

Analyzing the Packaging Practice of Agricultural Product: A Study on Selected Districts in the North Bengal

Fakir Tajul Islam¹

Abstract

Packaging service market is developing in Bangladesh with steady pace. People are now inclined to buy a well packed product with proper labeling and date of expiry. So potential is immense in this industry. To make the race with customers' choice, attractive packaging of all products especially agro products should be introduced. The purpose of the research is to find out current state of packaging service based on current market analysis in two districts in the northern area of Bangladesh, namely Rangpur and Bogra. Using conveniences sampling technique, the data was collected using in-depth interview, FGD and secondary materials were used to support this research as well. The finding shows that there is an immense necessity for the improvement of packaging in these districts. The research analysis suggested that there should be a new packaging system to be developed, including introducing plastic rate for mango and vegetable packaging and using standard packaging material for seed marketing.

Keywords: *Packaging Practice, Rural Packaging Service, Development, Agricultural Product.*

1. Introduction

In the ever increasing competition of today's global market the need for effective product promotion is crucial, and the product packaging has come to play a more important role as a brand communication vehicle. Today, virtually all goods that are manufactured or processed require some packaging in some phase of their production or distribution; Packaging decisions are to be considered in early marketing plans as an integral part of the total marketing strategy (Panwar, 2004).Packaging is an important integrative aspect of the product and often a critical factor in the success or failure of a given product (Schoell, 1985).The packaging component of a product refers to any container in which it is offered for sale and on which information is communicated (Berkowitz et al, 1989).Packaging of

¹. Senior Lecturer, Department of Business Administration, Uttara University, Bangladesh. Email: ftiprince@gmail.com

consumer products is extremely important at the point of sale. It plays a major role when products are purchased. After all, it is the first thing seen before making purchase choices and it is widely recognized that over 50% of purchasing decisions are made at the shelf, or point of purchase (Ferrell, 1987; Frontiers, 1996).for agro products business, packaging is playing a role of brand, hygiene, protection, and quality.

2. Rationale and significance of the research

When given the choice between two products, equal in price and function, targeted consumers buy the one they consider to be more attractive (Kotler and Rath 1984:).Packaging is gradually becoming a way to gain consumer's notice and attention, Today, virtually all goods that are manufactured or processed require some packaging in some phase of their production or distribution; Packaging decisions are to be considered in early marketing plans as an integral part of the total marketing strategy (Panwar, 2004).

3. Statement of the research problem

Packaging is an important integrative aspect of the product and often a critical factor in the success or failure of a given product. As a developing country Bangladesh is not ignorable because of its tremendous potentiality in economic progress. To make its businesses more acceptable and sustainable, packaging can contribute a lot. In the light of this logic, it is important to eradicate the flaws and try to update and improve the packaging practice in Bangladesh. This research is initiated to identify the current packaging practice and then to suggest the scope improvement of packaging for better business and profitability from the viewpoint of consumer and business both.

4. Research objectives

The objective of the research is to investigate and explore the current packaging practice based on market analysis for agro products sector in the northern region of Bangladesh, more specifically in two districts, namely Rangpur and Bogra. To attain the broad objective written earlier, this research first explore the current packaging practice in the sample area and then try to find out the constraints, and then the scope of improvement to give recommendation.

5. Literature review

In Bangladesh, research on packaging and its development is not adequate, the researcher did not find any relevant research to include in this review of literature, but few recent researches which are conducted in abroad, were helpful to understand the nature of packaging and its effect on different stakeholders. Hari Govind & Deepak Jain (2012) stated that packaging has an important role in marketing communications, especially from the point of sales and could be treated as one of the most important factors influencing consumer's purchase

