RESEARCH ARTICLE

STUDY OF MARKET STRUCTURE OF HYBRID COTTON SEEDS IN NORTH KARNATAKA

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Abstract: Cotton often referred as *"White gold"* or the *"King of Fibres"* enjoys a predominant position amongst all cash crops in India and is closely linked to human civilization itself. *Bt* cotton, a transgenic plant produces an insect controlling protein in Cry1A(c), the gene which has been derived from the naturally occurring bacterium, *Bacillus thuringenesis* subsp. kurstaki (B.t.k.). The cotton seed industry has emerged as an important component in the seed market basically due to its ability for development of hybrids and diversity of production. A multistage random sampling was adopted as appropriate sampling procedure for the study. The data on area under cotton in Karnataka was collected, which comprising of two northern districts of Karnataka namely Dharwad and Haveri. From each district 10 delears were selected for the study, Hence, a total of 20 dealers were selected to elicit information required for the study. Lorenz Coefficient of inequality for Dharwad district was slightly high (0.561) and for Haveri district was high (0.60) indicating Monopolistic competition in the both markets.

Keywords: *Bt* cotton, Gini co-efficient ratio, Multistage random sampling, Lorenz Coefficient

INTRODUCTION

Cotton often referred as *"White gold"* or the *"King of Fibres"* enjoys a predominant position amongst all cash crops in India and is closely linked to human civilization itself. There are about 42 species of the genus *Gossypium* out of these only four species, viz. *Gossypium arboreum*, *Gossypium herbaceum*, *Gossypium hirsutum* and *Gossypium barbadense* are cultivated and rest are wild. The *G.hirsutum* is also known as American cotton or upland cotton and *G.barbadense* is also referred to as Sea Island cotton or Egyptian cotton. The *G.hirsutum* is the predominant species, which alone contributes about 95 per cent to the global production, G. *barbadense* which contributes about 3 per cent to the global production, while G. *arboreum* and G. *herbaceum* account for about 2 per cent of global production.

Bt cotton

Bt cotton, a transgenic plant produces an insect controlling protein in Cry1A(c), the gene which has been derived from the naturally occurring bacterium, *Bacillus thuringenesis* subsp. kurstaki (B.t.k.). The cotton hybrids containing *Bt* gene produce its own toxin against bollworm attack thus significantly reducing chemical insecticide use and thereby providing a major benefit to cotton growers and the environment.

Bt cotton contains the following three genes inserted via genetic engineering techniques.

1. The *Cry1Ac* gene, which encodes for an insecticidal protein, Cry1Ac, derived from the common soil microbe *Bacillus thuringiensis* subsp. k*urstaki (Bt.k.).*
2. The *nptII* gene, which encodes the selectable marker enzyme neomycin Phosphotransferase II (NPTII), was used to identify transformed cells that contained the Cry1Ac protein. It served no other purpose and has no pesticide properties. The *nptII* gene is derived from the prokaryotic transposon Tn5.
3. The *aad* gene which encodes the bacterial selectable marker enzyme 3(9)-O- amino glycoside Adenyltransferase (AAD) allowed for the selection of bacteria containing the PV-GHBK04 plasmid on media containing Spectinomycin or streptomycin. The *aad* gene was isolated from transposon Tn7.NPTII and AAD proteins are used as a selectable marker and have no pesticidal activity and are not known to be toxic to any species. (www.geac.com).

The *Bt*-gene has empowered such hybrids to express a particular protein that can kill bollworm larvae. Such gene(s) can be introduced into any desired cotton cultivars has been accomplished by Mahyco and subsequently by Rasi, Ankur, Nuziveedu and several other seed companies. Similarly, the other technology developers like JK Agri Genetics, Nath Seeds, Metahelix, etc. also have developed the gene indigenously or obtained from other sources and incorporated the gene(s) using the same methodology.

