
100	N15	2.07	1.07	2.55	1.20	2.96	1.24	2.54	1.18	2.88	1.28	2.47	1.19	de
87	N21	1.83	1.08	2.65	1.36	2.42	1.31	2.12	1.17	2.68	1.24	2.28	1.20	cd
109	N16	1.71	0.71	2.03	0.90	1.80	0.82	1.75	0.73	1.71	0.75	1.82	0.84	bc
100	N8	1.60	0.82	1.95	0.97	2.32	1.13	1.66	0.82	2.26	1.10	1.80	0.85	ab
109	N13	1.23	0.58	1.55	0.82	1.63	0.88	1.40	0.75	1.63	0.93	1.42	0.72	ab
100	N10	1.22	0.52	1.83	0.88	1.43	0.74	1.43	0.78	1.53	0.82	1.34	0.57	a

'N' denotes NARITA

[ns] Not significantly different from Mbwazirume (the universal local check) at the 5% level using Tukey's tests; for all attributes

x For **overall acceptability**, means with the same letter are not significantly different at the 5% level using Tukey's tests

List of NARITAs recommended to take on farm at Mbarara site: N17, N7, N24, N23, N4, N14, N18, N12, N11
Note: N7 (syn. Kabana 6H, M9, Kiwangaazi) was released in Uganda in 2010. It is recommended to be included as a hybrid check

NARITAs with overall acceptability score >=3.3 at Mbarara site: N17, N7, N24, N23, N4, N14, N18, N12, N11

List of villages recommended for on farm trials: All villages that participated in the baseline surveys in Mbarara had relatively high cultivar diversity. The total number of cooking cultivars grown range from 14 to 19 (Refer to Appendix Table A5). The recommendation for on-farm trials is to choose villages outside the baseline study areas, especially those that might have low cultivar diversity. Villages in areas that are not traditionally banana-growing areas e.g. Northern region where some farmers are growing M9/NARITA 7 can be targeted[5]. This would build on the work done under the USAID ABSPII project. However, since on-station trials were not established in such regions, they might not meet the requirements by the release committee given it would be a different agroecological zone.

[5] https://www.youtube.com/watch?v=wf7tvBvIvLM
https://www.monitor.co.ug/Magazines/Farming/Growing-bananas-in-the-north/689860-2828178-tkj33a/index.html

Fig 23: Mbarara pictures ***(N17, N7, N17, N24, N23, N4, N14, N18, N12, N11)***

	N17	N7	N24	N23	N4	N14
steamed mashed matooke						
peeled uncooked fingers						
bunch						

Mbarara pictures (cont)

	N18	N12	N11	Mbwazirume
steamed mashed matooke				
peeled uncooked fingers				
bunch				

