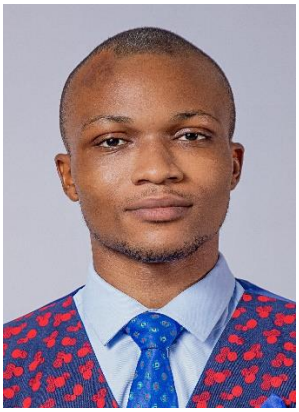
Higher micronutrient contents Cowpea for Northern Regions in Nigeria



Oluwatimilehin Adegbaju
West Africa Centre for Crop Improvement (WACCI)

Design target
Higher micronutrient (Fe, Zn, Cu, Mn, and B) contents in elite cowpea varieties for new emerging cowpea market.

Oluwatimilehin Adegbaju is an MPhil in Seed Science and Technology at the West Africa Centre for Crop Improvement (WACCI), University of Ghana. He holds a Bachelor's degree in Crop Production and Protection from OAU, Nigeria. He has worked as a postgraduate research assistant with a focus on cowpea. He is keenly interested in acquiring in-depth knowledge of plant and seed science, genetics and crop improvement, research methodology in plant breeding vis-à-vis plant biotechnology. Having learnt about some of the problems facing sustainable agriculture, he has focused his career on contributing to crop improvement and genetic modification programs to provide solutions to the problems of food insecurity, hidden hunger and micronutrient deficiencies that affect a higher percentage of the population.

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Product Profile design team

Step 1

PP Design Team Lead/Champion	Oluwatimilehin Adegbaju
	University of Ghana, West Africa Centre for Crop Improvement (WACCI)

PP Design Team		
Person	**Area of Expertise**	**Name of organization**
Oluwatimilehin Adegbaju	Seed scientist	WACCI
Prof. Pangirayi Tongoona	Breeder	WACCI
Prof Eric Danquah	Breeder	WACCI, Univ of Ghana
Dr Agyemang Danquah	Plant Molecular biologist	WACCI
Dr. Samuel Oladejo	Cowpea Breeder	OAU/IITA, Nigeria
Love Odunlami	Seed scientist	WACCI, Univ of Ghana

Step 2

Product profile descriptors	
Product profile name	Micronutrient dense cowpea
Crop	Cowpea *(Vigna unguiculata)*
Country	Nigeria, Ghana
Geographic regions	Southwest, Northcentral, Northeast and Northwest Nigeria.
Market segment and positioning	New emerging market for micronutrient dense cowpea with appealing sight grains, good taste and medium cooking time
Name of target variety to be replaced	Oloyin, Drum, Brown **Strength:** Higher concentration of micronutrients (iron, zinc, copper, manganese and boron). High yielding, drought resistance, big grains **Weakness:** Diseases and pest infestations
Date PP created	27/02/2022

Target client and use	
Value chain primary clients/customers	Farmers, Processors, transporters, traders, consumers.
Market scale	Local and regional markets
Use	Food
Type of processing	None-dry pod/grains
Market class	Biofortified beans

Target crop producers and production system	
Number of farmers	60,000 – 80,000 (Av. 140, 000 farmers)
% ratio: male to female farmers	20–30% male; 70–80% female
Production system	Open field (+- irrigation)
Area of production system	70,000 hectares (Av. farm size 0.5 hectares)
Growth habit	Semi-erect/prostrate
Expected level of inputs	Medium use - crop protection chemicals
Typical yield range of target system	0.75 – 1.5t/ha
Cropping system	Continuous Monocropping
Mechanization	Planting and threshing
Agroecological zone(s)	Rainfall range: 500-1200 mm/year, low altitude (1800m max)
Total vegetative propagation material market	13,000 – 25,000 tonnes

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	Grain yield	Dry grain weight > 1.5 t/ha	Oloyin	>
		Biotic stress resistance	All	4	Cercospora leaf spot	< 3 (CIAT scale)	Oloyin	>
					Aphids	< 3 (CIAT scale)	Oloyin	>
					Root knot nematode	< 3 (CIAT scale)	Oloyin	>
					Fusarium wilt	< 3 (CIAT scale)	Oloyin	>
					Bacterial blight	< 3 (CIAT scale)	Oloyin	>
		Abiotic stress tolerance	All	3	Flooding	Before flowering		>
					Drought	After flowering (terminal drought)	Oloyin	>
	Fodder/forage	Biomass	All	3	Biomass	Dry pods and stem	Oloyin	>
	Crop management and harvesting	Plant architecture	All	1	Growth habit	Indeterminate to fairly determinate	Oloyin	=
					Stem branching	Semi-erect/ prostrate	Oloyin	>
					Uniform flowering time	Days to 50% flowering	Oloyin	=
	Market value and price	Grain weight	All	2	Dry grain weight	Grain weight >20g 100 seed weight	Oloyin	>
		Crop duration	All	4	Early maturing	< 65 days	Oloyin	<
Consumer	Satisfaction	Taste	All	4	Sweet honey taste	Palatability	Oloyin	>
		Appearance	All	4	Brown – Reddish-brown colour	Uniform and attractive	Oloyin	>
		Shelf life	All	3	Long shelf-life	Fresh bean grain appearance	Oloyin	>
		Nutrition	All	4	Grain micronutrient content (Fe, Zn, Cu, Mn and B)	Fe > 45.1 µg.g−1 Zn > 33.9 µg.g−1 Mn > 10.1 µg.g−1 B > 14.7 µg.g−1 Cu > 5.2 µg.g−1	None	None
		Digestibility	All	4	No gassing, well-soften cooked grains	No bloating	Oloyin	<
		Food preparation	All	4	Short cooking time	30 - 45mins	Oloyin	<
Seed/vegetative material producer	Scalability and cost	Seed number	All	1	Number of seeds per pod	8-15 seeds	Oloyin	>
		Reproductive fertility	All	1	Seed germination	>97% viability and 99% uniformity	Oloyin	=
Seed distributors	Variety identification	Unique appearance of plants, grain and produce	All	4	Kidney-shaped seed, soft testa, big sized grains	Uniform and attractive	Oloyin	=

"Micronutrient-rich cowpea can help address nutritional concerns. Market research has helped the Product Profile Design Team to identify key nutritional traits demanded by consumers through the DLB approach"