# A STUDY OF HARYANA RICE SECTOR IN POST-REFORM ERA

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## ABSTRACT

*The purpose of this study to examine the economic efficiency and competitiveness of rice sector of Haryana state in the post-reform era using various indicators like Nominal Protection Coefficient (NPC), Effective Protection Coefficient (EPC), Effective Subsidy Coefficient (ESC) and Domestic Resource Cost (DRC). The results of the study based on secondary data found that Haryana has competitive and comparative advantage in the production of rice crop since its inception; however, the rice market is still facing many challenges like transportation, high fees and taxation at the local level, high extent of levy, handling and storage facilities at the port, and fluctuated government export policy which need to be tackled carefully.*

**KEY WORDS**: *MEP, MSP, CACP, FAO and Green Revolution.*

## INTRODUCTION

Haryana is located in the northwest part of the country and its climate is arid to semi- arid with average rainfall of 354.4 mm. Haryana is one of the smallest State of India with 4.4 million hectares of land, forming 1.4 percent of the total geographical area of the country. Food grains are planted in about 69 percent of gross cropped area, with rice and wheat alone accounting for 49 percent .There are two agro climatic zones in the states. The north western part is suitable for rice, wheat, vegetable and temperate fruits and the south western part is suitable for high quality agricultural produce, tropical fruits, herbal and medicinal plants. The food-grain production has increased to 16.2 million tons in 2010- 11, as against only 2.59 million tons when the State came into existence in 1966-67. The average yields of major commodities, such as rice, wheat, maize, oilseeds, sugarcane, and cotton exceed those of other large States as well as the all India average.

The State has the distinction of attaining food self-sufficiency in the shortest period. Currently, Haryana is the second largest contributor to the national food basket. Progressive policies and programs, Research & Development (R&D), required infrastructure and hard-working farmers have all contributed to the steady growth in the State. During 2011-12, the GDP growth rate was 8.1percent in Haryana, as against 6.9 percent at all India level. As regards sectoral growth, service sector recorded the highest growth of 10.2percent followed by industry 6.1percent and agriculture 5.1percent.

The broad based adoption of high yielding varieties of seeds (HYVs) in mid-sixties, extensive use of fertilizers, pesticides and insecticides, improved access to water through public and private investments in irrigation and power projects has increased the food grain production manifold, which helped to transformed the status of India from food deficit to a net food surplus country. The credit for this performance may be attributed to benevolent weather conditions, effective Government interventions, push given to agri-investment and the Minimum Support Price (MSP) Policy. Present study is an effort to evaluate the competitiveness of Haryana's rice sector in international market by keeping in view the overall food grain production, marketable surplus and number of farmers.

Agriculture is the major sources of export earnings of our country and the performance of agricultural export depends not only on adequate surplus, international prices, and quality of product, market competition and comparative advantages but also on domestic and international trade policy. The temporal behaviour of India's exports and imports shows that India has consistently remained a net exporter of agri-products during the last two decades. Agri-exports have increased more than ten times from US$ 3.5 billion in 1990-91 to US$ 37.1 billion in 2011-12 and Haryana is one of the major contributors. India's export of rice has been fluctuated between 2.2 million tonnes to 7.2 million tonnes during 2001-02 to 2011-12. Since exports of non-basmati rice have been opened from September, 2011, India exported record 7.2 million tonnes in FY 2011-12. As per FAO, India emerged as the world's largest exporter of rice in calendar year 2012. Only 7 per cent of world rice production is being traded and major rice-exporting countries are Thailand, Vietnam, India, the United States, Pakistan, Australia, Italy, Uruguay, Argentina, Egypt, and Spain.

Government affect the rice market by way of minimum support prices, procurement, stocking and distribution of

food-grains through targeted public distribution system. CACP set the minimum price before the beginning of the season so as to ensure the remunerative and stable price for the farmers.  The farmers are free to sell their produce either to the procurement agencies at MSP or in the open market, whichever is benefited for them. The Food co-proration of India (FCI) and other designated state agencies undertake procurement of cereals, wheat and rice. Rice is procured by the government agencies through compulsory levy and milled by rice millers, termed as Custom Rice Mill. The quantum of levy is determined by the state governments, according to the requirements under various welfare schemes and the price of the levy rice is fixed by the government of India.

