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Farmer Perceptions and Attitudes Towards Orange-Fleshed Sweetpotato Attributes: An Analysis of Common Beliefs about Sweetpotato Production and Consumption

Julius J. Okello^a, Kelvin M. Shikuku^b, Kirimi Sindi^b and Jan Low^b

^a International Potato Center, P.O. Box 22274, Kampala, Uganda

^b International Potato Center, P.O. Box 25171, Nairobi, Kenya



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Farmer Perceptions and Attitudes Towards Orange-Fleshed Sweetpotato Attributes: An Analysis of Common Beliefs about Sweetpotato Production and Consumption

Abstract

This paper interrogates some of the beliefs about production and consumption of sweetpotato in general, and orange fleshed sweetpotato (OFSP) in particular, using both descriptive and exploratory factor analysis and data collected from farmers in Tanzania. It finds that contrary to beliefs, sweetpotato production and consumption is significant to growers and farmers value some key attributes such as yield, taste, storability of the roots and nutritional benefits. It therefore concludes that the negative beliefs about sweetpotato are unfounded. The paper discusses the implications of the findings.

Keywords: Sweetpotato; farmers; production and consumption beliefs; factor analysis; Tanzania

1.0 Introduction

Vitamin A deficiency (VAD) is a major problem among developing-country rural populations. It is associated with increased mortality, particularly among children, pregnant and lactating mothers (Bovell-Benjamin, 2007). An estimated 127 million preschool children worldwide suffer from VAD (Chowdhury, *et al.* 2011) with between 250,000 and 500,000 children becoming blind every year and about 600,000 children dying annually as a result of VAD (Bovell-Benjamin, 2007).

Recent efforts to combat VAD have, among others, aimed at promoting the production and consumption of orange-fleshed sweetpotato (OFSP) in Sub-Sahara Africa. Several studies have examined consumer's acceptance of the biofortified foods including sweetpotato (Steven and Winter-Nelson, 2008; Hotz *et al.*, 2012). Other studies have assessed the impact of production and consumption of OFSP on income and health (Naico and Lusk, 2010; Chowdhury *et al.*, 2011). These studies find increased intake of OFSP and hence vitamin A. To date, however, very few studies have systematically examined farmers' perceptions and attitudes towards the attributes of OFSP. This paper uses a rich dataset collected from Tanzania to assess farmers' perception and attitude towards OFSP. It uses exploratory factor analysis (EFA) to identify latent constructs that condition farmers' decision to grow/consume sweetpotato, in general, and OFSP in particular. The study differs from earlier ones in that it interrogates some of the beliefs about sweetpotato in general and OFSP in particular.

2.0 Study methods and data

This study used descriptive analysis to examine preference for OFSP, evaluate farmer beliefs about OFSP and to understand attitudes towards some key attributes of sweetpotato in general and OFSP in particular. Exploratory Factor Analysis (EFA) was then used to extract attributes of OFSP valued by farmers and identify the latent construct that motivate farmers to grow and consume OFSP. Kaiser-Meyer-Olkin's (KMO) overall measure of sampling adequacy was used to test the suitability of the data for factor analysis using the recommended statistics (Hansson and Lagerkvist, 2012; Hair *et al.*, 2010). Eigen values determined the number of factors to retain based on factor loadings of 0.4. Items with insignificant loadings were deleted one by one, starting with the one with the lowest communality. Oblique (oblimin) rotation was used to facilitate interpretation of the factor matrix. Item-to-total correlation and Cronbach's alpha were used to assess the reliability of

the measurement scales obtained (Hair et al. 2010). Items with items-to-total correlation below 0.3 were removed from the measurement scale.

Data were collected from 732 households in January and February 2013 using multi-stage sampling technique. A stratified random sample of farmers was drawn from participants and nonparticipants of a sweetpotato improvement project yielding 455 participants and 277 nonparticipants, respectively. In order to capture gender effects a set of 14 attitude measurement items on attitudes were presented to 327 female and 327 male respondents separately, and responses recorded. The measurement items, presented in Table 2 along with the results, were constructed as statements posed on a five-point likert scale ranging from “strongly agree” to “strongly disagree”. The midpoint on the scale was “neither agree nor disagree”. To avoid agreement bias, both positively and negatively worded statements were intermixed as recommended in the literature (Hansson and Lagerkvist, 2012).

3.0 Results

Table 1 presents demographic characteristics of study respondents by participation in the project. The participants differed from nonparticipants in terms of age. There is also weak evidence that participants differed in terms of education and distance to market.