decision. Patrick & Thaddeus (2011) found that for the middlemen, it has become an effective tool in achieving optimum use of space efficient use of shelf-space in preventing inventory losses and pilferage. For the consumers, packaging has attempted to serve their informational, promotional and convenience needs. Staniewska et al (2008) stated consumers focused mostly on the product's shelf-life / minimum durability period, the producer's trademark which is often identified with the specific brand as well as information on the product's ingredients and nutritive value. The consumers' propensity to make impulse purchases was confirmed by an observation that the buyers' attention is frequently drawn to packaging design which is often identified with product quality. Pires (2008) found that colors and shapes combinations which are consistent are expected to enhance consumers' product quality perception, while other combinations that are inconsistent will decrease it. Silayo and Speece (2007), did a research on packaging where they showed that perceptions about packaging technology play the most important role overall in consumer likelihood to buy. Ampuero and Vila (2006), showed that the consumers have exhibited harmonious perceptions towards products-packaging strategies.

6. Research methodology

The study was undertaken in local perspective of the rural area of Rangpur and Bogra. For the study, a combination of field survey and literature survey was conducted. The primary information served as the critical framework for analysis, while the secondary information provided important input for understanding the context and rationality behind the service provisions. This combination provided rich context-bound information that led to explaining the market dynamics of the packaging services. The information collecting technique that was involved is provided below.

- Secondary Materials review
- Key Informant Interview
- Questionnaire: semi-structured with probing guideline
- FGD: to have qualitative information on critical issues of the service

This research is done on cross-sectional data in the year 2011-12. The type of the research is mixed of qualitative and quantitative research. There are numerous actors involve in the packaging industry has chosen for the scoping study. Based on the actors, the sample size has been set to 42. This is because a handful number of potential sub-sectors were identified while conducting the study which is flour, sweets, hotel and restaurants. There were 28 manufactures, 14 wholesaler, retailer and distributor. The products have been identified in terms of business to business and business to consumer transaction. Both Judgment and convenient sampling techniques have been used to select the sample size. The time frame of the research was 2011-12.

7. Data Analysis

After the information collected from different sources, the data were gathered and validated about its source and then analyzed followed by descriptive statistical methods such as mean, standard deviation, average, percentage, scoring, and ranking etc. Then the data were interpreted mainly in writing form.

8. Research findings

In this part of the research paper, the focus is on the demand side of the packaging service i.e. the users – existing and potential, volume and frequency of their usage and the trend of the service.

8.1. The Customers/Users of Packaging

Almost all enterprises, irrespective of size, use different types of packaging – starting from purchase of inputs to sales of final products. The selection also helped to be focused to those products while finding the information. Following are the principal users of packaging services in agro products sectors:

Table 1: The principal users of packaging services in agro products sectors

Sectors	Sub-sectors	Products
Agro Products	Vegetables	Tomato, Cauliflower, cabbage, Radish
	Fruits	Mango, Papaya, Litchi, Banana
	Spice	Turmeric, chilly, cumin, Coriander, Bay leaf, Alas, Long, Kismis, Cashew nut, Cicom (Daruchini)
	Oil and seeds	Mastered Oil, vegetable seeds

8.1. Packaging practices for agro products

8.1.2. Vegetables

Packaging is one of the most important parts of vegetable transportation. The look, color and freshness and overall image of a vegetable depend on the packaging system. Vegetables are by nature perishable products. So, if they are not treated with care and not transported properly in a suitable packaging mode, then the amount of wastage would be high resulting in a loss for the stakeholders. Different vegetables require different packaging. Therefore, a packaging system common to all would be a rare thing to find.

The state of packaging in Rangpur in the vegetables sub sector is not satisfactory. Farmers and traders lack knowledge of improved packaging. They are still using traditional methods of packaging using bamboo made baskets and sacks. In some parts they are using wooden boxes to carry Tomatoes, Pointed gourd, Bitter gourd, but they are very few in numbers and this also depends on the season and on the price of the goods as well. When in the off season of tomato, traders get more prices for their goods; they try to carry their goods in good shape hence in the wooden box.

