COMPARISON OF SUPERMARKET AND TRADITIONAL MARKET SUPPLY VEGETABLE FARMERS OF TWO DISTRICTS OF INDIA

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ABSTRACT

The study was done on the economic analysis of tomato, brinjal and bhendi cultivation with a comparison of income, access to technology of supermarket and traditional market supply farmers in the two selected districts. The per hectare cost of cultivation of the three selected vegetables on supermarket and traditional market supply farms revealed that cost of cultivation of vegetables was remarkably higher for traditional farms than supermarket supplying farms. This was mainly due to excessive use of manures and fertilizers, irrigation, plant protection chemicals and human labour. The returns per rupee invested have been noted higher for supermarket supply farmers than that of traditional farmers. The evidence indicates that innovative institutions contribute in reducing production cost and augmenting farm profits. Discriminant function analysis shows that price, manures and fertilizers, yield, hired labour and net income contributed mostly to discriminate between two groups' viz., supermarket and traditional market supplying farmers.

Key words: Andhra pradesh, marketing of vegetables, supermarket supply channel; traditional market supply channel.

INTRODUCTION

Indian agriculture is gradually diversifying towards high-value food commodities. This is expected to benefit millions of farmers especially smallholders, who rely on agriculture for their livelihood. The challenges that supermarkets pose in certain circumstances on small producers may have a comparative advantage over larger commercial growers (David *et al*., 2003). Vegetables are considered as protective food and acts as a regular source of returns in farm business. Production of vegetables is limited to a small proportion of farmers because of high production and

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market risks, institutional linkages between production and markets enable farmers to cope with such risks, contribute to more efficient markets and extension, and reduce public institution costs. Agribusiness firms enhanced skills and provided training in clean production, and provided inputs, technology, credit, and services to improve competitiveness. Demand for vegetables in India is income-elastic and is expected to grow faster as the factors underlying demand growth that is income growth and urbanization, have been quite robust during this period and are unlikely to subside in the near future. In other words, rapid growth in demand for high value food commodities opens up immense income and employment opportunities for producers especially, small holders and other stakeholders as the cultivation of vegetables is more profitable, capital and labour intensive compared to staples and other cash crops. This offers a perfect opportunity to small holders to augment their income and employment. Evidence from many Asian and African countries indicates that vegetable production requires 1.5-3 times more labour and generates 1.3-14 times more returns compared to cereals (Joshi *et al*., 2006). The farmers connected to organised retail in India have larger land holdings (Joseph *et al.,* 2008; Mangala and Chengappa, 2008; Alam and Verma, 2007) and higher proportion of irrigated land (Joseph *et al.,* 2008) than those supplying to traditional market channels. Studies on fresh fruit and vegetable retail chains in India have confirmed relative advantages for farmers connected with organised retail and the farmers contracted by retail chains received comparatively higher prices (Dhananjaya and Rao, 2009).

For supplying to supermarket less perishable commodities are procured from the farmers by setting up collection centers in the niche production regions. Most organised food retail ventures are involved in arrangements of procurement without any contracts or commitments, apart from paying farmers at price for the produce (Sulaiman *et al.,* 2010).The procurement officers provide technical support to the member farmers in preparation and planning of crop calendar and showing schedules to get the desired supply on a regular basis. For other inputs, the firm maintains a panel of some reputed input dealers and recommends producers to source their requirements from them. Producers, however, are free to buy from anywhere. In general, input price charged by these dealers are marginally less than their market prices. Extension services such as selection of quality inputs, sowing techniques, irrigation management practices, identification of pests and diseases and their management, harvesting techniques, and grading, standardization and packaging methods are provided to the farmers at free of cost to farmer. Singh (2010) report that retail chains have raised quality consciousness among farmers introduced grading (in primary processing) and have helped cost-cutting through extension and training on input use for better yield.

Under this perspective, the present study is undertaken with the following objectives: (i) to analyse the economics of vegetable production of supermarket and traditional market supply farmers , (ii) to compare the income of these two groups of

farmers, and (iii) to specify the variables that are discriminating the supermarket supply farmers from traditional market supply farmers.

MATERIALS AND METHODS

Medak and Rangareddy Districts of Andhra Pradesh were purposively selected for the present study as they were supplying vegetables to many corporate retail companies like Reliance Fresh, More, Spencers, ITC e-choupal which were operating their retail outlets in Hyderabad city. The study focuses on three fresh vegetables namely tomato, brinjal and bhendi as they are farmer perspective (regularly providing income for producers). A total of 468 vegetable cultivators were selected of which 234 are from Rangareddy district and 234 are from Medak district. Among the 234 farmers, 117 farmers are linked with supermarkets and 117 farmers are supplying vegetables to traditional markets. Out of 117 farmers 39 each of tomato, brinjal and bhendi farmers were selected randomly taking two categories of farmers i.e. small and large from each district.

