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SUBJECT I
LIVESTOCK MARKETING AND SUPPLY CHAIN MANAGEMENT OF LIVESTOCK PRODUCTS

Functioning of Livestock Markets and Buyers' Perspectives on Voluntary versus Mandatory Disclosure of Information: Evidence from Cattle Markets in Uttar Pradesh

Rakesh Singh*, Tribhuvan Nath, P.K. Singh* and Kamlesh Kumar***

ABSTRACT

Using data from buyers and sellers of livestock in three markets in Pratapgarh district of Uttar Pradesh this study examines the functioning of livestock markets with focus on disclosure of information and constraints faced by buyers and sellers. In traditional markets voluntary disclosure has been reported to exist for quite long, but it restricts itself to information on search and experience attributes of the animals which may lead to lack of transparency in the markets. The findings of the study clearly indicate that the livestock market may work well to induce self or voluntary disclosure of information for search and experience attributes, the mandatory disclosure is important for credence attributes of the animal and thereby efficient functioning of markets. The study suggests strengthening of infrastructure in livestock markets.

Keywords: Cattle markets, Logit model, Price discovery, Dissemination of information

JEL: Q11, Q13, Q19

I

INTRODUCTION

Livestock have been an integral part of India's agriculture since time immemorial, providing livelihood support to a majority of rural population. India has a huge population of different species of livestock and together these account for about 27 per cent of the country's agricultural gross domestic product, and 4 per cent of the overall gross domestic product (Chand, 2014). The sector has been growing faster, yet markets for livestock and livestock products have remained unorganised, traditional and fragmented even after decades of economic development.

Uttar Pradesh has the largest livestock population in the country. There are several departments, such as Department of Animal Husbandry, Department of Dairy Development, Department of Fisheries in the State to look after livestock development. The Mandi Board takes care of marketing of agricultural commodities

*Department of Agricultural Economics, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi-221 005 (Uttar Pradesh) and **Assistant Professor, National Institute of Food Technology Entrepreneurship and Management (NIFTEM), Sonepat (Haryana), respectively.

through various primary and secondary markets governed by the Agricultural Produce Market Committee (APMC) Act 1964. However there are no regulations, policies and formal arrangements for marketing of livestock. This has given rise to informal livestock marketing systems such as fairs and hats.

In this paper we first examine livestock population dynamics in Uttar Pradesh and then proceed looking into the functioning of livestock markets, disclosure and dissemination of information, and constraints faced by the cattle buyers and sellers.

II

DATA AND METHODOLOGY

2.1 *Sampling*

The study has been conducted in Pratapgarh district of Eastern Uttar Pradesh during first quarter of 2014. There are three privately owned livestock markets in the district, located at Kunda (Babuganj), Rampur and Kusuwapur villages. The primary data was collected through a pretested schedule from buyers and sellers of livestock. From each market ten pairs of sellers and buyers, i.e., 10 sellers and 10 buyers were selected randomly. Five commission agents were also interviewed in each market. Besides, the organisers of fairs/market were also interviewed.

2.2 *Hypothesis and Analytical Tools*

The performance of a livestock market crucially depends on the disclosure and dissemination of market information on the quality of livestock and market characteristics in terms of infrastructure facilities and support services. The quality of a product in a market can be described as a bundle of attributes like search, experience and credence (Weiss, 1995). Search attributes assist a buyer to determine product's quality by a distant look (Caswell and Mojduszka, 1996). In case of livestock, the important search attributes include activeness, disease status, colour, weight, height, eye look and overall appearance. The greatest leverage in evaluating a livestock are the experience and credence attributes. The experience attributes can be evaluated upon close look; while for food products these can be evaluated upon its consumption (Nelson, 1970; Darby and Karni, 1973). The major experience attributes for dairy animals can be udder size, milk vein, stomach size, teats, dock-point and first-calving. The credence attributes, which are also known as hidden attributes, can be evaluated by experts only (Caswell and Mojduszka, 1996; Mojduszka and Caswell, 2000). The important credence attributes are breed characteristics (milch breed, draft breed and cross breed).

To know about the functioning of market and disclosure of information the following hypotheses, also demonstrated in Figure 1, have been tested.

H1: The buyers, who take distant look for search attributes of livestock, view that the voluntary disclosure of information is sufficient for market functioning.

H2: The buyers, who take a close look for experience attributes of livestock, view that the voluntary disclosure of information is sufficient for market functioning.

H3: The buyers, who take expert look on credence attributes of livestock, view that combination of voluntary and mandatory disclosure of information need to be implemented for effective market functioning.

