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MARKET EFFICIENCY OF WHEAT SUPPLY CHAIN IN UTTAR PRADESH

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Abstract

Wheat is a major food staple in India, and is crucial to India's food economy and security. India's wheat economy is now the second largest in the world. The marketing system of wheat and its efficiency is one of serious concern. Poor efficiency in marketing has serious consequences for both producers and consumers as well as for the government budgets and the economy. The questions have been raised about the working of the market mechanisms and market related policies for wheat. The study examines the issues of marketing efficiency in traditional wheat supply chain and problems associated with them.

Introduction

Agriculture is an important sector of the Indian economy, accounting for 14% of the nation's GDP, about 11% of its exports, about half of the population still relies on agriculture as its principal source of income and it is a source of raw material for a large number of industries. During 2011-12, India reached 259.32 million tonnes of food grain production. (State of Indian Agriculture, 2012-13). Population explosion, shrinkage of cultivable land along with grain losses is a major problem in a developing country like India.

Food grains undergo a series of operations such as harvesting, threshing, winnowing, bagging, transportation, storage, and processing before they reach the consumer, and there are appreciable losses in crop output at all these stages. The post-harvest losses in India amount to 12 to 16 million metric tons of food grains each year, an amount that the World Bank stipulates could feed one-third of India's poor. The monetary value of these losses amounts to more than Rs. 50,000 crores per year (Singh, 2010).

Ramesh (1999) reported that high wastage and value loss are due to lack of storage infrastructure at the farm level. The losses during storage are quantity losses and quality losses. Quantity losses occur when insects, rodents, mites, birds and microorganisms, consume the grain. Infestation causes reduced seed germination, increase in moisture, free fatty acid levels, and decrease in pH and protein contents etc. resulting in total quality loss. Quality losses affect the economic value of the food grains fetching low prices to farmers (Ipsita et al., 2013).

Wheat is the dominant grain of world commerce. It is processed to produce a large variety of foods that include many kinds and types of breads, cakes, noodles, crackers, breakfast foods, biscuits, cookies, and confectionary items. India is second largest producer of wheat and rice in the world after china, while wheat, rice and maize together account for 82 per cent of total production. Most of wheat produced in India is bread wheat, which is soft or medium, with medium protein content. Production of this variety is mainly in the northern Indian states of Punjab, Haryana, Uttar Pradesh, and Rajasthan. Durum or Hard wheat is typically hard with high gluten strength is grown in Central and Western India. Green Revolution has helped India to attain self-sufficiency in food. The country's population has almost tripled in the last five decades and its food grain production has more than quadrupled, significantly enhancing the per capita food grain availability. On the other hand, the share of agriculture in GDP has declined substantially from 55 per cent in the early 1950s to about 42 per cent in the 1980s to 25 per cent in 1999-2000 and further to 19 per cent in 2006 (Economic Survey, 2006-07) compared with a much lower rate of decline in its share in total employment from 63 per cent to 57 per cent during the same period.

As we have a tradition of agricultural production, marketing and allied commercial activities, now it is the time for us to brainstorm and come out with new ideas of value added services. These value added services will give the existing agricultural engine a new dimension. The next logical step could be food-processing which not only could be another revenue generating area but also can provide lots of full-time employment to our youths. With the changing agricultural scenario and global competition, there is a need of exploiting the available resources at maximum level.

Agriculture is plagued by multitude of problems which hinder its efficient operation. In the Indian agriculture sector, the grain supply chain has remained unchanged: over 90 percent of food is sold in unorganized markets, with organized business accounting for just 2 percent of the market (Economic Times Intelligence Group, 2003). According to the Indian Ministry of Trade and Industry, approximately 20 percent of food produced in India is wasted (www.etfoodprocessing.com). Various

research studies by the Economic Times Intelligence Group (ETIG) and the Investment Information and Credit Rating Agency (ICRA) have detailed the weaknesses and problems present in the Indian grain chain (Investment Information and Credit Rating Agency, 2001). First, a large percent of grain is wasted due to improper handling and storage, pest infestation, poor logistics, inadequate storage and transportation infrastructure. Second, intermediaries take large portions of the earnings which should go to farmers. Third, post-harvest losses are about 25-30 percent in India. Even marginal reductions in these losses are bound to bring great relief on the food security front as well as improve the income level of the farmers. Fourth, Indian consumers pay three to four times the farm gate price, as compared to developed countries where the consumer pays one and a half to two times the farm gate price. Also, 60-80 percent of the price that consumers pay goes to traders, commission agents, traders, wholesalers and retailers (Economic Times Intelligence Group, 2003).