Discussion points

- NARITAs with an 'overall acceptability' score >=3.3 in all sites are N7, N14, N18 and N23. For on-farm advancement, NARITAs with average scores >=3.3 for each of the evaluated attributes (colour, aroma, texture in hand, taste, mouthfeel and overall acceptability) are recommended. N7 is recommended in 4 sites (except Moshi); N4, N12, N14, N18 and N20 are recommended in 3 of the sites. Please note that not all NARITA genotypes were grown in all the sites. Appendix table A1 shows a list of all the evaluated genotypes and recommendations for each site. Results indicate that location, preferences and other factors might have an impact on acceptability.
- Only one main product was cooked and evaluated in each site, yet farmers make different products from cooking banana cultivars (Marimo et al., 2019). Resources permitting, there is need to assess suitability of the cultivars (both recommended and not recommended) for other products. Some of the genotypes that were 'rejected' for food (e.g. NARITA 21 are good for juice). During the validation exercise two or more products were made in some of the sites e.g. In Uganda, steamed *matooke* and mpogora was evaluated. At the Moshi site, machalari (similar to katogo in Uganda) and mtori (boiled banana mixed with meat and smashed/stirred until it's like porridge) was prepared.
- Evaluations were done as a one-time assessment with a total of 572 farmers. There is a need, to perhaps do evaluations during different seasons (e.g. rainy and dry) and factor in other aspects to determine if seasonal changes affect quality characteristics. Another recommendation is to do evaluations in the same area more than once so that there are more data points used to calculate the average. In this study, the average number of participants per site was greater than 100, hence there were enough data points to learn and make valid conclusions on the NARITA hybrids that farmers as producer-consumers accept. Factors that affect acceptability were not the focus of this study and can be a point for further research
- Evaluations were conducted with farmers only, but the banana value chain has other actors that include traders, urban consumers, and exporters who might have different preferences. Some of the NARITAs 'rejected' by farmers might be accepted by the other value chain actors. The focus of the study, however, was to evaluate acceptability by farmers who both produce and consume.
- Mbwazirume (the universal check) was not mentioned in any of the Tanzania sites during the FGDs and baseline surveys. When the consumer acceptability tests were conducted, farmers in Tanzania were keen to have the planting material so perhaps it can be introduced as one of the cultivars during the on-farm trials. However, it should be noted that in some parts of Mbeya and Songwe, communities grow Mbwazirume (syn. Mbwailume or Kailuma)
- Based on the presented baseline results, some villages seem more affected than others by diseases/pests leading to disappearance of local cultivars e.g. Bumai, Bushasha, Rubafu in Bukoba. Almost all the cultivars that these villages are growing are FHIA hybrids and introduced types. From a social responsibility point of view the project should perhaps target such villages for on-farm trials to increase cultivar diversity in these villages
- Recommendations for additional local checks for on farm trials in Tanzania sites based on the baseline results

Recommendations for Tanzania sites in addition to the universal check, Mbwazirume	
Maruku	Musakala, **Enyoya**
Meru	Uganda (ndefu/fupi); **Ndizi ng'ombe**
Moshi	**Ndizi Ng'ombe**
Rungwe	Uganda

*__Bold__ already in the on-station trial sites.

- Analysis and writing ongoing to produce a manuscript

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Appendix A1: Comparison of evaluated genotypes across the 5 sites

Table A1: Evaluated and recommended genotypes for on farm advancement based on average scores for ALL attributes

	Tanzania			Uganda	
	Maruku	**Mitalula**	**Moshi**	**Kawanda**	**Mbarara**
1	**MBWAZIRUME**	**ITOKI (MZUZU)**	NARITA 18 [ns, g]	NARITA 14[ns]	NARITA 17[ns]
2	NARITA 20[ns, e]	**MBWAZIRUME**	**UGANDA GREEN**	**MBWAZIRUME**	NARITA 7[ns]
3	**ENYOYA**	NARITA 18[ns, b, z]	**MBWAZIRUME**	NARITA7	**MBWAZIRUME**
4	NARITA 12[e]	**ENJUBO/BUKOBA**	NARITA 4 [o]	NARITA 24	NARITA 24[ns]
5	NARITA 14[e]	NARITA 25[ns, g, b, z]	NARITA 20 [g, o]	NARITA 23	NARITA 23[ns]
6	NARITA 7	NARITA 4	**NDIZI NG'OMBE**	NARITA 18	NARITA 4
7	NARITA 6	NARITA 22[g]	NARITA 12 [o]	NARITA 4	NARITA 14
8	NARITA 18	**MSHARE**	NARITA 11[o]	NARITA 2	NARITA 18
9	NARITA 22	NARITA 20 [g, b]	NARITA 26	NARITA 11	NARITA 12
10	NARITA 23	NARITA 7 [g]	NARITA 27	NARITA 12	NARITA 11
11	NARITA 2	**UGANDA GREEN**	NARITA 19	NARITA 15	NARITA 2
12	NARITA 26	NARITA 19	NARITA 7	NARITA 8[J]	NARITA 15
13	NARITA 19	NARITA 6[g]	NARITA 2	NARITA 6	NARITA 21[J]
14	NARITA 4	NARITA 23	NARITA 15	NARITA 21[J]	NARITA 16[J]
15	NARITA 15	NARITA 26	NARITA 6	NARITA 16[J]	NARITA 8[J]
16	NARITA 27	NARITA 14	NARITA 14	NARITA 10[J]	NARITA 13[J]
17	NARITA 11	NARITA 11	NARITA 23		NARITA 10[J]
18	NARITA 8[J]	NARITA 2	NARITA 8[J]		
19	NARITA 10[J]	NARITA 12	NARITA 10[J]		
20	NARITA 13[J]	NARITA 15	NARITA 21[J]		
21	NARITA 21[J]	NARITA 16[J]	NARITA 13[J]		
22		NARITA 13[J]			
23		NARITA 10[J]			
24		NARITA 27			
25		NARITA 21[J]			
26		NARITA 8[J]			
	genotypes with mean score >=3.3 for ALL attributes (colour, aroma, texture in hand, taste, mouthfeel, overall acceptability); a score of 3.3 is equivalent to the benchmark in current Matooke product profile. NB: current profile uses a 6-point scale with 4 as benchmark. Genotypes are recommended for advancement to on-farm testing				
*	Mbwazirume was the universal local check. NB: Checks not available on-station were purchased at the market (i.e. Enjubo, Mzuzu, Mchare) –these were included in evaluations because farmers indicated they prefer & use them to prepare evaluated local products.				
ns	not significantly different from Mbwazirume at the 5% level using Tukey's tests				
b, e, g, o, z	not significantly different from other local checks evaluated on site at the 5% level using Tukey's tests: [b]Enjubo/Bukoba, [e]Enyoya, [g]Uganda green, [o]Ndizi Ng'ombe, [z]Mzuzu				
J	classified as juice bananas by: Tushemereirwe et al (2015), field data collectors & maintenance staff at on station trial sites				

