FOOD POLICY

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Branding and agricultural value chains in developing countries: Insights from Bihar (India)

Bart Minten [a,*], K.M. Singh [b], Rajib Sutradhar [c]

[a] IFPRI, Addis Ababa, Ethiopia
[b] ICAR, Patna, India
[c] JNU, New Delhi, India

ABSTRACT

Local brands are rapidly gaining agricultural market share in developing countries. However, it is not well understood how they reshape agricultural value chains. In a detailed case study of the value chain of makhana in Bihar, we see the fast emergence – a doubling over 5 years – of more expensive packed and branded products. The effect on consumers is ambiguous. While the emergence of brands leads to increasing differentiation in retail markets, the brands in these settings provide however mostly incomplete or misleading information for the consumer and quality contained in branded bags is often lower than for loose products. We further also find that there are little direct benefits to the farmers from the presence of these brands.

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Introduction

Significant changes are happening in food and agricultural markets in a large number of developing countries. They concern most importantly the emergence of modern retail in food retail (Reardon et al., 2010) and the increased consumption of high-value agricultural products (Gulati et al., 2007; Delgado et al., 2008). Rapid market changes have led to a large body of research to better try to understand the impacts on producers, consumers, and on the food system as a whole (e.g. Reardon et al., 2010; Pingali, 2007; Swinnen and Vandeplas, 2010; Maertens and Swinnen, 2009).

One of the changes in food systems that has recently been documented is the rapid emergence of packed and branded products of retailed food in Asia (e.g. Pingali, 2007; Minten et al., 2010a,b). For example, the sales of branded rice in traditional markets in Beijing increased by 8% over the course of 5 years (Reardon et al., 2010).[1] Similar patterns are seen in other developing countries, e.g. in a recent study in Delhi, it was shown that 31%, 70%, and 78% of all rice, wheat atta, and mustard oil sold by traditional retailers was branded (Minten et al., 2010a).

While unbranded and unpacked products are indistinguishable from those of competitors, marketing of packed and branded

produce adds a 'brand value' to products which enables sellers to charge higher prices for their products. The real benefit for the brand-owner occurs over time as the loyalty of the consumers to the brand and the cheapness of retaining these loyal customers, compared to the costs of attracting new ones, make it a profitable enterprise for a branding firm (e.g. Anholt, 2005). The benefits to consumers are guaranteed quality or food safety (Berges-Sennou et al., 2004).

The available analysis in the international development literature on branding in food markets has been limited to the study of the switch from manufactured labels to private retail labels, often linked with the emergence of modern retail (e.g. Reardon et al., 2003), or the effects of the development of brands for export markets in developed countries (e.g. Ponte, 2002). Despite its growing importance in local agricultural value chains in developing countries, few studies have looked empirically at what the effects are in local – traditional as well as modern – retail markets, what the impact is of the branding process on economic agents working along the value chain, and what potential policy implications are. To fill that lacuna, we present the case study of makhana (Euryale ferox) in Bihar, one of the poorest states in India. Makhana[2] is an interesting product because it is almost exclusively commercialized from this state, quality distinction is easy and branding and packing for this crop was not started until recently. It is thus a unique case study on the development of local brands in developing countries and its implications for the functioning of the value chain.

* Corresponding author.
E-mail address: b.minten@cgiar.org (B. Minten).

[1] Given that modern retail has grown at 23% over the same period (Reardon et al., 2010) and given that modern retail almost exclusively sells branded products, the effective importance of brands has even grown more.

[2] Also called fox nut or gorgon nut.

The contributions to the international literature of this study are threefold. First, this is the first analysis that documents, based on primary survey results, the fast emergence of brands in agricultural value chains in poor settings in India. In a 5 year period, the share of branded products increased from 25% to 50% of the total market. It is quite possible that similar fast growth rates happen in other value chains in India, and beyond, and it then raises important questions on the implications of this trend.

Second, we implement a unique study setup where stacked surveys were fielded for all agents in the value chain. By using such a methodology, we are able to document where the costs and benefits of brands in the value chain occur. While the retail prices of these brands are significantly higher than those of loose products, we find however that there are little direct benefits to the farmers from the emergence of these brands.

Third, a typology of brands in this developing market shows that two types of brands can be distinguished, low-price and high-price brands. Low-price brands focus exclusively on attractive glossy packaging with little consideration for quality and with no investments in advertising. Investments are small and so are price differences with loose products. The high-price brands pay attention to quality beyond packing, invest in advertisements and promotion, and employ specialized salesmen. We find that both types of brands are characterized by incomplete or misleading information for the consumer.

The structure of the paper is as follows. In 'Conceptual framework on changes in the agricultural value chain', we present a conceptual framework. 'Background' provides background information on the product studied. In 'Data', the data collection methodology is discussed as well as some descriptive statistics. Following the setup of agricultural value chains, we analyze pricing, packing and branding upstream in 'Downstream', midstream in 'Midstream', and downstream in 'Upstream'. In 'Price composition', we look at the price composition of the whole value chain. We finish with conclusions and implications in 'Conclusions'.

Conceptual framework for changes in the agricultural value chain

Various drivers are quickly changing food demand in a number of developing countries. These drivers include, most importantly, (1) urbanization (a larger share of the population in developing countries is living in urban centers; given that population growth in these countries is often high, a rapid increase in the urban population overall is usually seen); (2) income growth (an important increase in average incomes and a reduction in poverty levels has been seen in a number of developing countries in recent years); (3) changing lifestyle and female participation in the workplace (women have traditionally taken care of agricultural production and/or food preparation, but as they are increasingly entering into the urban labor force, they often have less time to spend on these activities); and (4) increasing access to better technologies (these include, at the household level, the spread of refrigerators, microwave ovens, and gas stoves, which allow for the use of different foods and food preparation methods, and at the industry level, access to better food packaging technology).

These changes have led consumers in developing countries to demand a different food basket: (1) the quantity, per person and overall, that is demanded from urban food markets is increasing faster than in rural areas; (2) the composition of the food basket is different, as better-off consumers often shift away from grains and consume relatively more high-value products such as fruits and vegetables, dairy products, meat, and fish,[3] as well as more

processed food for convenience; (3) there is a demand for more choices per product and a greater variety of food products in general; and (4) consumers in developing countries are also increasingly concerned about quality and safety issues with regard to their food, especially as safety issues tend to be more correlated with non-staple foods.