These intermediaries (also called commission agents) lead to poor coordination and collaboration in the supply chain, which in turn leads to inefficient information flow. Agricultural Produce marketing Committees (APMC) Act was enacted by the various State Governments to facilitate the establishment of an efficient system of buying and selling of agricultural commodities as well as regulate trade practices detrimental to farmers' interest. The basic objective of setting up of network of physical markets was to ensure farmers obtaining and fair and reasonable price for his produce by creating environment in markets for fair play of supply and demand forces, regulate market practices and attain transparency in transactions. An important characteristic of agricultural produce markets has been that private trade has continued to dominate the market. With the large quantities required to be handled by the private trade, the size and structure of markets over time have considerably expanded. Around two million wholesalers and five million retailers handle the trade in food grains. Apart from traders, processors also play an important role as they also enter in the market as bulk buyers and sellers. Pervasive regulations of domestic marketing coupled with fragmented and inefficient supply chain hampered the quality and unnecessarily increased the marketing costs, risks and uncertainty, hurting the agricultural sector. The resulting marketing margins place downward pressure on farm prices, increase the cost for consumers, and reduce the competitiveness of exports and potential demand by local consumers.

A marketing system backed by strong, adequate infrastructure is at the core of agricultural marketing. Market infrastructure is important not only for the performance of various marketing functions and expansion of the size of the market but also for transfer of appropriate price signals leading to improved marketing efficiency. Market information is needed by farmers in planning

production and marketing, and equally needed by other market participants in arriving at optimal trading decisions. The existence and dissemination of complete and accurate marketing information is the key to achieve both operational and pricing efficiency in the marketing system. India's internal agricultural marketing system needs revamping with both integration and strengthening to tap the new global market access opportunities as well as to benefit farming community.

Uttar Pradesh being the most populous state is highest producer of wheat at the same time is characterized with the state having the highest consumption of it (Consumption Price Index 2010). The State government in association with Central government provides subsidized food to the poor through PDS system to ensure the Food Security. The system takes care of all activities of food supply including procurement, storage, transportation, and pricing (Kapoor 2010). Wheat supply chain is characterizes by inefficiencies, diseconomies of scale, lack of investments and inadequate infrastructure, resulting in high prices, poor yields and inadequate preservation of processed wheat (KPMG 2006).

Review of Literature

Various studies have examined India's food grain and economy: These include Sidhu and Byerlee (1991, 1992), Sims (1988), and Gandhi (1997). Some studies had examined the grain marketing and its efficiency in India, these includes, (Lele 1971, Subbarao 1978, Kainth 1982). The central argument of the research is that it is imperative that we look the marketing of wheat in India focusing on the marketing system and the marketing efficiency. Wheat is now a major food staple in India, crucial to India's food economy and security. With production reaching 75 to 80 million tons and a large demand, India's wheat economy is the second largest in the world. The most important problem facing the Indian agricultural industry is the highly inefficient supply chain. Because of lack of proper storage, warehouse, infrastructure and also a food processing industry, about 20 per cent of all foods produced in India (Rs. 500 b) are wasted (Visshwanandham, 2008).

India can have food security and has a huge opportunity to become a leading global food supplier if only it has the right marketing strategies and of course agile, adaptive and efficient supply chain (Gyan Prakash 2008). The wheat supply chain is still characterized by inefficiencies, diseconomies of scale, lack of investments and inadequate infrastructure, resulting in high prices, poor yields and inadequate preservation of processed wheat.

Deole et al. (1979) identified a stable market and determined the possibility of increasing the producer's share in the marketing of wheat in some of the selected regulated markets in Parbhani district

of Maharashtra. It was observed that there were wide fluctuations in the prices of wheat in different months as well as among different markets. On the basis of coefficient of variance in the average price in different markets, it was found that Parbhani market was more stable. The price fluctuations varied between 33 to 39 per cent in Parbhani market, 32 to 38 per cent in Ganga Rhed market and 33 to 42 per cent in Manwath market. It was concluded from the study that it was profitable for the producers to sell their wheat in Parbhani market if efficient infrastructure for the transport of produce is provided.

