

Product Profile name: Development and dissemination of Pro-vitamin A orange maize varieties in Ghana



Manfred Bondzie Ewool
CSIR-Crop Research Institute, Ghana

Design target

Development and dissemination of Pro-vitamin A orange maize varieties

Manfred Bondzie Ewool is a Senior Research Scientist and Maize Breeder at the Crops Research Institute of the Council for Scientific and Industrial Research in Ghana. He obtained his first degree in Agriculture from the Kwame Ninsin University of Science and Technology, Kumasi, Ghana and a Master's and PhD degree in Plant Breeding from the same institution. His current Research focuses on development, testing and releasing of normal and quality protein maize varieties that are micro-nutrient rich (Pro-vitamin A, iron and Zinc) stable, high yielding, resistant to diseases, pests and tolerant to low nitrogen and drought for farmers in Ghana and Africa.



CSIR Crops Research Institute
Ghana



Contact:

manfredbewool@gmail.com

Product Profile design team

Step 1		
PP Design Team Lead/Champion	Manfred Bondzie Ewool	
	CSIR-Crops Research Institute	
PP Design Team		
Person	Area of Expertise	Name of organization
Manfred B. Ewool	Maize Breeder	CSIR-Crops Research Institute
Priscilla Francisco Ribeiro	Maize Breeder	CSIR-Crops Research Institute
Allen Oppong	Maize Breeder	CSIR-Crops Research Institute
Stephen Yeboah	Agroecology/Agronomist	CSIR-Crops Research Institute
Moses B. Mochiah	Entomologist	CSIR-Crops Research Institute
Patricia P. Acheampong	Socio-Economist	CSIR-Crops Research Institute
Alidu Haruna	Maize Breeder	CSIR-Savanna Agriculture research Institute
Gloria Boakyewa	Maize Breeder	CSIR-Savanna Agriculture Research Institute

Clients and markets

Step 2	
Product profile descriptors	
Product profile name	Development and dissemination of Pro-vitamin A orange maize varieties
Crop	Maize
Country	Ghana
Geographic regions	Ashanti, Brong Ahafo, Ahafo, Bono East, Central, Eastern, Greater Accra, Volta, Oti, Northern and Savannah
Market segment and positioning	Maize market (boiled, roasted and grain) High yielding pro-vitamin A orange maize
Name of target variety to be replaced	Landrace Abrohoma Strength: Long and slender cob size content with moderate carotene content Weaknesses Low yield, susceptible to lodging and diseases, Poor nutrition (No pro-vitamin A).
Date PP created	20 October July 2020

Target client and use	
Value chain primary clients/customers	Farmers, tractor operators, seed producers, agro input dealers, market retailers, transporters, processors, poultry farmers, food vendors, Agric extension agents and community health workers
Market scale	Households, local, regional, national and international markets
Use	Food and animal feed
Type of processing	Boiled, roasted, dried, milled, brewed
Market class	Pro-vitamin A enriched orange maize

Target crop producers and production system	
Number of farmers	50,000-100,000
% ratio: male to female farmers	70-75% males : 25-30 female
Production system	Open field with no irrigation
Area of production system	20,000-40,000 ha
Growth habit	Erect plant
Expected level of inputs	Medium- fertilizer, crop protection chemicals and weedicides

Typical yield range of target system	4-6 t/ha
Cropping system	Continuous Mono-crop
Mechanization	Mechanized and manual planting
Agroecological zone(s)	Forest, forest-transition, coastal and savannah
Total vegetative propagation material market	450-900 tons of certified seed

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	4	Maize yield	4-6 t/ha	Lccal Abrohoma	>
		Biotic stress resistance	All	1	Streak, blight, rust and striga	Score scale 1-5 1=free from disease 5=susceptible Preferred score:1-2	Lccal Abrohoma	<
		Abiotic stress tolerance	All	1	Drought and Nitrogen	Score scale 1-5 1=tolerant to drought/striga 5=susceptible to drought/striga Preferred score:1-2	Local Abrohoma	<
	Crop management and harvesting	Plant architecture	All	1	Erect plants with ear placement middle of plant	Sacle Score for plant aspect 1=Excellent 5=Poor Preferred score:1-2	Local Abrohoma	<
	Market value and price	Grain weight	All	4	1000 seed weight	Weight of dry seed target 300-500gm	Local Abrohoma	>
		Crop duration	All	4	Days to maturity	Number of day from sowing to maturity. Target 75-110 days	Local Abrohoma	<
	Post-harvest storage	Storage life	All	4	Seed/grain	2 years under ambient and >2 years in cold storage	Local Abrohoma	>
Transporter	Durability and cost	Container suitability	All	1	Flintiness	lint/semi-flint	Local Abrohoma	>
		Transportability and storage	All	1	Flintiness	lint/semi-flint	Local Abrohoma	>
Processor	Raw material quality specification	Milling	All	3	Flintiness	Semi-flint	Local Abrohoma	>
		Brewing	All	3	Physico-Chemical properties	Specifications from Breweries	Local Abrohoma	=
Retailer	Sales and profit	Shelf-life	All	4	Day to store	2 years under ambient and >2years in cold storage	Local Abrohoma	>
Consumer	Satisfaction	Taste	All	4	Palatability and aroma	Likert scale 1-5 1= like 5= dislike Preferred score 1-2	Local Abrohoma	<
		Appearance	All	4	Orange colour	Likert scale 1-5 1= like 5= dislike Preferred score 1-2	Local Abrohoma	<
		Shelf-life	All	4	Days to store	2years under ambient and >2years in cold storage	Local Abrohoma	>
		Nutrition	All	4	Pro-vitamin A content	Total carotenoid content of 7-15 µg/g	Local Abrohoma	>
		Digestibility	All	4	Fibre content	Low fibre content (<2%)	Local Abrohoma	<
		Food preparation	All	4	Physical properties	Water binding capacity, Solubility and swelling power (>100%)	Local Abrohoma	>
Seed/Vegetative	Scalability and cost	Seed numbers	All	4	Number of rows per cob	12-12 Rows	Local Abrohoma	>

material producer		Reproductive fertility	All	4	Germinability	% of Germination rate (85-90%)	Local Abrohoma	=
Seed distributors	Variety identification	Unique appearance of plants. Grain and product	ALL	1	Distinctiveness of variety for easy identification of Plant and cob aspect	Scale score for plant aspect 1=Excellent 5=Poor Preferred score:1-2	Local Abrohoma	<



Pro-Vitamin A orange maize variety under field condition

“It is amazing how Product Profiling has enabled our team reach out to our end users with a product that they desire. The training is highly recommended for all breeders as we target modernising agriculture in Ghana”