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Abstract

One of the important objectives of reforms in Indian agricultural marketing was to stimulate competition in the local food marketing system dominated by the state-regulated APMC marketplaces. This study was taken up to understand the different kinds of marketplaces that were available to producers besides the APMCs. Based on survey conducted in one of the pioneering states that introduced reforms, it was found that APMC and farm-gate emerged as the dominant marketplace options. The factors influencing choice of marketplaces were identified using binary logistic regression. Perishability of the produce, and services such as grading, storage and transport provided by buyers were found to be significant determinants of marketplace choice. A post-hoc survey was conducted to gauge farmers' expectations of services and facilities of a marketplace by presenting four scenarios. Even as farmers seem to expect a full-fledged APMC with wide-ranging facilities, warehousing seemed to be their major requirement. Willingness to pay for facilities and services was an important takeaway from the findings. The study has important implications for policy design and implementation, and scope for private sector participation.

Introduction

Over the years, economic forces such as globalization and liberalization, and societal changes such as urbanization have induced changes in agri-food systems, especially in developing countries (Onumah, Davis, Kleih, and Proctor, 2007). The consumer has multiple marketplace options for food such as wet markets, public markets, cooperatives, government-subsidized food shops, mom and pop stores, and modern retail chains (Minten, Reardon, and Sutradhar, 2010). These changes have also had an effect on local food marketing systems. Local food marketing systems have been described as those where locally produced food on small, labor-intensive farms is sold at, among other places, farm gates and public markets (Witkowski, 2008). Such marketing systems often involve direct exchange between producers and the first level of buyers, who could be small traders, thus making it the lowest level of aggregation involving individual producers and buyers as described by El-Ansary and Liebrez, and Dixon and Wilkinson (as cited in Layton, 2007, p. 233). Agricultural commodity markets in developing countries have frequently been dominated by government and public sector agencies (Giuliano & Scalise, 2009), and often existed alongside local rural markets (Ndoro, Mudhara, and Chimonyo, 2015; Zanello, Srinivasan, and Shankar, 2014). Modern retailers and global chains have come to contract directly with farmers in vertically coordinated arrangements to reduce costs and raise quality standards for competitive advantage (Reardon, Barrett, Berdegué, and Swinnen, 2009). Thus, producers could have multiple marketplace options, ranging from highly informal rural markets enmeshed in social ties, to formal, legally backed systems such as contract farming.

Market access by smallholder farmers has been a widely discussed topic, especially in research on development and welfare (Mithofer, Nang'ole, and Asfaw, 2008; Njuki, Kaaria, Chamunorwa, and Chiuri, 2011), since the choice of marketplace or marketing channel can impact producers in several ways. Studies have found that choice of marketing channel has affected crop management practices, profitability (Hernández, Reardon, and Berdegué, 2007); marketing costs (Lemeilleur and Codron, 2011); and, prices obtained by producers (Wollni and Zeller, 2007). However, channel choice in itself was influenced by various factors such as age of the farmer, his membership with a farmer organization, distance to market (Xaba and Masuku, 2012);

experience of the grower (Park and Lohr, 2006); contractual arrangements, credit, trust, information provided by the buyer (Schipmann and Qaim, 2011); buyer attributes such as payment terms, better prices and fulfillment of buying commitments (Umberger, Reardon, Stringer, and Mueller Loose, 2015). These studies were conducted in different developing and transition economies, and it appears that choice-influencing factors varied widely from one country to another. As such, regional and local settings appear important to understand marketing decisions of farmers in local food marketing systems.

Against this background, we aim to understand marketplace options available to smallholders in India, a country that has been pursuing reforms in its agricultural marketing system for over two decades now. India first reformed external trade of agricultural commodities, under the compulsion of WTO, by dismantling quantitative restrictions and moving towards tariff-based trade (Athukorala, 2005). Internal trade remained restricted and was saddled with market distortionary government controls and interventions (Bathla, 2006). The state-regulated Agricultural Produce Marketing Committee (APMC) system, which constituted one of the most important marketplaces for farmers, had become inefficient and uncompetitive. Policy measures were initiated to enable innovations in agricultural marketing, encourage competition to APMC market yards, and bring in efficiency. There have been few studies that have assessed impact of reforms in terms of the alternative marketplaces that accrued to growers, and how growers took decisions of marketplace selection under such conditions. Through a primary survey, this paper attempts to understand different avenues of marketing available to the producer and factors influencing farmers' choice of the most commonly accessed marketplaces. A short, post hoc survey tries to gauge farmers' expectations of marketplace facilities and services.