The changing requirements of consumers lead to a restructuring of food supply chains. The final food supply chain arrangements are, however, shaped not only by these demand factors. Conditioning factors such as geography,[4] the population structure,[5] the structure of the financial sector, and the reliability of the justice system, among others, are important in shaping the final outcome of the chain. Policy factors also play an important role, be it regulation, hard infrastructure, institutions, international trade, or foreign direct investment (FDI) rules.[6]

Changes in the supply chain are ultimately transmitted to the rural producer. His or her production environment and livelihood might change due to the different crops. Such changes could be in the overall amount required to grow and variations in input and output prices. Moreover, other types of labor, land, inputs and technologies may be used, and new requirements of the market, including transaction requirements (such as postharvest handling) might translate into additional investments. The producer's behavior is, however, influenced not only by market forces but by non-policy conditioning factors and policy factors as well. The rural nonfarm economy will often strongly condition the ability of the farmer to make the requisite investments to respond to the requirements of the transformed supply chain (Reardon et al., 2007).

The differential pull and push factors lead to a difference in food supply chains across countries and products – as reflected in different types of institutional arrangements, which range from spot market exchanges to full vertical integration, in which the stages of marketing, transaction, and production are linked through ownership rather than through market exchanges (Swinnen, 2007). The effects of changes in food supply chains – such as branding – on poverty are strongly debated in the literature. Minot and Roy (2007) distinguish four pathways by which they might affect poor farmers and poverty overall: through a direct effect on farm income, through backward linkages to agricultural input suppliers, by changing wages and employment, and by affecting the food prices faced by consumers. However, research is this area is still limited.

Background

Makhana is an aquatic crop that is largely grown in Northern India. Though makhana is also found in wild form in China, Japan and Russia, India is the only country where makhana is cultivated as a crop, mainly in the states of Bihar and some parts of Assam (Mishra et al., 2003). Makhana as a crop can be cultivated in any shallow and stagnant pond. Makhana has shown important production increases in the last decades and makhana cultivation has endogenously, (without public research or extension intervention), spread to off-season rice fields in the districts of Bihar. It is estimated that makhana cultivation done in ponds accounted for 90% of total production 10 years ago, while 65% and 35% of current production comes from ponds and ricefields respectively.[7] No improved varieties for makhana are currently available and higher makhana yields

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[3] This shift is more commonly known as Bennett's law (Bennett, 1941).

[4] For example, Reardon et al. (2007) show how changes might be strongly related to geographical locations.

[5] Increasing urbanization leads to an increasing scarcity of labor in rural areas and might, through induced innovation, force the adoption of new, less labor-intensive technologies.

[6] See Reardon and Timmer (2007) for a more detailed discussion of this point.

[7] Personal communication, Dr. Jha, Senior Scientist, Research Centre for Makhana, Darbhanga.

can only be achieved by improved pond management, especially the application of organic matter in the pond, as well as irrigation.

Makhana pop has several uses. It is a highly relished food consumed as namkeen, kheer, curry, etc. (Mishra et al., 2003). Makhana pop is traditionally consumed as a snack; high-protein, low-fat food; or sweet component; and it has been used in traditional medicine (World Bank, 2007). Makhana further holds special importance in cultural and social life of Bihar. It is considered obligatory for brides' parents to send makhana to the house of the groom to serve the latter's family before the marriage. It is usually eaten with betel and betel nut. It is also used as a part of final rituals in the case of death.

In traditional makhana markets, four quality types of pop are distinguished, i.e. lava, murha, turi, and mix. The differences in quality are almost exclusively linked with the size of the pop. Makhana transactions in these traditional markets are done in gunny bags. These gunny bags are standardized in size and the weight of such a gunny bag is indicative of the quality of makhana. If makhana is processed well, makhana pops are larger and weigh less and a low-weight bag is thus an indication of good quality. The general rule of thumb is that a bag of 8 kg is an indication of high-quality lava makhana and a bag that weighs more than 10 kg contains mostly lower quality makhana (murha and turi).

Data

Data collection

It is estimated that Bihar accounts for more than 80% of total makhana production in the country which takes place in 20 out of its 38 districts, mostly situated in the North of the state. Darbhanga, the district where the survey was fielded, is one of the most important makhana producing districts in Bihar. It is estimated that about 30,000–40,000 people are involved in the makhana sector in Darbhanga. The total makhana area cultivated in Darbhanga amounted to about 1200 ha in 2009. This compares to a total of 15,000 ha in Bihar. Also, increased commercialization has been noted over the years. While before the 2000s, only a tiny share of makhana was exported outside the district, it was estimated in 2009 that almost 60% was sent outside.[8]

In preparation for the study, extensive key informant interviews were conducted in the middle and end of 2009. We also had several talks with the manager of Shakti Sudha Industries, the largest processing and branding company of makhana so as to understand their procurement, processing, and sales practices. The information collected in this stage helped in the design of the survey instruments, especially given the complex production and processing processes involved in makhana pop production.

Different types of surveys were set up in the beginning of 2010. They included surveys with makhana producers and village leaders, and wholesale and retail traders. In the selected district, 12 makhana producing villages were randomly selected in the largest makhana producing block (Manigachi). In each selected village, a questionnaire was implemented. In each selected village, a census of households was conducted to enumerate all the makhana producers. Each household in the village was asked questions on their total area of ponds and makhana cultivation. From all the makhana cultivators, 18 households were then randomly selected. For all the selected households, a detailed household survey was conducted. 217 makhana producing households were effectively interviewed in total, one above the target of 216, i.e. 18 households times 12 villages.

Patna is the capital of Bihar and the largest city in the state and is a major demand sink for a large number of agricultural products

sold in the state. As a significant part of makhana from the district of Darbhanga was marketed in this town, we fielded a survey there to better understand the downstream part of the value chain. We implemented a survey of makhana retailers in 50 colonies in the city of Patna. The city of Patna has 72 wards. Ten wards were randomly selected and then five colonies in each of those 10 wards. A complete census of retailers that were selling makhana was done in each colony. A survey was then implemented with four retailers randomly chosen from the census list. In total, we interviewed about 150 retailers, lower than targeted as in some colonies not enough retailers could be found.

