

# **EVALUATION OF AGRICULTURAL MARKET EFFICIENCY IN INDIA: A COMPARATIVE STUDY OF PUNJAB AND UTTAR PRADESH**

**ABSTRACT**

**of**

**THESIS**

SUBMITTED TO

**BABASAHEB BHIMRAO AMBEDKAR UNIVERSITY  
(A CENTRAL UNIVERSITY)**



FOR THE AWARD OF DEGREE OF

**Doctor of Philosophy**

**IN**

**ECONOMICS**

Under the Supervision of  
**Dr. SURENDRA MEHER**

Submitted by  
**SHEKHAR**

DEPARTMENT OF ECONOMICS  
SCHOOL OF ECONOMICS & COMMERCE  
BABASAHEB BHIMRAO AMBEDKAR UNIVERSITY  
(A CENTRAL UNIVERSITY)  
VidyaVihar, Raebareli Road Lucknow-226025, (U.P.), India

**Enrolment No: 1291/15**

**Year 2022**

## ABSTRACT

In the Indian economy, agriculture is the primary occupation of the working population. The share of agrarian employment in total employment has 48.9 percent which comprises 70 percent of the rural population (GOI, 2011). Therefore, a major chunk of the total populace has a direct or indirect dependency upon this sector. Moreover, despite such a large change in the foodgrain production during the five years of planning the per person net availability for the foodgrain stood at merely 179.6 kg/per year or 491.9 grams/per day in 2019 (GOI, 2020). Further, secondary data explicates the contribution of agriculture. Further, secondary data explicates that contribution of agriculture and allied activities to GDP at factor cost has registered a fall from 51.9 percent in 1950-51 to only 13.9 percent in 2013-14 at 2004-05 prices (GOI, 2020). According to the new series with the base year 2011-12, the share of agriculture and allied activities in GVA at current basic prices was 18.6 percent in 2013-14 and this fell to 18.0 percent in 2016-17. This has further declined to 17.6 percent in 2019-20 (GOI, 2019, p. 25). From this prospect, the overall performance of the agriculture sector is still not adequate and sustained efforts are thus required to bring it to the optimal level.

Generally, low investment is accused of a declining share of agriculture and allied activities in total GVA. This decline in public investment in agriculture is a serious cause of concern because of its negative impact on agriculture growth over the long run (Sen, 1992; Mani, Bhalachandran, & Pandit, 2011; Shetty, 1990). In this context, Gulati and Bathla have estimated that a 10 percent decrease in public investment (including irrigation and power) leads to 2.4 percent annual reduction in agricultural GDP growth (Gulati & Bathla, 2002). Further, wastages in agricultural produce stood huge in lack of inadequate infrastructure for instance.

The Central Institute of Post-Harvest Engineering and Technology (CIPHET), Ludhiana has estimated the annual value of harvest and post-harvest losses of major agricultural produces at the national level to be of the order of Rs. 92,651 crores calculated using production data of 2012-13 at 2014 wholesale prices. Annual wastage of agricultural produce such as Cereals, Pulses, Oilseeds and Fruits & Vegetables stood at 20698, 3877, 8278 and 40811 Rs. crores respectively. Further,

Dr. Saumitra Chaudhuri Committee in 2012 constituted by the then Planning Commission suggested cold storage requirement of 61 million tonnes (Press Information Bureau, 2016). The present capacity of cold storage is estimated at around 32 million tonnes in the country. It must be noted that wastage of food is not confined to fruits, vegetables, and seafood but also to milk (Press Information Bureau, 2016).

Paradoxically, our country is the second largest producer of vegetables in the world; however, its share in global exports is just 1.3 percent. Once again, the reason behind this is the lack of storage, food processing units and other required infrastructure. As per the official data, only 6 percent of food in India goes through cold chains, whereas in developed markets, it is around 70 percent (Badal, 2018). Further, feeding around 17.74 percent of the world's population is a major challenge at the front of agricultural sector in India. Thus, low public investment leads to the shortage of adequate infrastructure required for farming germinates distress and excruciation within the rural sector. The inadequacy of infrastructure not only brings uncertainty to their income & output but also affects the incidence of poverty, hunger and malnutrition among them due to low earnings. Therefore, the challenge bestowed in present scenario is to provide adequate agrarian infrastructure to revive rural development.

