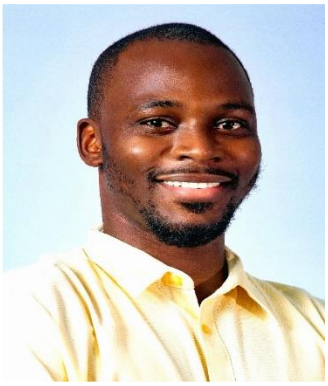
High-Yielding and Post-Flowering Drought Tolerant Sorghum For Southern and Northern Regions in Senegal



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Design target

Sorghum post-flowering drought tolerance, with high yielding and agronomical traits.

Joseph Pascal is currently a PhD student in plant breeding at WACCI. During his work at ISRA as a researcher assistant, he participated to several breeding programs such as grain-mold resistance, drought tolerance, development of dual-purpose sorghum, high protein digestibility in sorghum. Nowadays, his work is focused on a development of sorghum drought tolerance in Senegal. After graduation, he would wish to join a public institute (ISRA) in order to continue his research on sorghum and release sorghum varieties drought tolerance and other with important agronomical traits.

Contact

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Product Profile design team

Step 1

PP Design Team Lead/Champion	SENE Joseph Pascal
	Senegalese Agricultural Research Institute (ISRA)

PP Design Team		
Person	**Area of Expertise**	**Name of organization**
SENE Joseph pascal	Breeder	ISRA
DIATTA Cyril	Breeder	ISRA
FAYE Jacques Martin	Breeder	ISRA
SINE Bassirou	Plant physiologist	ISRA
DIOUF Diaga	Molecular biologist	UCAD Laboratory of Biotechnology
Mame Penda SARR	pathologist	ISRA

Step 2

Product profile descriptors	
Product profile name	Post flowering sorghum drought tolerance
Crop	Sorghum
Country	Senegal
Geographic regions	Central North and North, Central South and South Senegal
Market segment and positioning	Senegalese cereals market in each agronomical zone
Name of target variety to be replaced	Nganda **Strength**: High yielding, and white grain color **Weakness**: Susceptible to drought and grain mold
Date PP created	28-02-2022

Target client and use	
Value chain primary clients/customers	Farmers, input suppliers, processors, retailers, consumers, seeds producers, research institute
Market scale	Households, local and regional markets
Use	Food (staple food), animal feed, industry (beverage)
Type of processing	Cooked, brewed, milled
Market class	Non-tannin grain (non-pigmented testa)

Target crop producers and production system	
Number of farmers	500-600
% ratio: male to female farmers	70-80% male; 20-30% female
Production system	Off-season ; open field (+/-irrigation)
Area of production system	50-80 ha
Growth habit	Determinate, short height
Expected level of inputs	Medium use fertilizer and crop protection chemicals
Typical yield range of target system	2 – 3 t/ha
Cropping system	Rotated intercrop with cereals or vegetables
Mechanization	Weeding, mechanical threshing
Agroecological zone(s)	Central (<600mm), Oriental and South Senegal (>600mm)
Total vegetative propagation material market	10 – 15 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	Grain weight > 2t/ha	Nganda	>
		Biotic stress resistance	All	4	Grain mold	1-5 scale: 2(resistant)	F2-20	=
		Abiotic stress tolerance	All	4	Stay green	1-5 scale: 2 (tolerant)	B35	=
	Fodder/ forage	Biomass	All	4	Aboveground biomass	Dry biomass	Sariaso 16	>
		Animal nutrition	All	1	High level of micronutrients	Protein content >8%	Nganda	>
		Animal palatability	All	1	taste	palatability	Nganda	>
		Animal digestibility	All	3	Soft	Low gas production	Nganda	<
	Crop management and harvesting	Plant architecture	All	1	Plant height; Canopy development	Height (150-200cm)	Nganda	=
	Market value and price	Grain weight	All	1	Grain weight	100 grain weight > 25g	Nganda	>
		Crop duration	All	1	Early maturation	Cycle < 120 days	Nganda	=
	Post-harvest storage	Storage-life	All	3	Post-harvest mold infection	1-5 scale: 2 (resistant)	Nganda	>
Transporter	Durability and cost	Container suitability	All	1	Big transporters	Weight: 5-10 tonnes	Nganda	=
		Transportability and storage	All	1	Firmness, stability, packaged	Hand pressure test	Nganda	=
Processor	Raw material quality specification	Milling	W	1	thresh	Grain cleanness	Nganda	>
		Bread-making	All	3	Quality flour	Flour color	Nganda	=
		Brewing	All	3	Alcohol level	Alcohol content	Nganda	>
Retailer	Sales and profit	Shelf-life	All	1	Without refrigerator	Usable days	Nganda	=
Consumer	Satisfaction	Taste	All	3	Organoleptic properties	taste	Nganda	>
		Appearance	All	3	Grain colour; size	Color and size	Nganda	=
		Shelf-life	All	1	Grain deterioration	Days for usage before mold	Nganda	=
		Nutrition	All	3	High micronutrients	Micronutrients content	Nganda	>

		Digestibility	All	3	Easy digestion	Digestion time	Payenne	=
		Food preparation	W	3	Cooking time	Short cooking time: 20-25mn	Nganda	>
Seed/vegetative material producer	Scalability and cost	Seed numbers	All	1	Seed numbers per panicle	Seeds numbers: 300-400	Nganda	>
		Reproductive fertility	All	1	Pollen quality	Proportion of viable pollen	Nganda	=
		Ease of vegetative propagation	All	1	Canopy development	Emergence vigor	Nganda	>
Seed distributors	Variety identification	Unique appearance of plants, grain and produce	All	1	Seed quality	Uniformity, stability	Nganda	=

Measure of hydrique potential

Dwarf, drought tolerance Sorghum

"*Preparing a product profile requires many things to be done beforehand. Among them, you need to include the considerations of the stakeholders (farmers, buyers, consumers, seed companies, retailers...) in order to maximise the chances of better adoption of your variety. Therefore, be patient and work step by step, because PP is your best tool to have a useful and efficient work*"