# Impact of grow and save model on willingness to pay for organic vegetables: Matching technique among urban consumers in Kenya Eric Bett<sup>1</sup>;David Michael Ayieko<sup>1</sup>;Eustace Kiarii <sup>1</sup> Kenyatta University,P.O. Box 43844-0100,Nairobi,Department of Agribusiness Management and Trade



The markets for organic products are emerging as an alternative to health conscious consumers in the world. However, the purchase of organic vegetables among urban households, remains at minimum levels. Moreover, few studies have attempted to evaluate the factors that affect perception of sustainable agriculture models for organic vegetables among urban households. Furthermore, the specific impact of perception of "Save and Grow" model (SGM) on the WTP has not been widely evaluated by researchers. Therefore, we evaluated the determinants of adopting SGM for organic vegetables among consumers in Nairobi. Secondly, we also assessed the impact of SGM on WTP for organic vegetables among consumers in Nairobi. The survey collected data from 308 consumers in Nairobi, Kenya. We selected the consumers based on a systematic random sampling approach. This involved sampling every 5<sup>th</sup> consumer at the exit of the retail outlets. We used a pretested questionnaire to collect data at exit points of the main organic outlets in Nairobi. Subsequently, we analysed the data using a propensity score matching. The results suggest a significant relationship between perception of SGM and health, gender, employment status, education level, price and labeling. Moreover, the SGM had a significant impact on WTP. We concluded that SGM is an avenue for transitioning from conventional to organic products markets...Policy should focus on up scaling the SGM for accelerated on embracing of organic products.

•Probit regression:  $\mathbf{Y}_{i}^{*} = \alpha + \beta \mathbf{X} + \boldsymbol{\varepsilon}_{i}$ 

•Y<sup>\*</sup><sub>I</sub> is unobservable but is reflected by the choice of individuals, where

• $Y_{1}^{*}=1 \ge 0$  for yes and  $Y_{1}^{*}=0 <0$  for no

•X is a vector of independent variables, while  $\beta$  is coefficient and  $\epsilon$  is the disturbance or error term

Propensity score given By: P(x) =Pr {D=1|x} =E
{D|x}

Where D= {1, 0} represent decision to adopt SGM
ATT is given by:

- The sensitivity analysis showed that there is no hidden bias
- The level of bias would have to be more than 2 times for the study to be sensitive to bias
- Evidence that SGM adoption affects WTP for organic vegetables Table 5: Results of sensitivity analysis

Gamma	Q_mh+	Q_mh-	p_mh+	p_mh-	
1	4.19884	4.19884	0.000013	0.000013	
1.5	3.46327	5.07536	0.000267	1.9 e-07	
2	2.99449	5.77074	0.001375	3.9 e-09	
Discussions					

### Background

There is a steady increase in the population of the world projected to reach 9.7 billion by 2050(UN,2015)
The increase in population is accompanied by an

 $E={E{Y1i|D=Di=1,p(xi)}-E{Y0i|Di=0,p(xi)}|Di=1}$ 

### Result s

Table 2: Determinants of adoption of SGM among urban consumers in Nairobi, Kenya

Adoption of SGM	Marginal effects		
(DV)	(dy/dx)	Std. Err.	Z
Health conscious			
(1=Yes 0=No)	0.23	0.07	3.35***
Price	0.63	0.06	10.03***
Age	-0.05	0.04	-1.22
Employment status			
(1=Yes 0=No)	0.06	0.04	1.68*
Household size	-0.004	0.02	-0.23
Education level	-0.32	0.05	-6.26***
Gender			
(1=Male 0=Female)	-0.27	0.07	-4.07***
Labeling			
(1=Yes 0=No)	0.15	0.05	2.99**
(1 = 105  U = 100)	U.15	0.05	2.99

### Propensity score graphs



• If an individual health conscious the probability of adopting SGM increases by 23%

• Increasing the price of organic vegetable by Ksh.1 increases the probability of adopting SGM by 63%