Thus, a mere rise in agriculture production alone could not bring down these socio-economic evils unless a sound distribution channel that is equally essential for the disposal of the product does not exist. As truly said the role of an efficient agricultural marketing system would be critical in achieving the goals of the second green revolution (Acharya & Agarwal, 2018). Presently, a substantial part of output potential has already been unleashed and therefore least possibilities of further expansion in the agrarian output exist nowadays and so in poverty reduction measures too. Further, the bitter truth, in agricultural product market, is that a crop produced only in a particular season while its demand lasted the whole year, is the genesis of the need of an efficient marketing system.

In contemporary India, the market structure has been divided into two segments. The foremost is related to selling directly to the government at the MSP. The central government procures essential food items from the farmers through agencies such as the National Agricultural

Cooperative Marketing Federation of India Limited (NAFED) and Food Corporation of India (FCI) etc. While, the other segment includes the auction of produce to brokers, in front of state officers, in the nearby government designed Mandi. Mandi refers to a market in smaller towns and cities in which farmers from nearby villages bring their agricultural produce to sell. The Government of India passed the market reform particularly APMC act to establish Agricultural Produce Market Board in all the state and Union Territories to achieve an efficient system of buying and selling agricultural produce and to provide better regulation.

On basis of a thorough review of previous research work concerning agriculture marketing, it has been found that there is plenty of literature support in the context of agricultural marketing. However, a comparative analysis of market efficiency in the context of developing and less developed regions is rare in the existing literature. The prime and foremost aim of this study is to fill this lacuna and extend the existing literature by undertaking a comparative analysis of the efficiency of the two markets (procured and regulated) within the two states i.e., Punjab and Uttar Pradesh. The former state is developed in terms of agricultural activities while the other is backward so the learning from former is beneficial for the latter state. In other words, the study has substantially contributed by extending the existing literature from theoretical to empirical prospects.

### **Objectives of the Study**

The major objectives of the study are to examine:

1. Economic analysis of the efficiency under procured market channel for FCI in terms of income expenditure, quantity procured, grading, storage & buffer stock capacity.
2. Economic efficiency of the resource allocation under regulated market channel in terms of Income i.e., Mandi Fee and Arrivals and Expenditure (administrative and developmental overheads).
3. Economic Analysis of the efficiency of the beneficiaries under the procured market.
4. Economic Analysis of the efficiency of the beneficiaries under the regulated market.

### **Hypothesis of the Study**

The following are Null Hypothesis for the study:

- **H<sub>01</sub>**: Efficiency in regulated market is same among the states.
- **H<sub>02</sub>**: Efficiency of the beneficiaries under the procured market is same among the states.
- **H<sub>03</sub>**: Efficiency of the beneficiaries under the regulated market is same among the states.

### **Research Methodology**

The study is based on both secondary as well as primary data to accomplish the predetermined objectives. To accomplish the objective, secondary data from Food Corporation of India and State Agricultural Produce Marketing Board of Punjab and Uttar Pradesh state has been utilized. Further, the secondary data of agriculture output along with the selected social indicators has also been used at the India level as per the study requirement. Moreover, primary data from the beneficiaries of different market channel (procured and regulated market) has been collected through simple random sampling from Punjab and Uttar Pradesh State.

### **Sample Design**

The present study is also meant to verify the facts at ground level. The collection of primary data has been carried out in a properly well-structured manner. The study has selected two agricultural states (One developed and other less developed) in which the procurement and regulated market has been operated is taken into account. Consequently, Punjab from the advance and Uttar Pradesh from the less developed region have been taken for the two markets i.e. procured and regulated. Under the procured market, the data provided by the FCI under the Rabi Plan (2020-21) for Punjab and Uttar Pradesh has been taken as a base while selecting the purchasing centres for the conduct of sample survey in districts. While the data provided by the Mandi Board of the Punjab and Uttar Pradesh has been taken as a base for selection of market committee under the regulated market. As the unit of analysis in study is FCI centers and Market Committees, the primary survey of the participants from agricultural markets is preferred in each of the state. The targeted population of this market segment is unknown and therefore the study used the (Cochran, 1977) method for determination of sample size. (Cochran, 1977, p. 75) developed equation to yield a representative sample in case of large population.

