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MOZAMBIQUE PLANTCATALYST TRIALS REPORT

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BACKGROUND

Founded in 1971, Food for the Hungry (FH) operates in relief and development programs in 20 countries in Africa, Asia and Latin America and Caribbean with a focus on behavior change related to health, livelihoods, child education, and disaster risk reduction.

In 1987, FH began work in Mozambique implementing emergency relief and rehabilitation programs. In 1997, FH established Food for the Hungry Mozambique (FH/M) and began development programming in Maputo, Gaza, Sofala, Niassa, Manica and Tete Provinces. Currently, FH/M is operating in Sofala, Cabo Delgado, Inhambane and Maputo provinces implementing programs of Child sponsorship and education, emergency response, health and nutrition, WASH and livelihood.

Mozambique is one of the poorest countries in the world, ranked 181th out of 188 countries in Human Development Index (UNDP, 2016). With 2.9% yearly growth rate, 31.6% of 30,669,756 total number of population live in urban areas and depend on agriculture for they subsistence. The agricultural sector accounts for over 24% of the country's gross domestic product and provides employment for 70% of the workforce (FAO, 2014). Nearly, all agricultural activity (99.7%) is small-scale and 95% of agricultural production is rainfed, making the sector highly vulnerable to precipitation variability and other climate risks (MICOA, 2005).

Since 1973 farmers, gardeners and professional growers all over the world have been using PlantCatalyst® to reduce fertilizer costs, increase plant growth and yield, and maximize productivity.

PlantCatalyst® has partnered with FH in January, 2018 to conduct a series of field trials aimed at exploring how adding PlantCatalyst® to a farmer's regimen can help Mozambican farmers produce more crops per lima and increase their profit margins. PlantCatalyst® provided the product which was applied to selected on-farm field trails run by FH/M-supported farmers.

PlantCatalyst® is a 45-year old, Rapid, City, South Dakota-based, innovative, international and climate-smart, food security company that empowers smallholder farmers in developing countries and throughout the United States to grow any type of crop more sustainably, reduce deforestation, and increase yield. Specifically, PlantCatalyst® helps farmers improve their agricultural yield by 10% - 50%, reduce water and fertilizer use by 50%, reduce grow times by 1 - 7 days, provide greater resistance to diseases and drought, increase germination rates, and produce large poultry and livestock.

OBJECTIVE

Determine the yield effect with reduced fertilizer application of PlantCatalyst® for vegetables (Tomato, Onion, Cabbage, Lettuce) and cereal (Maize) and legumes (common bean and cowpea) in Mozambique.

METHODOLOGY

The trials were carried in 0.5 ha with 12x6m² plot size in three different regions, North (Cabo Delgado) and Center (Gorongosa and Caia) photo 1. Three types of crops (cereal, legumes and vegetables) were tested in side to side comparison trial. One plot as control or small farmer's practice sprayed with H₂O via backpack sprayer at 16L Ha⁻¹ and another using the same farmer practice but sprayed with 60mL of PlantCatalyst/16L H₂O dilution, applied via backpack sprayer. Note that, for all cereal and legumes the seeds were soaked in water and in PlantCatalyst for control and treatment plot respectively during 15min before sowing. For vegetable, seedling used for comparison were applied PlantCatalyst in seed bad before transplanting to definitive local. So, the process of spraying went till the plants stabilize his growth. Several variables were measured including yield, germination rate, plant height, number of pods and shape. However, due to discrepancy in results, dates from Caia were not included in this report. Note that, all measures were done in 10 plants sample.

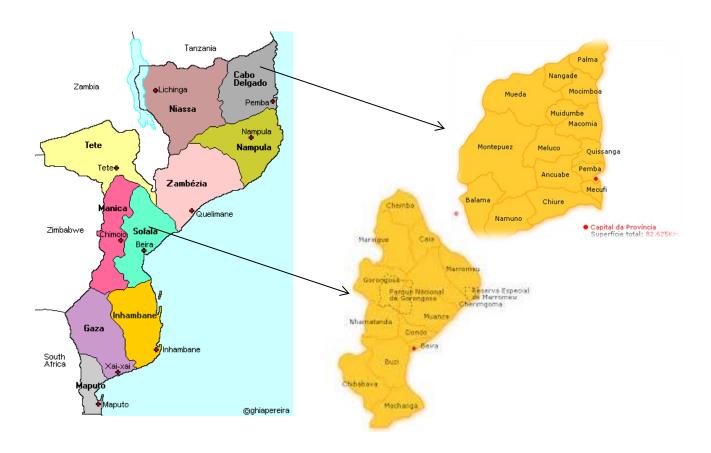


Fig. 1. Mozambique map and study areas



Fig. 2a. Process of mixing PlantCatalyst with water to soak seed



Fig. 2b. Putting PlantCatalyst in back sprayer



Fig. 2c. Applying PlantCatalyst using back sprayer by farmer



Fig. 2d. Soaking seed for 15min with PlantCatalyst mixed with water on left and water only on right