H4: Demographic characteristics of buyers influence the choices of voluntary disclosure of market information.

H5: Entrepreneurial characteristics of buyers influence the choices of mandatory disclosure of market information.

A binary logistic regression has been used to test the influence of buyers' demographic and entrepreneurial characteristics on the choice of voluntary or mandatory disclosure of information. An empirical model has been developed where demographic and entrepreneurial factors are included as independent variables, and disclosure of market information as a binary dependent variable (disclosure =1, otherwise zero). The logit model is based on the cumulative logistic probability function and is specified as:

$$P = F(Z) = \frac{1}{(1 + e^{-(A + BX)})}$$

Where Z is a theoretical index determined by a set of explanatory variables X; F(Z) is the cumulative logistic function; e represents the base of natural logarithms and P is the probability of success when explanatory variable has the value X. Maximum likelihood estimation technique is used, which is the most suitable for logit regression.

To find out the constraints faced by the buyers and sellers of cattle, Garret ranking technique was used. The percent position of each rank was calculated by the following equation:

$$\% \text{ position} = \frac{100\ (\text{Rij} - 0.5)}{\text{Nj}}$$

Where

Rank given for the i-th item by j-th individual and

Number of items ranked by j-th individual

III

RESULTS AND DISCUSSION

3.1 *Pattern of Cattle Composition*

Table 1 presents changes in livestock population in Uttar Pradesh during the past two decades or so. It comes out that compared to the population of other bovine species the population of crossbred cattle especially of females has increased much faster in both the rural and urban areas. The buffalo population also grew but at a slower rate. On the other hand, the population of indigenous male as well as female cattle has declined. A significant growth in crossbred population provides ample scope for marketing potential of cattle.

TABLE 1. COMPOSITION OF CATTLE POPULATION DURING 1992-2007

(population in '000)

		1992		2007		Per cent change	
S.No.	Cattle	Rural	Urban	Rural	Urban	Rural	Urban
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1.	Crossbred cows (female)	9187	1369	23666	2551	158	86
2.	Buffaloes (female)	63136	3719	81141	4604	29	24
3.	Indigenous cattle (male)	93977	2961	74991	1789	- 20	- 40
4.	Indigenous cattle (female)	88448	3983	85354	3882	- 3.5	- 2.5

Source: Calculated from Livestock Census 2007.

3.2 *Functioning of Livestock Markets*

Table 2 presents important characteristics of the selected markets. All the three markets are held once a week but on different days. The distance between Babuganj and Kusuwapur is about 19 km, while the distance between Babuganj and Rampur is about 40 km. Keeping in view the distance and easy access of stakeholders, the organisers of Babuganj, Kusuwapur and Rampur are organising markets on Sunday,

TABLE 2. COMPOSITION OF MARKETS IN TERMS OF SIZE AND REVENUE

S. No.	Items	Babuganj	Kusuwapur	Rampur
(1)	(2)	(3)	(4)	(5)
1.	Frequency and day of market	Weekly (Sunday)	Weekly (Tuesday)	Weekly (Thursday)
2.	Average size of market (number arrived and sold per week)	220 (170)	400 (310)	310 (200)
	Cows	70 (50)	150 (120)	100 (60)
	Buffaloes	30 (20)	50 (40)	50 (40)
	Bullocks	120 (100)	200 (150)	160 (100)
3.	Fee charged (Rs./animal)			
	Cows	250	300	200
	Buffaloes	500	400	300
	Bullocks	200	200	150
4.	Revenue (Rs./week)	42500	82000	39000

Compiled from primary data.

Figures in parentheses show the number of animals sold.

Tuesday and Thursday, respectively. Kusuwapur market is the largest market in terms of arrival and sale of animals. The ratio of sale to arrival is more than 0.75 per cent in Kusuwapur and Babuganj markets, 0.64 per cent in Rampur market.

Each animal brought to the market is registered against a fee. The registration charge is more for buffalo than for cow and bullock. Higher registration fee for buffalo seems to discourage farmers to bring them for sale in markets as is indicated by their poor arrival.