$$n_0 = \frac{Z^2 pq}{e^2}$$

Which is valid where  $n_0$  is the sample size,  $Z^2$  is the abscissa of the normal curve that cuts off an area  $\alpha$  at the tails ( $1 - \alpha$  equals the desired confidence level, e.g., 90%)<sup>1</sup>,  $e$  is the desired level of precision,  $p$  is the estimated proportion of an attribute that is present in the population, and  $q$  is  $1 - p$ . The value for  $Z$  is found in statistical tables which contain the area under the normal curve. The use of above method provides is a sample size of 280 samples. These 280 samples have been distributed into 140 samples from each state which has been further bifurcated into 70 samples for each of the market segment i.e. procured and regulated. Since the study is confined to the Punjab and Uttar Pradesh state only, sampling distribution is executed within the territory of these particular states. The study has deployed a random sampling method for collection of the required information from the participants (farmers) in each of the market segment i.e. procured and regulated. To fulfill the homogeneous assumption of SRS method, the developed region of the two states has been targeted. For instance, in Punjab, Khanpur & Ludhiana Mandi (FCI centers/APMC) within the Ludhiana District has been selected. In Uttar Pradesh, Naveen Khair mandi & Charra Mandi (FCI centers/APMC) under the Aligarh district has been selected. A total of 70 sample units have been picked from each selected unit.

The present research work is compartmentalized into eight chapters.

**First Chapter** entitled as **“Introduction”**. This chapter discusses the agriculture sector of India and the challenges that lie in its core. This chapter is divided into three major parts. The first part deals with India’s agricultural scenario and the role of agriculture market in the context of Punjab and Uttar Pradesh. Second part deals with the review of literature and third section deals with objective, hypothesis, research methodology of the study.

**Second Chapter** titled as **“Theoretical Framework of Agricultural Marketing”**. The main focus of this chapter is on theoretical and conceptual underpinnings of agricultural marketing in literature. Consequently, this chapter is split into six main sections: The introduction, which reveals the marketing's historical legacies, is the first section. The concept of marketing for agriculture was covered in the second segment. The evolution of marketing and agricultural marketing thoughts are covered in the third section. The fourth segment is exclusively focused on

agricultural marketing from the perspective of different theories and concepts related to the subject. The framework and structure of agricultural marketing in India are explained in the fifth part. The closing paragraph covered the conclusion.

**Third Chapter** entitled “*Economic Efficiency for the Procured Market*” is in line with the study's first objective, and thus examines the procured market's economic efficiency, particularly of Food Corporation of India. Furthermore, this chapter is split into eight major sections: After Introduction, economic cost of FCI for the wheat crop is examined in the second section. Third section analyses the economic cost for rice crop. Likewise, fourth section examines the components of economic cost for the wheat and rice crop. The fifth part demonstrates the central pool's stock position for the wheat and rice crop. The status of the wheat and rice crop's total output, market arrivals, and procurement are examined in the sixth section. The topic of food subsidies was covered in the seventh part with the aid of estimated ratios.

**Fourth Chapter** entitled “*Economic Efficiency for the Regulated Market*” makes an effort into the direction of measuring the efficiency of two apex public bodies in the field of agricultural market i.e., UPSAPMB and PMB under a comparative framework to fulfill the second objective. The analysis has been performed on secondary data collected from UPSAPMB and PMB over eighteen-year period, from 2000-01 to 2017-18. Further, this chapter is partitioned into six major sections. Introduction comes first. The second section examines the patterns and trends in PSAMB expenditure. Likewise, third section examined the expenditure trends and patterns for UPSAPMB. Utilizing a panel Data Envelope Analysis approach, fourth section measures efficiency of regulated market. In fifth section, Bootstrapping Panel DEA approach has been utilized to efficiency measurement. The chapter's conclusion was covered in the last part.