Primary data on cost of cultivation of both the group of farmers was collected during the year 2009-2010 through a pre-tested schedule. Analysis was done to estimate costs according to cost concepts where income measures and Discriminant function were employed as shown below.

Cost concepts:

Cost A_1: All the variable costs excluding family labour cost and including interest on working capital; Cost A_2: Cost A_1 + rent paid for leased-in land; Cost B_1: Cost A_1 + interest on value of owned capital assets (excluding land); Cost B_2: Cost B_1 + rental value of owned land + rent paid for leased- in land (net of land revenue); Cost C_1: Cost B_1 + imputed value of Family Labour; Cost C_2: Cost B_2 + imputed value of Family Labour and Cost C_3: 10% of C_2.

Income measures:

Gross income: Yield of the crop X market price received per quintal; Net income : Gross income - Cost C_2; Farm business income : Gross income - Cost A_1 or Cost A_2; Family labour income : Gross income - Cost B_2 ; Farm investment income : Farm business income – imputed value of family labour.

Discriminant Function

Discriminant functional analysis was used to know the relative importance of different variables, power of relevant variables to discriminate between two groups of farmers viz., suppliers to supermarkets and non- supplier to supermarkets. The discriminant function employed was of the following form:

$$Z_1 = \sum_{i=1}^{p} L_i X_i \quad \text{(for first group farmers)}$$

$$Z_2 = \sum_{i=1}^{p} L_i X_i \quad \text{(for second group farmers)}$$

Where, Z = Total discriminant score for both group of farmers, X_i= Variables selected to discriminate the two groups; and L_i = Discriminant coefficients of the variables estimated from the data.

S L = d

Where,

L= Column vector of the coefficient of discriminant function, S= Pooled dispersion matrix S_{ij} (pooled covariance matrix of the same groups), d = d_1, d_2,…………d_p was the vector of mean differences on the 'p' original measure.

The discriminant function was tested for significance, whether the variables considered together were significantly discriminating between the two groups. Mahalanobis D^2 statistics was used to measure the discriminating distance between the two groups as follows:

$$D^2_{ab}= (n-g)\sum^{p}\sum^{n} W_{ij} (X_{ia}-X_{ib}) (X_{ja}-X_{jb}) = \sum^{n} L_i d_i$$

Where, n = total number of cases, g = number of groups, p = number of variables, X_{ia} = Mean of ith variable in group 'a', W_{ij} = Element from the inverse of within groups covariance matrix; and L_i = Inverted matrix of the coefficients of the discriminant function. a = suppliers,   b= non suppliers. The significance of D^2 as tested by applying the following F- test. $D^2 = (X_1-X_2) S^{-1} (X_1- X_2)$; and S = Pooled covariance matrix of the two samples.

RESULTS AND DISCUSSION

Cost of cultivation of vegetables

Various components of cost of cultivation of tomato, brinjal and bhendi farmers for supermarket and traditional market supply in Rangareddy and Medak districts were presented in tables-1,2,3. In Rangareddy district, operational cost per hectare was less for supermarket supply tomato small farmers (Rs. 18978) over traditional market supply tomato farmers (Rs. 21589) due to excess indiscriminate usage of seeds, manures and fertilizers and plant protection chemicals (Table 1). Among the operational costs for tomato of small farmers, human labour occupies a major share (28.38 and 30.20) of total cost of (Rs. 36379 and Rs. 38855) of supermarket and traditional market supply, respectively. In Medak district also the operational cost per hectare was less for supermarket supply farmers (Rs. 19206) over traditional market supply tomato farmers (Rs. 20825). Farmers of Medak district were also found to have used labour efficiently in supermarket supply.

The cost of cultivation of supermarket supply brinjal small farmers in Rangareddy district was Rs. 38473 which was comparatively less than traditional market supply farmers of Rs. 39902. Among the various items in operational cost of brinjal cultivation in Medak district, human labour accounts slightly 1% more for supermarket supply farms than traditional markets supply. It was also noted that human labour utilization of supermarket supply brinjal was more than tomato crop, this might be due to the long duration of brinjal crop. The expenditure on manures and fertilizers was highest in small farms followed by large farms for both the channel farmers. It was observed that the expenditure on plant protection chemicals was higher in brinjal compared to tomato, as more number of pests and diseases are observed on brinjal. Supermarket supply small farmers invested less amount on plant protection chemicals when compared to the traditional markets supply channels by Rs. 121 (Table 2). The reason may be that the supermarket suppliers are more conscious about chemicals usage than traditional farmers.