The paper has been organized as follows. The next section evaluates Indian agricultural marketing in the context of marketing systems. This is followed by survey methodology and analysis. Results are discussed followed by concluding remarks.

Indian Agricultural Marketing – A Marketing Systems Perspective

Layton (2007) provided a “working definition” for marketing system as “a network of individuals, groups, and/or shared entities linked directly or indirectly through sequential or shared participation in economic exchange that creates, assembles, transforms, and makes available assortments of products, both tangible and intangible, provided in response to customer demand” (pp. 230). Agricultural marketing system has been described on similar lines, but from specific perspectives such as post-harvest systems (Prussia and Shewfelt, 1993), or as a subsystem in the larger agri-food system which interacts with the health and disease system (Hammond and Dube, 2012). Chand (2012) described agricultural marketing as a broad economic activity that not just deals with matching supply and demand of agri-food output along market-based signals, but also about improving producer and consumer welfare. Thus, when viewed holistically, agricultural marketing is a system that extends beyond the farm ecosystem. However, at the lowest level of aggregation, it involves exchange between individual producers and buyers in various kinds of exchange mechanisms.

Agricultural marketing system in India is complex and consists of diverse marketplaces, from rural markets to urban wholesale or terminal markets. There are rural primary markets or periodic markets, known as “haats”, usually managed by local municipalities or “panchayats”. These are more of traditional markets, which were characterized by poor efficiency, lack of adequate infrastructure, less number of buyers, nevertheless an important marketplace for many of the small and marginal farmers (Planning Commission, 2011). The other most prominent marketplaces are APMC market yards. These are wholesale markets under the purview of the state governments. These marketplaces may be interpreted as examples of public markets, which Spitzer and Baum described as spaces owned and operated by municipal agencies where sellers sell fresh food (as cited in Visconti, Minowa, and Maclaran, 2014).

APMCs are governed by APMC Acts of the respective states. Each APMC has a notified area, which serves as a captive hinterland for the market yard. Farmers under the notified region are supposed to sell at the designated APMC. This regulated marketing system was supported by a host of other laws pertaining to grades and standards, storage, consumer protection and so on

(Acharya, 1998). While these market yards were created with an aim of curtailing exploitation of farmers at the hands of unscrupulous traders and opaque trading practices, over a period of time, they fell prey to various corrupt practices and trader cartels. They ended up as inefficient, state-sponsored monopsonies (Acharya, 2006). Consequently, internal trade in the country was impeded physically, legally and institutionally, leading to market distortion (Bathla, 2006). Since the early 2000s, efforts were being made to reform agricultural markets, especially the APMC system. The Government of India, based on recommendations of different committees, proposed The Model APMC Act of 2003 and the Draft State/UT Agricultural Produce and Livestock Marketing (Promotion & Facilitation) Act, 2017 to facilitate liberalizing domestic agricultural marketing system. Reform measures were aimed at promoting alternative marketing avenues or marketplaces such as contract farming, creation of private market yards, direct linkages between producers and consumers, and electronic trading. It was believed that such measures would spur competition for farmers' produce and enable them to get remunerative prices (Chand, 2012).

Layton (2007) identified four kinds of market exchange patterns on the basis of the boundary conditions, and the participating entities between or among them: pure exchange, structured exchange, centralized exchange and network exchange. Rural primary markets may be considered an example of pure exchange, the APMC system may serve as an example of a structured exchange system. New models such as contract farming or electronic trading may be treated as instances of centralized exchanges. Thus, the reforms policy was expected to result in creation of an assortment of exchange mechanisms. Each exchange mechanism has its own benefits and shortcomings, and is inclusive or exclusive in nature by design or otherwise. Given the multifarious impact the choice of a channel has on the producer, it is necessary to understand which channels or marketplaces are chosen, the factors influencing such choice, and to verify if policy measures have resulted in a qualitative change in the marketing system.

Methodology

As a first step, we identified different states that had implemented agricultural marketing reforms. We found that Karnataka had taken pioneering initiatives in amending its APMC Act to encourage contract farming, direct marketing, spot exchanges and e-trading. The state government had also implemented Unified Market Platform (UMP) to electronically integrate

APMCs to create a state-wide unified agricultural market. Hence, Karnataka was shortlisted for our study.