• If an individual is employed then the probability of adopting the SGM increases by 6%

• An increase in the level of education reduces the probability of adopting SGM by 32%

• If an individual is a male by gender the probability of adopting SGM reduces by 27%

 If an individual uses products with organic labels then the probability of adopting SGM increases by 15%

 The adoption of SGM increases the difference in WTP for organic products among adopters and non adopters

• The WTP of the adopters of SGM is at least 31% higher than those in the control group

• The SGM have a potential of addressing food insecurity and poverty alleviation





increase in demand for food (FAO,2010)

•The current level of depletion in natural resources is partly attributed to Intensive agriculture

•A significant population of the world is face by threat of food insecurity (FAO,2010)

The world is experiencing a change in the climate partly due to intensive agriculture (IPCC,2007)
SGM is a sustainable agriculture model for food production and environmental conservation

## Table 1:Projected growth in world humanpopulation between 2015-2100

Year	Millions
2015	7247
2015	/34/
2030	8501
2050	9725
2100	11213

(Source: adopted from (UN,2015)

Figure 1:A peri-urban SGM farm in Kenya

### **Research objectives**

•To evaluate the SGM adoption decision among consumers in Nairobi

•To assess the impact of the SGM adoption decision on Willingness to pay(WTP) for organic vegetables



Figure2: Graph showing propensity score with overlapping regions



Figure 3: Graph showing propensity score with trimmed overlap regions

# Impact of adopting SGM on WTP for organic vegetables

### Table 3: Results of the ATT of SGM on the WTP for organic vegetables

Kernel matching						
Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
WTP	Unmatched	0.45	0.05	0.40	0.04	9.14***
	ATT	0.48	0.11	0.36	0.05	6.94***
Radius						
matching						
WTP	Unmatched	0.45	0.05	0.40	0.04	9.14***
	ATT	0.48	0.06	0.42	0.05	9.24***
Caliper						
matching(0.01)						
WTP	Unmatched	0.45	0.05	0.40	0.04	9.14***
	ATT	0.45	0.14	0.31	0.08	3.96***



Figure 4: The SGM innovations for urban gardens

### **Conclusions** and Recommendations

- There is a niche of health conscious consumers that have a preference for organic vegetables
- Pricing of organic products have an influence on the decisions to adopt sustainable organic models
- Income has an effect on the adoption of sustainable organic models
- Male gender are less likely to adopt organic models
- labeling organic products has an influence on consumer decisions to adopt organic inventions
- SGM requires promotion among individuals with higher education levels
- Adoption of SGM has a significant impact on consumer WTP for organic products
- •The SGM can be up scaled and integrated into extension services within the ministry of agriculture

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### among consumers in Nairobi

### Methodology

- A purposive selection of organic store outlets in Nairobi
- We described the SGM model to the respondents
- We asked if respondents would adopt SGM and their WTP for organic products
- Sample included 308 shoppers at organic store outlets in Nairobi
- We interviewed every 5<sup>th</sup> shopper at the exit of the organic store
- The data was subsequently analysed using a propensity score matching (PSM)
- PSM preferred to check endogenity and since the study was an observational study

Table 4:Results of the ATET, ATENT and ATE of SGM on the WTP for organic vegetables

ATET	Average Treatment Effect on the Treated				
Variable	Treated	Controls	Difference	S.E.	T-stat
WTP	0.50	0.01	0.48	0.04	11.39***
ATENT	Average Treatment Effect on the Non- Treated				
Variable	Treated	Controls	Difference	S.E.	T-stat
WTP	0.75	0.01	0.74	0.04	19.44***
ATE	Average Treatment Effect				
Variable	Treated	Controls	Difference	S.E.	T-stat
WTP	0.62	0.01	0.61	0.04	17.14***

- Kenya Organic Agriculture Network (KOAN)
- Ministry of Livestock and Fisheries Development (MoLFD)

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