The cost of cultivation of supermarket supply bhendi large farmers in Rangareedy district was Rs. 29579 which was comparatively lower than supermarket supply small farms i.e Rs. 36313.The same trend was noticed in Medak district also. The cost of cultivation per hectare for supermarket supply bhendi small farmers in Rangareddy was Rs. 36314 which was comparatively less than traditional market supply farmers of Rs. 38969. In Medak district the cost of cultivation of supermarket supply bhendi small farmers was less than traditional market supply channels by Rs. 2170. Likewise, in tomato and brinjal, there is an inverse relationship between cost and farm size, the results revealed that supermarket farmer was efficient in carrying out the various operational activities. The total operational cost is observed to be more in bhendi compared to brinjal and tomato in both the districts. Among the various operational costs human labour utilization was more in bhendi compared to other vegetables which occupied a major share because of risk involved to carry out the cultural operations within the crop, followed by manures and fertilizers for both the channel farmers.

From the above analysis it was evident that the total cost of cultivation per hectare was highest in Rangareddy district brinjal traditional farmer followed by tomato and bhendi farmers. This difference across the vegetables was due to duration of the crops and the requirement of inputs. The difference across the channels was due to the lack of proper knowledge about the material inputs management. Small farmers were incurring more expenditure compared to large farmers in the cultivation of all these selected vegetables inspite of this small holders were gradually diversifying out of staples towards high-value commodities, (Birthal, Joshi and Gulati 2003) and this was expected as small holders had a higher endowment of labour in relation to land and thus, had a comparative advantage in production of labour-intensive high value crops (Birthal and Joshi 2007).

Cost concepts and income measures

The comparison of cost concepts in table 4 revealed interesting findings in all the three selected vegetables. $CostA_1$ for tomato of supermarket supplier pertaining to small farms in Rangareddy district was less than the traditional market supply farms by Rs. 2,813.85. $CostA_1$ indicated an inverse relationship with farm size in tomato, brinjal, bhendi cultivation. This was mainly due to participation of more of owned labour in small farms. The $CostB_1$ on tomato supermarket small farmers accounted to Rs. 15,008.08 against Rs. 17,029.17 of brinjal and Rs. 16794.23 of bhendi small farmers. While in Medak district tomato, brinjal and bhendi crop small farmers recorded Rs. 15,312.31, Rs. 16,258.75, Rs. 17,277.69 respectively. $CostC_1$ has showed an inverse relationship with the farm size for both the market channels in two districts. Cost C_3 which was 10% of Cost C_2 indicated as Rs. 3638, Rs. 3847, and Rs. 3631 in Rangareddy district pertaining to supermarket suppliers of small farms with respect to tomato, brinjal and bhendi. In Medak district Cost C_3 for supermarket supply small farms of tomato, brinjal, bhendi was indicated as Rs. 3598, 3762 and 3643 respectively.

The average yield of Rangareddy supermarket supplying small farms in case of tomato, brinjal, bhendi was 131, 132 and 68 quintal per hectare, while that of traditional market supply farmer's average yield for the selected vegetables was 130, 134 and 67 quintal per hectare. In Rangareddy district supermarket supply tomato small farmer yield obtained was 131 quintals per hectare which was slightly higher than traditional market supply farmers of 130 quintals per hectare, in Medak district also supermarket supply farmers yields were slightly higher than traditional market supply farmers. It was also known that the average yields in quintals per hectare of all the three vegetables were slightly higher in Medak district pertaining to suppliers of supermarket small farms when compared to large farms which indicated an inverse relationship with farm size. It was observed that the gross returns (94098), farm business income (73518), family labour income (57401) obtained in Rupees per hectare were the highest in Rangareddy district brinjal producing supermarket supply small farmers than large farmers. for all the three selected vegetables the gross returns, farm business income, family labour income were highest in supermarket supply small farms than large farms. The reason was identified as more concentration paid by the small farmers in vegetable production which resulted higher yields and returns. Naveen *et al.,* (2005) revealed that Supermarket channel farmers had adopted more capital intensive production technologies (irrigation interventions and enhanced use of soil fertility inputs) which resulted in their average land and labour productivity being 60-70 percentages higher than those of traditional channel farmers.

Different measures of return namely, gross income, net income, family labour income, farm family investment income and farm business income per hectare also revealed high degree of profit from supermarket supplying farms. It was found

that retail chains had enhanced the farmers profitability by 10-15% (Changappa and Nagaraj 2005). Even though, the yields were slightly higher for supermarket supply farmers, a deeper view indicated that there was minimum difference in productivity of the three selected vegetables between the supermarket and traditional market supply farmers. But there were differences in cost of cultivation of the three selected vegetables between supermarket and traditional market supply farmers. The price received per quintal for supermarket supply farmers was relatively higher than traditional market supply farmers in both the districts for all the three selected vegetables due to the freshness retained and less damage caused by transportation for supermarket supply farmers (Tables 4, 5 and 6). Linking of traditional market farmers with retail outlets would enable small farmers to have more profit (Mangala and Changappa 2008).