Singh et al. (1979) examined the correlation between monthly prices, arrivals and seasonal variability of wheat and paddy in Uttar Pradesh. It was observed that wheat prices were higher than the annual mean by 18.22 and 10.42 per cent in the months of January and February respectively and was lowest in the month of May (below 11 per cent of the annual mean). The regression coefficient of arrivals and prices of wheat indicated that with the increase in one unit in the arrivals resulted in decrease in prices by 0.364 which however was found non-significant. The study also revealed that the off season price rise of wheat was enough to cover the cost of storage of wheat.

Mishra et al. (1987) conducted a study to identify the group of farmers generating marketable surplus of wheat and to examine the channels of marketing suitable for marginal and small as well as medium and large farmers of the Eastern Uttar Pradesh. The analysis indicated that marginal and small farmers generated some marketable surplus which constituted only 1/10 of the total surplus and rest was generated by medium and large farmers. Secondly, all the marketable surpluses were not marketed by the farmers. It also showed that marginal farmers in particular go for distress sale and other categories of farmers sell less than their marketable surplus owing to precautionary measures. The study revealed that state regulation did not succeed in making the farmers free from the clutches of the traders and private traders had major influence over the marketing of wheat crop.

Shukla et al. (1988) analyzed the arrival and prices of wheat as well as its price spread in two primary markets of Lalganj Block of district Azamgarh, Uttar Pradesh. It was observed that there existed a definite relation between the price of wheat and its market arrival. In primary markets, the prices of wheat seemed to have highly relevant effect upon marketed surplus.

Bhatt et al. (1990) quantified the marketing efficiency for wheat in regulated markets of Saurashtra for the year 1984-85. The analysis indicated that the correlation coefficients of wheat price among all the markets were positive and highly significant indicating thereby that the markets were well integrated. The size of the market yards and the human population had positive and significant influence on marketing efficiency, while the negative but significant influence was observed in case of

commission agent. Positive relationship between total turn over and wholesale traders and commission agents was observed in most of the markets. The study concluded that the market yards should be established large enough, yet not too large to avoid congestion as well as too much empty space in the yards.

Sinha and Verma (1974) tried to find out the price spread of rice and wheat in two regulated markets, Darbhanga and Muzaffarpur of North Bihar. It was observed that the producer's share, wholesaler's margin, retailer's margin and cost of marketing in case of marketing of wheat in Darbhanga district was 74.2, 10.5, 5.2 and 10.6 per cent and 74.8, 9.97, 5.60 and 9.63 per cent in Muzaffarpur district respectively. The percentage distribution of marketing margins into its components indicated that the wholesaler's margin was higher (39.5 and 38.7 per cent), than the retailer's margin (22.3 and 20.1 per cent) in Muzaffarpur and Darbhanga districts respectively. The cost of marketing was a little higher in Darbhanga district (41.2 per cent) than Muzaffarpur district (38.2 per cent).

Acharya and Antani (1979) tested the hypothesis that the emergence of foodgrain surpluses specially in wheat after green revolution contributed to a dampening in seasonal variation in foodgrain prices. The study covered three major crops of Rajasthan including wheat for the period 1961-1975. It was observed that the seasonal variation increased from 7.88 in 1961-63 to 10.93 in the year 1970-75 for bajra, from 8.46 to 18.46 for wheat and from 11.29 to 17.81 for gram in the corresponding years. It was also observed that by and large the seasonal pattern of price movement remained the same for wheat and gram. The study concluded that the emergence of foodgrain surpluses especially in wheat following the green revolution did not dampened the seasonal variation in foodgrain prices.