The registration fee varies across markets. Although the fee charged in Kusuwapur market is not significantly more than that in the Babuganj market, the revenue realised by the organiser is higher than in this market because of more arrivals and sales. The facilities in Kusuwapur market are better than in other markets and this is one of the reasons which attracted the traders in this market. Babuganj and Rampur markets lack proper drinking water facilities and access to roads. In all the markets, transportation and loading-unloading services are absent and these activities are generally carried out by livestock owners themselves. Further, there is no arrangement for feed and fodder. The lighting and illumination arrangements are also missing. Though these markets are closed before sunset, livestock owners carry petromax, lanterns and oil burners with them in anticipation of their night stay at the market site. Markets too do not have catering facilities. Animal shelters are also inadequate. The sanitary works such as sweeping and removal of garbage are generally carried out by the livestock owners. In all the markets there are no veterinary services for on-site treatment, vaccination, and issue of health certificates. Importantly, in all the markets there is no expert to identify the credence attributes of the animal, although buyers are willing to pay additional fee for expert services.

It is therefore suggested to extend financial and infrastructural support to livestock markets may be as public-private-panchayat partnership for effective functioning of the livestock markets.

Based on traits the price of animal is arrived through negotiation between the buyer and seller, and of course involving commission agents.

3.3 *Disclosure of Information*

The relationship between the buyers' responses on livestock quality attributes and disclosure of market information has been analysed using Spearman's rank correlation (Table 3). The findings indicated that buyers significantly perceive

TABLE 3. CORRELATION BETWEEN LIVESTOCK QUALITY ATTRIBUTES AND DISCLOSURE OF MARKET INFORMATION

(1)	Voluntary disclosure (2)	Mandatory disclosure (3)
Search attributes	0.748*	-0.091
Experience attributes	0.645*	-0.027
Credence attributes	-0.204*	0.154**

* and ** Significant at 0.01 and 0.05 level, respectively.

voluntary disclosure of information in case of search and experience attributes. Hence, hypothesis H1 and H2 are accepted. However, mandatory disclosure of information is perceived significantly in case of credence attributes. Hence, hypothesis H3 is partially accepted.

Apart from livestock-specific attributes, the search, experience and credence, efficient functioning of livestock markets requires infrastructural facilities like feeding, drinking water, shelter, sanitary arrangement, lighting and illumination, veterinary care for animals and stay arrangements for the livestock owner and other stakeholders, which are lacking in the selected markets. Furthermore, disclosure of reliable and relevant information about livestock attributes is crucial because it greatly facilitates the price discovery process and ensures the efficient functioning of the livestock markets. Mandatory disclosure of crucial information obviously is superior to voluntary disclosure as the information has value to buyer and plays an important role in price fixation. The voluntary disclosure induces buyer to acquire more information about cattle attributes as they may remain silent if the information is unfavourable (Schroeder *et al*., 2002).

The demographic profile of the buyers and their entrepreneurial characteristics also play an important role in the demand for market information (Ali and Nath, 2009). Based on the study, the proposed model for disclosure of voluntary versus mandatory market information is presented in Figure 1. This model is a modified version of consumer model presented for food safety provision by Ali and Nath (2009).

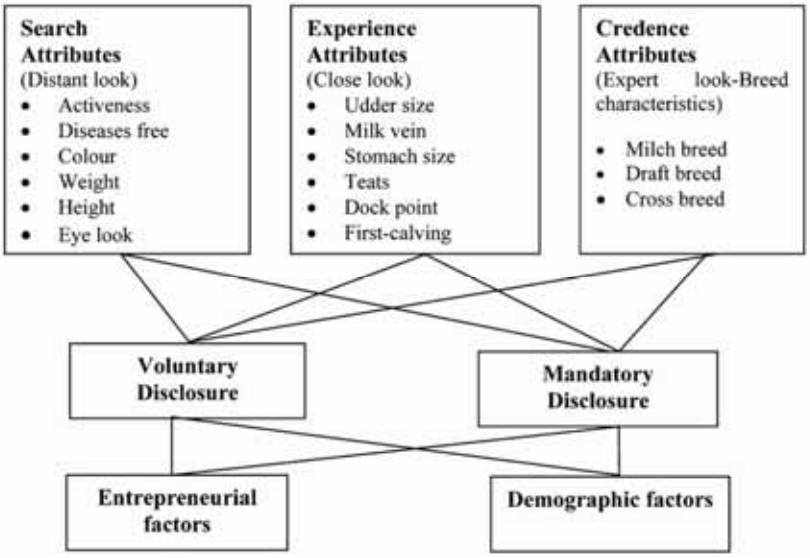

Figure 1. Proposed Model for the Disclosure of Market Information

3.4 *Factors Affecting the Choices of Disclosure of Market Information*

Table 4 presents the results of the logit model for information disclosure. The model provides reasonably a good fit, and correctly predicts 72 per cent and 85 per cent of the observed responses on voluntary and mandatory disclosures, respectively. The results indicate that the educated buyers having small family size and belonging to higher income groups with high entrepreneurial qualities perceive mandatory disclosure of information for efficient functioning of livestock markets. On the other hand, the less educated buyers having comparatively big families and belonging to lower income strata with less entrepreneurial qualities perceive that there should be voluntary disclosure of market information. Thus, the hypothesis H4 is partially true, whereas H5 is accepted.