Appendix A2: "Validation exercises"

In 4 of the sites, validation exercises were conducted using a subset of the cultivars that were rated high (scores >3) by the farmers.

Site	Cultivars evaluated	'Validation exercise' conducted? (Group which participated)	Main product evaluated by farmers	Products evaluated during 'validation exercise'
Maruku	-	no	boiled fingers	
Mitalula	N4, N6, N7, N19, N26	yes (staff and students from TARI-Uyole)	boiled fingers	boiled fingers
Moshi	N18, N4, N7, N26, N19, N20, N11, N12, N2, N23, N15, N14, N27	yes (staff from TARI-Tengeru)	boiled fingers	mtori, machalari
Kawanda	N2, 4, 7, 11, 12, 14, 17, 23, 24	yes (staff from NARL and Bioversity)	steamed matooke	steamed matooke, mpogora
Mbarara	N2, 4, 7, 11, 12, 14, 17, 23, 24	yes (staff from NARL and Bioversity)	steamed matooke	steamed matooke, mpogora

Mpogora: boiled finger with peel
Mtori: boiled banana mixed with meat and smashed after cooking to make a thick porridge
Machalari: chopped bananas boiled with meat (if available) and other ingredients
Bukoba was the 1st location where evaluations were conducted. At that time no validation exercises were planned.

Appendix A3: Number of FGD participants in each site

	Older women (>35 years)	Young women (<35 years)	Young men (<35 years)	Older men (>35 years)	TOTAL
Maruku	36	15	7	26	84
Mitalula	37	42	20	48	147
Moshi	60	20	16	49	145
Kawanda	27	25	15	7	74
Mbarara	22	31	22	21	96
Overall					**546**

Appendix A4: Tables of cooking cultivars grown in baseline study sites as reported by farmers