Agriculturally, Karnataka ranked among top producers of corn, pigeon pea, and tomato, among others. Secondary data on crop acreages and production, enabled us to identify three districts, which were prominent producers of pigeon pea, corn and vegetables (primarily tomato). Two hundred and ten farmers were surveyed, out of which 202 usable responses were elicited. The sample was selected such that it had equal representation of growers of food grains (corn and pigeon pea) and vegetables. Respondents were classified into three categories – marginal (those owning less than 2.5 acres of land), small (those owning more than 2.5 acres, but not more than 5 acres), and medium and above (those owning more than 5 acres). This sample was designed to represent the farmer population of the concerned district by aligning it with the 2010-11 agricultural census data. Overall, there were 42% marginal farmers, 44% were small farmers, and 14% medium and above.

The survey questionnaire covered demographic and household parameters of the grower; farm enterprise parameters; type and importance of produce to the household income; infrastructure such as roads and transport facilities to input and output markets; credit, extension and information institutions; marketplace infrastructure, costs incurred and services provided by buyers. The dependent and independent variables have been presented in Table 1.

Farmers were found to sell at (1) rural primary markets (commonly called weekly village markets), (2) the APMC, and (3) within the village to itinerant or unregistered traders or agents of registered traders, which we termed as “farm gate”. Of these, only seven out of over 200 respondents were found to sell at rural primary markets. Hence we discarded rural primary markets and shortlisted only APMC and farm gate for further analysis.

In case of APMC sale, farmers usually availed a hired vehicle to transport their produce to the APMC market yard. They rented packing material such as gunny bags for food grains or plastic crates for vegetables from commission agents or traders, with whom they often had a long association. The APMC market yard had two important functionaries – commission agents (who

are supposed to be agents for farmers and facilitate sale of the produce by cleaning, drying and sieving grain), and traders (who are actual buyers). Open auction or closed tender methods of sale are common methods of sale. On conclusion of sale, traders paid the quoted amount along with a predetermined margin to the commission agent. The commission agent would retain the margin money as a compensation for the services rendered and passed on the rest of the money to the farmer. A farm gate sale on the other hand was largely a negotiated exchange. A local unregistered trader or agent of an APMC trader visited villages and quoted a price for the produce. The prices reportedly were similar to those prevailing at APMC market yards, but at a discount to compensate for transport charges. If found acceptable, farmers would bring their produce to a specific spot within the village where the trader had arranged for a physical balance and packing material. Payment was reported to be usually on the spot and the buyer would load the goods in a truck and transport to his destination.

Since two marketplaces emerged as the most prominent ones, binary logistic regression was adopted for analysis. All the explanatory variables, except age, were converted into binary indicator variables, and regression was done using Minitab version 16. “APMC” was treated as the predicted event in the regression equation.

Results

The binary logit regression output at 95% confidence interval has been presented in Table 2. The goodness of fit tests – Pearson, Deviance and Hosmer-Lemeshow – had p-values of 0.978, 0.938 and 0.928 respectively. Being greater than $\alpha=0.05$, the model indicates a good fit. The likelihood ratio test statistic $G=84.076$ and $df=4$ had a p-value of 0.000, which is statistically significant at 95% confidence interval. This implies that the proposed model is parsimonious and a more reduced model is not possible.

The findings of the logistic regression model can be represented as:

Logit of (marketplace choice being APMC) = 0.184 + 4.193(Perishable) – 2.429*(Buyer serv-Transport) + 1.480*(Buyer serv-Grading/Sorting) + 2.210*(Buyer serv-Storage)*

The odds of selecting APMC as the marketing channel are very high when the produce is perishable, under conditions of constancy of other predictor variables. As such, perishability seems to play a major role in influencing the farmer's choice of marketplace. Services provided by the buyer are the other important determinants affecting channel choice. The estimated model indicates that the odds of selecting APMC are higher when the buyer is providing grading, sorting and storage services. On the other hand, odds of selecting farm gate as a channel are greater when transportation services are provided by the buyer.

Thus, a farmer is very likely to select APMC as the marketplace when his produce is perishable and cannot be stored under normal conditions. A farmer is also likely to be influenced to select APMC while seeking services such as grading, sorting and warehousing from the buyer. Conversely, farm gate is likely to be preferred when the produce is not perishable (such as grains and pulses) and transportation services are expected from the buyer.

