APE -06

Quality and Constraints in Smallholder Egg Value Chain of Greater Port Harcourt City, Nigeria

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Abstract
Egg quality and constraints in smallholder egg chain in Greater Port Harcourt City (GPHC) were assessed in 3 of the 8 Local Governments. Forty-seven farmers were surveyed with questionnaires while 22 actors were interviewed in-depth. Thirty eggs per grade were used to get the weight per egg. Quantitative data were analyzed using SPSS software. Results show that farmers use 5-grade, size-based system, to market eggs for better prices. Vital quality parameters were size>shell>colour>cleanliness>weight. Consumers prefer brown eggs. Farmers faced input-based, management and infrastructure-related constraints. Other stakeholders face quality, financing, handling and marketing challenges. There are opportunities for introducing chain coordination, quality control, machine-based grading, grade-based pricing, cooperatives, staff motivation, and jumbo brown eggs are opportunities.

Keywords: Egg grading, input, upgrading, value chain

Introduction

Value chain refers to activities of chain actors in bringing a product from conception through production to consumers and disposal after use (Kaplinsky and Morris, 2001). The concept encompasses constraints and quality affecting chain function. Product quality includes product features that induce consumer preference. Customers' view of egg quality differs and is decided by egg physical features and chemical content (Luning & Marcelis, 2015). Actors must know consumer egg quality needs to satisfy their preferences. Value chain analysis also reveals constraints that stop smallholders from exploiting chain opportunities (KIT *et al*., 2010). This study assessed egg quality and chain constraints in Greater Port Harcourt City (GPHC). It will reveal opportunities for exploitation by actors such as smallholders.

Materials and Methods

Purposively selected small-scale (<2,500 birds) farms in Obio-Akpor, Oyigbo and Etche LGAs of GPHC were used to survey 47 farmers using questionnaires. Eight farmers attended focused group discussion, 3 each of hawking and sedentary wholesalers, supermarkets, small shop, boarding schools, fast food, inter-city traders and chairman, Poultry Association of Nigeria were interviewed. Thirty eggs/grade were used to get mean egg weight. SPSS app was used to analyze data.

Results

Figure 1 indicates that 56% of the farmers sort and grade their eggs while 44% do not. Farmers that sort and grade, do so to attract better price while those that do not attribute it to lack of time. Figure 2 shows that size was the only criteria used for grading. Table 2 indicates five grades of eggs: jumbo, extra-large, large, small and bullet as grade I, II, III, IV and V weighing 85, 78, 60.67, 53 and 47g, respectively. The prices of the grades were ₦950, ₦900, ₦850, ₦800 and ₦600 for grades I, II, III, IV and V, respectively. A crate of eggs was 30 eggs. Jumbo and bullet grades were rare. Figure 3 shows that 41% of the farmers choose size as the most important quality parameter while 29%, 28% and 2% picked shell colour, cleanliness and weight, respectively.

Figure 4 indicates that 82% of egg farmers' customers prefer brown shelled eggs while 15% prefer white shelled eggs. Three percent had no preference. The constraints faced by stakeholders and potential solutions are shown in Table 3. Poor quality breeds and feeds, weak regulation of drugs and feed, professional rivalry and weak poultry association were challenges facing input suppliers. Producers face high cost and low-quality feed and drugs, poor breeds, incompetent veterinarians, disease, bad roads and poor electricity, lack of credit and staff indiscipline.

