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Socio-Economic Impact of Retail Super Markets on Peri-Urban Vegetable Growers

H.D. Venu Prasad[1*], B.K. Singh[2], Premlata Singh[2] and Abhimanyu Jhajhria[3]

[1]Centre for Water Resources Development and Management, Kozhikode, India
[2]Division of Agricultural Extension, Indian Agricultural Research Institute, New Delhi, India
[3]National Institute of Agricultural Economics and Policy Research, New Delhi, India

**Corresponding author*

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A B S T R A C T

Organized retail markets play an important role of reducing middlemen in the marketing system. These markets provide good customary services to consumers as well as to producers. Organized retailers directly procure the vegetables from the farmer's field, thereby avoid the entry of middlemen in the marketing channel which is beneficial to the farmer, at the same time producers share in consumer rupees also increased. The present study was aimed at assessing the socio-economic impact of organized retail farmers. A sample size of 100 retail farmers and 100 non-retail farmers was selected. A binary logit model was used to analyze the impact of organized retail marketing. The results revealed that in comparison to non-retail farmers, retail farmers were more likely to bring changes in increased cropping intensity, leased in land for cultivation, improved education of their children, repay their old loans and increase savings.The study also observed that organised retail marketing is more effective compared to traditional one.

Introduction

India's food retail industry is dominated by thousands of small "kirana" stores which account for 98 percent of food sales (Sood and Mishra, 2014). India can be a market leader in the agricultural sector for horticultural produce if its market functions properly. The existing traditional system of wholesale market is one where a commission agent procures the produce from the farmers at a price after deducting his commission charge and then sells the produce in the wholesale market to traders and retailers. Here the farmer has to bear costs like commission charge, marketing cost, etc. and finally he is left with little amount of money. The emergence of larger retail chains and stores began around 2005 and the sector has since grown to over 3,200 modern retail outlets across India (Sood and Mishra, 2014). The involvement of the private institutions in marketing or procuring of produce directly from the farmers helps in reducing the cost involved in marketing for farmers. Previously, marketing of fruits and vegetables was undertaken by the farmers' co-operatives only. National Dairy Development Board (NDDB) has started the Fruit and vegetable unit of *Safal* at Delhi, which is one of the first fruit and vegetable retail chains set

up as a part of the Mother Dairy Foods Processing Ltd (Singh and Singla, 2010). The retail unit provided a direct link between fruit and vegetable growers and consumers. Now a number of big corporate houses like the *Reliance*, *ITC*, *Aditya Birla* Group, *Godrej* and *Bharti Airtel* Group have entered the retailing of fresh fruits and vegetables. In the present study, farmers who were selling their vegetables to *Safal* and *Reliance Fresh* were selected to access the socio-economic impact.

Materials and Methods

To assess the socio-economic impact of organised retail markets on farmers (which acts as a treatment group), a set of non-retail farmers (acts as a control group) were selected. The study was undertaken in the National Capital Region (NCR) of Delhi, where *Safal* and Reliance Fresh collection centres are in operation. Collection centres of both *Safal* and *Reliance Fresh* are located in Bakhtawarpur village of Alipur block in Delhi. Bakhtawarpur village was selected purposively because this is the only centre in Delhi where we find the collection centres of both *Safal* and *Reliance Fresh*. A list of all the farmers who are selling their vegetables to the collection centres was collected and from this list a random sample of 100 farmers was selected. Another sample consisting of 100 farmers who were selling their vegetables directly to Azadpur *mandi* were selected randomly.

A socio-economic impact is any change to the socio-economic environment, positive or negative, that wholly or partially results from a project activity or an associated process. In the present study the socio-economic impact was found in terms of consequences experienced by farmers after selling their vegetables from their farms to the retail collection center or to the nearby market. In order to measure socio-economic impact of retail farmers over non-retail farmers, schedule developed by Johnson (2002) was used with slight modifications. A list of consequence items was prepared with the reference to six broad aspects of consequences namely changes in farm, material changes, changes in living standards, economic changes, home changes and social changes. The respondents were asked to react to each item as yes or no and the responses were subjected to logistic regression, which is explained below:

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = Z_i \qquad (1)$$

that is, L, the log of odds ratio, is not only linear in X, but also (from the estimation viewpoint) linear in the parameters. L is called the logit, and hence the name logit models for models like equation (1).