Simultaneously, a wholesale questionnaire was implemented with all the wholesalers in Patna (a census of the wholesalers) and in the rural production areas where the producer survey was being fielded (as well as with a small number in Delhi), reflecting trade flow from producers to ultimate consumers. Twenty-three wholesalers were interviewed.

As a main indicator that we wanted to study in this analysis was the level of prices that are offered to different agents in the value chain, careful information was collected at each level on these prices. This information allows us thus to analyze the price composition along the value chain and compare price composition for loose versus branded and packed products. To better understand price formation at different levels in the value chain, additional variables were also collected that could potentially explain price formation on top of packing and branding. Such variables included quality indicators, quantities sold, place and time of sales, type of buyers, inter-linkages, and payment modalities.

Descriptive statistics

Table 1 presents the descriptive statistics of the interviewed makhana farmers. Two-thirds of the producers are member of a fishermen cooperative society but only very few are members of any other farmers' organization. The households involved in makhana cultivation are relatively poor, even for Bihar standards, as seen by several indicators (Table 1).[9] The average number of ponds cultivated by the household is 2.1. While almost half of the farmers only cultivate makhana in one pond, 13% of the households reported to cultivate more than three ponds. The average pond area cultivated per household is 4.8 acres and the average production per household in 2009 was 3.1 tons of makhana seeds.

Table 2 shows descriptive statistics on characteristics of the two agents, wholesalers and retailers, on top of the farmers that were interviewed in the value chain study. First, 23 wholesalers were interviewed in different markets, i.e. 57% in Patna, 26% in the production areas (Darbhanga and Madhubani), and 17% in Delhi. Wholesalers declare to procure, on average, about 7 tons per week in the beginning of the July to September harvest period. This then increases to an average of about 11 tons per week in the period of January to March. Compared to 5 years ago, there has been a doubling of the procurement quantities by these wholesalers, possibly indicating the fast growth of the commercial makhana sector (as indicated by several key informants).

Second, 154 retailers were interviewed in the city of Patna. Only some retailers are street hawkers and most of the makhana is sold by kirana stores, i.e. family owned and operated stores represented 97% of those interviewed. The quantities that are sold of makhana were low and amount only to 5 kg per week per store and retailers declare that this product makes up just over 4% of their sales and profits. It is

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[8] Personal communication, Dr. Jha.

[9] Ninety three percent of the households belong to the mallah (i.e. fishermen) caste. While some key informants indicated that other farmers than the mallah caste were often cultivators of the pond and that the role of the mallah caste – the traditional producers and processors of makhana – was basically reduced to wage labor for pond-owning or – leasing households, this is thus not borne out by our data, at least in the survey area.

Table 1
Characteristics of makhana farmers.

	Statistics		
	Unit	Mean or %	Median
Number of observations	Number	217	
Background information household			
Age head of household	Years	49	45
Household size	Number	7.3	6.0
Gender of head of households	% Male	100	
Illiterate heads of household	%	48	
Holder of a Below the Poverty Line (BPL) card	%	63	
Holder of a Above the Poverty Line (APL) card	%	28	
Holder of an Antyodaya card	%	5	
Belong to the Mallah caste	%	93	
Perceived wealth: compared to other households in the village, would you describe yourself as...			
... among the richest in the village	%	5	
... richer than most households	%	5	
... about average	%	29	
... a little poorer than most households	%	32	
... among the poorest in the village	%	25	
... the poorest in the village	%	3	
Member of a fisherman cooperative society	%	65	
Member of any other farmers' organization (self-help group)	%	5	
Distance to closest wholesale market	Minutes	34	30
Makhana cultivation and production			
Number of ponds cultivated	Number	2.15	2.00
Number of households that cultivate only one pond	%	47	
Number of households that cultivate more than three ponds	%	13	
Area of ponds cultivated for makhana	Acres	4.83	2.00
Total production of makhana seeds in 2009	kg	3177	1280

Table 2
Descriptive statistics agents value chain surveys.

	Statistics		
	Unit	Mean or %	Median
Wholesalers			
Number of observations	Number	23	
Location of trader			
Dharbangha	%	13	
Madhubani	%	13	
Patna	%	57	
Delhi	%	17	
Quantities procured weekly in July–September	Tons	6.8	2.0
Quantities procured weekly in January–March	Tons	10.6	4.0
Quantities procured weekly in July–September 5 years ago	Tons	4.1	1.0
Quantities procured weekly in January–March	Tons	5.1	2.5
Number of suppliers weekly procured from in July–September	Number	10.7	4.0
Number of suppliers weekly procured from in January–March	Number	16.6	5.0
Traditional retailers			
Number of observations	Number	154	
% Of makhana retailers that are kirana stores	%	97	
Number of years since start with retailing of this product	Years	9.3	7.5
Quantities sold	kg/week	5.3	2.0
Share of makhana in total retail sales	%	4.1	1.0
Share of makhana in total retail profit	%	4.3	1.9
Value of assets	1000 Rs.	51	16
Value of assets	1000 USD	1.1	0.4
Working capital	1000 Rs.	117	80
Working capital	1000 USD	2.6	1.8

thus clearly a minor product in the sales portfolio for most of these stores. Values on asset values and working capital are shown at the bottom of the Table 2. They show that most retail stores are rather small operations, i.e. the average value of assets and working capital are evaluated at 1100 USD and 2600 USD respectively.[10]

While seemingly little has changed over time on the production and processing side of *makhana*, however we note important changes downstream in the value chain, especially related to packing and branding practices. Table 3 shows the importance and emergence of packed and branded produce, as reported by wholesalers. Ninety-six percent of the interviewed wholesalers report that they are currently selling packed and branded products which now account for almost half of their total sales. This compares with only 23% 5 years ago. The rather recent take-off of branded products is

[10] Retailers were asked the price at which they thought they would potentially be able to sell the different assets that they owned to conduct their business. These were then added. Working capital is that amount of money that the retailer has at his/her disposal to purchase products (without credit).

Table 3
Importance and emergence of branding as reported by wholesalers.

