High Yielding Drought Tolerant Bambara Groundnut Variety With Low Anti Nutritional Factors for Nigeria

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Design target
High yielding drought tolerant Bambara groundnut variety with low anti nutritional factors (ANF)

Umudike. Ogechi Ihuoma is an early career researcher who has passion for improvement of indigenous and underutilized legumes using various breeding and genetic approaches. She is currently Assistant Lecturer at Michael Okpara University of Agriculture under the Department of Plant Science and Biotechnology. Umudike. Ogechi also does research in Physiology, Molecular Biology and Genetics. Her current research interest deals with genetic improvement of underutilized legumes

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Product Profile design team

Step 1

PP Design Team Lead/Champion	Ogechi Ihuoma
	Michael Okpara University of Agriculture, Umudike, Nigeria

PP Design Team		
Person	**Area of Expertise**	**Name of organization**
Ogechi Ihuoma	Legume breeder	MOUA, Umudike
Mohamed Sagir Mohamed	Legume breeder	IAR, Zaria
Adegboyega Taofeek Tope	Legume breeder	IITA, Ibadan
Kabir, Umar Mustapha	Food biotechnologist	CDA, Kano
	Plant physiologist	
	Extension officer	

Step 2

Product profile descriptors	
Product profile name	High yielding drought tolerant Bambara groundnut variety with low ANF (easy to cook)
Crop	Bambara groundnut
Country	Nigeria
Geographic regions	South-east, North-central and North-east regions
Market segment and positioning	Grain market: High yielding cream coloured variety with low ANF (easy to cook)
Name of target variety to be replaced	Local landraces (Cream/black or brown eyes) **Strength:** Drought tolerance, low ANF in the seeds **Weakness:** Low yield
Date PP created	01.03.20222

Target client and use	
Value chain primary clients/customers	Farmers, wholesalers, retailers, consumers
Market scale	Households, local and regional markets
Use	Food, livestock feed, medicine
Type of processing	Fresh, dried, cooked, roasted, ground to flour
Market class	cooking ability (determined by seed colour: cream)

Target crop producers and production system	
Number of farmers	500-1500
% ratio: male to female farmers	20-30% male: 70-80% females
Production system	Open field
Area of production system	0.25 -1ha/farmer
Growth habit	Bunch types (fully bunched or semi bunched)
Expected level of inputs	Low (fertilizer, crop protection, weeding)
Typical yield range of target system	3t/ha
Cropping system	Monocropping, intercrop mixed cropping
Mechanization	None, mostly hand threshing (traditional)
Agroecological zone(s)	Sahel savannah, guinea savannah and sudan savannah
Total vegetative propagation material market	1500 – 4000kg

Variety technical specification

Step 3

Client/customer	Driver	Trait category	Preference group: Women (W) Men (M) Youth (Y) W+M+Y (All)	Trait demand classification: 1. *Essential/ "must have"* 2. *Niche opportunity* 3. *Added-value* 4. *Winning trait*	Target traits	Trait description (Quantitative measures)	Name of benchmark variety	Performance required compared to benchmark variety <, =, > etc.
Farmer	Productivity	Yield	ALL	1	Seed yield	Weight of dry seed at harvest in kg/ha	Cream/ black eye	>
		Biotic stress resistance	ALL	2	Leaf spot disease tolerance	1-9 scale: moderate (5)		≥
			ALL	2	Cowpea associated viruses eg. CABMV, BECMV, CMV, CYMV.	1-9 scale: moderate (5)		>
			ALL	1	Cowpea weevil resistance	1-9 scale: high (8)		>
		Abiotic stress tolerance	ALL	1	Drought tolerance	1-9 scale: high (9)		>
			ALL	1	Heat tolerance	1-9 scale: high (7)		>
			ALL	2	Day length	1-9 scale: high (7)		>
	Fodder/ forage	Biomass	M	3	Fresh biomass	Fresh biomass after harvest of pods in kg/ha		≥
	Crop management and harvesting	Plant architecture	ALL	1	bunch types	fully bunched or semi bunched		=
	Market value and price	Grain colour	ALL	1	seed coat colour	Cream seed coat	Cream/ black or brown eyes	=
		Crop duration	ALL	1	Early maturity	Ready or harvest < 110 days after sowing	Black eye	<
	Post-harvest storage	Storage-life	M	1	Insect resistance	Seeds able to store for long period without being attacked by weevil		>
Retailer	Sales and profit	Shelf-life	W	4	Good quality grains	Store up to weeks without getting infested		>
Consumer	Satisfaction	Taste	ALL	1	Good taste	Sensory evaluation		
		Appearance	W	3	Neat cream seeds, no holes	Cream coloured seeds with no holes indicating insect attack		>

		Shelf-life	W	3	Good quality grains	Store up to weeks at room temperature without getting infested		≥
		Nutrition	ALL	3	High in protein and essential nutrients	High level of protein and micro nutrients		≥
		Digestibility	ALL	3	Easy to digest	Gluten free		≥
		Food preparation	W	1	Fast to cook	Low ANF in the seeds		<
Seed/vegetative material producer	Scalability and cost	Seed numbers	ALL	1	Number of seeds/pod/ plant	High seed index		>
		Reproductive fertility	ALL	1	Easy hybridization	High success rate of crossing		>

A

Fruits of Bambara groundnut (A) and healthy Bambara groundnut plant

B

"Bambara groundnut can be considered a medicinal crop because it contains protein with bioactive properties that can help prevent or treat chronic diseases such as hypertension, diabetes, heart disease and cancer. However, its use is limited by several antinutritional factors, which are well understood and are being addressed through the demand-driven breeding approach."