Table 1. Demographic characteristics of respondents and t-test of differences in means

Variable	Participant		Non-participant		Test of diff in means	
	Mean	Std Dev	Mean	Std Dev	t-stat	p-value
Gender (1=men,0=women)	0.29	0.46	0.32	0.47	0.72	0.469
Education (years)	5.88	3.12	5.59	3.07	-1.23	0.109
Age (years)	46.23	12.50	48.22	12.30	2.13	0.033
Distance to market (km)	14.53	28.94	11.94	21.16	-1.30	0.097
Farm size (acres)	4.55	2.63	4.65	2.72	0.44	0.662

Table 2 presents the average, minimum, and maximum scores for male and female respondents over all the statements that were used to elicit attitudes. A higher score indicates that farmers care less about the suggested attribute (Hansson and Lagerkvist, 2012). For instance the statement AP03: “Sweet potato (SP) is a food for women and children only”, associated with the highest score of 4.31, means that most respondents disagreed with the statement. Similarly, statement AP07: “You can’t grow SP and be considered a man” and AP08: “You can’t eat too much SP because you’ll get stomach problems” with scores of 4.16 (4.20) and 3.57(3.64) for female (male) respondents also indicate that majority of the respondents did not agree with the statements. On the other hand statement AP06: “Even if there is enough staples, we still keep SP in our diet”, associated with the lowest score of 1.32 (1.33) for female (male) respondents indicate that majority of the female (male) respondents agreed with it.

Seven statements (in italics) were excluded from the analysis after failing to attain the item-total-correlation threshold of 0.3 or factor loading threshold of 0.4, indicating that they do not load significantly on the factor.. The final matrices had overall KMO values of 0.806 for women and 0.794 for men implying that the data could support factor analysis (Hair *et al.* 2010). In addition, Bartlett’s test of sphericity yielded a p-value of 0.000 as required (Hansson and Lagerkvist, 2012). In both cases also, the Cronbach’s alpha statistic was above 0.7, hence above the threshold of 0.6 (Hair *et al.* 2010). Table 2 reveals that EFA extracted only statements that relate to OFSP, and that represent positive attributes of OFSP, namely, the nutritional value, taste, yield, storage, disease-resistance, and whether or not children like

OFSP. Both male and female respondents either agreed or strongly agreed with these statements but disagreed with negative statements about OFSP. We therefore interpret the extracted statements collectively into a single attribute that we call *OFSP attribute preferences*.

Table 2: Mean scores and factor loadings of attitudinal statements of the latent constructs

Code	Statement	Women			Men		
		Mean score	SD	Factor loading	Mean score	SD	Factor loading
AP02	<i>SP leaves are good for human beings to consume</i>	1.90	1.17		1.90	1.17	
AP03	<i>SP is a food for women and children only</i>	4.31	0.96		4.26	0.95	
AP04	OFSP are healthier WFSP	2.01	1.01	0.5435	1.93	1.01	0.5104
AP05	<i>SP is the most reliable food crop during food shortage</i>	1.62	1.20		1.65	1.23	
AP06	<i>Even there are enough staples, we still keep SP in our diet</i>	1.32	0.70		1.33	0.72	
AP07	<i>You can't grow sweetpotato and be considered a man</i>	4.16	1.01		4.20	1.00	
AP08	<i>You can't eat too much SP because you'll get stomach problems</i>	4.12	1.03		4.17	1.02	
AP09	OFSP do not taste as good as WFSP.	3.29	1.20	0.5078	3.38	1.16	0.5098
AP10	OFSP yield more than WFSP.	2.40	1.12	0.5347	2.44	1.16	0.4599
AP11	OFSP do not store as well after harvest as WFSP.	3.13	1.06	0.5558	3.20	1.05	0.5589
AP12	You can't consume too much OFSP because they are very sweet	3.57	1.04	0.5709	3.64	0.97	0.6293
AP13	<i>OFSP mature earlier than the others</i>	2.48	1.22		2.43	1.18	
AP14	OFSP are not loved by children	3.82	1.10	0.5916	3.94	0.95	0.5365
AP15	OFSP are not tolerant to diseases	3.40	1.13	0.5785	3.34	1.08	0.5628
Cronbach's alpha		0.7574			0.7342		
Bartlett's p-value		0.0000			0.0000		
Overall KMO value		0.806			0.794		

Figure 1 shows that the percentage of farmers who strongly agree that OFSP is nutritionally superior to WFSP is much higher among both male and female participants than non-participants.