		Statistics	
	Unit	Mean or %	Median
Number of wholesalers that sell branded produce	%	96	
Share of branded produce in total sales now	%	47	50
Share of branded produce in total sales five years ago	%	23	10
Year that wholesaler started selling branded products[a]			
2009–2008	%	9	
2007–2006	%	18	
2005–2004	%	45	
Before 2004	%	27	
Importance of branded produce by season			
July–September			
In supply	%	25	30
In sales	%	41	45
January–March			
In supply	%	24	30
In sales	%	49	50

[a] Only calculated for those wholesalers that have been in business for a long period.

illustrated by the year that these wholesalers started selling branded produce.[11] While almost all wholesalers were selling branded products at the time of the survey, only 27% were doing so before 2004. A large number of wholesalers (45%) started selling branded products in the years 2004–2005, the apparent year of major take-off.[12]

The data thus indicate that there is a fast emergence of these branded products. This then begs the question regarding how this branding process works. Wholesalers were asked about the share of branded products in their sales as well as in their procurement. The numbers show that the share of branded products is twice as high in sales as it is in procurement, indicating that a large part of the branding is done by the interviewed wholesalers themselves. However, it also indicates some wholesalers buy branded products and then re-sell them.

In the next sections, we try to better understand the implications of the rapid emergence of these brands. We look consecutively at effects downstream (with the retailers), midstream (with wholesalers), and upstream (with farmers). In the last section, we compare price composition of the branded and packed versus loose products over the value chain as a whole.

Downstream

To understand the rewards of packing and branding in retail markets, price data were collected for all *makhana* products that were being sold by *makhana* retailers in Patna. Information was also collected on the size of the pop, type of bags, the location of the sale as well as on characteristics of the retail shop. The results of a hedonic price regression where these factors are included as explanatory variables are reported in Table 4. The estimation of such a model, where we control for these different confounding factors, allows us to get at the benefits from branding and packing downstream in the value chain. The logarithm of the price of *makhana* in Rs. per kg is used as the dependent variable. Ward and colony dummies are included in all specifications as to control for possible location-wise unobserved heterogeneity. Standard errors are estimated after accounting for within cluster (ward) correlations and possible heteroskedasticity.

The results show that the *lava* quality (the default value in the regression) is rewarded with a premium, compared with a mixed and *murha* quality, of 11% in the retail market.[13] *Makhana* products sold in *kirana* shops are on average, (controlling for confounding factors), not cheaper than those sold by street hawkers. Focusing on our major variables of interest, the regression results show significant rewards to branding and packing in retail markets. Non-branded but packaged products are sold at prices that are 11% higher than loose products and branding adds another 10% on top of this, amounting to a price difference with loose products of 21%.

As expected, we find significant price effects of branding and packing in the retail market. To better understand perceptions at the retail level on branding, a number of questions were asked to the retailers (Table 5). While almost all wholesalers sell branded products, their importance is much less in the retail market of Patna as only 19% of retailers sell branded products, indicating that a large number of the branded bags handled by wholesalers in the city are sold outside Patna (and mostly in bigger cities outside the state). For those retailers that sell branded products, they almost exclusively sell branded products as they account for an important percentage in total sales for these retailers (92%). In contrast with wholesalers (who better know what actually goes into the bags as we will see later), the majority of *makhana* retailers that sell branded products believe that the quality of these branded products is higher (73%).

Retailers were also asked to evaluate why they think their consumers are interested in branded products (Table 5). All retailers believe that because of the branding, customers are assured of receiving the right quantity of the product. Only just over half of the retailers believe that customers would buy brands because of better quality. Retailers that were selling branded products were also asked to state why they were selling these branded products. Only a small number indicated that this was done because of higher profits but they prefer the branded products because of a reduction in hassle and transaction costs (as no weighing and quality checking by customers was required) and because of the increase in demand for these branded products by customers. When asked about the type of customers that would buy these branded products, the majority of retailers believed that these were richer customers (68%) than those buying loose products.

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[11] This statistic was only calculated for those wholesalers that had been in business for a long enough period.

[12] It is well known in survey research that recall data typically peaks at intervals such as 5 or 10 years. There might thus be some error in the exact year. See Ravallion (2012) on problems of recall in socio-economic surveys.

[13] The *murha* coefficient is not statistically significant. However, there were only a few *murha* observations in our dataset and comparison might be a bit difficult because of this.

Table 4
Price effects of packing and branding in the retail market.

Dependent variable = log(Rs./kg)[a]	OLS		
	Unit	Coeff.	t-Value
Characteristics product			
Loose (default)			
Low-cost brand	Yes = 1	0.21	2.17
Packed but non-branded	Yes = 1	0.11	2.25
Size lava (default)			
Size murha	Yes = 1	−0.11	−1.39
Size mixed	Yes = 1	−0.11	−2.32
Characteristics shop/owner			
Sold by kirana shop	Yes = 1	−0.08	−0.80
Experience in retail of product	Years	0.00	−2.16
Age of owner	Years	0.00	0.20
Number of years of education	Years	−0.01	−2.33
Household size	Number	0.00	−0.99
Intercept		5.81	51.73
Colony and ward dummies included but not reported			
Number of observations		156	
R-squared		0.52	
Root mean square error		0.11	

[a] Standard errors estimated after accounting for within cluster(ward) correlations and possible heteroskedasticity.

Table 5
Perceived impact of branding and packaging, as reported by retailers.

	Unit	% Of answers
Total number of observations		154
Number of retailers that sell branded makhana	%	19
For those retailers who sell branded products.		
The importance of sales of branded in total sales	%	92
In his opinion, compared to loose is the average quality of branded produce		
Better	%	73
Same	%	7
Worse	%	20
Total	%	100
In his opinion, why do some customers prefer branded produce (compared to loose)?		
Assured quality of the product	% Very important	57
Assured quantity of the product	% Very important	100
Nice package	% Very important	80
Why does he sell branded produce?		
Higher profits than loose	% Very important	17
Less hassle with customers (no weighing, no quality checking)	% Very important	100
Consumers demand branded produce	% Very important	93
In his opinion, customers who buy branded produce are		
Richer	%	68
Same	%	32
Poorer	%	0
Total	%	100
Who printed the Maximum Retail Price (MRP) price on the package		
Retailer himself	%	7
Trader he bought from	%	93

Midstream

Low-priced brands

As shown before, the branded products graded and packaged by wholesalers themselves have taken off in recent years. These are called the low-price brands from here onwards. Wholesalers were asked detailed questions on each branded product that they were selling at the time of the survey (Table 6). Because wholesalers might sell different brands, this gives us 61 brand observations in total. Despite the recent start of brands and the rather small market, the results show that there are already a large number of brands out there, as 33 different brand names were identified in

total. There are no clear market leaders and the most frequently observed brand, *Swagat*, accounted for only 13% of all the brands found.[14] Of all the brands on sale, 31% were packed by the wholesalers themselves and a quarter of the branded bags were sold exclusively by that wholesaler.