Cotton Scenario in Karnataka

In Karnataka cotton is grown in all the districts, the state is having the total area of 8.75 lakh ha produced 16.94 lakh bales during the year 2013-14. Among all the districts, Haveri is the largest producing district in the state in terms of both area (97798 ha) and

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production (200975 bales) of cotton, followed by Dharwad (90497 ha and production 115002 bales), Haveri contributes 14.79 per cent of area and 11.85 per cent of production and followed by Dharwad (13.68 per cent of area and 6.786 per cent of production) to the state. (Directorate of Economics and Statistics 2013 -14)

Cotton seed Industry in Karnataka

The cotton seed industry has emerged as an important component in the seed market basically due to its ability for development of hybrids and diversity of production. It becomes very important on the part of the seed producer to deliver good seeds at right time, at right place and required quantities for better performance of the company. To satisfy the continuous demand for cotton seeds by the farmers, several seed companies in the corporate sector are supplying seeds in the cotton growing region. Some of the important companies, Such as Kaveri seeds, Krishidhan Seeds, Machyo Seeds, Shri Ram Bioseed Genetics India, G. K. Seeds, Monsanto seeds, Ajeet seeds, Nuziveedu seeds, Rasi seeds, Prabhat seeds, Ankur seeds, Vikram seeds, Vibha seeds, etc. These seed companies supply seeds first to the distributors, who in turn employ the dealers through whom seeds reach the ultimate users i.e., the farmers. These dealers operate at the taluka level and they come in direct contact with the farmers. The marketing of seeds involves demand assessment, structure, shares, farmers brand acceptance, logistics, etc.

METHODOLOGY

A multistage random sampling was adopted as appropriate sampling procedure for the study. The data on area under cotton in Karnataka was collected, which comprising of two northern districts of Karnataka namely Dharwad and Haveri, these two districts were occupied highest area under cotton that contributed about 29 per cent of the total area under cotton during the study period. Hence, it was proposed to select these two districts for the study so as to investigate into the research problem. From each district two taluks were selected. These taluks were ranked in descending order in order of their area under cotton crop. It was decided to select two taluks in each of the district based on area of cotton seeds, hence, total of four taluks were selected. Kundagol and Navalgund taluks were selected in Dharwad district; and Haveri and Hirekerur Taluks were selected in Haveri district. It was also proposed to analyse the important component in the seed industry i.e., agriculture input supply agencies which formed nodal agencies from agriculture input marketing. Hence it was proposed to select 10 dealers from each district. The dealers were selected on the basis of extent of purchase of cotton seeds by the farmers, by keeping in mind the relative importance of agencies/companies in the total volume of business, especially in cotton seed marketing. Hence, a total of 20 dealers were selected to elicit information required for the study.

ANALYTICAL TECHNIQUES EMPLOYED

Gini ratio analysis

This analysis was carried out in order to know the market structure in the agricultural input marketing system by different agencies in cotton trade. This helps in exploiting precisely the extent of inequality in distribution of volume of business. The agencies were arranged in the ascending order of the volume of commodity transacted. The frequency distribution of different agencies and the actual volume of the business were worked out. The same method was followed by Timmanna, 2011.

The coefficient of inequality is given by

$$L = 1 - \sum_{i=1}^{n} \frac{(X_i - X_{i-1})(Yi + Y_{i-1})}{10{,}000}$$

Where,

L = The coefficient of inequality

X_i = Cumulative percentage of number of firms upto and including i^{th} class

Y_i = Cumulative percentage of quantity handled by firms upto and including i^{th} class

n = Number of firms or size groups and

i = Takes value 1,2,3, n size groups

L = 1, indicating perfect inequality in the distribution

X_{i-1} = Cumulative percentage of number of firms upto and including $(i-1)^{th}$

Y_{i-1} = Cumulative percentage of quantity handled by firms upto and including $(i-1)^{th}$