TABLE A1: COOKING BANANA CULTIVARS GROWN BY FARMERS IN BUKOBA, TZ

SUBCOUNTY	PARISH/ WARD	VILLAGE (number of households interviewed)	Total no. of cooking bananas grown in the village	Top 5 cooking cultivars grown in village	No. of households growing variety in village	% of households growing variety in village
Bugabo	Kishanje	**Bumai* (n=19)**	4	FHIA	19	100
				Gold	2	10.5
				EAHB cooking[x]	2	10.5
				Pilipita	1	5.3
Bugabo	Rubafu	**Bushasha* (n=19)**	4	FHIA	19	100
				Mchare	1	5.3
				Pilipita	1	5.3
				Kivuvu	1	5.3
Bugabo	Rubafu	**Rubafu* (n=22)**	5	FHIA	22	100.0
				Musakala	2	9.1
				Kivuvu	1	4.6
				Mchare	1	4.6
				Nyoroba	1	4.6
Katerero	Kishogo	**Kashule (n-24)**	12	FHIA	18	75.0
				Musakala	14	58.3
				EAHB cooking	5	20.8
				Enyoya	5	20.8
				Butobe, Enyeru, Muvubo, Nakitembe	2	8.3
Katerero	Mikoni	**Kagondo (n=21)**	9	Musakala	19	90.5
				FHIA	17	81.0
				Enyoya	10	47.6
				Kibuzi, Butobe, EAHB cooking	4	19.1
Katerero	Mikoni	**Mikoni (n23)**	11	Musakala	16	69.6
				Enyoya	14	60.9
				FHIA	9	39.1
				Kibuzi	8	34.8
				Kibiddebidde	5	21.7
Rubale	Butulage	**Butulage (n22)**	12	Musakala	17	77.3
				Butobe	12	55.6
				Nsikila	11	50.0
				FHIA	9	40.9
				Kibuzi	8	36.3
Rubale	Rubale	**Kabirizi (n=23)**	14	FHIA	16	69.6
				Musakala	15	65.2
				Kibuzi	10	43.5
				Enyoya	9	39.1
				Nsikila, Enyeru, EAHB cooking	4	17.4
Rubale	Rubale	**Rubale (n=23)**	15	Musakala	15	65.2
				FHIA	14	60.9
				Kibuzi	11	47.8
				Butobe	8	34.8
				Enyoya	5	21.7

*recommended for on farm evaluations. Villages recommended because they have little cultivar diversity amongst the cooking types

[x]EAHB cooking – respondents could not specify the cultivar name of the cooking type they were growing

TABLE A2: COOKING BANANA CULTIVARS GROWN BY FARMERS IN MBEYA, TZ

SUBCOUNTY	PARISH/ WARD	VILLAGE (number of households interviewed)	Total no of cooking cultivars grown in village	Top 5 cooking cultivars grown in village	Number of households growing variety in village	% of households growing variety in village
Pakati	Kisondela	**Mpuga* (n=22)**	**4**	Uganda Pilipita Kivuvu Mchare	21 2 1 1	95.5 9.1 4.6 4.6
Pakati	Mpuguso	**Isajilo* (n=23)**	**2**	Uganda Mchare	23 1	100.0 4.4
Pakati	Mpuguso	**Mibula* (n=23)**	**4**	Uganda Mchare Pilipita Uganda fupi	22 3 1 1	95.7 13.0 4.4 4.4
Ukukwe	Ibigi	**Ilinga* (n=20)**	**2**	Uganda Mchare	20 7	100.0 35.0
Ukukwe	Lufingo	**Simike* (n=24)**	**3**	Uganda Bukoba Mchare	21 3 3	87.5 12.5 12.5
Ukukwe	Lupepo	**Lupepo* (n=21)**	**2**	Uganda Mchare	21 2	100.0 9.5
Ukukwe	Makandana	**Makandana* (n=20)**	**3**	Uganda Kivuvu Bukoba	19 2 1	95.0 10.0 5.0
Ukukwe	Nkunga	**Ibililo* (n=18)**	**3**	Uganda Mchare Uganda	18 3 2	100.0 16.7 11.1
Ukukwe	Nkunga	**Nkunga* (n=22)**	**4**	Uganda Mchare Uganda ndefu FHIA	20 3 2 1	90.9 13.6 9.1 4.6

*recommended for on farm evaluations. Villages recommended because they have little cultivar diversity amongst the cooking types