Post hoc

A subsequent survey was conducted using a judgement sample of 60 farmers to gauge farmer's expectations of a marketplace. Four different marketplace scenarios with varying facilities were presented to respondents, who were asked to rank the scenarios. First rank was given to the most preferred marketplace scenario and fourth rank to the least preferred one. Each of the four scenarios had parameters of distance to the marketplace, assaying, cleaning and drying, storage, warehouse receipt financing, mode of sale, mode of payment and costs incurred. Each of the parameters had different options. The four scenarios are summarized in Table 2.

The responses were analyzed using Kemeny-Young method or Kemeny rule. It has been argued that the ultimate objective of analyzing rank data is to find the rank which is representative of the population or sample of respondents, irrespective of plain assumption or use of probabilistic models to ascertain homogeneity or heterogeneity of the respondents. Such consensus or median ranking, that "minimizes the sum of distances between itself and all input rankings" is the Kemeny ranking or Kemeny distance or Kemeny median (D'Ambrosio, Amodio, & Iorio, 2015). With the four scenarios, there were a potential 24 combinations of ranks. The 24 options and their Kemeny distances are presented in Table 3.

Respondents indicated that the most preferred location would be the existing APMC; with mechanized cleaning and drying; scientific assaying facilities; warehousing coupled with warehouse receipt financing; sale through electronic auction; and electronic payment. The second rank was for a marketing facility within the village with scientific assaying; but manual cleaning and drying, where farmers could store for a short period, such as two months. In short, this version was just a minor improvement over the present habit, where farmers stored their produce, especially grains and other non-perishables, within their homes and sold it a few weeks after harvest. The other two options of a new marketplace at a distance of five kilometers from the village were ranked third and fourth.

Discussion

Our findings indicate that the local food marketing system is dominated by the APMC, followed by farm gate. New marketplaces envisaged in the policy, such as contract farming, private markets, producer / consumer markets, were not found in the surveyed areas. The precise reasons for the unavailability of these marketplaces was not covered in this study, although it may be conjectured that these are buyer-driven channels and hence can be established only out of buyer need. In other words, only two exchange systems were observed – pure and structured.

Perishability of produce emerges as an important determinant of marketplace choice. Perishable products need to be sold soon after harvest and therefore require ready presence of buyers in a market. The APMC happens to provide such an environment, and hence appears to be a preferred avenue by farmers, especially those growing vegetables, which are a perishable commodity. During the survey, we found that farmers harvesting as low as 10 or 20 kg of vegetables in a day also preferred to sell at the APMC. On the other hand, farm gate sale was a preferred option for non-perishable produce such as grains, pulses or oilseeds. It was observed that farmers were aware of postponing sale soon after harvest to avoid glut-induced low prices. They stored the produce at home or in farm sheds for a few weeks and then sold to itinerant buyers at the village when prices were more favourable. Farm gate sale helped farmers cut costs of transportation, loading, unloading and other associated hassles of selling at APMC.

Buyers at an APMC were more likely to provide grading, sorting and warehousing facilities. Previous studies in Indian context identified the grading and sorting facilities in terms of mechanical graders, analysis labs, sieves, drying machines, mechanized crop handling machines, fumigation equipment, auction platforms and so on (Manjunath & Kannan, 2012; Shilpi & Umali-Deininger, 2008). In our study, even the use of sieves and moisture meters was treated as availability of grading and sorting facilities. It appears that farmers associated the availability of marketing infrastructure such as for weighing, grading, sorting and warehousing with APMCs, though not all amenities were availed.

As for expectations of a marketplace, respondents indicated highest preference for APMC with facilities including scientific testing, warehousing, warehouse receipt financing, electronic trade and electronic payments. The second rank was given to farm gate sale with additional facility of warehousing, but continuation of negotiated sale and cash payment. Thus, it may be inferred that farmers are very keen on scientific and mechanical marketing infrastructure at the APMC, or at least warehousing facility at their village, in the absence of the former. Meeting such requirements not only necessitates investment in infrastructure but also greater coordination between marketing, warehousing and financing organizations. Our findings are corroborated by earlier recommendations of developing institutions and infrastructure for marketing in rural areas (Sharma & Wardhan, 2016), and reinforce these recommendations as the expectations of smallholder growers from a marketplace.