RESULT AND DISCUSSION

Distribution of hybrid cotton seed dealers in Dharwad district

Results in Table 1 showed that, the concentration of hybrid cotton seed dealers in Dharwad district. From the study, it is found that nearly 20 per cent of the dealers handled around 2.32 per cent of sales and percentage of sales handled by every percentage of the firms is 0.116 per cent in category I. Whereas, 10 per cent of the firms/dealers handled around 1.93 per cent of sales and percentage of sales handled by every percentage of the firms is 0.193 per cent in category II. In case of category VI about 20.24 per cent of the firms/dealers handled around 24.5 per cent of sales and percentage of sales handled by every percentage of the firms is 1.012 per cent. Thus indicated 50 per cent of the firms in the market had sales performance up to VI category. In case of category VIII about 30 per cent of the firms/dealers handled around 41.77 per cent of sales and percentage of sales handled by every percentage of the firms are 1.392 per cent. In case of category IX about 10 per cent of the firms/dealers handled around 15.66 per cent of sales and percentage of sales handled by every percentage of the firms are 1.566 per cent. In case of category X about 10 per cent of

the firms/dealers handled around 18.08 per cent of sales and percentage of sales handled by every percentage of the firms is 1.808 per cent. Here we can say that in category X 10 per cent of the firms will sale 18.08 per cent and this category of the firms will sale highest per cent of sales. Thus it can be concluded that, in case of category X 10 per cent of the firms will sale 18.08 per cent and this category of the firms will sale highest per cent of sales. Lorenz Coefficient of inequality for Dharwad district was slightly high (0.561) indicating Monopolistic competition in the market. Fig.1 depicts the extent of concentration in Dharwad diagrammatically.

Distribution of hybrid cotton seed dealers in Haveri district

Results in the Table 2 shows the concentration of hybrid cotton seed dealers in Haveri district. From the study it is found that nearly 20 per cent of the dealers handled around 4.78 per cent of sales and percentage of sales handled by every percentage of the firms is 0.239per cent in case of category I. Whereas, 10 per cent of the firms/dealers handled around 3.51 per cent of sales and percentage of sales handled by every percentage of the firms is 0.351per cent in category II. In case of category III about 30 per cent of the firms/dealers handled around 24.08 per cent of sales and percentage of sales handled by every percentage of the firms are 0.802 per cent. In case of category IV about 20 per cent of the firms/dealers handled around 20.89 per cent of sales and percentage of sales handled by every percentage of the firms is 1.044 per cent. In case of category VII about 10 per cent of the firms/dealers handled around 20.95 per cent of sales and percentage of sales handled by every percentage of the firms are 2.09 per cent. In case of category IX about 10 per cent of the firms/dealers handled around 25.79 per cent of sales and percentage of sales handled by every percentage of the firms is 2.579 per cent. Here we can say that in category IX, 10 per cent of the firms will sale 25.79 per cent and this category of the firms will sale highest per cent of sales in the market. Lorenz Coefficient of inequality for Haveri district was high (0.60) indicating monopolistic competition in the market. Fig.2 depicts the extent of concentration in Haveri diagrammatically.

From the above discussion, it is clear that, the values of Lorenz coefficient of inequality were fairly high for each of the two districts. As such the hybrid cotton seed dealers have monopolistic competition in the market in both the districts. The similar findings were observed in case of Thimmanna (2007).