Branded bags contain in general 250 mg of popped *makhana* (97% of the branded bags). The type of *makhana* found in the bag is usually a mix of qualities, and in only a few cases (9% of the bags) it is indicated that only the best quality ('*lava*') is in the bag. Quality assurance is often assured by the wholesaler himself (35%). There

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[14] Ramaswami et al. (2009) found similar results in the proliferation of brands in cotton seed markets in India.

Table 6
Description branding practices, as reported by wholesalers.

	Unit	Share
Number of observations/brands[a]		61
Brand name		
Welcome (Swagat)	%	13
Krishna's Devotee (Gopi)	%	11
Safron (Kesar)	%	11
The Goddess of Wealth (Laxmi)	%	6
Lavkush – The Children of Lord Ram (Lavkush)	%	3
Smile (Muskan)	%	3
Royal Food (Rajbhog)	%	3
Colorful (Rangeela)	%	3
Rest[b]	%	47
Branding and wholesalers		
Packaged by wholesaler himself	%	31
Size of bag		
250 mg	%	97
500 mg	%	3
Type of makhana		
Lava	%	9
Mix	%	91
Quality assurance by wholesaler himself	%	35
Differences in quality by bag, as stated by wholesaler		
A lot	%	13
A bit	%	38
None	%	48
Designed bags exclusively used by wholesaler	% Yes	25
Information on bag		
Exact weight printed	% Yes	80
Expiry date printed	% Yes	16
Exact contact address manufacturer printed	% Yes	0
Telephone number manufacturer printed	% Yes	5
Maximum Retail Price (MRP) printed (versus blanc)	% Yes	0

[a] Several brands are sold per wholesaler; there are thus more brands than wholesalers interviewed.
[b] Include Potion Food (Amrit Bhog), Priceless (Anmol), Lord Balaji (Balaji), Bigboss, Bunti&Babli, Dollar, Five Star, Jain Food (Jain Bhog), Kohinoor Diamond (Kohinoor), Lord Krishna (Kirhsna), Lord Krishna Food (Krihsnabhog), MPS SSS, NL, NPS555, Love (Neha), OM, Royal (Raj), Ocean (Sagar), Goddess Laxmi (Sri Laxmi), Tricolor (Tiranga), Emperor (Badsah), Water Fountain (Panghat), The Great Goddess of Wealth Goddess Laxmi (Maha Laxmi), Heart Felt (Manpasand).

is not clear homogeneity in the quality per bag. While 48% of the same brands are reported to show no difference in quality, 38% and 13% show 'a bit' and 'a lot' of difference in quality, respectively. Further questions were then asked on the information given on the bag. In 80% of the brands, the exact weights were printed on the bags. However, most other information that typically goes with food branding was not available. Only 16% of the bags provided an expiration date. In none of the cases was the exact address of the manufacturer or the maximum retail price printed, and in only 5% of the cases a telephone number for the manufacturer was given. Thus, if a customer was not satisfied with the product, it would be hard for him to trace the product back to the company where the product was packaged. This implies that these sellers show little willingness to be accountable for the quality of their products, since clear traceability mechanisms – increasingly demanded in more sophisticated markets – are not in place.

Table 7 documents some of the costs and benefits from this branding process for wholesalers that brand and package their products. Three costs are needed in the packing and branding process, i.e. the purchase of designed bags or the design itself, packing machines, and labor for packing. Half of the wholesalers buy empty branded bags. While some of these bags are made in the production area of Darbhanga itself, the majority, 94% of the bags, however are ordered from specialized manufacturers in the cities of Kanpur or Delhi. In 18% of the cases, the design of the bag was done by the wholesaler himself. In that case, the costs of the design amount to a one time investment of Rs. 22,000. The average cost for an empty bag is Rs. 2.1. Almost half of the wholesalers (47%) report to own a packaging machine. The investment costs for such a

machine are minimal, with a reported price of Rs. 1862 (or 41 USD). The labor costs involved in filling up and the sealing of the bags amounts to Rs. 0.4 per bag.

Wholesalers were asked to evaluate the benefits from the packing and branding process. They estimated that if the products that were in the bags were sold loose, they would be able to obtain a price that is on average Rs. 15 lower than when bagged and branded.[15] Based on the numbers above, this compares to total variable costs for bagging of Rs. 2.5 per bag or Rs. 10 per kg (as bags are mostly 0.25 kg) or a 50% margin to pay for the investment costs, or the initial machine and design. However, some wholesalers indicated that *makhana* products were not comparable as the quality of products that was put in the branded bags was lower and could not be sold loose, as seen below.

In the opinion of the wholesalers, branded bags do often not contain quality that is better than those products that are sold loose (Table 8). 19% of the wholesalers indicate that the quality of *makhana* in the branded bags is better, 38% evaluates the quality to be the same, and 38% think it is worse. In contrast with what could be expected of branding practices, (i.e. consistent good quality with the purpose of building a loyal clientele willing to buy the branded product), a significant number of wholesalers seem to try to hide poor quality inside their branded bags. Most of the wholesalers also indicate that the quality of the *makhana* that is used for

[15] Wholesalers indicated that they use a differential price scheme where higher prices were asked from direct consumers that bought from them compared to purchases by retailers. The average price difference was about 8 Rs./bag or 32 Rs. per kg. However, direct sales to consumers are limited.

Table 7
Cost and benefits of branding, as reported by wholesalers.