Aulakh and Singh (1979) studied the regional price differentials in wheat price between a terminal market (Delhi) and other primary markets of Punjab, namely Barnala, Moga and Ludhiana. It was observed that the average price differentials between Barnala and Delhi market, Moga and Delhi market and Ludhiana and Delhi market were Rs. 11.85, Rs. 9.71 and Rs. 8.85 respectively. It indicated direct relationship between price differential and geographical distance. Price differentials between Delhi-Ludhiana were found more variable than those between Moga-Delhi and Barnala-Delhi markets. The study concluded that the wheat markets functioning in the state of Punjab were by and large well integrated.

Sinha et al. (1979) tried to find out the marketing costs and margins of rice, wheat and maize in two regulated markets of Bihar situated in two different situations. The study indicated that in case of wheat, the producer's share in consumer's price was 76.13 and 81.53 per cent in Muzaffarpur and

Chakulia markets respectively. The wholesaler's and retailer's margin were worked out to be 38.84 and 35.60 per cent in Muzaffarpur and 23.11 and 33.23 per cent in Chakulia markets respectively. Marketing costs constituted 57.99 and 42.01 per cent and 57.97 and 42.03 per cent in Muzaffarpur and Chakulia markets respectively.

It was also observed that among different marketing costs items handling losses (25.04 per cent) and commission charges (19.74 per cent) at Muzaffarpur market and transportation charge (30.22 per cent) and commission charge (28.34 per cent), constituted the major proportion in Chakulia market respectively. This indicated higher marketing costs and large price spread for all the selected commodities in both the markets.

Mishra and Mishra (1982) analyzed the marketing costs and margins of wheat and gram in central Madhya Pradesh. It was observed that in case of wheat cost on commission charges and taxes contributed major share in all the channels. The retailer's margin was found to be more than the wholesaler's margin. The total margin of intermediaries varied between 42.58 per cent to 48.87 per cent in different channels without unwanted intervention of market intermediaries.

Mishra et al. (1986) attempted to analyze the behaviour of marketing costs, marketing margins and the producer's share for wheat and gram in Madhya Pradesh at two different periods of time 1978-79 and 1984-85. It was observed from the analysis that the producer's share declined from 84.50 per cent to 83.77 per cent in case of wheat and from 86.46 per cent to 84.84 per cent in case of gram during the two periods. It was also seen that the producers suffered more in case of gram as compared to wheat because of the higher gram price escalation during the successive intervals of its transaction. The results clearly indicated that the farmers need to be compensated in proportion to the decline in their share.

Malik et al. (1988) conducted a study to calculate the price spread of wheat in Hissar regulated market of Haryana. The producer's share in consumer's rupee varied between 86.76 to 77.00 per cent in different channels. The analysis also indicated that the Government agencies were comparatively inefficient as compared to private traders resulting into huge subsidy expenditure. The farmers faced the problems of delay in auction, weighing and unloading. They also faced the problems of storage facilities and higher charges of transportation in bringing their produce to the market.

Prasad (1989) determined costs and margins and price spread of some of the agriculture commodities including wheat in Gulab Bagh, Chanpatia and Bihar Sarif regulated markets of Bihar. It was observed that about 70 per cent of the produce (wheat) was marketed during the months of April,

May and June. The producer's share in consumer's rupee was observed to be 72.34 and 69.41 per cent in identified channel I and II respectively. The total cost of marketing was observed to be 15.11 per cent and 16.32 per cent of the consumer's rupee, and the total cost borne by the farmers was 5.09 and 3.83 per cent in the respective channels. The total marketing margins were observed to be 12.86 and 14.27 per cent of consumer's rupee in channel I and II respectively.

Objectives

- To study the marketing efficiencies of the existing wheat supply chains in Uttar Pradesh.
- To suggest appropriate measures for reduce inefficiencies in wheat supply chain process.
- To suggest appropriate strategy for efficient supply chain process.

Methods and Procedures

The paper examines traditional wheat supply chain and problems associated with them. The study is based on both primary and secondary data. The primary data were collected from farmers and intermediaries involved in wheat trade in Allahabad district of Uttar Pradesh. The data were collected from randomly selected 200 farmers in four villages of Allahabad. Interviews with actors at all levels of the chain were conducted. Marketing costs and margins are estimated and the paper further compares the traditional supply chain with that being developed by a private sector company. This paper presents the preliminary findings and recommendations of the analysis.