Table 1. Size wise distribution of dealers for hybrid cotton seed in Dharwad District during

Category	Size of Firm (Kgs)	Percentage of firms	Percentage of sales	Cumulative percentage of firms	Cumulative percentage of sales	Percentage of sales handled by every percentage of the firms
I	Upto-1000	20	2.32	20	2.32	0.116
II	1000 - 2000	10	1.93	30	4.26	0.193
III	2000-3000	0	0	30	4.26	0
IV	3000-4000	0	0	30	4.26	0
V	4000-5000	0	0	30	4.26	0
VI	5000 – 6000	20	20.24	50	24.5	1.012
VII	6000-7000	0	0	50	24.5	0
VIII	7000 -8000	30	41.77	80	66.26	1.392
IX	8000 - 9000	10	15.66	90	81.92	1.566
X	9000 - 10000	10	18.08	100	100	1.808
	Gini coefficient = 0.5614					

Table 2. Size wise distribution of dealers for hybrid cotton seed in Haveri District during

Category	Size of Firm (Kgs)	Percentage of firms	Percentage of sales	Cumulative percentage of firms	Cumulative percentage of sales	Percentage of sales handled by every percentage of the firms
I	Upto-1000	20	4.78	20	4.78	0.239
II	1000 - 2000	10	3.51	30	8.3	0.351
III	2000-3000	30	24.08	60	32.37	0.802
IV	3000-4000	20	20.89	80	53.26	1.044
V	4000-5000	0	0	80	53.26	0
VI	5000 – 6000	0	0	80	53.26	0

VII	6000-7000	10	20.95	90	74.21	2.09
VIII	7000 -8000	0	0	90	74.21	0
IX	8000 - 9000	10	25.79	100	100	2.579
X	9000 - 10000	0	0	100	100	0
	Gini coefficient = 0.6042					