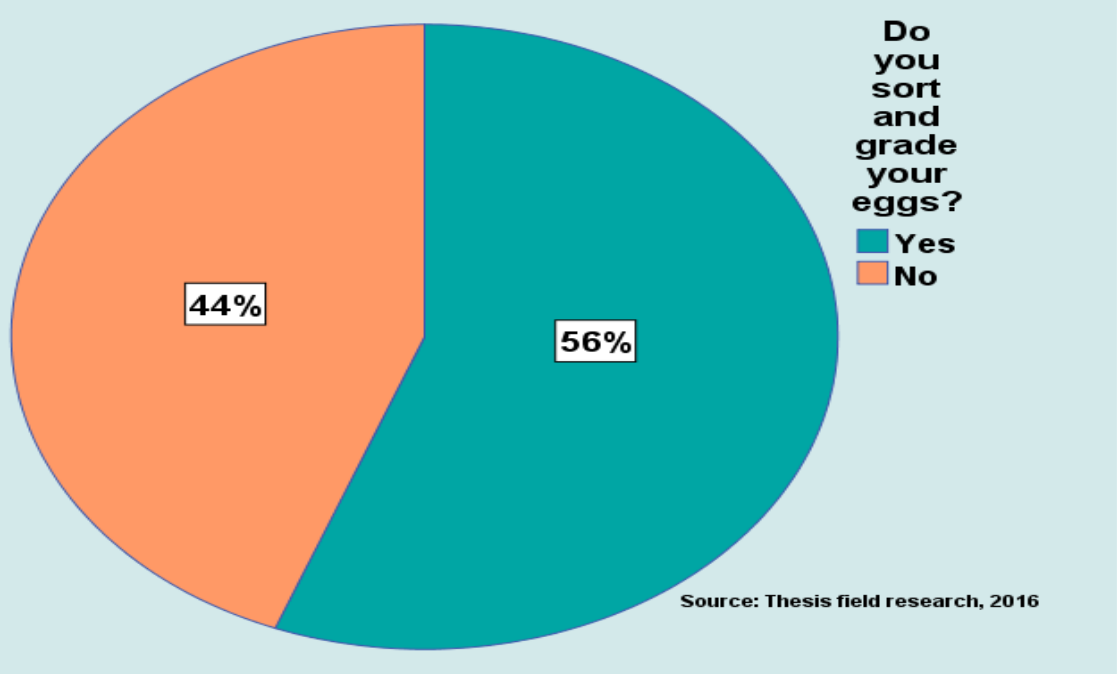

Figure 1: Egg sorting and grading by farmers

Figure 2: Criteria for grading eggs

Table 2: Egg grade, price and occurrence

Grade	Name	Weight (g/egg)	Price (₦/crate)	Eggs per crate	Occurrence
I	Jumbo	85	950	30	Rare
II	Extra-large	78	900	30	Common
III	Large	61	850	30	Common
IV	Small	53	800	30	Common
V	Bullet	47	600	30	Rare