Discriminating characteristics between supermarket and traditional market supply farmers.

The results of discriminant function analysis as studied between two distinct groups of farmers in the selected districts are presented in (Table 7). The D^2 value was found to be 65.60 and 44.29 in Rangareddy and Medak districts, respectively which were statistically significant at one per cent level of probability indicating that the variables considered in the function are significantly distinguishing between the two groups of farmers.

The relative importance of the discriminators as seen through the table revealed that price, manures and fertilizers, yield, hired labour and net income contributed mostly to discriminate between two groups in Rangareddy, while in case of Medak district, transportation cost, rent for owned land, human labour, price received per quintal contributed mostly to discriminate between the two groups. This indicated that there was a significant difference in the cultivation of vegetables by the supermarket and traditional supply farmers.

CONCLUSIONS

This paper analyzed issue of small holder participation in high-value vegetable production and their access to the markets. Even though, the yields were slightly higher for supermarket supply farmers, a deeper view indicated that there was minimum difference in productivity of the three selected vegetables between the supermarket and traditional market supply farmers. But there were differences in cost of cultivation of the three selected vegetables between supermarket and traditional market supply farmers. It emerged from this study that small holders, despite their limited access to land, participated more in vegetable production and made sizeable contribution to their output. Further, small holders had greater endowment of family labour and were more efficient in production of labour intensive crops like vegetables. So it could be concluded that the supermarket supply farmers were profitable, as the collection centre officers and the distribution centre officers were

disseminating good agricultural practices to the farmers who were linked with the supermarkets, hence led to reduced cost of cultivation. The profitability of small farmers could be increased by reducing the cost of cultivation, by adopting a location specific suitable method of input supply system. The linkage of supermarket with farming changed the method of farming especially for small farmers, through their intensive cultivation, and they had been able to earn considerably higher income. Developmental programs should assist small holder farmers to access the supermarket chain and would have to make sure that farmers meet the major portion of supermarket requirements. Production of most of the high -value vegetables is capital- and information/knowledge- intensive and riskier, while smallholders lack access to capital, improved technologies, quality inputs, extension services needed for entry into the high- value segment. Institutions like cooperatives, contract farming and growers associations were considered to improve producer's access to markets and the evidence indicated that these institutional innovations enhanced their access to market, quality inputs, improved technology information and services. It was, therefore, essential to strengthen institutional mechanisms that improve smallholders' access to credit, technology and support services. Institutional innovations that linked production with markets, enable producers cope up with risks, contributed towards development of efficient markets and extension systems, and reduced burden on public exchequer of providing such services. Task force on promotion of new and competitive agricultural market in private and cooperative sectors was required to encourage direct marketing and contract marketing programmes that facilitated industries and large trading companies to undertake procurement of agricultural commodities directly from the farmers field and to establish effective linkages between the farm production and retail chains. Reduction in commission charges, provision of cheap and efficient transport facilities, establishment of regulated markets, strengthening of the cooperative marketing institutions, innovations in packing and storage technology for the vegetables needed be developed. India being the land of small and marginal farmers and have been advocating the fact that small farmers are going to feed India, it is important to mobilize and help them to diversify to meet the increasing domestic demand of horticulture products. As identified from African nations the small farmers are the key to initiate the horticultural revolution and with technical change and increase in international competitiveness large scale operations and vertical integration takes place. Thus to sustain the growth and development of the small land holder, farmers should be monitored to identify, select and support horticultural and entrepreneurial smallholders. Linking small farmers with high value urban and export markets would lead to the development of the rural sector.

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Table 1: Cost of cultivation of tomato supermarket and traditional market supply farmers in Ranga reddy and Medak districts of Andhra Pradesh.

(Rupees per hectare)