**Fifth Chapter** entitled “*Agricultural Profile of the Field Study Area*” is a requisite pre-survey exercise of the field study area for the accomplishment of predetermined aim as stated in third and fourth objective of the study. Thus, this chapter hold a crucial place and therefore this chapter describes demographic, geographic, and socioeconomic characteristics of the chosen states before primary field survey is carried out. There are primarily four sections in this chapter. The foremost section is Introduction. The second section portrays an overview of Punjab State. Third section similarly presents an overview of the Uttar Pradesh State. The comparative outlook of the two

states, Punjab and Uttar Pradesh, is covered in the fourth part. The conclusion is covered in the final section.

**Sixth Chapter** titled “*Socio-Economic Analysis of Market Beneficiaries*” analyze the socio-economic aspect of the market beneficiaries on certain dimensions. Based on these dimensions the chapter has been sub-categorized ten broad sections. After Introduction, the first section portrayed demographic profile of respondents. Second section discussed the social profile. Third section depict the land holding pattern of respondents. Fourth section analyze returns for paddy crop. Fifth analyze returns for wheat crop. Sixth section discuss the investment and loan pattern among respondents. Seventh section articulates the marketing cost incurred by the respondents. Eighth section dealt with the consumption expenditure pattern observed among respondents. Ninth section portrays the level of awareness among the respondents. And at last, conclusion of the chapter has been discussed in the Tenth section.

**Seventh Chapter** entitled “*Economic Analysis of the Efficiency in the Procured and Regulated Market*” analyze the farmers efficiency to fulfill the third and fourth objective of the study using Stochastic Production Frontier methods. Further, whole chapter is divided into eight major sections. Firstly, the Introduction is covered. The technique of stochastic production frontier used to analyze efficiency is described in the second section. The third section discusses Data & Methodology related to the Production Frontier (Model-1) and Revenue Frontier (Model-2). Efficiency measurement for paddy crop using Model-1 has been estimated in section four. A similar method (Model-1) for efficiency measurement for wheat crop is analyzed in the fifth section. Efficiency measurement for the paddy crop using Model-2 has been discussed in sixth section. Likewise, seventh section uses Model-2 for Wheat Crop to estimate efficiency. Finally, in the eighth part, the chapter's conclusion is discussed.

The study finds that despite economic cost for FCI has been consistently increasing for wheat and rice crop. The food subsidy as a percent of total subsidy declined upto 2013. The obvious reason behind such decline in the increase in subsidies other than food subsidy for such period. After 2013, the food subsidy expenditure as a percent of total subsidy started inclining. The reason behind the increase of such food subsidy is the widening gap between MSP and Economic cost from 2007 onwards due to increase in the MSP for wheat and rice crops. Further,

all India level data of agricultural productivity and market arrivals clearly show that productivity has increased considerably during the period 2000-01 to 2018-19. In brief, it can be concluded that FCI is relatively efficient from the prospects of its predetermined goals & objectives i.e. farmers welfare, price stabilization in the market and food grain at a reasonable price to vulnerable section of society. However, from the economic aspect the FCI is not so cost-effective as can be seen under the cost analysis of the FCI. Therefore, the study concludes that trade-off between cost efficiency and the pre-determined objective of FCI is permissible as long as GOI is in a better position to finance their subsidy expenditure and welfare accruing to society is larger than the operational cost of FCI.

Further, despite the rise in agricultural productivity, the market arrivals have considerably low. This may be due to wastage of output or a major portion of the production retained by the farmer for their consumption. If the market efficiency is high not only the wastage is lower but more output would be attracted to the market fences. The infrastructure to APMC and the services is the jurisdiction of State Agricultural Produce Marketing Board in Punjab and Uttar Pradesh. And its depend upon the expenditure incurred by the respective SAPMB. Therefore, Data Envelope Analysis method has been adopted to measure the efficiency in allocating the expenditure incurred by the UPSAPMB and PMB over the various head for maintaining the agricultural market within their state boundaries. The study exhibited that there has been a general decline in the efficiency of UPSAPMB during the study period (2000-01 to 2017-18). On the other side, PMB demonstrates higher efficiency during the study period relative to Uttar Pradesh. In short, PMB appeared as more efficient in allocation of their expenditure in maintaining the regulated market structure relative to its counterpart i.e., UPSAPMB.