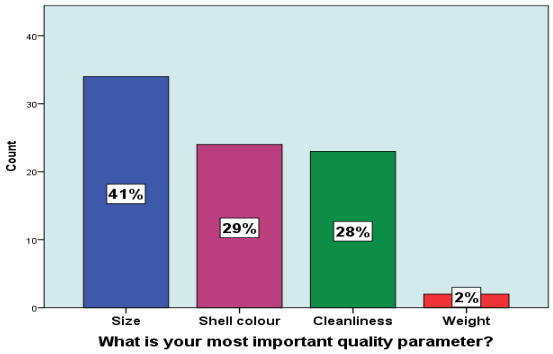

Figure 3: Most important quality parameter

Figure 4: Buyers' preferred egg shell colour

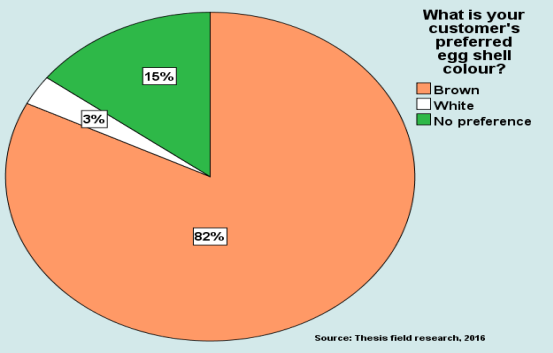

Table 3: Stakeholder constraints and potential solutions

Actor	Constraint	Potential solution
Input supplier	-Poor regulation of feed and drugs -Poor breed -Professional rivalry -Weak PAN -Import ban of fertile eggs	-Input standards enforcement -Multi-stakeholder coordination -Trust building -Increase local hatchery capacity
Producer	-High cost and low-quality feed -High cost and low drug efficacy -Poor breeds -Incompetent vets -Disease burden (AI) -Bad roads and poor electricity -No loans -Staff misbehavior	-Improved quality control and standards -Multi-stakeholder coordination -Formation of producer cooperatives -Bulk input purchase -Strict biosecurity -Use of solar energy and lobbying government -Staff training and motivation
Trader	-Dispersed farms -Low local production -Bad roads -High transport cost -Cracking and rotting eggs	-Aggregation centers -Increased local production -Local sourcing -Use-by date for eggs -Lobbying government road repair
Wholesaler	-No loans -Glut -Transit breakage -High returns rate -Producers not accepting returns	-Multi-stakeholder coordination -Market planning/coordination -Local sourcing -Use-by date for eggs -Collective action

Table 3: Stakeholder constraints and potential solutions

Actor	Constraint	Potential solution
	-Credit purchase by institutions	-Alternative sourcing
Retailer	-Inconsistent availability	-Aggregation center
	-Dirty eggs	-Increased local production
	-Small size	-Grade-based pricing
	-Cracking and rotting	-Credit sales
	-No grading by wholesalers	-Local sourcing
	-Long distance to wholesalers	-Use-by date for eggs
	-No credit sales by wholesalers	
Consumer	-Small size	-Grade-based pricing
	-No uniformity in size	-Stricter quality control
	-Poor grading	-Multi-stakeholder coordination
	-High price/cost	-Reduce local cost of production

DISCUSSION

Most farmers (56%) grade their eggs for better price using grade-based pricing while 44% do not due to lack of time (Figure 1). This agrees with reports that in Nigeria, smallholder farmers increased their revenue by grade-based pricing (Abanikannda and Leigh, 2012). Only egg size was grading criteria used by farmers (Figure 2). This becomes inefficient when egg number increases. Grading eggs using machines will need weight for calibration. Upgrading will need support for use of machine grading to help 44% of farmers that are busy to still grade their eggs. The five egg grades in GPHC include jumbo, extra-large, large, small and bullet as grades 1, 2, 3, 4 and 5, respectively (Table 2). The grades attract different prices. The American six grades system was used to increase sales revenue by 15% in Lagos (Abanikannda and Leigh, 2012). GPHC five grade and the American six-grade systems need to be compared to know the best for GPHC. Farmers selected size (41%) as the most important quality parameter, then shell colour (29%), cleanliness (28%) and weight (2%) (Figure 3). This agrees with Jibir et al. (2012). Size could be most important because consumers feel that large eggs have more edible content. Customers preferred brown (82%) to white (15%) eggs. This preference is supported by previous reports in Nigeria that link it to culture (Guyonnet, 2012). Preference reasons for GPHC remain unknown. However, to access markets, smallholders need to produce brown eggs of large size to jumbo size. Constraints facing producers were input-based, staff misbehavior, and poor infrastructure. Stakeholders and research (KIT et al., 2010; Luning and Marcelis, 2015) suggested improving chain coordination, formation of cooperatives, increasing staff motivation and quality control. Other stakeholders have problems of quality, lack of loans and egg breakage, and glut. Possible solutions (Akinwumi et al 2010; Abanikannda and Leigh, 2012) include local sourcing, chain coordination, quality control, and grade-pricing.

CONCLUSION

Egg quality and chain constraints of smallholder egg producers in GPHC were assessed to reveal opportunities for improvement. Chain function can be improved by better chain coordination, local egg sourcing, quality control, machine-based grading, grade-based pricing, producers' cooperatives, improved staff motivation, and production of large to jumbo-sized brown eggs.

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