Packaging scenario of vegetables in Rangpur

About 60% of farmers of greater Rangpur are producing vegetables commercially. There are almost 23,000 traders involved in vegetable trading who require packaging most. These traders trade 24 million MT vegetable per year and they demand improved packaging. Since most of the farmers (more than 95%) do not know that there is any improved packaging other than their existing ones. The packaging scenario is shown below-

Table 2: Packaging practice in vegetables

Vegetable	Packaging	
Pointed gourd	Jute Sack+Khacha-20%	Jute Sack-80%
Bitter gourd	Jute Sack+Khacha- 100%	
Cauliflower	Jute Sack+Khacha+Paper-100%	
Cabbage	Jute Sack-100%	
Tomato	Box-30%	Jute Sack+Khacha-65%, Jhuri- 5%

Source: primary data

High rate of wastage, high labor cost and no options for reuse are the main drawback of this packaging system. Packaging with sack only facilitate the cultivator through less expense, availability but rate of wastage and inability to reuse discourage some extent them. The table below shows the number of service providers and the number of Service receivers of these packages.

Table 3: the number of service providers and the number of Service receivers of these packages

Packaging	Applicable for what	Service Providers	Service Receivers
Kacha+Sack	Pointed gourd, Bitter gourd, Tomato	94	205
Sack only	Pointed gourd and Cabbage	52	205
Khacha	Coli Flower	37	160
Jhuri	Tomato	23	100
Wooden Box	Tomato	25	115

Source: primary data

Following table shows that the service takers have more incentives than that of service providers of better packaging.

Table 4: Benefits of Improved Packaging System

<i>From Service Providers</i>	<ul style="list-style-type: none"> • Less wastage • More quantity • Easy Transportation • Easy handling
<i>From Service Receivers</i>	<ul style="list-style-type: none"> • Less wastage • Better price • Durability • Easy transportation • Less labor cost • Convenience of selling

Source: primary data

These benefits are arranged in their order of significance to the demanders or suppliers. Thus, it is clear that both parties (supply and demand) put the most value on *less wastage*. But then providers want to *carry more goods* in the package but actors in the demand side want a *better price* for using the packaging service. In the table above, there are more things common to both sides but their order of significance is different (except for *Less Wastage* where they unanimously put it in the first place).

Types of vegetable packaging

Jhuri mainly used for tomato. It is useful when low expense, low transportation cost and high availability is required. The problem of this packaging system is can not carry more and wastage rate up to 15%. Among the existing packaging system, wood box is the best solution when quality preservation is the most concentration and reduces the wastage rate as well. But boxes made of wood require high expenditure, extensive labor which is scarce in the pick season and lack of quality material. So still improved packaging material needed there. The study found that packaging of vegetables due to *khachis* leads to wastage of about 15%-20% whereas in wooden boxes (especially for tomatoes) this percentage lowers to only 5%. However, the wastage can be further lowered by 2%-3% through better packaging mode. Also the cost of packaging increases as these boxes and *khachis* can be used only once. Henceforth, a packaging material that can be reused would lead to reduction of costs.

Cost comparison of different types of packs

The survey team also prepared a table consisting of the cost estimates for different types of packaging for a number of vegetables.

Table 5: of the cost estimates for different types of packaging for a number of vegetables

Vegetable name	Packaging product	Packaging Ingredients	Amount can be carried	Cost
Pointed Gourd	Jute sack with a basket at the bottom	Sack, sewing labor, thread, basket	6-7 mounds	60/-
			10-12 mounds	85/-
	Only jute sack		8-10 mounds	60/-
Bitter Gourd	Jute sack with a basket at the bottom	Sack, sewing labor, thread, basket	5-6 mounds	60/-
			9-10 mounds	85/-
Coli flower	Jute sack with a basket at the bottom	Sack, sewing labor, thread, basket, paper	150 coli flower weighing 1 kg individually on average.	83/-
Cabbage	Only basket	Sack, thread, sewing labor	150-160 pcs each one weighing 1.5-2 kgs.	60/-
Tomato	Khachi	Sack, hay, thread, paper, bamboo basket	80-120 kgs	53/-
	Jhuri	Bamboo basket, thread, hay	40-60 kgs	43/- to 53/-
	Wooden box	Box, thread, labor, paper	40-50 kgs	53/-
80-90 kgs			80/-	

Source: primary data

The khachi seemed to be the most preferred mode of packaging. However, wooden boxes are used only in case of tomatoes and that too during off season. During the peak season, almost all vegetables are transported packed in khachis.