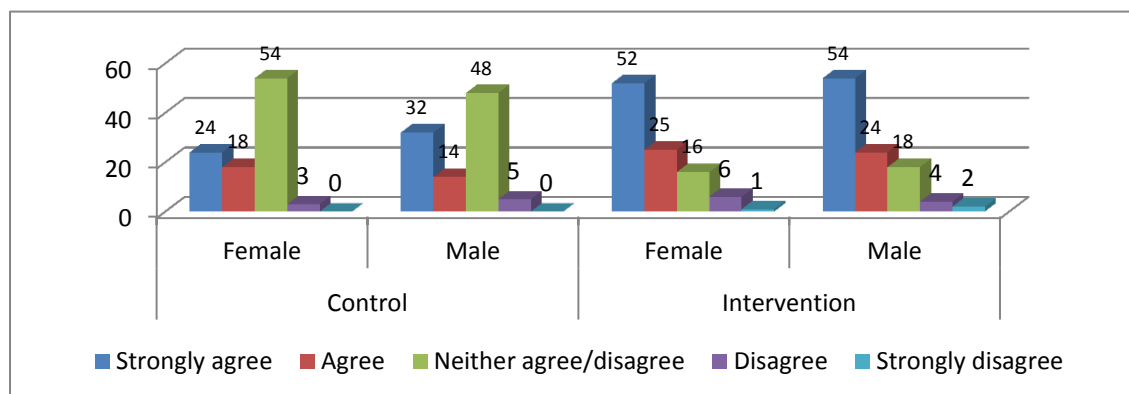


Figure1: OFSP is healthier to eat than WFSP, % by project participation

About one-half of both male and female non-participants were unsure of the nutritional superiority of OFSP. Figure 2 presents the results of analysis of the belief that children do not love orange-fleshed sweetpotato due to its color. There are major differences among male and female participants and non-participants. Participants strongly disputed the myth that children don't like the orange-colored SP. To the contrary, more than 50% male and female non-participants were unsure whether children dislike the orangeness.

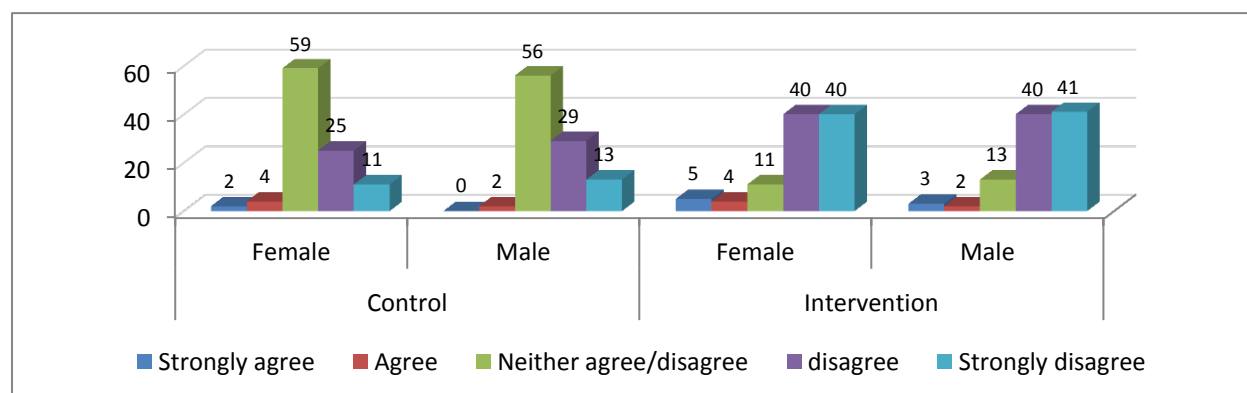


Figure 2. Perceptions about children's preference for orange-flesh color, % by intervention

This study also examined respondents' perception of the yield potential and storability of OFSP. As in the above case of color, more than 50% of the male and female non-participants were unsure whether OFSP could store as well as the white-flesh sweetpotato and/or could yield more. On the other hand, more than 70% of the male and female participants agreed or strongly agreed that OFSP can produce more and can also store just as well as the white fleshed varieties. These findings corroborate those of factor analysis above.

4. Summary, conclusions and implications

This paper interrogates some of the beliefs on sweetpotato, and especially OFSP, production and consumption attributes using both descriptive and exploratory factor analysis (EFA). The results of EFA confirm those of the descriptive analysis that indicate that the negative beliefs about OFSP production and consumption are unfounded. Instead, the study finds that farmers generally have a positive perception of OFSP production and consumption is related to positive attributes of OFSP. However, perceptions seem to be influenced by awareness and knowledge of OFSP. Project participants were more positive about the superior nutritional value of OFSP and its popularity among children.

This paper concludes that, despite common belief, farmers treat SP as major part of household diet, do not treat it as food for women and children only, use sweetpotato to bridge the hunger gap, and view its leaves as healthy vegetable. Further the study concludes that OFSP growers have positive perception of its taste, yielding ability, disease resistance, storability and popularity of the orange color among children. However, this positive perception is influenced by knowledge of OFSP.

These findings imply the need to upscale efforts to sensitize farmers about the nutritional benefits of growing and consuming OFSP. In particular, training on health effects of inadequate intake of Vitamin A and OFSP as its source can greatly influence perception of OFSP. Indeed, the studies indicate that attitude affect decision-making (Poppenborg and Koellner (2013). The findings relating to attributes imply the need to increase efforts at

breeding for multiple SP attributes rather than focusing on agronomics traits only, as was the case before.

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