	Unit	Mean or %	Median
Costs			
Branding costs:			
Design organized by			
wholesaler himself	%	18	
other	%	82	
Costs design	Rs.	22,000	25,000
Bagging costs:			
Buy empty branded bags	%	50	
Own a packing machine	%	47	
Price of packing machine	Rs.	1862	1900
City where bags are made			
Darbhanga	%	6	
Delhi	%	41	
Kanpur	%	53	
Price of empty bag	Rs./bag	2.1	2.0
Labor costs for bagging:			
Price of labor	Rs./bag	0.4	0.4
Sales prices/benefits			
Sales price to retailer	Rs./bag	40.0	38.8
Sales price to consumer	Rs./bag	47.6	47.5
Sales price to retailer	Rs./kg	157	150
Reported sales price to retailer, if same quality sold loose	Rs./kg	142	138
Willingness to pay for branded quality			
Willingness to pay for the high-cost brand quality ($N = 15$)	Rs./kg	179	160
Willingness to pay for the low-cost brand quality ($N = 14$)	Rs./kg	163	163
t-Test	t-Value	−1.43	
	Pr $(T < t)$	0.08	
	Pr$(|T| > |t|)$	0.16	

inclusion in the bags can come from all types of suppliers (58%) and inclusion in the bag does not depend on specific characteristics of suppliers. There are thus seemingly little exclusion effects from branding, which sometimes has been found in other modernizing markets (Reardon et al., 2009).

Wholesalers were further questioned on why they do not sell more branded products. The major reason is seemingly that a large number of customers like to check the quality of the product and they cannot do this with the packed product. The lack of demand for branded product does not seem related to the higher prices that are asked for branded products (5% of wholesalers), the longer time required to sell branded products (11% of wholesalers), and the lack of availability of sufficient quality to be included in branded bags (6% of wholesalers).

Branding is a complex process which aims at creating a unique name and image for a product in the consumers' mind. However, none of the wholesalers that produce the branded bags employ salesmen to sell their brand, and none of them pay for ads on television, on the radio, or in the newspaper. It seems that the only way that these wholesalers communicate the superiority of their branded products to potentially loyal consumers is through the information that is printed on their bags and consumers' experience of the product itself.

High-priced brands

A different packing and branding system has been put in place by Shakti Sudha Industries which has received positive press coverage.[16] This will be called the high-price brand hence forward. This firm which started in 2004 implemented a new business model opening up new market opportunities for the *makhana* product. While the best quality of *makhana* (*lava*) is branded and sold in export markets or in big cities, the lower qualities are processed into

new products, such as roasted snack foods, flakes, or powder for pudding. Until recently these products did not exist in the market place. To sell the branded products, the company employs 24 sales persons in the country and it spends monthly on average 1 million Rs. (22,000 USD) for ads on TV, radio and in newspapers. The reported quantities of popped *makhana* sold by the company have increased from 124 tons in 2005 to 3000 tons in 2009. In 2009, 40% was sold in export markets (mostly to Pakistan, Nepal, Bangladesh, and the Middle East; no processed products were exported) while the rest was being sold in local markets all over India (30% sold as processed products and 70% in natural form). Little is sold to the local markets in Bihar as they feel there is no quality demand and there are no quality rewards in these local markets.

Shakti Sudha Industries implemented a procurement system that supposedly benefits the farmers in four ways.[17] First, they assure a fixed floor price at 100 Rs./kg for *makhana* pop for all farmers that own the membership card *khet se bazaar tak*[18] of the company. A different price is implemented every month in line with market prices, but the offered farm prices are assured to never drop lower than the floor price. The prices offered are also further guaranteed to raise steadily over the season or around 5 Rs./kg rise per month, protecting farmers from potential downward price volatility. Farmers are paid within 3 days of delivery in their account. Second, farmers are linked to the banking system as they are required by the company to set up a banking account. They will help farmers get access to the *Kisan Credit Card* scheme, a successful government intervention that allows farmers access to (cheap) credit. Third, farmers do not have to bear the cost of transportation because the firm reimburses them for all produce that is transported from farmers' fields to collection centers. Fourth, Shakti Sudha Industries facilitate the leasing arrangements between cultivators and owners of ponds (mostly by linking the owners of ponds to potential cultivators and writing the contracts).

However, despite a large number of interactions with Shakti Sudha Industries and key informants in several of their supposed

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[16] Business Outlook, a leading Indian business magazine, has chosen it one of the 14 best agricultural innovations in the country (http://business.outlookindia.com/inner.aspx?articleid=2165&editionid=58&catgid=2&subcatgid=973).

[17] See <http://www.shaktisudha.com/about.html>.

[18] Translated "Farm to Market".

Table 8
Branding and packaging, as reported by wholesalers.

	Unit	% of answers
The quality of the branded bag is on average better than loose products you sell (five options)		
Significantly better	%	5
Better	%	14
The same	%	38
Worse	%	38
Significantly worse	%	0
No choice	%	5
The produce that you buy for inclusion in branded bags:		
is only produce from specific buyers to be used for branded bags	%	42
can come from all types of suppliers	%	58
If only specific suppliers, what type of suppliers		
Only farmers	%	29
Only processors	%	29
Only traders	%	29
Other	%	14
Employ salesmen to sell your brand	%	0
Pay for ads on television, on the radio or in the newspaper	%	0
Reasons that wholesaler does not sell more branded produce		
"There is limited demand for branded produce"	% Very important	26
"Some customers like to check the quality of products themselves"	% Very important	68
"The price of branded produce is too high for some consumers"	% Very important	5
"Once packed, it takes too long to sell branded produce"	% Very important	11
"I have to get rid of lower quality, which can not be branded"	% Very important	6

production areas, only a handful of people could be identified who had direct linkages with them and it seems that their direct procurement model has (mostly) fallen apart in recent years (and they seem to procure part of their products from traders). In any case, it is clear that their impact on farmers is less than stated but it is not directly evident why the company claimed otherwise.[19,20]

To evaluate the quality that is sold by the branding companies, bags were bought of the high-price brand (Shakti Sudha Industries) and of a prominent low-price (wholesaler) brand. Produce was taken out and shown to the wholesalers without informing them where the product came from. In an open-format question, wholesalers were asked to state the maximum price they were willing to pay for the observed *makhana* quality. The results presented at the bottom of Table 8 indicate that the wholesalers valued *makhana* quality contained in a high-price brand at a higher price than the low-price brand. The difference between the two qualities was 16 Rs./kg. While the difference is significant at the 10% level in a one-sided *t*-test, this is not the case with a conventional two-sided test. This thus indicates the weak superiority in the quality of the high-price brand.