## INDIA'S RICE TRADE POLICY

The rice market was regulated by way of minimum export price MEP), export quota and quantitative restrictions till 1991. But the economic reforms of 1991 in the forms of liberalisation, privatisation and globalisation have changed . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . The removal of export bans on non- basmati rice and liberalizing the exports of basmati rice by eliminating the MEP helped India to liberate rice exports from government controls and improve the export volumes.  The rice export policy generally follows a counter-cyclical position, i.e. when global prices are high and rising, India also filters its exports through high MEP or outright ban on common rice exports, and when global prices fall, India also opens the exports policy and reduces MEP. This is done primarily to give some stability to domestic rice prices. This stop go behaviour of export policy has irritated the Indian exporter and as they do not get the full potential price for their product in the international market and was also considered as against the global food security especially when exports were restricted by keeping in view the rising global prices. It is one of the facts that the export of rice from India is fluctuating year after year particularly in case of non-basmati rice while the export of basmati rice is more or less stable. In such a situation of fluctuating exports, the country could hardly benefit from the advantages of rice trade. Thus, farmers, producers and consumers lose from the participation in world market.

## REVIEW OF LITERATURE

Beyond several constraints in production and marketing of agricultural commodities, performance of Indian agricultural and allied sector is noteworthy in global context. There are several studies on assessment of agricultural trade performance (Datta *et al,* 2001 and Chand, 2003) and implications of trade on several dimensions (Chand, 1999; Gulati, 2002 and Mittal, 2007) in India. For certain commodities like basmati rice and spices; India has a niche market access in spite of competition. Export earnings from traditional group consisting of tea, coffee, spices, and tobacco suffered mainly due to sharp fall in international prices as quantity of export in most cases did not decline. Gulati *et al.* (1990) worked out the National Protection Coefficient (NPC) and Effective Protection Coefficient (EPC) for rice growing states in India, namely, A.P, Bihar, M.P, Orissa, Punjab and U.P under the exportable and importable hypothesis during 1978 –1986. These results showed that rice cultivators were more taxed on the pricing front under import competitive hypothesis. Datta (1996) calculated Nominal Protection Co-efficient (NPC), Effective Protection Co-efficient (EPC) and Domestic Resource Cost (DRC) for Indian Basmati and non-basmati rice. The results revealed that India has very slender

competitive strength in export of basmati rice and moderate strength in case of non-basmati rice. Raj Singh (2003) made an attempt to examine interrelationship among globalization, agrarian situation and sustainability in Haryana State of India. This study reported that area under wheat and rice had increased considerably during the post-liberalized period and area under other crops such as gram, sugarcane, groundnut, fruits and vegetables had decreased.

This is against the manifest objectives of economic liberalization because the wheat-rice monoculture pattern leads to biological problems besides reduced soil fertility. The study highlighted that wheat-rice mono cultivation system required the application of considerable amount of chemical fertilizers, pesticides and excessive application of both surface and ground water. Consequently, consumption of chemical fertilizers pesticides and use of tractors have increased considerably since 1990-91, which almost destroyed bio-diversity, ecosystem and soil health. Since fertilizer use of rice and wheat is now close to optimal level and application of additional doses of fertilizers is often unprofitable, the study stressed the necessity of diversifying some areas from wheat and rice to other crops and it is a serious challenge for the researchers to develop some cropping crops, which the farmers would accept. Khush and Virak (2005) the increase in per capita availability of rice and the decrease in the cost of production per ton of output contributed to a decline in the real price of rice, in both domestic and international markets. Datta (2007), analysed the problems and prospects of India's rice trade in a WTO regime and concluded that Indian rice is fairly price competitive and has the potential to gather further competitive strength through concerted by product use. Sharma (2013) examined India's commitment related to domestic support under the Agreement on Agriculture (AoA) and agricultural modalities in context of Doha ministerial negotiations. The study found that India does not have any commitment to reduce domestic support under AoA because Aggregate Measure of Support (AMS) is below *deminius* level. Further, the study examined the revised draft of Doha negotiations and concluded there is no reduction commitment related to OTDS and final bound AMS. Therefore, in total, the study concluded that India has more flexibility to provide Blue Box and Green Box subsidies to its agricultural sector. Mohanty (2009) estimated that global rice consumption in rough equivalent will increase by 90 million tons by 2020. The decline in Asian countries, where economic growth diverts consumption from rice to other high-value food products, is more or less offset by rising per capita consumption in the rest of the world. It is expected that, in the future, per capita consumption will decline in most Asian countries due to increasing income and shifting consumption habits from staple food to more products with high value added. Mohanty et al (2010) in Africa, the United States, Latin America, and the European Union, where rice is not a staple, per capita consumption is continually growing).