Based on socio-economic analysis of the household in the field survey, it can be summed up that despite the geographical, cultural and institutional differences. The returns stand higher among the participants from the Punjab markets as compared to the market of U.P. This could be explained with the help of differences observed in land holding size, access to the financial institution and investment pattern between the participants. The focus was more on investment in agricultural machinery and equipment in Punjab relative to its counterpart. Further, the food habit is relatively better and a nutritionally rich diet has also been followed by the participants of Punjab. At last, better symphony and coordination has been observed among the participants from Punjab

market explains why the participants from Punjab are performing better as relative to their counterpart. At last, efficiency of the beneficiaries of agrarian market nexus (FCI & Mandi Samities) in respect of two states i.e., Punjab and Uttar Pradesh, has been analyzed using the stochastic production frontier methods upon field survey data. The efficiency that are being analyzed is related to production efficiency and afterward when the farmers sale their product in the market at a price. Therefore, two models have been incorporated in this chapter. The first model analyses the production associated technical efficiency and the second model will analyse the revenue generating capacity associated with technical efficiency of the beneficiaries in agrarian market nexus for two major crops i.e., paddy and wheat. In brief, it has been found that the efficiency among the production & revenue frontier has been higher for Punjab State as compared to Uttar Pradesh State for paddy as well as wheat crop. However, the efficiency has seen higher among the beneficiaries of mandi samities as compared to the beneficiaries of FCI for the paddy crop. The likely reason behind such a fact is that the beneficiaries of mandi samities have been efficiently utilizing their factor resources in the production of the fine quality of paddy that fetches them a relatively better price that is not covered under the procurement of paddy as witnessed among the samples during the survey in Punjab. While for wheat crop the efficiency can be seen higher for the FCI led beneficiaries as compared to mandi samities in production as well as revenue based frontier. Further, the production, as well as revenue based efficiency, have seen higher for the Punjab state as compared to Uttar Pradesh. in case of wheat crop.

### **Policy Recommendation**

The present study proposes the following recommendation for improving the marketing operation in the agricultural sector:

1. There is need to improve the governance of Uttar Pradesh State Agricultural Produce Marketing Board in terms of expenditure, generation of revenue and market arrivals. The Punjab state has been done wonderful work in this scenario and thus able to attract more revenue and market arrivals. Therefore, the study recommends to improve the same in the Uttar Pradesh so that the more output can reach to markets.
2. The study recommends to intensify the focus upon the short-term training programmes for farmers as the farmer's efficiency are found to be positively related with the same.

3. The study observed the farmer revenue generation capacity in the market has increased for those farmers who have been directly participating in the procurement process. The reason behind the such fact is relatively higher price for their staple crop in such framework. Therefore, the study recommends to rotate the procurement process in other unexplored areas rather than procuring from the same area again and again. This will reduce the aftermath of the heavy dose of chemical fertilizer in such areas and helps in regenerating the soil fertility in those particular areas.
4. It has been observed that the source of selling does influence the revenue generation capacity of the farmers in the present market scenario. Therefore, study suggests to make a check on the role of “mandi arhatias” who are found negatively associated with the revenue generation capacity of farmers in the new market reforms.
5. At last, since most of the production enhancement technology has already been explored in the forms of HYV seeds, and fertilizers. The possibility of further expansion in production is minimal. Therefore, the next revolution in the agricultural sector is only possible by strengthening and empowering the agricultural market nexus in India. Indeed, the objective of doubling of farmers income would only be accomplished if more focus will be laid on erecting market infrastructure for supplying inputs and outputs to minimize the wastage of time, food and other resources and better price for the crop has been given to stakeholders.
6. A better price for the agricultural crop is a means and not an end in itself. Therefore, the study suggests working upon other alternatives such as agriculture and rural infrastructure for raising the sustainability of farmers income rather than raising the minimum support price. These alternatives should also be in the form of minimizing the cost of cultivation.