Analytical Framework

Marketing Channels

Marketing channels may be defined as the chain of intermediaries through which agricultural products move from producers to consumers. The number of channels and their length varies from commodity to commodity. For identifying alternative market opportunities for any product a comparative study of various market channels are essential. In the present study market channels for wheat have been examined closely.

Marketing cost

Marketing cost is the cost involved in different functions of marketing. It can be computed as follows:

$$C = C_f + C_{mi}$$

Where,

C= Total cost of marketing.

C_f = Cost paid by farmer

C_{mi}=Cost incurred by the i^{th} middlemen in the process of marketing.

Marketing margin

The margin charged by different functionaries / intermediaries in the market. The total marketing margin is calculated as follows

$$M = \sum_{i=1}^{n} m_i$$

Where, M= Total marketing margin, and m_i = margin of the i^{th} middlemen in the market.

Price Spread

The analysis of price spread, marketing cost and margins is an important method of examining the pricing efficiency. This reflects upon the shares of producer and different functionaries as well as marketing cost out of the price paid by the consumer and the price received by the grower. Marketing costs include all actual expenses incurred in the process of moving the produce from harvesting up to the ultimate consumer on the other end. Marketing margins are the net amount received by the marketing agents in the marketing process and as their share for their services in marketing.

Price Spread can be defined as the difference between price paid by consumer to price received by producer for an equivalent quantity of farm produce. Thus,

Price Spread = [Price paid by consumer - Price received by producer]

Producer's share in consumer's rupee

It is the price received by the producer expressed as percentage of the retail prices (Price paid by the consumer). If Pf is the Producer's price and Pr is the retail prices then Producer's share in the consumer's rupee may be expressed as follow:

$$\text{Ps} = \frac{Pf}{Pr} \times 100$$

Marketing Efficiency

The marketing efficiency is directly related to the cost involved to move the goods from producer to consumer and quantum of services desired by the consumer. If the cost compared with the service involved is low then it will be termed as an efficient marketing and vice-versa. An improvement that reduces the cost of particular function without reducing consumer's satisfaction indicates an improvement in the marketing efficiency.

Marketing efficiency of different channels was estimated by Acharya's formula.

$$ME = \left(\frac{FP}{MM + MC} \right)$$

Where,

ME = Index of marketing efficiency, FP = Farmers Price,
MM = Total Marketing Margins, MC = Total marketing cost

Major Findings

The study finds that the farmers now almost invariably sell in the nearby primary markets rather than to village traders, indicating increasing awareness and mobility. The study finds that typically, the market intermediaries provide hardly any special or value adding services or development, in return for the commissions and margins, other than conducting the transactions and making the payment. The farmers see considerable scope for improvement in the marketing system. However, the commission

agent and traders seem relatively satisfied. Whereas market factors of demand and supply are seen as important, government policies are being seen as major determinants of prices.

Marketing Channels

The marketing channels are the routes through which agricultural products move from producers to consumers. Marketing channels of wheat in Uttar Pradesh are routed through *Kaccha Adhatiya* involved in regulated markets. The study finds the following major private marketing channels in the study area:

(I) Producer – Village Trader/itinerant merchant for primary market – Wholesaler/Commission Agent for distant market – Retailer – Consumer

(II) Producer – Village Trader/itinerant merchant for primary market – Wholesaler for primary market – Retailer – Consumer

(III) Producer – Wholesaler/Commission Agent for distant market – Retailer – Consumer

(IV) Producer – Wholesaler/Commission Agent for primary market – Consumer

(V) Producer – Retailer – Consumer

The cost analysis of channel I to channel V reflected that the net price received per quintal by the producer was highest in channel III followed by channel V, and channel IV. The net price received per quintal by producers was observed to be lowest in case of channel I because of maximum number of middlemen were involved in this channel. The highest net price received in channel III was due to the fact that in this channel, the producers directly sold the wheat in the regulated market.

These tables also depict that out of the total marketing cost incurred by wholesalers the highest charge was paid in the form of transportation cost in different channels. The transportation cost in channel I was found to be as much higher than the other channels because this channel belongs to distant markets.

- The maximum marketing cost of wheat is estimated to about Rs. 107 per quintal and in this transportation has the largest share.