## RESEARCH METHODOLOGY

To examine the economic efficiency and competitiveness of existing cropping pattern of Haryana agriculture under the open environment, various indicators like NPC, EPC, ESC and DRC are used. Here it is interesting to examine the deviation between the domestic and world price of rice with a view to understand the extent of potential gains that external trade can provide by allocating the resources efficiently. It also takes care of various subsidies and distortions in the

pricing of non-tradable factors of production ranging from water to land. It is important to note that if the value of competitive coefficient is less than one than rice crop is competitive and resources has efficiently utilised in the production of this crop. Trade competitiveness basically depends upon the level of domestic prices relative to international prices.

## Nominal Protection Coefficient (NPC)

NPC is defined as the ratio of domestic price to international price. The domestic price used in this computation could be either procurement or wholesale price while the world reference price is international price adjusted for transport costs, marketing costs and processing cost necessary to make the commodity comparable. If the estimated NPC of a crop is less than one then that crop is competitive and vice-versa.

$$NPC_i = P_i^d / P_i^w$$

Where,

$NPC_i$    Nominal protection coefficient of commodity I

$P_i^d$    Domestic price of commodity $i$

$P_i^w$    World reference price of commodity, adjusted for transportation, handling and marketing expenses.

Under importable hypothesis the commodity in question is regarded as an import substitute, i.e. there is an imported commodity that competes with the domestically produced commodity. Thus, NPC greater than one indicates that protection is given to the commodity and therefore, trade liberalization in this situation would reduce the domestic price. Likewise NPC less than one indicate that commodity is dis-protected and trade liberalization in this situation would raise the domestic price. NPC equal to one indicates that domestic price is equal to its border price (CIF or FOB) and no protection is given to the commodity.

## Effective Protection Coefficient (EPC)

The EPC adjusts the NPC for the protection of the relevant tradable inputs. It is defined as the ratio of the value added at domestic prices of the value added at world reference price converted into the local currency. Value added refers to the difference between the output price and the per unit value of all tradable inputs used to produce one unit of output. If the estimated EPC of a crop is less than one then that crop is competitive and vice –versa.

$$EPC_i = \frac{Q_i \left( P_i^d - \sum_{j=1}^{k} A_{ij} P_j^d \right)}{Q_i \left( P_i^w - \sum_{j=1}^{k} A_{ij} P_j^w \right)}$$

Where,

$EPC_i$    Effective Protection Coefficient for commodity $i$

$Q_i$    Quantity of output of commodity $i^{th}$

$A_{ij}$    Quantity of $j^{th}$ input required to produce a unit of commodity I

$P_j^d$    Domestic price of traded input

$P_j^w$    World reference price of $j^{th}$ traded input, adjusted for transportation, handling and marketing expenses

$Q_i$ In the above expression cancel out and the whole expression reduce to value added as given below:

$$EPC_i \qquad \frac{V_i^d}{V_i^w}$$

$V_i^d$    Value added at domestic prices
$V_i^w$    Value added at world reference prices

EPC value of greater than one suggests that government provide positive incentives to producers while values less than one indicate that producers are not protected through policy interventions.