Particulars	Ranga reddy				Medak			
	Super market supply farmers		Traditional market supply farmers		Super market supply farmers		Traditional market supply farmers	
	Small	Large	Small	Large	Small	Large	Small	Large
Human Labour	10327.31(28.38)	8528.85 (29.29)	11736.54(30.20)	9802.69 (30.87)	1093462 (25.29)	9268.08 (31.48)	11518.46(30.53)	9532.31(31.56)
Owned	5871.15 (16.13)	3860.77 (13.26)	5479.23 (14.10)	3339.23 (10.51)	5669.62 (12.72)	3187.31 (10.82)	5244.62 (13.90)	3861.15 (12.7)
Hired	4456.15 (12.24)	4668.08 (16.03)	6257.31 (16.10)	6463.46 (20.35)	5265.00 (14.63)	6080.77 (20.65)	6273.85 (16.63)	5671.15(18.77)
Bullock labour	2010.38 (5.52)	1897.69 (6.51)	2244.62 (5.77)	1923.85 (6.05)	1966.92 (5.46)	1848.85 (6.28)	2083.08 (5.52)	1895.38 (6.27)
Seeds	533.85 (1.46)	560.00 (1.92)	750.00 (1.93)	794.62 (2.48)	522.31 (1.48)	556.15 (1.88)	748.46 (1.97)	789.62 (2.59)
Manures and fertilizers	3270.00 (8.98)	2863.08 (9.83)	3760.00 (9.67)	3365.77 (10.60)	3048.46 (8.47)	2780.77 (9.44)	3576.54 (9.48)	3065.00(10.14)
Irrigation	444.62 (1.22)	421.54 (1.44)	466.92 (1.20)	423.08 (1.33)	439.23 (1.22)	430.77 (1.46)	470.00 (1.24)	413.85 (1.37)
Plant Protection chemicals	2060.77 (5.66)	2373.08 (8.15)	2255.00 (5.80)	2559.23 (8.06)	1968.85 (6.27)	2286.15 (7.76)	2053.85 (5.44)	2474.62 (8.19)
Interest on working capital	330.7 (0.90)	427.31 (1.46)	376.54 (0.96)	419.23 (1.32)	325.77 (0.90)	429.23 (1.45)	375.00 (0.99)	416.15 (1.37)
Total variable cost	18977.69(52.16)	17071.54(58.63)	21589.62(55.56)	19288.46(60.37)	19206.15(55.10)	17600.00(59.79)	20825.38(54.91)	18586.92(61.1)
Rent owned land	15500.00(42.60)	10815.38(37.14)	15600.00(40.35)	11516.92(36.27)	15500.00(43.07)	10661.54(36.22)	15500.00(41.00)	10684.92(35.3)
Land revenue	150.00 (0.41)	133.08 (0.45)	79.23 (0.20)	76.54 (0.24)	85.38 (0.23)	82.69 (0.28)	78.08 (0.20)	75.38 (0.24)
Depreciation	548.46 (4.41)	439.23 (1.50)	429.23 (1.11)	344.62 (1.08)	535.00 (1.48)	436.92 (1.48)	426.92 (1.13)	343.85 (1.13)
Interest on fixed capital	1203.07 (3.30)	656.15 (2.25)	1157.69 (2.99)	721.54 (2.27)	1155.38 (3.21)	653.08 (2.21)	1094.23 (2.90)	712.31 (2.35)
Total fixed cost	17401.5 (47.83)	12043.85(41.36)	17266.15(44.66)	12659.62(39.87)	16775.77(46.62)	11834.23 (40.2)	17099.23(45.32)	11816.15(39.1)
Total cost	36379.23 (100)	29115.38 (100)	38855.77 (100)	31948.08 (100)	35981.92 (100)	29434.23 (100)	37924.62 (100)	30403.03 (100)

figures in parenthesis indicate percentages to total cost

Table 2: Cost of cultivation of brinjal supermarket and traditional market supply farmers in Ranga reddy and Medak districts of Andhra Pradesh. (Rupees per hectare)