Conclusion

Local food marketing systems, particularly in developing countries, can have more than one kind of marketplace and farmers could access one or more of these different marketplaces. Access to different kinds of marketplaces can influence not only the profitability of the farmer but also access to skills, knowledge and inputs for agriculture. Studies have highlighted the fact that the factors affecting marketplace choice can vary across countries. This study, carried out in the state of Karnataka in India, is among the few of its kind in the Indian context. Our findings showed that there were two important marketplaces utilized by farmers – the APMC or the government-regulated marketplace, and the informal farm gate sale. Out of various factors considered for affecting the choice of the marketplace, it was found that perishability of the produce was a

critical factor, followed by services offered by buyers. Demographic, credit, extension, rural infrastructural and other factors were not significant determinants. Farmers preferred the APMC for selling perishables as the marketplace ensured ready presence of buyers for their produce while farm gate was preferred for grains and pulses, which were not very perishable and could be stored for a few weeks. Buyers in the APMC were found to provide grading, sorting and storage facilities, whereas the farm gate buyer offered transport service. A subsequent survey about farmers' expectations of the marketplace found that farmers were keen to avail several facilities such as storage, assaying, cleaning and grading, warehouse receipt financing and so on, which were currently unavailable.

This study adds to the extant knowledge in local food marketing systems by using empirical methods to explore the marketplace choice determinants at the lowest level of aggregation. It is evident that farmers display marketing acumen and identify and select marketplaces for some distinct benefits. In the farm gate system, which is more of a pure exchange system, farmers seem to seek facilities such as warehousing and assaying, without foregoing the existing benefits such as negotiated sale and payment in cash. In case of the APMC system, which is a representative of the structured exchange system, growers seem open to the idea of converting the system to a network exchange mechanism, where benefits such as warehousing, certification, electronic trade and settlement are available, besides post-harvest credit arrangements in the form of warehouse receipt financing. It may also be noted that there was no aversion to the indicative cost structure. This opens up avenues for the private sector to make gainful investments in the agricultural marketing system.

Our findings reinforce the policy direction which advocates creation of multiple marketplaces and marketing infrastructure, by surveying the intended beneficiaries of the services – the farmer. Given the complexity in the Indian agricultural marketing system, it may not be prudent to generalize these findings across other states; however, this study does provide a starting point to conduct research in other regions of the country. Similarities and differences can give a greater insight into generalizability, or otherwise, across local food marketing systems within the country. Further, the study establishes a base to conduct further research such as assessing the impact of marketplace choice on socio-economics and other parameters of growers.

Table 1

Binary logistic regression output

Predictor description	Coefficient	p-value	Odds ratio
Constant	0.184	0.568	
Product type is perishable	4.193	0.000	66.22
Buyer provides transport service	-2.429	0.000	0.09
Buyer provides grading/sorting services	1.480	0.008	4.39
Buyer provides storage services	2.210	0.001	9.11

Table 2

Market Design: Scenarios Presented to Respondents

Scenario No.	Location	Assaying	Cleaning & drying	Storage	Warehouse Receipt Finance (WRF)	Mode of sale	Mode of payment	Cost
1	Within village	Scientific	Manual	Up to 2 months	No WRF	Negotiated	Cash	Transport + Processing (1%) + Warehousing
2	Between 5 and 10 km	Scientific	Manual	Up to 2 months	No WRF	Electronic auction	Electronic	Transport + Processing (1%) + Warehousing
3	Between 5 and 10 km	Scientific	Mechanical	3-6 months	WRF available	Electronic auction	Electronic	Transport + Processing (5%) + Warehousing
4	APMC	Scientific	Mechanical	3-6 months	WRF available	Electronic auction	Electronic	Transport + Processing (3%) + Warehousing

Table 3	
<i>Rank Distances and Kemeny Median</i>	
Rank combinations	Distances
1-2-3-4	113
1-2-4-3	113
1-4-2-3	111
1-3-2-4	120
1-3-4-2	118
1-4-3-2*	109
2-1-3-4	129
2-1-4-3	129
2-4-1-3	133
2-4-3-1	129
2-3-1-4	142
2-3-4-1	138
3-1-2-4	156
3-1-4-2	154
3-4-1-2	158
3-2-1-4	162
3-2-4-1	158
3-4-2-1	156
4-1-2-3	171
4-1-3-2	169
4-2-1-3	177
4-2-3-1	173
4-3-1-2	182
4-3-2-1	180

**Rank combination with shortest distance*

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