## Effective Subsidy Coefficient (ESC)

The ESC adjusts EPC for subsidies or taxes on non-traded inputs and is defined as the ratio of value added at domestic prices (adjusted for subsidies and taxes on non-traded inputs) to the value added at world references prices. It is worth mentioning that if the estimated ESC of a crop is less than one than that crop is competitive and vice-versa.

$$ESC_i = \frac{Q_i \left[ \left( P_i^d - \sum_{i=1}^{k} A_i P_i^d \right) + \left( \sum_{j=k+1}^{l} A_{ij} S_j - \sum_{j=k+1}^{l} A_{ij} T_j \right) \right]}{Q_i \left( P_i^w - \sum_{i=1}^{k} A_{ij} P_i^w \right)}$$

$ESC_i$    Effective Subsidy Coefficient for the commodity $i$

$S_j$    Subsidy on the $j^{th}$ non-traded input

$T_j$    Tax on the non-traded input

$$\left( \sum_{j=k+1}^{j} A_{ij} S_j - \sum_{j=k+1}^{j} A_{ij} T_j \right)$$ Subsidies on non-traded factors of production

## Domestic Resource Cost (DRC)

The DRC may be defined as the value of domestic resources (primarily, non-traded factors of production such as land, labour and non-traded capital) needed to earn or save a unit of foreign exchange through the production of the commodity under consideration.

$$DRC_i = \frac{\sum_{j=k+1}^{l} A_{ij} P_j^s}{P_i^w - \sum_{j=1}^{k} A_{ij} P_j^w}$$ Where,

$DRC_i$    Domestic resource cost of saving or earning a unit of foreign exchange through the production of one unit of the $i^{th}$ commodity;

$A_{ij}$    Quantity of the $j^{th}$ input required to produce a unit of commodity $i$ ;

$P_i^s$    Shadow price or opportunity cost of $j^{th}$ non-traded input;

$$\sum_{j=k+1}^{j} A_{ij} P_j^s$$    Normative cost of all those $j$ inputs

(needed to produce one unit of the $i^{th}$ commodity) that are direct, primary, non-traded plus the indirect, primary, non-traded elements of non-traded items obtained after decomposition. (The normative costs are the "true cost" to the society, after adjusting for subsides etc., if any);

$P_i^w$     World reference price of commodity $i$, adjusted for transportation, handling and marketing expenses;

$P_j^w$     World reference price of $j^{th}$ traded input, adjusted for transportation, handling and marketing expenses;

$$\sum_{i=1}^{k} A_{ij} P_j^w$$     The world value of all those $j$ inputs directly traded plus the indirect traded elements of non-traded items obtained after decomposing the non-traded items into tradable and non-tradable;

$j = 1....k$     Directly traded inputs plus the traded elements of non-traded inputs obtained after decomposing the non-traded items into tradable and non-tradable;

$j = k + 1....j$     Primary inputs plus non-traded elements of non-traded inputs obtained after decomposing the non-traded items into tradable and non-tradable.

If the estimated DRC of a crop is less than one then the domestic resources are efficiently utilized in the production of that commodity and vice-versa.

### Table: 1
### Competitiveness in Rice Production (Exportable Hypothesis)

| Year | NPC | EPC | ESC | DRC |
|------|-----|-----|-----|-----|
| 1992-93 | 0.27 | 0.25 | 0.25 | 0.14 |
| 1993-94 | 0.24 | N.A. | N.A. | N.A. |
| 1994-95 | 0.37 | 0.36 | 0.37 | 0.18 |
| 1995-96 | 0.33 | 0.32 | 0.32 | 0.17 |
| 1996-97 | 0.85 | 0.00 | 0.00 | 0.00 |
| 1997-98 | 0.74 | 0.00 | 0.00 | 0.00 |
| 1998-99 | 0.88 | 0.89 | 0.91 | 0.45 |
| 1999-00 | 0.66 | 0.64 | 0.66 | 0.33 |
| 2000-01 | 0.55 | 0.54 | 0.56 | 0.27 |
| 2001-02 | 0.76 | 0.75 | 0.77 | 0.39 |
| 2002-03 | 1.01 | 1.03 | 1.05 | 0.40 |
| 2003-04 | 1.04 | 1.07 | 1.10 | 0.42 |
| 2004-05 | 0.95 | 1.02 | 1.05 | 0.56 |
| 2005-06 | 0.93 | 0.96 | 0.99 | 0.41 |
| 2006-07 | 1.02 | 1.07 | 1.11 | 0.45 |
| 2007-08 | 0.65 | 0.65 | 0.70 | 0.35 |
| 2008-09 | 0.34 | 0.32 | 0.35 | 0.18 |
| 2009-10 | 0.27 | 0.25 | 0.27 | 0.17 |
| 2010-11 | 0.34 | N.A. | N.A. | N.A. |