8.2.2. Fruits

Fruits that are imported from abroad, usually packed in carton and the costing for the packaging included in the purchase price. So there is no additional cost in imported product packaging. But for local fruits, different types of packaging product are used and expenses are also varied according to the types of packaging.

Table 6: Packaging product price for Fruits packaging

Product Name	Price	Remark
Carton	10-20tk. Per carton	Second hand carton costs very lower than new carton.
Bamboo basket	30-50 tk. Each basket	Varies in different season
Net Bag	125-150 each 100pcs	
Plastic Bag	140-190 Per kg	
Crate	120-320 tk. Each	

Source: primary data

Imported fruits are very significant amount which are coming well-packaged from abroad. But local produced fruits are very vulnerable to wastage and bad packaging which cause great loss for producers. Especially for Mango, Banana packaging improvement is very necessary. 10-20% wastage can be saved through proper packaging product for example Crate for Mango. Crate replaces bamboo basket for mango packaging and transportation. The packaging cost will be decreased by 20-30% and wastage rate as well. In fruits market, packaging plays a very vital role to ensure the quality of fruits. Apple imported in carton which made of hard paper. To preserve the quality, there is 5 to 6 layer separated by tray and every apple has a net cover. This packaging system makes the apple more pressure resistant. This sort of packaging protects fruits from getting rotten and preserve quality for a certain time.

Mango

No doubt, mango is a very popular fruits in Bangladesh. The season of Mango is April to August but it is available over the year as mango is also imported from India. Due to lack of proper packaging in transporting and preserving, 15-20% damage is occurred. Mango wholesalers and distributors use *Jhuri* (local name of a kind of bamboo basket) in packaging mango. In these Jhuries, mangoes are arranged with straw or newspaper to reduce the damage occurred by pressure. Net bags, packet, large PP are used in packaging mangoes at retail level.

In the study, it was found that crate can be the best replacement of *Jhuri* in packaging mango and protecting damage while transporting. The capacity of these Jhuri is approximately 3 mon. The price of a Jhuri is approximately Tk.20. In compare to Jhuri, Crate is more beneficial and cost efficient. Jhuri is used once but a crate can be used more than 20 times. So usage of crate in packaging mango not only saves the cost but also gives highest protection, longevity and freshness of mangoes.

Table 7: Comparison between Jhuri and Crate for mango packaging

	Jhuri	Crate
Cost of purchase	20 tk each basket at producer level	110-230tk each at wholesale level
Reuse capabilities	No	Yes (more than 20 times)
Load capacity	Up to 120 kgs	Up to 30 kgs
Longevity	Low	High
Made of	Bamboo	Grade 1 plastic
protection	Low	High
Decoration needed	Yes (50-150tk per Jhuri)	Very low (10-50tk per crate)

Source: primary data

From the following analysis, it can be understood that the trader makes more profit by using crate. Moreover, Using plastic crate, mango traders can transport (12510-9282) = 3227 kg Mango more. On the other hand, whatever expense is incurred for jhuri that is totally forever as jhuri is one time use.

Table 8: Cost benefit analysis: Crate rules out the use of Jhuri: Mango perspective

	Unit	Jhuri	Crate
1. A 5 ton truck loads	crate	91	486
2. Per Crate carries	Kg	120	26
3. Total Mango Transportation (no wastage)	Kg	10920	12636
4. Wastage/crate (Average case)	Kg	15%	1%
5. Wastage/Truck	kg	1638	126.36
Total Mango Transportation	kg	9282	12,510
Saving from 1 truck	kg		3227.64
Saving from 20 truck	kg		64552.8
Saving from 20 truck (considering Tk. 40/Kg only)	Tk.		2582112
Total (Considering 3% only) profit by using crate for a trader	Tk.		77463
Investment for crate (Tk. 140 each)	Tk.		68040