TABLE A3: COOKING BANANA CULTIVARS GROWN BY FARMERS IN MERU AND MOSHI, TZ

District	SUBCOUNTY	PARISH/ WARD	VILLAGE* (number of households interviewed)	Total no of cooking cultivars grown in village	Top 5 cooking cultivars grown in village	Number of households growing variety in village	% of households growing variety in village
Meru	Poli	Ambureni	**Ambureni (n=23)**	**10**	Mchare	23	100.0
					Uganda ndefu	12	52.2
					Ndizi ng'ombe	8	34.8
					Uganda fupi	7	30.4
					Bukoba ndefu	4	17.4
Meru	Poli	Nkoaranga	**Ngyani (n=21)**	**11**	Mchare	21	100.0
					Uganda	12	57.1
					Ndizi ng'ombe	8	38.1
					Uganda fupi	3	14.3
					Uganda ndefu	3	14.3
Meru	Poli	Nkoaranga	**Nkoaranga (n=22)**	**7**	Mchare	20	90.9
					Ndizi ng'ombe	9	40.9
					Uganda	6	27.3
					Uganda ndefu	6	27.3
					Uganda fupi	3	13.6
Moshi	Kibosho	Kibosho Kati	**Otaruni (n=24)**	**10**	Mchare	22	91.7
					Ndizi ng'ombe	12	50.0
					Bukoba	2	8.3
					Ilali	2	8.3
					Kivuvu	2	8.3
Moshi	Kibosho	Kibosho Magharibi	**Manushi_Sinde (n=22)**	**8**	Mchare	15	68.2
					Ndizi ng'ombe	9	40.9
					Kivuvu	5	22.7
					Bukoba fupi	2	9.1
					Bukoba ndefu	1	4.6
Moshi	Kibosho	Kibosho Magharibi	**Umbwe_Sinde (n=24)**	**9**	Mchare	22	91.7
					Ndizi ng'ombe	9	37.5
					Mchare mnyenyele	5	20.8
					Mchare ngumadu	5	20.8
					Ilali, Kitarasa, Mnambo, Uganda fupi, Mchare nchanowa	1	4.2
Moshi	Vunjo_Mashariki	Kilema Kati	**Rosho (n=24)**	**11**	Mchare	21	87.5
					Ndizi ng'ombe	11	45.8
					Uganda	3	12.5
					Kitarasa	2	8.3
					Mchare ngumadu	2	8.3
Moshi	Vunjo_Mashariki	Mamba Kusini	**Lekura (n=24)**	**8**	Mchare	24	100.0
					EAHB cooking	6	25.0
					Bukoba	5	20.8
					Ndizi ng'ombe	3	12.5
					Bukoba ndefu, Kitarasa, Kivuvu	2	8.3
	Vunjo_Mashariki	Mamba Kusini	**Mkolowonyi (n=22)**	**10**	Mchare	19	86.4
					Bukoba	9	40.9
					Bukoba ndefu	5	22.7
					EAHB cooking[x]	3	13.6
					Mchare mnyenyele	3	13.6

*All villages recommended for consideration to implement on farm trials

[x]EAHB cooking – respondents could not specify the cultivar name of the cooking type they were growing

TABLE A4: COOKING BANANA CULTIVARS GROWN BY FARMERS IN MBARARA, UG

SUBCOUNTY	PARISH/ WARD	VILLAGE (number of households interviewed)	Total no of cooking cultivars grown in village	Top 5 cooking cultivars grown in village	Number of households growing variety in village	% of households growing variety in village
Bubaare	Kamushoko	**Kyantamba_Kashaka (n=17)**	**17**	Nakitembe	17	100.0
				Enjagata	13	76.5
				Enyeru	13	76.5
				Kibuzi	12	70.6
				Mbwazirume, Musakala	8	47.1
Bubaare	Kamushoko	**Rwobuyenje (n=24)**	**18**	Enyeru	23	95.8
				Nakitembe	22	91.7
				Enjagata	20	83.3
				Bubaare	18	75.0
				Mbwazirume	14	58.3
Bubaare	Mugarutsya	**Kanyara_1 (n=23)**	**17**	Enyeru	21	91.3
				Nakitembe	19	82.6
				Mbwazirume	18	78.3
				Enjagata	13	56.5
				Kibuzi	11	47.8
Ndeija	Kakigaani	**Kitookye (n=23)**	**15**	Kibuzi	23	100.0
				Enyeru	19	82.6
				Enjagata	13	56.5
				Mbwazirume	13	56.5
				Nakitembe	13	56.5
Ndeija	Kakigaani	**Rutooma (n=24)**	**14**	Enyeru	21	87.5
				Kibuzi	21	87.5
				Nakitembe	15	62.5
				Enjagata	14	58.3
				Mbwazirume	12	50.0
Ndeija	Ndeija	**Kyesika_1 (n=22)**	**18**	Kibuzi	20	90.9
				Enyeru	18	81.8
				Mbwazirume	15	68.2
				Nakitembe	14	63.6
				Enjagata	10	45.5
Rubindi	Kariro	**Nyakabungo (n=25)**	**19**	Nakabululu	22	88.0
				Enyeru	20	80.0
				Kibuzi	20	80.0
				Mbwazirume	19	76.0
				Enjagata	17	68.0
Rubindi	Rwamuhigi	**Nyakasa (n=24)**	**16**	Enjagata	23	95.8
				Kibuzi	22	91.7
				Nakabululu	22	91.7
				Nakitembe	21	87.5
				Enyeru	20	83.3
Rubindi	Rwamuhigi	**Nyakwebundika_II (n=20)**	**14**	Nakabululu	19	95.0
				Butobe	17	85.0
				Kibuzi	16	80.0
				Enjagata	15	75.0
				Enyeru	12	60.0