Finally, a common feature of the low- as well as high-price brands is that they make several claims that are false or misleading for the consumer. First, several brands printed on their bags that the quality contained in the bags is an export-quality grade. However such – publicly or privately enforced – grades do not exist in practice. As reported by the wholesalers themselves, the quality contained in branded bags is often no different than loose products. Second, on several branded bags, it is printed that their products and grade have been approved by the local *makhana* research organization (the Research Centre for *Makhana*). However, this research center is only

involved in the development of better *makhana* varieties and farming practices along with better processing techniques, but has no mandate in the area of quality approval or marketing. Third, further claims are made by the high-price branding company on backward linkages with farmers while few backward linkages exist in practice. Thus, this seems to highlight an important problem in these settings related to the protection and empowerment of consumers against lack of quality assurance and transparency.

Upstream

To understand how farmers face these changing value chains, they were asked to give specifics on the marketing of their *makhana* for all transactions done in the year prior to the survey. We first present a descriptive overview of their practices (Table 9). Most of the *makhana* sold by farmers is marketed as *makhana* seeds (55% of the transactions). Forty-four percent is sold in the form of mixed popped *makhana* and in only 1% of transactions is it sold as *makhana lava*. This indicates that the grading in different qualities is thus seemingly happening at a later stage than the farmer level. In our interviews with farmers, they indicated they preferred to sell mixed qualities as it is reportedly hard to grade and sell the lower popped quality *makhana* in the market place.

Most of the sales of *makhana* happen over a short-time period and it seems that few farmers store *makhana* so as to benefit from the potentially higher prices that might be offered in the off-season. More than half of the transactions (51%) take place with collectors in the village and 20% with wholesalers from the district itself, while in 13% of the cases products are sold to processors indicating their importance as a marketing outlet for some farmers. In contrast with conventional wisdom, our research shows input advances are not very important as in only 3% of the transactions they were reported to have been given by the buyer of the produce. Despite our efforts to field our surveys in areas where the Shakti Sudha Industries were active, only 0.3% of the transactions were reported to have been done with this high-priced brand company and direct backward linkages of the firm to farmers were thus limited.

Using multivariate regression analysis, Table 10 shows the importance of different determinants in price setting at the farm level. Each reported sales transaction is a unit of observation. We use the logarithm of the price per kg as a dependent variable and

[19] Despite multiple attempts with the manager of the company as well as with local traders and farmers, we were unable to track down its suppliers from the villages where the company was active, inside the selected district as well as outside it. This indicated that the company did not have these downstream activities (anymore?) that it claimed to have in place earlier or, more likely, that it never had the claimed procurement practices in place at least on a large-scale. Given that *makhana* commercialization is confined to a rather limited geographical area (as the company has few other places to procure), we conclude that the benefits of some of the backward linkages of the company are exaggerated.

[20] One source indicated that the firm had obtained loans from the government and the World Bank to build up such rural networks. However, that information could not be verified.

Table 9
Marketing by makhana farmers (% of transactions).

	Statistics		
	Unit	Mean or %	Median
Number of observations	386		
Quantity sold	kg	1240	400
Total amount received per transaction	Rs.	62,458	25,600
Price			
Makhana seeds	Rs./kg	36	35
Makhana pop lava	Rs./kg	126	133
Makhana pop mix	Rs./kg	108	105
Form of sales			
Makhana seeds	%	55	
Makhana pop lava	%	1	
Makhana pop mix	%	44	
Month of sales			
Quarter 1 (January-March)	%	3	
Quarter 3 (July-September)	%	75	
Quarter 4 (October-December)	%	22	
Buyer			
Trader collector in village (outside wholesale market)	%	51	
Wholesaler from this district	%	20	
Wholesaler from outside this district	%	9	
Processor	%	13	
Shakti Sudha Industries/Ket Se Bazar Tak	%	0.3	
Farmer co-op	%	1	
Retailer	%	5	
Input advances given	% Yes	3.0	

we include as explanatory variables the characteristics of the transaction and of the owner. Standard errors are estimated after accounting for correlations and possible heteroskedasticity within the cluster, or village. Independent variables were checked for multi-collinearity but no VIF was estimated to be higher than 10 in the specification used.

The results of the regression show the rewards, as could be expected, from the sales of processed *makhana* compared with *makhana* seeds. During the year of the survey, the results also show that *makhana lava* at the farm level was sold at a premium over mixed quality at 10% on average. There are few other determinants that show a significant effect on the price. Prices go up when farmers are able to offer a higher quantity. Doubling the quantity sold lead to a price offered that is about 3% higher. Unexpectedly, *makhana* sold to wholesalers from the district itself fetched a lower price than products sold in the village itself. Most important, the results show that when the high-price brand is directly procured from the farmer, it was able to offer a price to the farmer that was significantly higher than any other procurement outlet. Therefore, some farmers benefited from their procurement model. However, as shown in Table 9, the direct procurement by this firm is limited.

Price composition

Based on price data collected in the different surveys with all *makhana* value chain agents, we were able to calculate the relative contribution of each actor in the retail price. We present this graph for loose and low-priced branded products during the period from July-August, 2009. To make prices comparable, the reported *makhana* seed prices, (the most common form in which farmers market *makhana*), were converted to pop equivalents by using a conversion ratio of 40%, as reported by interviewed processors.[21] The results are shown in Fig. 1.

The results show that the farmers receive 55% of the final retail price in Patna, when *makhana* is sold loose. Since there are no benefits to the farmer from the branding process, this share declines to 50% in the final price of the low-price branded products. The retail margin is the second most important component in the final price, accounting for 19% and 22% in the final retail price of loose and low-price branded products, respectively. Processors and urban wholesalers count for equal shares in the final retail price. In short, the emergence of packing and branding leads to a higher off-farm share in the retail price compared with the price formation of loose products.