Particulars	Ranga reddy				Medak			
	Super market supply farmers		Traditional market supply farmers		Super market supply farmers		Traditional market supply farmers	
	Small	Large	Small	Large	Small	Large	Small	Large
Human Labour	11351.54(29.50)	9840.00 (31.73)	11903.85(29.98)	10125.77(31.88)	11416.15(28.7?)	9432.31 (31.17)	11544.23(27.73)	9422.31 (30.20)
Owned	5779.23 (15.02)	3671.54 (11.84)	5876.15 (14.80)	3868.08 (12.17)	5738.85 (14.50)	3559.23 (11.76)	6286.92 (16.27)	3669.23 (11.76)
Hired	5572.31 (14.48)	6168.46 (19.89)	6027.69 (15.18)	6257.69 (19.70)	5677.31 (15.09)	5873.08 (19.40)	5257.31 (13.61)	5753.08 (18.44)
Bullock labour	2470.00 (6.42)	1934.62 (6.23)	2371.92 (5.97)	1960.00 (6.17)	2066.15 (5.49)	1861.15 (6.15)	2265.71 (5.86)	1960.00 (6.28)
Seeds	550.00 (1.42)	562.30 (1.81)	771.15 (1.93)	767.69 (2.40)	542.31 (1.44)	559.23 (1.84)	761.15 (1.96)	763.83 (2.43)
Manures and fertilizers	3378.46 (8.78)	3062.69 (9.87)	3759.62 (9.46)	3228.46 (10.16)	3270.38 (8.69)	2961.54 (9.78)	3670.38 (9.50)	3377.69 (10.82)
Irrigation	452.30 (1.17)	383.85 (1.23)	459.23 (1.15)	419.23 (1.32)	446.54 (1.18)	377.69 (1.24)	450.77 (1.16)	415.35 (1.33)
Plant Protection chemicals	2181.92 (5.67)	2484.62 (8.01)	2340.77 (5.89)	2745.38 (8.64)	2148.46 (5.71)	2359.62 (7.79)	2270.00 (5.87)	2668.08 (8.55)
Interest on working capital	350.00 (0.90)	425.00 (1.37)	368.08 (0.92)	419.23 (1.32)	346.92 (0.92)	418.85 (1.38)	367.69 (0.95)	431.54 (1.38)
Total variable cost	20734.23 (53.9)	18693.08(64.7)	21974.62(55.07)	19665.7 (61.53)	20236.92 (53.7)	17970.38(59.38)	21330.00(54.93)	19238.85(61.27)
Rent owned land	15661.54(40.70)	11130.0 (35.89)	15823.08(39.85)	11033.08(34.74)	15615.38(41.5?)	11103.85(36.69)	15700.00(40.64)	11115.38(35.62)
Land revenue	87.31 (0.22)	64.62 (0.20)	90.00 (0.22)	94.62 (0.29)	86.54 (0.23)	63.46 (0.20)	83.08 (0.21)	92.31 (0.29)
Depreciation	540.00 (1.40)	435.38 (1.40)	518.08 (1.30)	368.46 (1.16)	410.77 (1.09)	443.85 (1.46)	535.38 (1.38)	361.54 (1.15)
Interest on fixed capital	1450.00 (3.76)	638.84 (2.06)	1496.15 (3.76)	796.15 (2.50)	1266.15 (3.36)	678.46 (2.24)	1176.15 (3.04)	789.23 (2.52)
Total fixed cost	17738.35(46.10)	12313.85(39.71)	17927.31(45.15)	12292.31(38.70)	17378.85(46.2?)	12289.62(40.61)	17494.62(45.29)	12358.46(39.61)
Total cost	38473.08 (100)	31006.92 (100)	39901.92 (100)	31958.08 (100)	37615.77 (100)	30260.00 (100)	38824.62 (100)	31397.31 (100)

(figures in parenthesis indicate percentages to total cost)

Table 3: **Cost of cultivation of bhendi supermarket and traditional market supply farmers in Ranga reddy and Medak districts of Andhra Pradesh.** **(Rupees per hectare)**

Particulars	Ranga reddy				Medak			
	Super market supply farmers		Traditional market supply farmers		Super market supply farmers		Traditional market supply farmer	
	Small	Large	Small	Large	Small	Large	Small	Large
Human Labour	11118.85(30.61)	9792.69 (33.10)	12128.08(31.28)	10249.23(33.43)	12058.85(33.09)	9626.54 (33.14)	12395.77(32.27)	10249.23(33.43)
Owned	6444.23 (17.74)	3735.38 (12.62)	6553.85 (16.90)	4279.23 (13.95)	6428.08 (17.64)	3664.23 (12.61)	6538.85 (17.02)	4279.23 (13.95)
Hired	4674.62 (12.87)	6057.31 (20.47)	5574.23 (14.37)	5970.00 (19.47)	5630.77 (15.45)	5962.31 (20.52)	5856.92 (15.24)	5970.00 (19.47)
Bullock labour	2655.77 (7.31)	2423.08 (8.19)	2723.85 (7.02)	2587.69 (8.44)	2423.08 (6.65)	2260.00 (7.78)	2671.54 (6.95)	2587.69 (8.44)
Seeds	627.31 (1.72)	516.54 (1.74)	845.38 (2.16)	751.54 (2.43)	627.31 (1.72)	510.38 (1.75)	840.00 (2.17)	751.54 (2.43)
Manures and fertilizers	3864.62 (10.64)	3474.23 (11.74)	4073.85 (10.50)	3672.69 (11.98)	3762.3 (10.32)	3580.38 (12.32)	3957.31 (10..30)	3672.69 (11.98)
Irrigation	455.38 (1.25)	260.00 (0.87)	485.38 (1.25)	205.38 (0.66)	449.23 (1.23)	260.00 (0.89)	478.46 (1.24)	205.38 (0.66)
Plant protection chemicals	2686.15 (7.39)	2389.62 (8.07)	2731.92 (7.04)	2417.69 (7.88)	2570.77 (7.05)	2389.62 (8.22)	2656.92 (6.91)	2417.69 (7.88)
Interest on working capital	318.85 (0.87)	322.31 (1.08)	336.15 (0.86)	316.92 (1.03)	315.77 (0.86)	313.85 (1.08)	321.54 (0.83)	316.92 (1.03)
Total variable cost	21726.92(59.83)	19178.46(64.83)	23324.62(59.85)	20201.15(65.47)	22207.31(60.94)	18940.77(65.21)	23321.54 (60.4)	20201.15(65.47)
Rent owned land	12730.7 (35.05)	9220.00 (31.17)	14151.54(36.50)	9340.00 (30.46)	12730.77(34.93)	8900.00 (30.64)	13800.0 (34.93)	9340.00 (30.46)
Land revenue	60.00 (0.16)	63.85 (0.21)	68.46 (0.17)	63.85 (0.20)	63.08 (0.17)	62.69 (0.21)	66.92 (0.17)	63.85 (0.20)
Depreciation	463.85 (1.27)	332.31 (1.12)	466.92 (1.20)	363.85 (1.18)	460.00 (1.26)	350.00 (1.20)	465.00 (1.21)	363.85 (1.18)
Interest on fixed capital	987.69 (2.71)	784.62 (2.65)	957.69 (2.47)	886.15 (2.89)	975.38 (2.67)	791.92 (2.72)	952.69 (2.48)	886.15 (2.89)
Total fixed cost	14586.92(40.16)	10400.77(35.16)	15644.62(40.35)	10653.85(34.75)	14229.23(39.05)	10104.62(34.78)	15284.62(39.79)	10653.85(34.75)
Total cost	36313.85 (100)	29579.23 (100)	38969.23 (100)	30855.00 (100)	36436.54 (100)	29045.38 (100)	38606.15 (100)	30855.00 (100)