TABLE A5: COOKING BANANA CULTIVARS GROWN BY FARMERS IN LUWERO, UG

SUBCOUNTY	PARISH/ WARD	VILLAGE (number of households interviewed)	Total no of cooking cultivars grown in village	Top 5 cooking cultivars grown in village	Number of households growing variety in village	% of households growing variety in village
Makulubita	Kagogo	**Buligwe Ntinda (n=16)**	**21**	Nakitembe	14	87.5
				Musakala	8	50.0
				Katwalo	7	43.8
				Mpologoma	7	43.8
				Kisansa	5	31.3
Makulubita	Kalasa	**Kabembe (n=20)**	**24**	Nakitembe	17	85.0
				Mpologoma	16	80.0
				Muvubo	10	50.0
				Kisansa	9	45.0
				Musakala	8	40.0
Makulubita	Waluleeta	**Mpumudde (n=18)**	**22**	Nakitembe	14	77.8
				Mpologoma	11	61.1
				Kisansa	9	50.0
				Nakabululu	8	44.4
				Musakala	6	33.3
Zirobwe	Nakigoza	**Luteete (n=19)**	**18**	Nakabululu	14	73.7
				Musakala	13	68.4
				Nakitembe	10	52.6
				Namwezi	8	42.1
				Mpologoma	7	36.8
Zirobwe	Nakigoza	**Nakigozi B (n=22)**	**24**	Nakabululu	20	90.9
				Nakitembe	17	77.3
				Mpologoma	13	59.1
				Siira	12	54.6
				Kabana (maybe M9/NARITA 7 or FHIA)	10	45.5
Zirobwe	Nambi	**Nambi (n=19)**	**22**	Nakitembe	17	89.5
				Mpologoma	16	84.2
				Nakabululu	16	84.2
				Musakala	13	68.4
				Mbwazirume	9	47.4
Zirobwe	Nambi	**Nampunge (n=16)**	**19**	Nakitembe	14	87.5
				Mpologoma	12	75.0
				Kabana (maybe M9/NARITA 7 or FHIA)	11	68.8
				Musakala	8	50.0
				Nakabululu	7	43.8

KABANA is the acronym for **Ka**wanda **Bana**na depicting hybrids and introduced cultivars where 'Kawanda' is the institution which introduced, evaluated and released the variety under the National Banana Research Programme in Uganda. These include FHIA hybrids, Yangambi Km5 and NARITA 7 (e.g. FHIA 1 was released as KABANA 1, Yangambi Km5 released as KABANA 5 and NARITA 7 as Kabana 6H. See (Kagezi et al. 2012) for a full list and explanation. In this instance, the farmers did not mention the Kabana number but since the analysis focused on cooking types they were probably referring to Kabana 6H/ NARITA 7/M9/Kiwangaazi, a NARITA hybrid that was officially released in Uganda in 2010. It is however possible that they were referring to some of the FHIA hybrids they use for cooking.