High Yielding and Drought Tolerant Groundnut for Guinea and Savanah Zones in Ghana

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Design target
Delivery of high yielding and drought tolerant groundnut varieties

Achana Niagiah holds BSc Agriculture and MPhil in Biotechnology. He worked in various sectors including Faculty of Agriculture, KNUST as a Teaching and Research Assistant; Ghana Education Service as a Subject Teacher; Millennium Villages (NGO) as an Agricultural Project Supervisor and WAEC as an Assistant Registrar. His MPhil thesis was on Genetic Diversity and Heritability Studies of kenaf accessions in Ghana with the overall aim of determining variability of economic traits and selection of subpopulations with desired traits for creating lines with fine fibre. He is currently a PhD student at WACCI, University of Ghana and his research interest is in developing drought tolerant groundnuts using transposon-mediated mutagenesis.

Product Profile design team

Step 1

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

PP Design Team		
Person	**Area of Expertise**	**Name of organization**
Prof. P. Tongoona	Plant Breeder	WACCI, University of Ghana
Prof. Antonia Tetteh	Plant Breeding and Genetics	Kwame Nkrumah University of Science and Technology
Dr. Ife Beatrice	Plant Breeder	WACCI, University of Ghana
Dr. Pearl Abu	Plant Breeder	WACCI, University of Ghana

Step 2

Product profile descriptors	
Product profile name	Drought Tolerant Groundnut with high economic yield for Sudan and Guinea Savannah zones of Ghana
Crop	Groundnut (*Arachis hypogaea* L.)
Country	Ghana
Geographic regions	Upper East, Upper West, Northern, Savannah, Bono East Regions of Ghana
Market segment and positioning	Farmers at the Sudan and Guinea savannah zones of Ghana
Name of target variety to be replaced	Chinese **Strength**: Early maturing (90 days). Relatively low oil content (35% oil). **Weaknesses**: low yielding and susceptible to drought Nkatiesari **Strength:** High yielding, high oil content, resistant to, early and late leafspot infections caused by *Cercospora arachidicola S. Hori* and *Cercosporidium personatum* respectively. **Weaknesses:** susceptible to drought
Date PP created	28th February, 2022

Target client and use	
Value chain primary clients/customers	Farmers, market queens, retailers, wholesalers, Consumers
Market scale	households, local, regional and national Markets
Use	Food, Peanut butter, cooking oil, animal feed
Type of processing	Drying, cooking, roasting, frying, oil extraction, milling
Market class	Seed, paste, oil, stalk

Target crop producers and production system	
Number of farmers	650,000 households
% ratio: male to female farmers	60-75 male; 15-40 female
Production system	Open field
Area of production system	350,000 - 400,000 ha
Growth habit	Erect
Expected level of inputs	Medium application of calcium
Typical yield range of target system	0.5 – 0.9t/ha
Cropping system	Continuous monocrop, rotation
Mechanization	None – manual planting, maintenance and harvesting
Agroecological zone(s)	Sudan and Guinea Savannah zones of Ghana
Total seed or vegetative propagation material market	1.6 MT

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	Economic Yield	Pod yield potential of 2.4/ha	SARI NUT 2	>=
		Biotic stress resistance	All	1	Early and late leaf spot	1-9 scale (9 – resistant)	Nkatiesari	=
		Abiotic stress tolerance	All	3	Drought Tolerance	Drought tolerant index (DTI) of 0.97, 92 days to maturity	SARI NUT 2	<=
	Fodder/forage	Biomass	All	1	Average weight of dried biomass of individual plants	Medium to high	"Chinese"	>=
		Animal digestibility		1	Highly digestible	high	Nkatiesari	
	Crop management and harvesting	Plant architecture	All	1	Average individual Plant height	Short to medium	"Chinese"	=
	Market value and price	Seed weight	All	4	Individual plant seed weight	100 seed weight = 50g	Nkatiesari	>=
		Crop duration	All	3	Early maturation	Planting to maturity of pods = 92days	SARI Nut 2	< =
Retailer	Sales and profit	Shelf-life	All	3	Duration from harvesting to processing	Medium to high	Chinese	>=
Consumer	Satisfaction	Taste	All	1	Palatability	Palatable	Oboshie	=
		Appearance	All	3	Colour	Brown	SARI NUT 2	=
		Shelf-life	All	3	Duration from harvesting to processing	Medium	Nkatiesari	>=
		Nutrition	All	1	Nutritional composition	Nutritive	Nkatiesari	=
		Digestibility	All	1	Fibre, protein, and carbohydrates	Digestible	Oboshie	=
Processor	Raw material quality specification	Milling	All	4	Oil content	45% oil content	Nkatiesari	=
		Paste	All	4	Butter /paste content	55% paste content	SARI NUT 2	=
		Appearance	All	1	Seed colour	brown seed colour	SARI NUT 2	=
Seed/vegetative material producer	Scalability and cost	Seed numbers	All	4	Average number of seeds per plant	Many	Nkatiesari	>=

(A) Seed multiplication at Plantation field, KNUST

"Demand-Led Breeding is helping African groundnut Breeders to produce varieties with farmers and consumers preferences, adaptable to climate change and with high adoption"

(B) Seed multiplication at KNUST Agric field, Awomanso field, KNUST