

Dwarf High-Yielding Palm Oil for Ghana



Dickson Osei Darkwah

Council for Scientific and Industrial Research (CSIR)-Oil Palm Research Institute (OPRI)

Design target

High-yielding, drought tolerant dwarf palm oil for eastern, western and central regions in Ghana

Dickson Osei Darkwah is a dedicated researcher and agricultural scientist at the CSIR-Oil Palm Research Institute in Ghana. With a passion for sustainable agriculture and a keen interest in the oil palm industry, Dickson's work focuses on advancing scientific knowledge and technological innovations to enhance the productivity and profitability of oil palm cultivation.

Dickson holds a Bachelor's degree in Agriculture and a Master's degree in Plant Breeding and Biotechnology. His academic background, combined with years of hands-on experience in the field, equips him with valuable insights into the complexities of oil palm cultivation and research.

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Product Profile design team

Step 1

PP Design Team Lead/Champion	Dickson Osei Darkwah
	Council for Scientific and Industrial Research (CSIR)-Oil Palm Research Institute (OPRI)

PP Design Team

Person	Area of Expertise	Name of organization
Daniel Agyei-Dwarko	Plant Breeder	CSIR-OPRI
Sapey Enoch	Plant Breeder	CSIR-OPRI
Sarpong Frederick	Nutritionist	CSIR-OPRI
Johnny Ossom Sackitey	Biochemist	CSIR-OPRI
Gregory	Nutritionist	CSIR-FRI
Isaac Danso	Agronomist	CSIR-OPRI

Step 2

Product profile descriptors	
Product profile name	High yielding with dwarf trait
Crop	Oil Palm (<i>Elais guinensis</i>)
Country	Ghana
Geographic regions	Eastern, Western, Central
Market segment and positioning	Oil palm growing areas in Ghana and some countries in Africa
Name of target variety to be replaced	Cross 131 Strength: High yielding and drought resistance Weakness: Grow too tall too fast
Date PP created	01.03.20222

Target client and use	
Value chain primary clients/customers	Farmers, processors, oil palm agro-industry
Market scale	Households, local, national and international markets
Use	Seeds for planting
Type of processing	Food, energy, animal feed
Market class	Cooked, milled

Target crop producers and production system	
Number of farmers	30,000 to 50,000
% ratio: male to female farmers	60-70 males and 30-40 females
Production system	Open field
Area of production system	10,000 to 20,000 ha
Growth habit	Vertical
Expected level of inputs	Best management practices (BMP)
Typical yield range of target system	20-25 t/ha/yr
Cropping system	Intercropping and monocropping
Mechanization	Planting, harvesting
Agroecological zone(s)	Rainforest, semi-deciduous, transitional zone
Total vegetative propagation material market	1,000,000

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	High yield	25 -27t/ha	Cross 131 20-24t/ha	>
		Biotic stress resistance	All	1	Fusarium wilt resistance	High	Cross 131	=
			All	1	Ganoderma resistance	High	Cross 131	>
		Abiotic stress tolerance	All	1	Drought resistance	High	Cross 131	>
	Crop management and harvesting	Plant architecture	All	1	Dwarf and less rachis length	30 cm annual HI	Cross 131	>=
	Market value and price	Seed nut	All	1	High germination capacity	95 %	Cross 131	>=
		Crop duration	All	1	2-3 years to fruit bearing 25 years economic lifespan	2-3 yrs fruit bearing Over 30yrs economic lifespan	Cross 131	>=
		Post-harvest storage	Storage-life	All	1	Moderate	Moderate	Cross 131
	Transporter	Durability and cost	Transportability and storage		1	Storage temperature /oxidation	Optimum temperature (OT) 47<(OT)<50	Cross 131
Processor	Raw material quality specification	Milling	All	1	High oil extraction rate	28%	Cross 131 (25%)	=
Retailer	Sales and profit	Shelf-life	All	1	Fruit shelf life time	High	Cross 131	=
Consumer	Satisfaction	Taste	All	1	Good	Good	Cross 131	=
		Appearance	All	1	Shiny	Brilliant red	Cross 131	=
		Shelf-life	All	1	High fruit shelf life	Number of days on shelf after harvest	Cross 131	=
		Nutrition	All	1	High Vitamin E and A	High Vitamin E and A	Cross 131	=
		Digestibility	All	1	Digestibility	High	Cross 131	=
		Food preparation	All	1	Easy to cook	Short cooking time	Cross 131	=
Seed producer	Scalability and cost	BMP Package	All	1	Different fertilizers at different growth stage	Immature NPK 30:10:10 Mature NPK 10:10:30	Cross 131	=

		Ease of propagation	All	1	Nursing	95 %	Cross 131	=
Seed distributors	Variety identification	Cross 137	All	4	High yielding oil palm Dwarf traits Drought resistance	25-27 t/ha 30cm annual High	Cross 131 Cross 131	> >



“The dwarfing trait in the palm oil business is a winning trait for higher yield efficiency, ease of harvesting, reduced environmental impact as it requires less space to grow, faster time to maturity, improved disease resistance and better pest management, all leading to increased productivity in farmers' fields. DLB has provided the impetus to better understand customer needs and winning traits.”