Where $Z_i=\beta_0+ \beta_1X_{i1} +\beta_2X_{i2}+----+\beta_n X_{in}$

Where:

β_0: is the intercept.

$\beta_1, \beta_2 \ldots \beta_n$ are coefficients of the equation in the model.

$X_{i1}, X_{i2 \ldots} X_{in}$ are the independent variables.

In this study, the above econometric model was used to analyze the data.

Apart from this, to work out the producers share in consumer rupee Acharya's method of marketing efficiency was used.

Acharya's method (MME) = FP / (MC+MM)

Where, FP = Net price received by farmer, MC = Total marketing costs and MM= Total net margins of intermediaries.

Before taking the selected variables into the logit model, it is necessary to check for the existence of multicollinearity (Multicollinearity suggests that several of the independent variables are closely linked in some way. In statistics, the occurrences of several independent variables in a multiple regression model are closely correlated to one another. Multicollinearity can cause strange results when attempting to study how well individual independent variables contribute to an understanding of the dependent variable) among the continuous variables and verify the degree of association among discrete variables. For this purpose correlation analysis was performed on independent variables. Based on the result obtained the variables which showed high significant correlation were omitted from the logistic regression.

The correlation results of independent variables are depicted in the following table 1 From table 1 it was found that there was high significant correlation between age and farming experience, and also in between size of the land holding and income. Therefore, it is necessary to omit either age or farming experience at the same time omit either income or size of the land holding.

After omitting farming experience and size of land holding, the remaining independent variables were taken into consideration for logit regression.

Income was expected to be main incentive factor without which development and wealth building activities would not be possible. This encourages the farmers to involve in organized marketing, which ensures the availability of a guaranteed market for the farmers, thus promoting market participation and other developmental activities.

Education is the part of formal institutions that can influence marketing and developmental activities. In the model, the dummy variable, guided by education acquirement was used to determine effects on variable of interest. To understand the relationships and role in their agricultural activities the duration or years of education attainment data was collected.

As cited by Kherallah and Kirsten (2001), socio-political technologies is another important variable which is expected to empower farmers, because it contributes towards reduced transaction costs and it strengthens farmers' bargaining and lobbying power. Respondents were asked whether they belonged to an organization or not and whether they sold output in groups or individually, the responses were allocated dummy values. Both the variables are anticipated to impact positively on market participation choice among the smallholder farmers. This helps in building personal social networks that encourage market participation. It is through these networks that trust is developed, which, in turn, encourages cooperation and regular exchanges. Therefore, social networks reduce transaction costs, leading to diversified market participation choices.

Mass media exposure helps the farmer to get production techniques and other market information in time. In order to capture this variable closely, households were interviewed on the communication networks that are accessible to them. Exposure to mass media like TV, Radio and News Paper etc., has been set as a dummy variable.

If household has no mass media exposure value set to zero. Mass media exposure was expected to influence farmers 'participation and decision making positively; implying that households with access to information are more likely to participate in marketing, purchase of new implements, improvement of education to children etc.

Another variable that is closely linked to information availability is access to extension services such as access to farming advice and knowledge through extension officers. This variable was also allocated dummy values where households with access to extension services took the value of one and zero if otherwise.

Results and Discussion

This section presents the results of the binominal logistic regression model and discusses the results of the significant independent variables that determine dependent variable or the variable of interest to this study. These variables that were discussed in the previous section were considered for the model and tested for their significance. The logistic results compared to the relevant dependent variables are presented in table 2.

The table shows the estimated coefficients (β values). According to Gujarati, (1992), the coefficient values measure the expected change in the logit for a unit change in each independent variable, all other independent variables being equal. The sign of the coefficient shows the direction of influence of the variable on the logit. It follows that a positive value indicates an increase in the likelihood that a household will change to the alternative option from the baseline group. On the other hand, a negative value shows that it is less likely that a household will consider the alternative (Gujarati, 1992; Pundo and Fraser, 2006). Therefore, in this study, a positive value implies an increase in the likelihood of changing from not participating in non-retail activities.