- The marketing efficiency was found to be lowest in case of channel I (Producer – Village Trader/itinerant merchant for primary market – Wholesaler/Commission Agent for distant market – Retailer - Consumer) and channel II (Producer – Village Trader/itinerant merchant for

primary market - Wholesaler for primary market - Retailer – Consumer) due to presence of large number of intermediaries in these channels resulting higher marketing cost and lower efficiency.

- On the other hand, the marketing efficiency index was found to be highest in case of channel V (Producer – Retailer – Consumer).

- The major price differential/ jump in the marketing chain between the primary market wholesaler selling price and the distant market wholesaler selling price. There is scope and opportunity for improvement in this link.

- The study found a large overall variation in prices among primary and distant *mandis*.

- The study also find that producers sell their wheat at up to 5 per cent lower prices in geographically isolated mandis which enjoy market power because they face little competition, compared to areas where mandis enjoy little market power.

- The study found the commission agent as a facilitating chain member who buys and sells at the same prices, but charges a commission on transaction in the range of 2 to 3 percent.

- The study finds the Pragati Gram Fresh (PGF), the Farmers' Producer Organization established in Allahabad district of Uttar Pradesh. The Pragati Gram Fresh is based on cooperative and supportive relationships between all the actors starting from rural producers to traders, business service providers, processing units, retailers and above all 'the consumers' through integrating the production, processing, distribution and marketing systems in a coordinated manner.

- The five objectives of the Pragati Gram Fresh aim to achieve sustainable solutions for improving total agricultural production, enhancing health status of the farmers as well as the consumers and protection of natural environment. It aims to assure benefits to producers as well as consumers with following 5 guiding principles: (i) Farmers' *Swaraj* (Autonomy to Farmers) consisting of seed, fertilizers, rainwater, energy, funds, indigenous knowledge; (ii) Freedom from Debt-bondage (Inclusiveness) consisting of bank linkage, legal aid, govt. welfare projects, SHG, PSK; (iii) Sustainable Agri-system (harmony with nature) consisting of organic farming system, diversified cropping pattern, animal husbandry, short distance organic SCM; (iv) Ecological balance (Protecting Bio-diversity) consisting of protecting the CPRs; preservation of local varieties of crops, fruits and vegetables; preservation of soil health through bacteria, fungi, insects, small animals, birds and animals life and rainwater conservation; and (v) Food for Good

Health (human centric SCM) consisting of reduced usage of harmful chemicals in processing, fresh and nutritional food for consumers.

- It was interesting to find that farmers' share in consumers' rupee in Pragati Gram Fresh supply chain was substantially high as compared to other five private channels studied.

Opinion of the Sample Farmers

- The farmers faced various difficulties while selling their wheat to the village traders.
- All the sample farmers opined for received the low price while selling their wheat to the village traders.
- In selling their wheat to the local markets, high transport cost and harassment has been reported by over 40 per cent of the sample households.
- While selling to the wholesale markets, 82 per cent sample farmers reported about high transport cost and harassment.
- In respect of selling to the public agencies, over 62 per cent of the sample farmers reported for delayed payment and over 86 per cent expressed for high transport cost and harassment.