Source: primary data

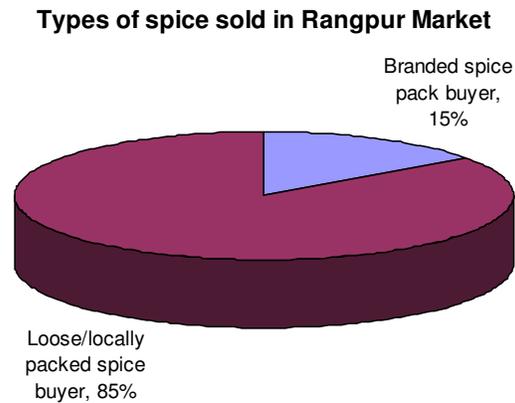
8.2.3. Spice

Traditionally, people of Bangladesh are fond of using spices in their different food items. In Rangpur and Bogra, people use different sorts of spices such as turmeric, chilly, corundum, Zira, bayleaf, white alas, small alas, different types of local and imported nuts etc. Observing the spices market in Bogra and Rangpur, the demand can be categorized into two parts:

Demand of local spices

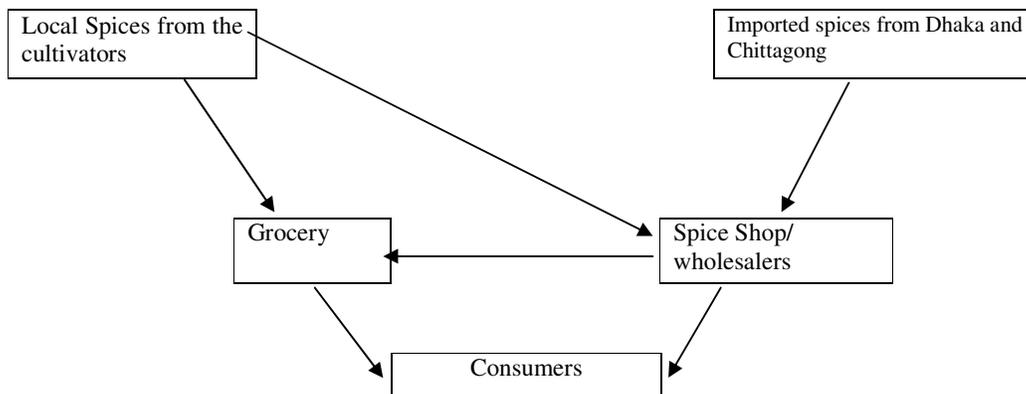
Among the local items of spices such as Turmeric, Chilly, Corundum and Zira have to be used after crashing. To get the crystal image of spices market, consumers' types should be classified into rural consumers (who are living in villages) and urban consumers (who are living very adjacent to municipal or Upazila). Among the rural consumers, most of them cultivate these spices and take them to the crashing mills and use them. Other consumers who do not cultivate these spices are used to purchase these items from the local market and take them to the crashing mills.

In general 10-20% buyers buy packet spice of different brands like Radhuni, Arku, BD Food, PRAN, etc. and rest buy either the whole or locally crashed spice powder that are non branded and mostly non-packed or poorly packed. In Rangpur spices market, there are 1050 retailers and 37 wholesalers whose total sales of turmeric, chilly, corundum and Zira power is 45,900 kilograms per-month.

Figure 1. Types of spice sold in Rangpur

Source: primary data

In Rangpur market, there has been introduced small size polythene and paper packet in marketing hot spices and its' powder (these are locally crashed). The cost of each of packets is only Tk.1.00. Basically the target group of these packets is the rural poor people. There is scope to improve this local packaging. The price of the packet is not a major factor rather than local people do believe in the quality of locally crashed spices especially in case of turmeric, chilly and corundum. So, the above 85% vacant market can be tapped with local packaging easily.