TABLE 4. FACTORS AFFECTING THE CHOICES OF DISCLOSURE OF MARKET INFORMATION

	Mandatory Disclosure					Voluntary Disclosure				
	β	S.E.	Wald	Sig.	Exp (β)	β	S.E.	Wald	Sig.	Exp (β)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Age (1 if >35 years, 0-otherwise)	0.465	0.440	1.116	0.291	1.592	-0.250	0.353	0.502	0.479	1.285
Education (1 if graduate, 0-otherwise)	3.551	0.477	55.343	0.000	34.835	-2.175	0.373	34.080	0.000	8.805
Income (1 if >Rs. 1.8 lakhs annual, 0-otherwise)	2.096	0.593	12.512	0.000	8.133	-1.301	0.398	10.659	0.001	3.673
Family size (1 if upto 6 members, 0-otherwise)	0.520	0.468	1.237	0.266	1.682	0.073	0.365	0.040	0.842	0.930
Entrepreneurial qualities (1 if high, 0-otherwise)	1.062	0.458	5.384	0.020	2.893	-0.128	0.380	0.114	0.736	1.137
Constant	-2.605	0.555	22.072	0.000	0.074	2.199	0.444	24.568	0.000	0.111
Correct prediction (per cent)	85.0					71.5				
-2 Log likelihood	146.797					211.131				
Cox and Snell R Square	0.436					0.267				
Nagelkerke R Square	0.598					0.359				

3.5 *Constraints Faced by Buyers and Sellers of Cattle*

Amongst various constrains faced by the sellers and buyers of animals, the lack of information on buyers and sellers is one of the most severe problems in the markets (Table 5). The lack of demand has been perceived to be another major problem by sellers. Sometimes a kind of monopsony situation also exists to the disadvantage of sellers. Further, there is no standard method of price fixation and therefore, realise it

as the next most important constraint. Information on price also does not flow properly between sellers and buyers. Lack of proper market is reported as a major constraint by both sellers and buyers. About 45 per cent buyers face lack of disclosure of animal attributes as one of the problems in animal transactions. Information and communication technology can act as a driving force in the market development process. These technologies have been with us for many years and have played an important role in promoting agricultural and rural development during the past few decades (Panda, 2007).

TABLE 5. CONSTRAINTS FACED BY CATTLE SELLERS AND BUYERS

(1)	Per cent position (2)	Rank (3)
Constraints faced by sellers		
Lack of information about buyers	89	I
Lack of demand	73	II
Lack of price information	71	III
Lack of proper market	52	IV
Low price	48	V
Constraints faced by buyers		
Lack of information about sellers	92	I
Lack of price information	79	II
Large number of middleman	76	III
Lack of proper market	58	IV
Lack of disclosure of attributes	46	V

It is concluded that livestock markets are imperfect and lack competition. Therefore, it is suggested that the Department of Animal Husbandry, Government of Uttar Pradesh should make efforts and frame policies to improve the livestock marketing systems in the state.

IV

CONCLUSION AND POLICY IMPLICATIONS

Reliable, relevant, and timely market information is essential for price discovery and efficient functioning of livestock markets. In traditional markets price information on a voluntary basis has been reported for quite long. However, the voluntary disclosure generally provides information on search and experience attributes of the animal which may lead to lack of transparency in the markets. Therefore, the provision for the mandatory disclosure of information for credence attributes is crucial; and hence the role of Government.

The buyers' perspective on disclosure of market information is becoming important due to changing socio-economic profiles and emerging entrepreneurial environment in the country. This study addresses the buyers' perspective on the disclosure of market information based on the quality attributes of livestock. The findings of the study clearly explains that while the livestock market may work well

to induce self or voluntary disclosure of information for search and experience attributes, the mandatory disclosure is essential for credence attributes and efficient functioning of markets. Hence, the role of Government is to ensure mandatory disclosure of information for credence attributes of livestock. Importantly, buyers are willing to pay for expert services and also technology for identifying credence attributes. Therefore, there is a need to take regulatory steps together with infrastructure development to enhance the efficiency of livestock markets.

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