The significance values (also known as p-values) show whether a change in the independent variable significantly influences the logit at a given level. In this study, the variables were tested at the 5% significance level. Thus, if the significance value is greater than 0.10, then it shows that there is insufficient evidence to support that the independent variable influence a change away from the baseline group (refers to dummy variable set to zero). If the significance value is equal to or less than 0.10, then there is enough evidence to support a claim presented by the coefficient value.

The results of the socio-economic impact of organised retail farmers over non-retail farmers are presented below.

From the table 2 in comparison with non-retail farmers, retail-farmer increased the cropping intensity at 1 per cent level of significance. The other factors that contributed for the same are income and education. All the variables showed positive sign and imply that they are positively related with increase in cropping intensity. Similarly in relation with non-retail farmers, retail-farmers leased in land for cultivation, improved the education of their children, repaid their old loans and increased savings on deposits. As shown in table, it is statistically significant at 10 per cent level in effecting foresaid dependent variables.

Net income is the important variable that influenced many developmental activities of farmers, both directly and indirectly. That contributed towards lease in land from other farmers, purchase of new implements, increase expenditure on nutritious food, repayment of old loans, savings in deposits and modification of existing house.

Education of the retail farmers was found statistically significant at 10 per cent level for purchase of new implements and improvement in children education. There was no significant difference found between retail and non-retail farmers in case of purchase of household appliances.

Table.1 Inter-correlation among independent variables

	Income	Age	Farming experience	Land size	Education	Family type	Occupation	Socio-political participation	Mass media exposure	Extension contact	Retail nonretail
Income	1.000	0.146*	0.107	0.954**	0.158*	0.127	0.101	0.060	-0.009	-0.048	0.263*
Age		1.000	0.802**	0.146*	-0.125	0.059	0.086	0.109	0.019	-0.050	0.166*
Farming experience			1.000	0.076	-0.016	0.089	0.120	0.231*	0.163*	0.091	-0.08
Land size				1.000	0.073	0.087	0.118	-0.026	-0.055	-0.018	0.207*
Education					1.000	0.099	0.047	0.308*	0.086	-0.066	0.345*
Family type						1.000	-0.056	0.190*	-0.009	-0.017	0.021
Occupation							1.000	0.038	-0.021	0.035	-0.085
Socio-political participation								1.000	0.251*	0.129	0.148*
Mass media exposure									1.000	0.288*	-0.086
Extension contact										1.000	-0.259*
Retail nonretail											1.000

** Correlation is significant at 0.01 level
* Correlation is significant at 0.05 level

Table.2 Analysis of maximum likelihood estimates

(n=200)