Figure 2. Supply process of spices

Source: primary data

Spice contributes about 10% of the total sales of a grocery shops. Usually, well packaging of any product serves the quality of that product. The grocers or spice shopkeepers keep their spices in plastic bags and jars, polythene bags and jute bags which vary on the basis of the nature of spices. Sometimes, in storing bulk amount of turmeric, chilly, corundum and Zira powder in plastic bags, there create a problem of coagulating powder. So traders try to crash the required amount of these items following the market demand. There are many national renowned companies as well who crashing all spice items, are packaging with quality polythene bags and marketing around Bangladesh.

8.2.4. Seed

The demand of packaging product in seed industry is not well organized as the demand is varying from different aspect. But our study reveals that the demand of seed industry for one distributor or wholesaler on an average 52 kgs polythene packet, 3600- 4800 pieces per year approximately. Demand of thin steel container is not found as it is not that much in current packaging practice.

45% of total seed production packed in printed PP mostly and 55% seed sold in open market without any branding and labeling. Among the 55% non branded, approx 20% are packed by local distributors with relatively low quality packaging materials and rest are sold as non-packed seed. Well packaging for seeds increases the germination rate 5-10% than the productivity was before.

Table 9: Market stakeholders in seed packaging

Actors		Number	Sales per year
Producer	Local	15	1-1.5 million tk.
	National	25	10-15 million tk.
Wholesaler & Retailer	Rangpur	80	1.5-2 lac tk.
	Saidpur	25	

Source: primary data

Major problem is that the low quality packet doesn't stay for long time; it is damaged or torned and cannot hold temperature and decrease the germination rate. Over 20% wastage of seed can be reduced if properly packed. Seed comes from seed producer to distributor in very large amount like 20-30 kgs and then sold to retailer from 5 gms to 5000 gms. Seeds need to preserve in under 12 percent of humidity.

Packaged seeds are transported through carton, plastic sack, and jute sack by truck, van and bus etc. Seeds that are marketed with printed and nice looking plastic packet will attract more customer than that of normal or non-branded seed. Packaging, especially branding grab the trust of farmers. The packaging of seed is very crucial as it preserve well, store and keep healthy the seeds. Here the packaging materials are plastic printed paper, thin steel container (look like a can) as described before.

8.3. Key Constraints in the Packaging Industry

8.3.1. Constraints

- Non availability of better container / packing materials mainly causes traditional use of packs like jhuri, khachi etc for vegetable transportation
- Low quality packaging of seeds results in low germination and low yield for the farmers that build mistrust to the distributor who ultimately loose sales.
- Existing packaging system of Mango during transportation results in huge wastage that leads to low income for producers and traders.

8.3.2. Opportunity

- Introduction of usage of plastic crates for mangoes to reduce wastage from 15% to 5% at transportation
- Introduction of better quality packaging for spices to increase product quality
- High potential is there to pack the non-branded indigenous seed (55% of the total seed market) and create a brand image amongst the farmers

9. Conclusion and recommendations for packaging development

Packaging is recognized as an integral part of modern marketing operation, which embraces all phases of activities involved in the transfer of goods and services from the manufacturer to the consumer. In Bogra and Rangpur, quality and attractive packaging of flour, sweet, vermicelli is not available. As a result, producers are not able to promote the sale of their products in markets in a large scale. Here, introduction of attractive, different forms of packaging has the scope to play the pivotal role in promoting the market access of these products which will stimulate the sales of producers. After analyzing different agro products product category in Bogra and Rangpur, the researcher found the following areas to develop for better packaging service from the business perspective and consumer perspective both:

- Introduce improvised containers and better packing materials like plastic crates at wholesaler or arotadar (Dealer) level that would reduce wastage by 10-15% that not only increase profitability for farmers and traders, but also keep people's health better for fresh supply of fruits and vegetables
- Local distributors can be facilitated to replace their existing seed packing materials with the better materials through proper understanding of its benefits.
- Introducing the usage of plastic crates in packaging mango and vegetables

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