

The Adoption of Orange Flesh Sweetpotatoes (OFS) by Ghanaian Small Farmers for Nutritional and Economic Well-Being

By

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Problem Statement

Nutritional deficiencies (e.g., Iron and Vitamin A) take heavy health and economic tolls on rural peoples across the globe, especially among young children and women

Iron Deficiency Anemia

What: inadequate levels of iron in the body

Causes: blood loss, poor diet, inability to absorb iron

Who: young children, women of child-bearing age and pregnant women

Symptoms: fatigue, heart and spleen problems, lowering of resistance to infections

Vitamin A Deficiency

What: inadequate levels of vitamin A in the body

Causes: poor diet

Symptoms: night blindness, specific eye problems, lowering of resistance to infections

The Sweetpotato (*Ipomoea batatas*)— A source for both iron (the leaves) and Vitamin A (in orange flesh varieties)



In Ghana, West Africa, the sweetpotato lags behind other root crops such as cassava and yam in terms of production and food preference



This research explores ways in which orange flesh sweetpotatoes can be adopted by Ghanaian small farmers and introduced to the general public for increased health and economic benefits.

Through the use of multidisciplinary teams that included plant science, extension, agricultural economics, nutrition and anthropology, it was found that adoption by farmers of a new variety of sweetpotato was not based on a single production—marketing decision but, rather contingent on a series of adoption decisions by a series of actors and based in a value-added chain of production—processing—new product development, each with technical, economic and commercial considerations.

Sweetpotato in Ghana: Production

Compared to other traditional leafy vegetables, the sweetpotato:

- Has a shorter and year-round production season**
- Is drought resistant**
- Requires a minimum of inputs**

Current Use of Sweetpotato

Traditional Uses:

- “Famine” food: when cassava, yam and cocoyam are not available
- Snack Food: chips

New Uses:

- Stew
- Potpie

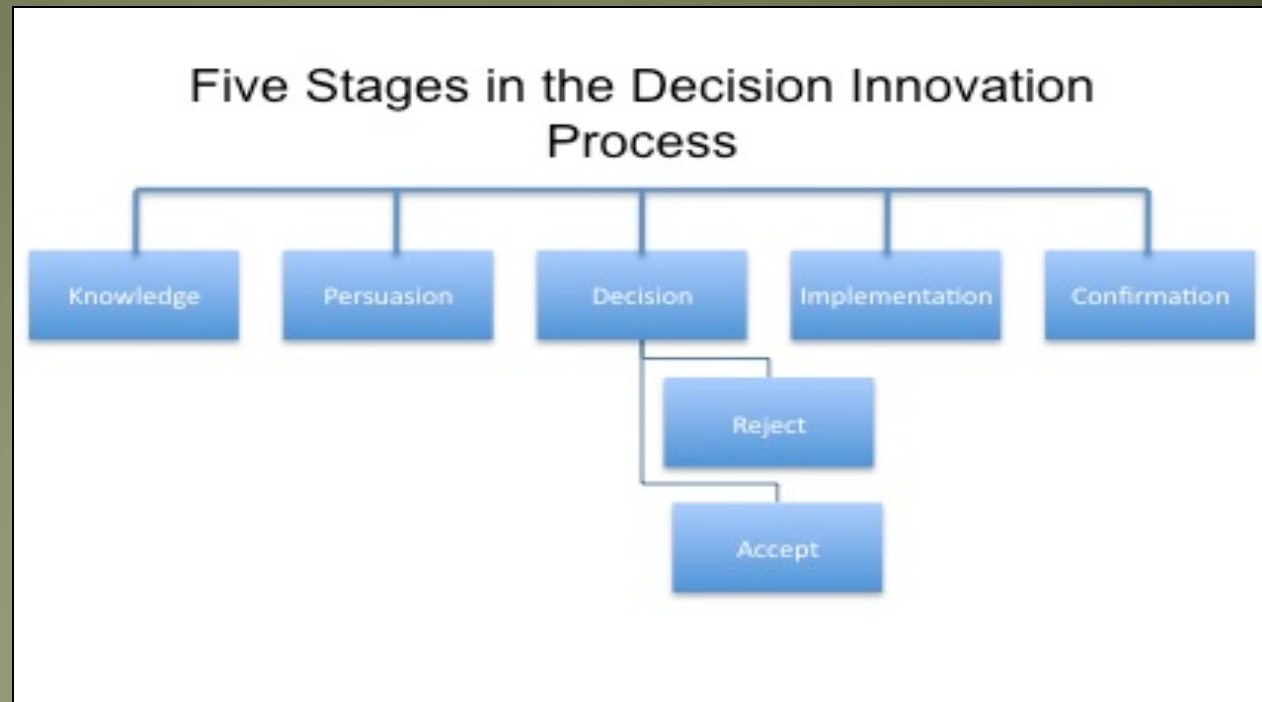


Research Question:

Can and Will Sweetpotato be adopted as an additional food to enhance both the nutritional and economic well-being of Ghanaian small farmers?

Rogers' Characteristics of Innovations

- Relative Advantage
- Compatibility
- Complexity
- Trialability
- Observability



Strategic Decision-Making and Adoption of Agricultural Technologies and Risk

- **Efficient use of resources**
- **Technology is similar**
- **No risk of total failure**
- **Easy to apply**
- **Inexpensive**
- **Environmentally compatible**

Adapted from Mariam, Galaty, and Coffin (1993)

New Technology- Innovation:

Sweetpotato Greens



Previous Research: Sweetpotato Greens



Gboma Toga, Yevu Gboma, Sweetpotato

Previous Research: Sweetpotato Greens



Previous Research: Sweetpotato Greens



New Technology- Innovation:

Orange Flesh Sweetpotato

2007 CRI Report



CSIR-CROPS RESEARCH INSTITUTE

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Vision
To become a centre of excellence for innovative and quality agricultural research for development.