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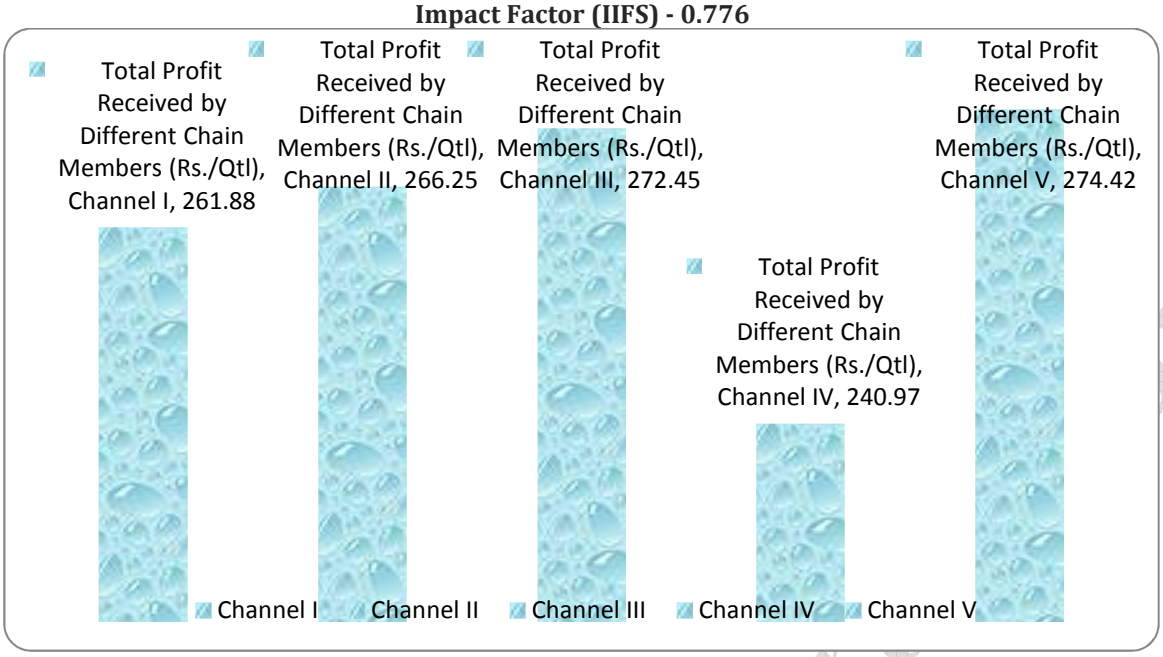
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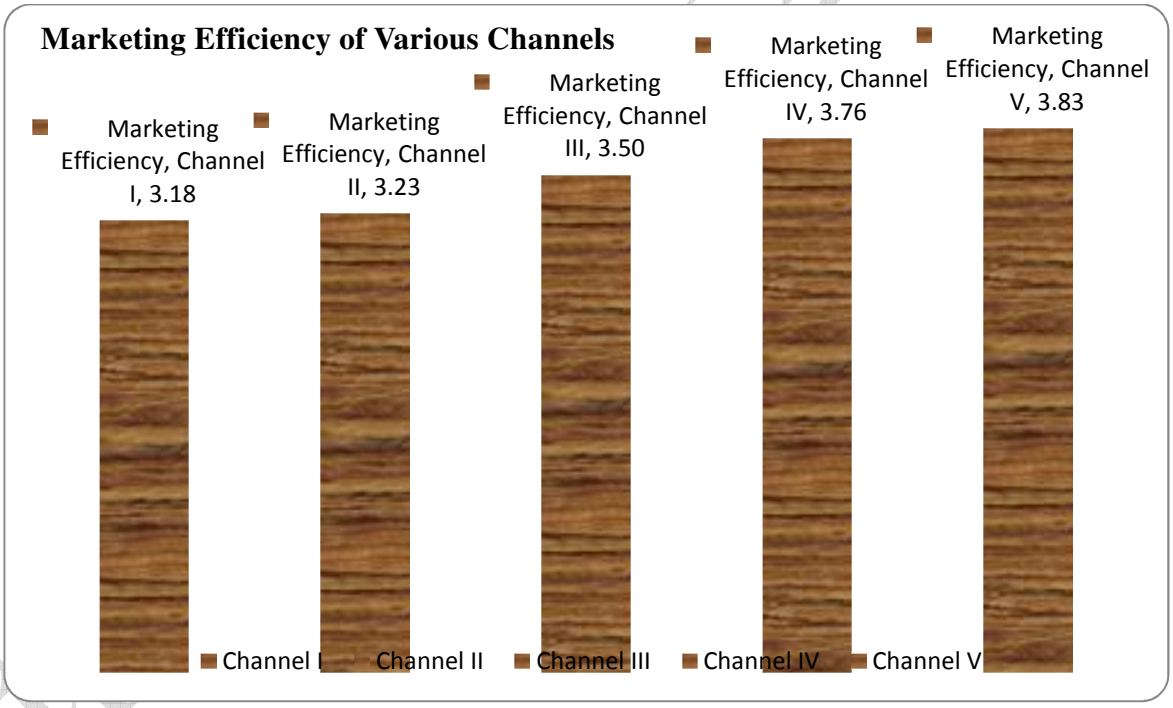
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