RESULTS

A. Trial of maize variety Matuba (OPV) in Gorongosa, Sofala



Fig. 3a. Maize without Plant catalyst (growing phase)



Fig. 3b. Maize without Plant catalyst (growing phase)



Fig. 3c. Maize with Plant catalyst (maturity phase)



Fig. 3d. Maize without Plant catalyst (maturity phase)

			Growing phase		Maturity phase		
Maize	Variety	Germination	Plant height	Leave	Plant height	Leave	Yield of 10
		rate (%)	(cm)	colour	(cm)	colour	plants (kg)
Treated	Matuba	90	180	Green	220	Dark Green	4
Control	Matuba	85	110	Light Green	195	Dark Green	2.5
Diference		5	70		25		1.5

B. Trial of Maize variety (ZM523) in Chiure, Cabo Delgado



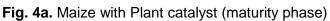




Fig. 4b. Maize without Plant catalyst (maturity phase)

OBS. Unfortunately for this trial we didn't harvest almost anything due to the drought. However, its bit clear that plots treated with PlantCatalyst resisted bit more, looking to leaves are much open compared to other side.

C. Trial of Common bean local variety in Gorongosa



Fig. 5a. Common bean with Plant catalyst



Fig. 5b. Common bean without Plant catalyst

		Beans in monoculture			
Common	Variety	Germination	# of pods	Leave	
bean	variety	rate (%)	# or pous	colour	
Treated		95	86	Light green	
Control		85	66	Light green	
Diference		10	20		

D. Trial of Cowpea (Variety IT18) in Cabo Delgado



Fig. 6a. Cowpea with Plant catalyst (maturity



Fig. 6b. Cowpea without Plant catalyst (maturity



Fig. 7a. Cowpea + Maize with Plant catalyst



Fig. 7b. Cowpea + Maize without Plant catalyst

		Beans in monoculture		Yield of 10	Beans + Maize		Yield of 10	
Cowpea	Variety	Germination	# of pods	Leave	plants (g)	# of pods	Leave	plants (g)
		rate (%)		colour		# oi pous	colour	
Treated	IT 18	95	264	Greeen	300	381	Greeen	400
Control	IT18	85	198	Greeen	150	184	Greeen	145
Diference		10	66		150	197		255

E. Trial of Cabbage in Gorongosa



Fig. 8a. Cabbage with Plant catalyst



Fig. 7b. Cabbage without Plant catalyst

F. Trial of Cabbage in Cabo Delgado



Fig. 9a. Cabbage with Plant catalyst



Fig. 9b. Cabbage without Plant catalyst

OBS. In terms of shape, in all trials where PlantCatalyst were applied the leaves looks much larger and more leaves in the same plant compared to control trial.

G. Trial of Onion in Cabo Delgado







Fig. 11a. Side to side onion field in Gorongosa



Fig. 11c. Bulb of Onion with Plant catalyst



Fig. 11b. Bulb of Onion without Plant catalyst

OBS. In first case of Cabo Delgado in the control plot the leaves look bit thin and with tendency to dry much faster compared to the plots where PlantCatalyst were applied.

For Gorongosa trial it's much clear that with PlantCatalyst the bulbs are much bigger than without PlantCatalyst. We harvest 30kg in treated plot and 20kg in control plot.

H. Trial of Garlic in Cabo Delgado



Fig. 12a. Garlic field with Plant catalyst



Fig. 12b. Garlic field without Plant catalyst



Fig. 12c. 20kg of garlic from plot with Plant



Fig. 12d. 13kg of garlic from plot without Plant

CONCLUSION:

In general most of the farmers liked the effects of PlantCatalyst specifically on vegetables. The differences are so clear when applying the product rather than not applying and overall prices are good.

The disadvantage of using PlantCatalyst for cereals like maize is due to type of system that many of them use, rainfed and small scale which has no need to irrigate and applying PlantCatalyst it tend to become more laborious.

Another thing that was interesting is, when applying PlantCatalyst in garlic they tend to grow very fast and flowering fast also, perhaps is due to type of variety that we use. We have to test with different variety.