Dependent variables ↓	Explanatory variables →	Intercept	Retail nonretail	Income	Farming experience	Education	Family type	Occupation	Socio-political participation	Mass media exposure	Extension contact
Intensive cultivation	Estimate	-0.0118	0.717***	0.060*	0.0884	-0.272*	-0.0944	-0.564	-0.007	0.0449	0.2803
Leased in land for cultivation	Estimate	2.4622	0.724**	0.123*	-0.1809	-0.1271	-0.0631	0.0781	0.0572*	-0.2616	-0.0152
Purchased new implements	Estimate	3.2198	1.0153	0.485*	0.0256*	0.546*	-0.3031	-0.4288	-0.0283	0.0454	-0.1815
Purchased household appliances	Estimate	2.434	0.2724	-0.265	0.0351	0.1143	-0.0641	-0.00286*	-0.0993	-0.3467	-0.1863
Improvement in education to children	Estimate	3.2442	0.066*	-7.46E-06	0.2218	0.8015*	-0.4976	0.7293*	-0.0498	0.0349	-0.1074
Increased expenditure on nutritious food	Estimate	-1.6009	0.2278	0.248*	-0.2133	0.3912	-0.277*	0.1824	0.00742	0.0702	-0.1114
Increased expenditure on clothing	Estimate	-0.1779	0.3551	0.474	0.141	-0.2766	0.4198	0.179	0.00242	-0.0396	-0.086
Increased expenditure on religious ceremonies	Estimate	5.3821	-0.2019	-0.168	0.3097	-0.1423	0.2957	-0.0495	0.0023	-0.3532	0.2827
Repaid old loans	Estimate	4.4625	0.3039*	0.747**	0.1033	0.3679*	-0.2358	-0.4484	0.00537	-0.2105	0.5998
Increased savings / deposits	Estimate	-2.7127	0.2936*	-0.404*	-0.3953	-0.5261	-0.3583	-0.1549	0.0237	-0.0379	0.1141
Diversification of the cropping system	Estimate	1.340	-1.7468	-0.531*	-0.0431	-0.2142	-0.3061	-0.4363	0.00318	-0.2938	0.191
Incurred financial losses in vegetable cultivation	Estimate	-8.2202	-1.3984	-8.66E-06	-0.1911	0.1956	0.2396	0.577	0.0468	-0.5069	-0.0173
Modification of the existing house	Estimate	3.71E+00	0.163	-0.201*	0.2806	-0.1368	-0.002	-0.0705	0.0299	-0.326	-0.05
Increased extension contact	Estimate	-8.42E+00	1.3897	4.35E-06	-5.94E-02	0.078	0.2642	0.5031	-0.0866	-0.0104	0.6448
Effective communication	Estimate	1.8869	1.52E+00	-5.66E-06	0.1257	0.0967	-0.2281	-0.0936	-0.00612	-0.1225	-0.0901
Subscribed for farm publications	Estimate	7.1781	0.5259	-2.85E-07	0.0961	-0.406*	-0.0442	-0.0984	0.015	0.1744	-0.9609

*** Significance at 1% level; ** Significance at 5 % level; * Significance at 10 % level

Table.3 Marketing efficiency of cauliflower under different marketing channels

S. No.	Particulars	Unit	Traditional channel	*Safal*	*Reliance Fresh*	Organised retail
1	Consumer's retail purchase price (RP)	Rs/quintal	3082.52	2650.96	2644.60	2647.78
2	Total marketing costs (MC) + Marketing margins (MM)	Rs/quintal	1762.52	934.96	920.60	927.78
3	Net price received by farmer (FP)	Rs/quintal	1320.00	1716.00	1724.00	1720.00
Farmer's share in the consumer's rupee (3÷1 X 100)		Percent	42.82	64.73	65.19	64.96
Index of marketing efficiency						
Acharya's method (3 ÷ 2)		Ratio	0.75	1.84	1.87	1.85

Table.4 Marketing efficiency of Spinach under different marketing channels

S. No.	Particulars	Unit	Traditional channel	*Safal*	*Reliance Fresh*	Organized retail
1	Consumer's retail purchase price (RP)	Rs/quintal	1849.00	1627.12	1638.34	1632.73
2	Total marketing costs (MC) + Marketing margins (MM)	Rs/quintal	1114.00	656.92	673.84	665.38
3	Net price received by farmer (FP)	Rs/quintal	735.00	970.20	964.50	967.35
Farmer's share in the consumer's rupee (3÷1 X 100)		Percent	39.75	59.63	58.87	59.25
Index of marketing efficiency						
Acharya's method (3 ÷ 2)		Ratio	0.66	1.48	1.43	1.45

Table.5 Marketing efficiency of radish under different marketing channels

S. No.	Particulars	Unit	Traditional channel	*Safal*	*Reliance Fresh*	Organized Retail
1	Consumer's retail purchase price (RP)	Rs/quintal	1330.50	1184.14	1186.60	1185.37
2	Total marketing costs (MC) + Marketing margins (MM)	Rs/quintal	770.50	400.14	406.60	403.37
3	Net price received by farmer (FP)	Rs/quintal	560.00	784.00	780.00	782.00
Farmer's share in the consumer's rupee (3÷1 X 100)		Percent	42.09	66.21	65.73	65.97
Index of marketing efficiency						
Acharya's method (3 ÷ 2)		Ratio	0.73	1.96	1.92	1.94

Education of the retail farmer was found to be highly significant and income of the retail farmers showed 5 per cent significance to the improvement in children education. Similarly education of the retail farmers was found to be highly significant to the increased expenditure on nutritious food.