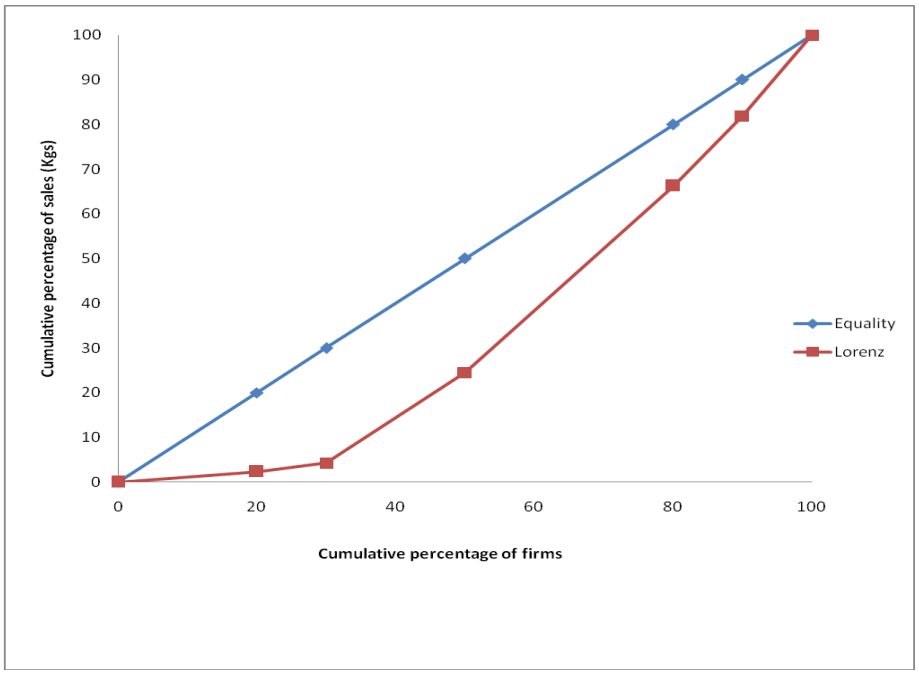

Fig. 1: Lorenz curve for Hybrid cotton seed dealers in Dharwad District

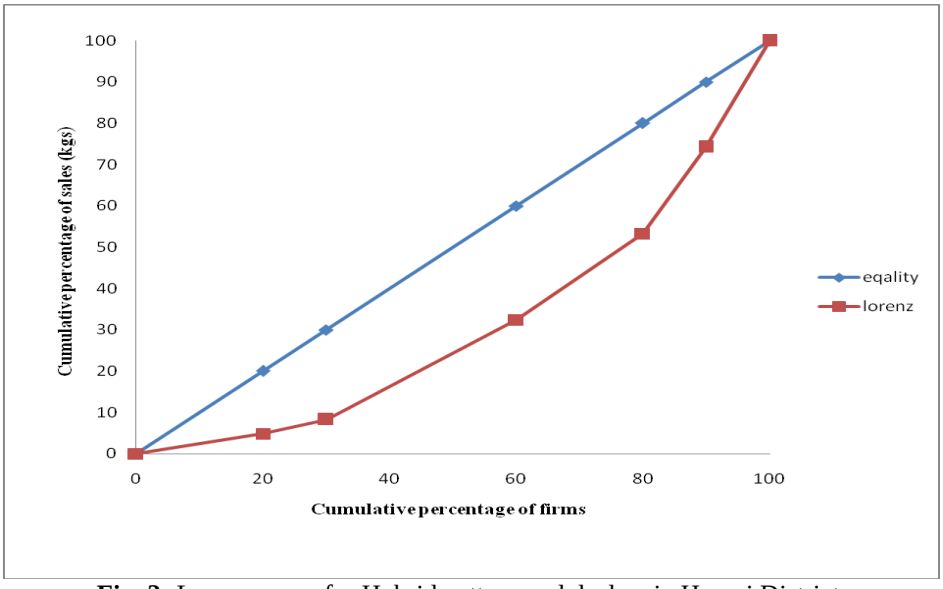

Fig. 2: Lorenz curve for Hybrid cotton seed dealers in Haveri District

CONCLUSION

India has largest area under cotton cultivation accounting for 34 per cent of world cotton area (2013-14). And it is the First largest cotton producing country in the world, accounting for about 27.30 per cent to the world production (2015-16). The cumulative percentage of dealers in Bt cotton in the sample district and this cumulative percentage of quantity's handled by these agencies in the study area. Gini coefficient was observed to be 0.56; the market concentration was slightly high in Dharwad district. Gini coefficient was observed to be 0.60; the market concentration was high in haveri district. In Dharwad district, the dealers belonging to category X 10 per cent of the firms will sale 18.08 per cent and

this category of the firms will sale highest per cent of sales in the district. In Haveri district, the dealers belonging to category IX, 10 per cent of the firms will sale 25.79 per cent and this category of the firms will sale highest per cent of sales in the district. There is a Monopolistic competition in the market. Here in both the districts i.e., Dharwad and Haveri, category X and category IX these both category of firms will sale highest percent of sales in the market.

REFERENCES

Ada Okungbowa, C. I. (1998). The market structure, conduct and performance for yarn in Ondo State, Nigeria. *Agro Search* 4 (1/2): 12-20.

Elangovan, S. and Zeaudeen, P. (1983). An economic analysis of market structure of groundnut. *Rural Dev. Rev.*, 2(2): 53-58.

Handiganur, S. S. and Kunnal, L. B. (1999). Market structure for chickpea in different markets of Karnataka. *Indian J. Agric. Mktg.*, 13 (3): 28-33.

Hosamani, Raju (2007). Vegetable seed marketing in Belgaum District: An analysis of market structure and farmers preference. *M. Sc. (Agri) Thesis*, Univ. Agric. Sci., Dharwad, Karnataka, India.

Huballi, S.M. (2002). Market structure, conduct and performance – A case of tamarind in north Karnataka, *M. Sc. (Agri.) Thesis*, Univ. Agric. Sci., Dharwad, Karnataka, India.

Prasad, Jagadish and Prasad, Rajendra (1984). Agricultural market project and market structure and performance. A case study of two jute markets in Bihar. *Indian J. Agric. Econ.*, 3 (3): 236.

Timmanna, R.B. (2007). A study on marketing of cotton seeds – A market Strategy analysis. *M.Sc. (Agri.) Thesis*, Univ. Agric. Sci., Dharwad.