Conclusions

In response to growing incomes and increasing willingness to pay for food quality and safety, developing countries see an increasing differentiation and choice in food retail markets. In a detailed case study of *makhana* in Bihar, we document the fast emergence of more expensive packed and branded products. Two types of brands can be distinguished, i.e. low-price and high-price brands. Low-price brands focus exclusively on attractive glossy packing with little consideration for quality. Investments and profits are small. The high-price brands pay attention to quality beyond packing, including investment in advertisements and promotion, and they explore options for value-addition, and employ specialized salesmen. We find that there are little direct benefits to the farmers from the emergence of these brands.

A common feature of the low- as well as high-price brands is that they make several false or misleading claims to consumers. First, several brands have printed on their bags that the quality contained in the bags is an "export quality grade". However, such publicly or privately enforced grades do not exist in practice. As reported by the wholesalers themselves, the quality of the *makhana* contained in branded bags is often no different from loose products. Second, on several branded bags, it is printed that the product was approved by the local *makhana* research organization, while in

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[21] Because margins were not collected through the same time period for wholesalers and retailers, margin rates were imposed to the following period.

Table 10
Price determinants of farm prices of makhana.

Dependent variable = log(Rs./kg)[a]		OLS	
		Coeff.	t-Value
Characteristics transactions			
Form of sales			
Makhana seeds (default)	Yes = 1		
Makhana pop lava	Yes = 1	1.28	10.91
Makhana pop mix	Yes = 1	1.18	32.24
Quantity sold in kg	log()	0.03	3.07
Immediate payment	Yes = 1	0.07	0.91
No input advances received	Yes = 1	0.02	0.37
Not sold on farmers' fields or village	Yes = 1	−0.05	−0.82
Timing of sales			
Quarter 1 (default)	Yes = 1		
Quarter 3	Yes = 1	−0.08	−1.78
Quarter 4	Yes = 1	−0.09	−2.20
Type of buyer			
Trader collector in village (outside wholesale market) (default)	Yes = 1		
Wholesaler from this district	Yes = 1	−0.16	−3.83
Wholesaler from outside this district	Yes = 1	−0.03	−0.49
Processor	Yes = 1	−0.03	−0.43
Shakti Sudha Industries/Ket Se Bazar Tak or farmer co-op	Yes = 1	0.16	2.38
Retailer	Yes = 1	0.06	1.27
Characteristics farmer			
Age of the head of household	Years	0.00	−0.34
Size of the household	Number	0.00	−1.11
Head of household is illiterate	Yes = 1	0.01	0.36
Intercept		3.43	31.12
Number of observations		386	
R-squared		0.84	
Root mean square error		0.24	

[a] Standard errors estimated after accounting for within cluster(village) correlations and possible heteroskedasticity.
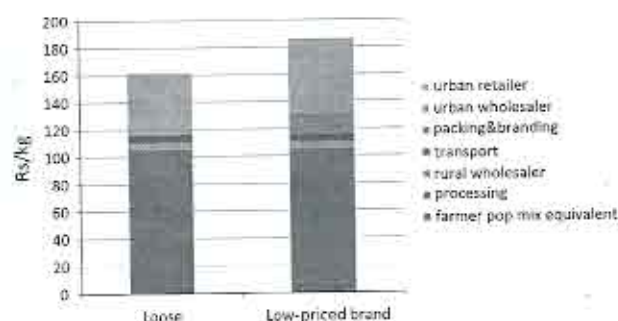

Fig. 1. Price composition *makhana* Patna market (July–August 2009).

actuality the organization was not involved. Third, further claims are made by the largest branding company regarding backward linkages with farmers, while in truth few of such backward linkages exist. In short, these findings highlight an important problem in these settings related to the protection and empowerment of consumers against a lack of quality assurance and transparency.

The brand name's failure to guarantee quality to its consumers seems symptomatic of the problems of enforcing intellectual property rights in a number of developing countries, including India. Effective branding processes in agricultural markets are often undermined by the emergence of other, sometimes illegal, brands very similar to original ones, but they put little effort in to ensuring the required quality or safety of their products.[22] Such brands then often create confusion for consumers, especially in low-educated populations. The emergence of these brands and the lack of effective

intellectual property right protection can lead to less than optimal market choices and a loss of consumer welfare as innovators willing to make investments in quality assurance might not have the right incentives to do so.

This research indicates several policy implications. First, the results highlight the importance of independent certification mechanisms for consumer protection. Several claims done by some of the low-price and high-price brands are false and misleading. The lack of an effective consumer protection body leads to misinformation to consumers and less effective quality determinants for consumers in the market place.

Second, an important question remains regarding how poor farmers can be directly connected to major branding companies and potentially capture some of the benefits of branding in retail markets. In food markets we see that some modern companies in developing countries – be it processing or retail – invest in backward linkages to farmers to ensure timeliness, quality, food safety, and traceability characteristics of their supplies (Reardon et al., 2009). The role of the government is then to assure that the appropriate conditions for investments by the private sector are in place. This can be done by assuring property rights, law and order, road and communication infrastructure, and education of rural households; all things that the state of Bihar had been lacking and only improved recently.

Third, the branding systems found in this research differ widely from effective branding practices in other sectors and countries.[23] Brands in this setting in India have seemingly little function other than the packing function as they provide little credible information to the consumer on the characteristics of the product. It is likely that most current branding practices will be unsustainable as consumers

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[22] Lalitha et al. (2008) give examples from similar problems in the spread of illegal transgenetic seeds in India.

[23] E.g. (Berges-Sennou et al., 2004; Carriquiry and Babcock, 2007; Jekanowski et al., 2010; Marsden and Smith, 2005; Ménard and Klein, 2004; Papadopoulos, 2004; Ponte, 2002; Ward et al., 1985; Wohlgenant, 1993).

become more demanding and informed over time and because they do not lead to a loyal consumer base, which is a requirement for success of a given brand.

Given the fast emergence of brands and the lack of empirical evidence on the effects of brands in food markets in developing countries, this should be fertile ground for future research. The research questions that should be further pursued relate most importantly to the needed conditions of an institutional environment for successful development of effective brands, to ensure quality and safe food at prices that are affordable for consumers in developing countries. Also, the conditions required to ensure direct benefits to poorer farmers from the emergence of food brands and a better understanding of the evolution of branding practices over time in developing countries is required, especially when transitional states move toward a situation where branding represents a guarantee of quality.

Acknowledgments

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