Mission
To develop and disseminate environmentally sound technologies for high and sustainable food and industrial crop productivity, enhanced food security and poverty reduction.

Objectives
These include:

- Developing high yielding, consumer acceptable, food and industrial crop varieties, tolerant to biotic and abiotic stresses
- Developing appropriate management technologies for food and industrial crops production
- Packaging and transferring proven technologies to appropriate stakeholders
- Accessing external donor funding for demand-driven agricultural research
- Establishing and strengthening inter-institutional collaboration



RECENT ACHIEVEMENTS

The following improved crop varieties were released in March 2005

				
CSIR Ausha: Pst. yield - 2.8 t/ha. For seedling and tuber.	CSIR Akshay: Pst. yield - 2.3 t/ha. For meals (bread, baking material and for feed).	Famers variety and improved variety.	CSIR Anjali: Pst. yield - 2.4 t/ha. For oil extraction and food preparation.	CSIR Janki: Pst. yield - 2.0 t/ha. For oil extraction, cover crop.
				
CSIR Anbu: Pst. yield - 2.4 t/ha. 42.0% protein, rich in Fe, Ca and P.	CSIR Rangshree: Pst. yield - 2.1 t/ha. 43% protein, rich in Fe, Ca and P.	A good soybean field.	Sensory evaluation of soybean products.	
				
CSIR Shikha: Pst. yield - 30 t/ha. Very hot.	CSIR Mito: Pst. yield - 30 t/ha. Mild pungency.	A field of Bulley CSIR Mito variety.	Soups prepared from Bulley variety (left) and Mito variety (right).	
				
CSIR Apurabi: Pst. yield - 35.6 t/ha. High B-carotene (vit. A) content.	CSIR Ojas: Pst. yield 23 t/ha. Multiple B-carotene (vit. A) content for infant feeding.	CSIR High starch: Pst. yield - 18 t/ha. 27% starch content. Good for food, animal and industrial uses.	CSIR Ojas: Pst. yield - 20 t/ha. 12.6% starch content. Excellent for animal and food crops.	
				
CSIR Agulhas: Pst. yield - 50.8 t/ha. 24.4% starch content. Good for starch and pulp production.	CSIR Easwari: Pst. yield - 49.9 t/ha. 18.6% starch content. Good for food production.	CSIR Barabani: Pst. yield - 49.9 t/ha. 21% starch content. Good for bakery products.	CSIR Dhruv: Pst. yield - 40.3 t/ha. 24% starch content. Good for starch production.	
				
CSIR Pooja: Pst. yield - 33 t/ha. Excellent tuber and storage. Matures in 7-8 months.	CSIR Sheeraj: Pst. yield - 50 t/ha. Matures in 7-8 months.	CSIR Akshaya: Pst. yield - 45.2 t/ha. Multiple tubering. For export.	Farmers evaluating crop production with selection.	

Previous Research: Sweetpotato Puree



The Value-Added Chain

Farmer



Processor



Product Developer



Consumer

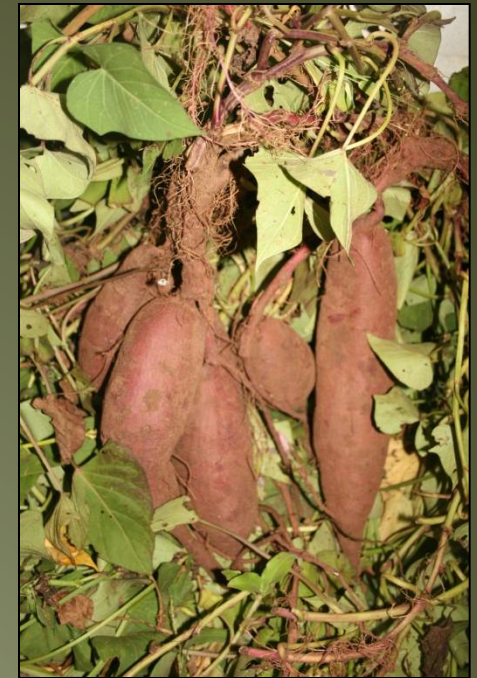


Farmer Adoption Decision: Orange Flesh Sweetpotato

Adoption Questions:

- 1. Access to plants**
- 2. Compatibility with existing farming system**
- 3. Any possible improvements to farming system**
- 4. Marketing possibilities (sunflower experience)**

Non- Traditional Production: Orange and Purple Flesh



Key Farmer Constraints:

- Labor and
- Storage



New Innovations:

- Rows vs. Mounds
- Technology vs. Labor



and...
Mechanization



Diversify Marketing Opportunities



Processor Adoption Decision: Orange Flesh Sweetpotato

Adoption Questions:

- 1. Access to quality potatoes**
- 2. Compatibility with existing processing system**
- 3. Any possible improvements to processing system**
- 4. Product possibilities**

Key Processor Constraints: Quality Product and Labor



Diversify Processing Opportunities



Baker Adoption Decision: Orange Flesh Sweetpotato

Adoption Questions:

- 1. Access to quality ingredients-Puree**
- 2. Compatibility with existing baking system**
- 3. Any possible improvements to processing system**
- 4. Product possibilities**
- 5. Consumer acceptance and willingness to pay**

Baker Adoption Decision: Compatibility



Diversify Product Possibilities



Consumer Acceptance and Willingness to Pay



Conclusions

- **Three Adopters: Farmers, Processors and Bakers**
- **Adoption decisions based on: compatibility, innovation, diversity and market risk**
- **Potential in the individual market, additional potential in the value-added chain.**
- **Benefit to consumers with product choices.**



Team Approach





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