Not even a single independent variable showed significant effect on increased expenditure on clothing, religious ceremonies, incurred financial losses in vegetable cultivation, increased extension contact. This may be due to lack of important variables in the model. Farming experience of the retail farmers was found to be significant at 10 per cent level. Similarly, family type of the retail farmers was not found to be significant at 10 per cent level to increased saving or deposits.

The marketing efficiency of cauliflower according to Acharya's method (Modified Measure of Marketing Efficiency) under different marketing channels i.e. traditional, *Safal*, *Reliance Fresh* and organized retail channel (which includes both *Safal* and *Reliance Fresh*) was 0.75, 1.84, 1.87 and 1.85 respectively. From this efficiency index it could be observed that organized channel was the most efficient compared to traditional channel. This is because of the fact that in organized channel there was no involvement of middlemen and hence this channel was most efficient. Moreover, marketing efficiency increased with the decrease in market intermediaries between producer and consumer (Table 3).

The marketing efficiency of spinach (Table 4) according to Acharya's method under different marketing channels i.e. traditional, *Safal*, *Reliance Fresh* and organized retail channel (which includes both *Safal* and *Reliance Fresh*) was 0.66, 1.48, 1.43 and 1.45 respectively. This indicates that the higher the value higher the efficiency of the marketing channel.

The marketing efficiency of radish (Table 5) according to Acharya's method under

different marketing channels i.e. traditional, *Safal*, *Reliance Fresh* and organized retail channel (which includes both *Safal* and *Reliance Fresh*) was 0.73, 1.96, 1.92 and 1.94 respectively. Producer share in consumer rupee was ₹ 42 in traditional market, whereas it was ₹ 65 in organized retail channel. It indicates that traditional channel was found to be less efficient compared to organized retail channel.

Socio-economic implications

Based on the results of the socio-economic impact analysis of retail marketing as compared to non-retail marketing, some important implications that emerge are enhanced income from retail marketing is the main motivating factors for farmers to shift here from the traditional mandis. The results also pointed to the likelihood of shifting towards retail marketing. Hence, conducive environment and policies need to be in place to facilitate this positive trend. The resultant increase in income is likely to lead to positive outcomes especially, better education for children and better nutrition for family members.

The study was undertaken in the NCR of Delhi to study the impact of retail marketing on farmers over non-retail farmers on socio economic variables.

The findings of the study showed that in comparison with non-retail farmers, retail-farmers were found influencing or impacting many socio-economic variable like intensive cultivation, lease in land, purchase of new implements, improvement in children's education, repayment of old loans and investment on savings. Similarly, this variable also influences the net income. Hence, net income, like retail and non-retail farmer, impact the other variables, also the modification of existing houses.

The implication of this study is that by integrating farmers with organized retail markets channel, farmer income will be increased. This eventually led to intensive cultivation of vegetable, investment on new implements, repayment of old loans and increase in savings. It also improves the social capital, investment on children education and expenditure on nutritious food.

Organizing farmers associations help the farmer to integrate with organized marketing channel, benefits them more than present unorganized marketing channel. In this regard extension officials need to promote farmers organization and bring them together with organized marketing channel. In due course of time, integrating organized retail market with world market will fetch premium price to their produce. Policy makers can actively promote organized retail marketing in vegetable cultivation and other similar commodities.

It was concluded from the above study that organised retail marketing was found to be more effective than traditional one and retail farmers were more likely to bring changes in intensive cultivation, go for lease in land for vegetable cultivation compared to non-retail farmers. This implies that organized retail marketing is more advantageous to the vegetable growers than the traditional ones. Hence, policy makers and extension officials may promote organised retail marketing and other institutional mechanism and organization that increase the marketing efficiency. This will increase farmers' incomes and their social economic status.

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