High Yielding, Coffee Wilt and Coffee Berry Diseases Resistant, Quality and Good Architecture Arabica Coffee Varieties For Ethiopia

Admikew Getaneh Yigletu
Ethiopian Institute of Agricultural Research (EIAR), Ethiopia
PhD student in Plant Breeding at WACCI, University of Ghana

Design target
Developing coffee wilt and coffee berry diseases Resistant, high-yielding, high quality, and good-architecture coffee varieties in major coffee growing areas of Ethiopia.

Mr. Admikew Getaneh Yigletu is currently a coffee breeder and a PhD student at WACCI, University of Ghana, and he has been working as a coffee breeder at the national coffee and tea research program (Jimma Agricultural Research Center, JARC), Ethiopian Institute of Agricultural Research, before he started his PhD. He has more than 10 years of research experience in coffee breeding and genetics, especially in the generation and delivery of coffee varieties to producers. He graduated with an M.Sc. degree from Jimma University, Ethiopia, and his thesis was on "inheritance of resistance to coffee wilt disease in arabica coffee genotypes". He published seven articles. He is interested in working in the field of resistance breeding.

Contact: email: adamget21@gmail.com
WhatsApp: +251910181697

Product profile design team

Step 1

PP Design Team Lead/Champion	Admikew Getaneh Yigletu	
Organization	Ethiopian Institute of Agriculture Research (EIAR)	
PP Design Team		
Person	**Area of Expertise**	**Name of Organization**
Mr. Admikew Getaneh	Coffee Breeder	JARC, EIAR
Mr. LemiBekisisa	Coffee Breeder	JARC, EIAR
Mr. Gabisa Gadisa	Crop protection	JARC, EIAR
Dr. AbirarSahile	Coffee Processing and Quality	JARC, EIAR
Dr. Taye Kufa	Crop Agronomy and Physiology	JARC, EIAR
Mr. Matewose Mebirate	Agricultural extension & communication	JARC, EIAR

Step 2

Product profile descriptors	
Product profile name	High yielding, Coffee wilt Disease (CWD) and Coffee Berry Disease (CBD) Resistant, Quality and good architecture coffee variety for Ethiopia
Crop	Coffee (*Coffea arabica* L.)
Country(s)	Ethiopia
Geographic region(s)	Southwest, South and west regions
Market segment and positioning	New emerging market for CWD and CBD resistant with high yielding and quality varieties that grows from lowland to highland coffee growing areas
Name of target variety or landrace to be replaced	Dessu **Strengths:** High yielding, coffee berry disease resistant/ tolerant, good architecture **Weaknesses:** Susceptible to coffee wilt disease
Date PP created	24/05/2023

Target client and use	
Value chain primary clients/customers	Farmers, processors, transporters, and consumers are the key beneficiaries of coffee bean/seed
Market scale	Households, local, regional, national and international markets
Use	Beverage, medicinal value
Type of processing	Washed, Semi washed, Dried and Honey taste processing methods
Market class	Processing method, coffee bean grade, cup quality, roasting type, packaging

Target crop producers and production system	
Number of famers (min-max range)	100,000-200,000
%Ratio: male to female farmers	60-70 males and 30-40 females
Production system	Garden and large-scale plantation system using shade or irrigation)
Area of production system (ha)	70,000-100,000 ha
Growth habit	Small tree
Expected levels of inputs	Medium fertilizer and chemicals use
Typical yield range of target system	1.0-1.8 t/ha
Cropping system	Garden and plantation system
Mechanization	Pulpier machine (both fresh cherry and dried)
Agro-ecological zone(s)	1000—2100 meters above sea level

Variety technical specification

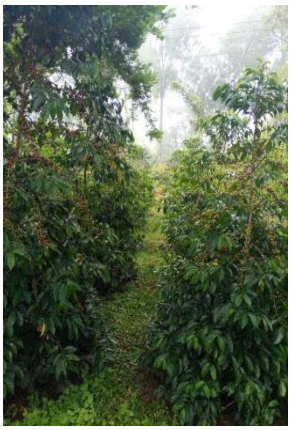
Step 3

How are you	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	Clean coffee bean yield	>1.8t/ha clean coffee bean	Dessu	>=
			All	3	Fresh cherry weight	>5 kg/ tree red fresh cherry	Dessu	>=
		Biotic stress resistance	All	1	CWD resistance	<10% of severity or resistance	Feyate	<=
			All	1	CBD resistance	<10% of severity or resistance	74110	<=
			All	2	Coffee leaf rust resistance	Tolerance	Geisha	<=
			All	2	Coffee thread blight resistance	Tolerance	74110	<=
			All	3	Bacterial blight of coffee resistance	Tolerance	Dessu	<=
			All	3	Root knot nematode	Tolerance	Dessu	<=
		Abiotic stress tolerance	All	1	Drought tolerance	Tolerance	Geisha	<=
				3	Acid tolerance	Tolerance	Dessu	<=
	Crop management and harvesting	Plant architecture	All	3	Plant height	short to medium	Dessu	<
			All	3	Branching	Many	Dessu	>=
			All	3	Canopy diameter (meter)	Medium to high	Dessu	>=
			All	2	Leaf to fruit ratio	Medium	Dessu	=
	Market value and price	coffee bean weight	All	3	100-bean weight	Heavy	7440	>=
		Crop duration	All	3	Early maturing	Early to medium	74110	<=
	Post-harvest storage	Storage-life	All	3	Shelf-life duration	Long	Dessu	>=
Transporter	Durability and cost	Container suitability	M	3	Moisture maintaining ability	High	Dessu	>
		Transportability and storage	M	3	Resistance to breakage	Tolerance	Dessu	>
Retailer	Sales and profit	Shelf-life	All	3	Moisture content	Medium	Dessu	=
Seed/vegetative material producer	Scalability and cost	Seed numbers	All	3	Number of beans per branch	Many	Dessu	>
		Seed germination	All	3	Seed germination percentage	>95% germination percentage, high	Dessu	>
		Reproductive fertility	M	3	Secondary and tertiary branchies	Many	75227	>

		Ease of vegetative propagation	All	3	Propagation ability by Cutting	High Seedling success rate in percentage; >85%	Dessu	>=
Seed distributors	Variety identification	Unique appearance of plants, bean and produce	All	1	Branching nature	Intermediate to open	Dessu	=
Processor	Raw material quality specification	Milling	W	3	Grinding ability	Easy	74110	<=
		Brewing	All	1	Cup quality	>80% grade	74110	>=
Consumer	Satisfaction	Taste	All	1	Beverage-test value	>80% grade	74110	>=
		Appearance	All	2	Bean size and colour	medium sized, uniform & attractive	7440	=
		Shelf-life	All	2	Duration of volatileness after roasting & gridding	Longer period without volatile	Dessu	>=
		Nutrition/ stimulant	All	1	Caffeine content	Low	Geisha	<=

Screening of resistant genotypes

Evaluation of genotypes for yield, disease, quality, abiotic stress, Consumer's preference and other important agro-morphological traits



Produce promising coffee pipelines

"In Ethiopia, various institutes have produced vastly improved agricultural technologies. However, these technologies don't fully take into account the needs of stakeholders and are sitting on the shelf. So it is time to stand up and stop shooting in the dark for the benefit of our society. Therefore, we need to develop product profiles for individual crops, including coffee, based on the Demand-Led Breeding approach and apply it for the renaissance of the Ethiopian and African Agriculture and economies..