Purdue Improved Cowpea Storage (PICS) Technology Usage among Legume Traders in Nigeria: What are the Set-backs to the Breakthrough?

BY

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PURDUE IMPROVED COWPEA STORAGE (PICS) TECHNOLOGY USAGE AMONG LEGUME TRADERS IN NIGERIA: WHAT ARE THE SET-BACKS TO THE BREAKTHROUGH?

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OVERVIEW

Cowpea (*Vigna unguiculata L.)* is a key food security legume in the West Africa subregion, given its relative cheapness as a plant-based protein. Cowpea is of major importance in livelihoods along the value chain. Nigeria is its highest global producer (IITA, 2017), hence farmers have been saddled with the responsibility of meeting considerable demands of neighboring countries alongside domestic demands. With the ongoing trade integration in the Africa region, the country has a competitive advantage if the legume value chain is developed.

Storage losses is a huge challenge as Cowpea is particularly prone to pest Infestations. Bruchids(*Callosobruchus maculatus*) accounts for a significant amount of qualitative and quantitative post-harvest losses as cowpea move along the actors from farm to fork.

Transference of the inherent risk often leads to abrupt marketing of cowpea in the contemporaneous- and short-run periods following harvesting hence preventing farmers and traders from benefiting from the economic gains attributable to inter-temporal and inter-spatial choices.

Hermetic storage technology (Purdue Improved Cowpea Storage, PICS) was developed and designed to address cowpea storage issues. However, the use of (banned) hazardous chemicals and poison have continued to plague food commodity storage in the country. Infact, Nigerian cowpea was banned by EU markets in 2015 due to the high chemical content over the acceptable limit of 0.01 dichlorvos. In 2018, there were various incidences of lives lost to the consumption of poorly preserved cowpea which became a national issue to which Nigeria Consumer Protection Council, Nigerian Agricultural Quarantine Service, and Nigerian Stored Products Research Institute had to publicly react (Premium Times, 9/November/2018).

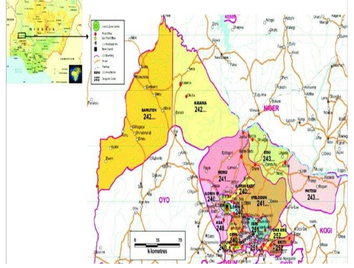
Evidence exist that PICS technology is effective in reducing post-harvest losses, the open question, is: ***"what prevents farmers, traders and consumers in the value chain from harnessing the benefits of this technology?"*** Majority of post-harvest losses occur during trade levels, hence it is a critical node for intervention to forestall loss of livelihoods and food security in the region.. This research is premised on the Diffusion of Innovations Theory as proposed by Rogers (1962).

OBJECTIVES

- ✓ evaluate the level of awareness & usage of the PICS bag
- ✓ investigate the perception of legume traders on the risks involved with indiscriminate chemical preservation.
- ✓ assess the knowledge gap in chemical usage and handling among legume traders
- ✓ identify the determinants of PICS usage among traders
- ✓ assess the constraints to PICS usage by the traders.

DATA DESCRIPTION/METHODOLOGY

Data was collected in a two-stage sampling procedure viz: (i) selection of the top eight (8) legumes market in Kwara state (ii) proportionate random selection of 189 key cowpea traders from the markets.



Study area was selected due to:
- ➢ location as gateway of major producing to consuming zones
- ➢ market prominence in legume trading for top producing region

Data were analyzed using: descriptive statistics, Hyperbolic Cosine Unfolding Quasi-Rasch model, psychometric measure, binary logit regression model, and the Likert-type scale.

The Hyperbolic Cosine Unfolding Quasi-Rasch model is specified as follows:

$$\Pr\{X_{fi} = 1\} = \frac{1}{1 + Cosh(\beta_{fi} - \delta_i)}$$

where, β_{fi} is the perception of farmer f on preservation method i, δ_i is the safety of preservation method i and $Pr\{X_{fi} = 1\}$ is the probability that farmer, f recognizes the riskiness that the preservation method portends.

Binary logit regression to identify the determinants of PICS usage among traders is specified as:

$$Y = \beta X_1 + \cdots + \beta X_n + \varepsilon$$

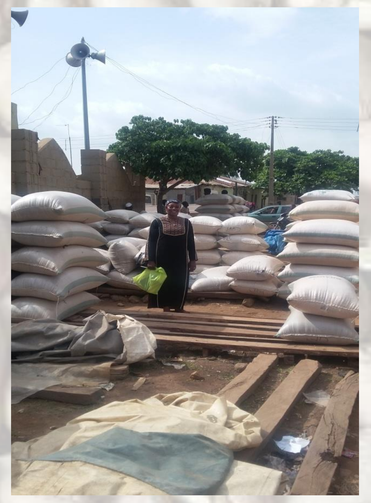
KEY FINDINGS

- ✓ about 29% of the marketers were aware of the PICS bag although only 22.75% were actual users
- ✓ Hyperbolic Cosine model unfolded that only 9.5% ($p<0.05$) of the sampled legume traders agreed to the risks that indiscriminate chemical preservation portends to the final consumer
- ✓ Coombs scale result shown that only 33% had a positive attitude towards PICS usage
- ✓ 78.3% of traders that employ chemical preservatives had sparse knowledge on the health implication/safety precautions in chemical handling in commodity storage.
- ✓ PICS bag usage was positively influenced by: traders' educational status, access to extension services, business scale, quality of storage facilities and negatively by the intended length of storage ($p<0.05$)
- ✓ major constraints to PICS bag usage are: inaccessibility of the bags, initial cost outlay, and technicality involved with storing with the PICS bag

Variables	Coeff [Std. Error]	Wald	DF	Sign	Exp.(β)
Educ. Stat.	1.324** [1.348]	2.381	1	0.029	4.853
Extension access	2.440** [1.648]	1.276	1	0.000	11.324
Scale of business	0.902** [0.521]	6.734	1	0.001	6.728
Storage Quality	0.776** [1.184]	0.426	1	0.002	2.535
Intended length of storage	- 0.941** [0.786]	3.415	1	0.043	10.374
Constant	0.912** [1.114]	3.447	1	0.001	9.212
Overall case correctly predicted 82.6%; Model Chi-square 56.18					

RECOMMENDATIONS & POLICY IMPLICATIONS

- ✓ Campaign and sensitization on PICs technology
- ✓ PICS sales centers to be set up close to markets/farm gates
- ✓ Target policies to promote infrastructural support for traders (assemblers and wholesalers) to enhance storage system
- ✓ Private sector to take on business opportunities in restructuring warehousing node in the legumes value chain
- ✓ Policymakers should partner with private sector to revive Federal Strategic Grain Reserves in Nigeria, availability of good storage facilities will encourage PICS usage by traders
- ✓ MSMEs may generate employment through providing technical support in farmgates and markets in the hermetic storage procedure

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