(Figures in parenthesis indicate percentages to total cost)

Table 4.   Market wise Comparision of cost concepts of selected vegetables production in Rangareddy and Medak districts of Andhra Pradesh For the year 2009-2010.

Particulars	Rangareddy				Medak			
	Super market supply farmers		Traditional farmers		Super market supply farers		Traditional farmers	
Tomato	Small	Large	Small	Large	Small	Large	Small	Large
Cost A_1	13805.00	13783.08	16618.85	16170.38	14156.92	14932.31	16085.77	14945.00
Cost A_2	18805.00	16783.08	21618.85	20170.38	19156.90	19932.31	21085.76	19945.00
Cost B_1	15008.08	14439.23	17776.54	16891.92	15312.31	15585.38	17180.00	15657.31
Cost B_2	35508.08	28254.62	38376.54	33408.84	35312.32	31246.92	37680.00	31341.92
Cost C_1	20879.23	19260.00	23255.77	20231.15	20981.92	18772.69	22424.62	19518.46
Cost C_2	36379.23	29115.38	38855.77	31948.08	35981.94	29434.23	37924.62	30403.03
Cost C_3	3637.92	3007.53	3885.57	3174.80	3598.19	3443.42	3792.46	3020.30
Brinjal								
Cost A_1	15579.16	15521.54	16706.54	16260.77	14993.75	14918.46	15661.54	15823.46
Cost A_2	20579.17	19421.52	21706.55	20060.77	18993.72	18418.42	20661.52	18823.44
Cost B_1	17029.17	16205.38	18202.69	17056.92	16258.75	15596.92	16837.69	16612.69
Cost B_2	36695.83	31335.38	39025.77	31890.00	35875.42	30200.77	37537.63	30728.08
Cost C_1	22809.17	19876.92	24078.85	20925.00	22005.00	19156.15	23124.62	20281.92
Cost C_2	38473.08	31006.92	39901.92	31958.08	37615.77	30260.00	38824.62	31397.31
Cost C_3	3847.58	3100.69	3990.19	3195.80	3762.16	2976.00	3882.46	3129.73
Bhendi								
Cost A_1	15806.54	15839.23	17306.15	16349.62	16302.31	15689.23	17314.62	16332.31
Cost A_2	20806.35	20839.23	22306.14	21349.63	21302.21	19687.22	22314.64	20332.33
Cost B_1	16794.23	16623.85	18263.85	17235.77	17277.69	16481.15	18267.31	17189.25
Cost B_2	34869.62	30843.85	37415.38	31575.77	35008.46	29381.17	37067.34	30439.23
Cost C_1	23238.46	20359.23	24817.69	21515.00	23705.77	20145.38	24806.15	21540.00
Cost C_2	36313.85	29579.23	38969.23	30855.00	36436.54	29045.38	38606.17	30855.00
Cost C_3	3631.38	2957.92	3896.92	3085.50	3643.65	2904.53	3860.61	3079.00

Table 5 : Market wise farm income measures for tomato and brinjal production in Rangareddy and Medak districts of Andhra Pradesh (Rupees per hectare)

Particulars	Tomato				Brinjal			
	Super market supply farmers		Traditional farmers		Super market supply farmers		Traditional farmers	
	Small	Large	Small	Large	Small	Large	Small	Large
Rangareddy								
Average yield (Q/Ha)	131.54	129.54	130.00	128.46	134.69	127.85	133.85	128.92
Market price	693.27	688.46	552.88	548.08	703.85	693.08	586.54	570.19
Gross returns	91192.73	89183.10	71874.40	70406.35	94097.70	88610.27	78508.37	73508.89
Net returns	54813.50	60067.72	33018.63	38458.27	55624.62	57603.35	38606.45	41550.81
Farm business income	72387.73	72400.02	50255.60	50235.97	73518.53	69188.75	56801.82	53448.12
Farm family labour income	59684.65	58528.48	36497.86	35997.51	57401.17	57274.89	41483.20	40218.00
Farm investment income	66516.58	68539.25	44776.37	46896.76	67739.30	65517.21	50925.67	49580.04
Medak								
Average yield (Q/Ha)	151.38	148.46	149.69	148.00	153.08	149.08	150.92	148.00
Marker Price	696.15.00	680.38	470.19	463.46	675.04	624.04	511.54	494.23
Gross returns	105383.18	101009.21	70382.74	68592.08	103335.12	93031.88	77201.61	73146.04
Net returns	69401.26	71574.77	32458.12	38189.05	65719.35	62771.88	38376.99	41748.73
Farm business income	86226.28	81076.90	49296.98	48647.08	84341.40	74613.46	56540.09	54322.60
Farm family labour income	73070.86	69762.29	35702.74	32250.16	67459.70	62831.11	42663.98	40417.96
Farm investment income	80556.6	71808.82	43953.38	44785.93	78602.55	71054.23	50253.17	50653.37

Table 6 : Market wise farm income measures for bhendi production in Rangareddy and Medak districts of Andhra pradesh

(Rupees per hectare)

Particulars	Bhendi			
	Super market supply farmers		Traditional farmers	
	Small	**Large**	**Small**	**Large**
Rangareddy				
Average yield (Q/Ha)	69.15	66.92	67.38	65.85
Market Price	1269.23	1228.85	1148.08	1131.73
Gross returns	86498.02	82234.64	77357.63	74524.42
Net returns	50184.17	52655.41	38388.40	43669.42
Farm business income	65691.67	61395.41	55051.49	53174.79
Farm family labour income	51628.40	51390.79	42942.27	40948.65
Farm investment income	59247.44	57660.03	48497.64	48895.56
Medak				
Average yield (Q/Ha)	73.85	71.69	72.77	69.69
Market Price	1168.27	1155.77	1059.62	1054.81
Gross returns	85907.48	82857.15	77108.54	73509.70
Net returns	49470.94	53811.77	38502.39	42719.70
Farm business income	64605.27	63169.93	54793.90	53177.37
Farm family labour income	53899.02	50475.98	43041.20	41070.47
Farm investment income	63957.19	59505.70	48255.05	48826.60

Table 7 : Discriminant function analysis for vegetable cultivators in Rangareddy and Medak districts of Andhra Pradesh.

S.No	Districts	Rangareddy		Medak	
	Variables	Discriminant coefficients	t-value	Discriminant coefficients	t-value
1	Intercept a	-13.43***	12.48	-6.579***	5.244
2	Owned labour	0.00016**	2.668	0.00048***	4.781
3	Hired labour	0.00055***	6.260	0.00050***	4.691
4	Bullock labour	0.00059*	2.579	0.00117**	2.605
5	Seeds	0.00383***	5.161	-0.00080	0.696
6	Manures and fertilizers	0.00162***	8.039	0.0005**	3.067
7	Irrigation	-0.00064	0.867	-0.00180**	3.010
8	Plant protection chemicals	0.00046*	2.286	0.00023	0.953
9	Rent for own land	-0.00020***	4.193	0.00018***	4.880
10	Depreciation	-0.00101*	2.230	0.00127*	2.114
11	Price (Rs/Q)	0.01727***	9.183	0.00925**	3.301
12	Yield	0.01547***	7.409	0.00075	1.252
13	Net income	0.00003***	5.429	0.00001	1.391
14	Distance covered	0.01962***	2.767	-0.00818	1.192
15	Transportation cost	0.00560	1.819	0.01856***	5.205
	Misclassification probability	0.0051%		0.0875%	
	D^2	65.60		44.29	
	T^2	3838.80		2591.84	
	F statistics	210.24		141.94	

*** Significant at one percent level   ** Significant at five percent level   * Significant at ten percent level