*Source: Author's Calculation*

Under exportable hypothesis, rice remained competitive till 2001-02 in international market as the value of competitive coefficient NPC was less than unity during this period. But it turned marginal competitive from 2002-03 to 2006-07 as the NPC was either greater than unity or closer to the unity. However, rice turned to be competitive for the next three years i.e. from 2007-08 to 2010-11. The EPC which adjust the NPC for the protection of relevant tradable in puts, was less than one during 1992-92 to 2001-02 which further reflects that rice was a competitive crop in the state, EPC was greater than one between the period of 2002-03 to 2006-07 which means that rice was not a competitive crop if subsidies on tradable inputs were adjusted. However, in later years, rice turned to be competitive as the value of EPC turned to be less than unity as indicated in the table No.1. The ESC, which adjusts the EPC for subsidies or taxes on non-tradable inputs, was less than one during 1992-93 to 2001-02 and hence rice was competitive during this period, but it was estimated greater than one from 2002-03 to 2006-07 which points out that rice remained uncompetitive during that period. However rice turned to be competitive for the next four years because the traditional competitive coefficient has shown the value less than unity. The results related to the DRC also led to conclude that domestic resources were efficiently utilized in case of rice crop and Haryana has comparative advantage in the production of this commodity.

## Table: 2
## Competitiveness in Rice production (Importable Hypothesis)

| Year | NPC | EPC | ESC | DRC |
|---|---|---|---|---|
| 1992-93 | 0.21 | 0.19 | 0.20 | 0.12 |
| 1993-94 | 0.21 | N.A. | N.A. | N.A. |
| 1994-95 | 0.31 | 0.29 | 0.30 | 0.16 |
| 1995-96 | 0.28 | 0.26 | 0.26 | 0.15 |
| 1996-97 | 0.67 | 0.00 | 0.00 | 0.00 |
| 1997-98 | 0.61 | 0.00 | 0.00 | 0.00 |
| 1998-99 | 1.01 | 1.04 | 1.06 | 0.57 |
| 1999-00 | 0.54 | 0.51 | 0.52 | 0.28 |
| 2000-01 | 0.62 | 0.60 | 0.62 | 0.33 |
| 2001-02 | 1.06 | 1.09 | 1.12 | 0.61 |
| 2002-03 | 0.72 | 0.70 | 0.72 | 0.29 |
| 2003-04 | 0.25 | 0.23 | 0.23 | 0.10 |
| 2004-05 | 0.74 | 0.76 | 0.78 | 0.46 |
| 2005-06 | 0.78 | 0.79 | 0.82 | 0.37 |
| 2006-07 | 0.50 | 0.48 | 0.50 | 0.22 |
| 2007-08 | 0.33 | 0.31 | 0.33 | 0.18 |
| 2008-09 | 0.22 | 0.20 | 0.22 | 0.13 |
| 2009-10 | 0.24 | 0.22 | 0.24 | 0.16 |
| 2010-11 | 0.33 | N.A. | N.A. | N.A. |

*Source: Author's Calculation*

Under importable hypothesis rice was also fairly competitive during the entire study period and is a good import substitute except the years of 1998-99 and 2001-02 as reflected by the behaviour of competitive coefficient NPC. In the state rice crop was highly competitive till 1995-96 and then turned relatively less competitiveness in the next two years i.e. in 1996-97 and 1997-98 as shown by the relatively higher value of NPC. From 1996-97 as the impacts of AoA agreement on agriculture started taking place NPC under importable hypothesis became relatively higher and even exceeds unity in the years of 1998-99 and 2001-02 which turned Indian rice uncompetitive in the domestic market. However from 2002-03 onwards rice crop was fairly competitive in most of the years of the study period as indicated by the declining trends of NPC. EPC and ESC also shows the almost same trends which further led to conclude that rice crop has remained competitive and of a good import substitute during the entire study period except 1998-99 and 2001-02. As far as DRC is concerned it is also less than one in all years and falling continually which shows that Haryana is an efficient producer of rice and have comparative advantage in the production of rice and resources are utilized efficiently. Overall, Haryana was competitive in the production of rice under exportable and importable hypothesis, in most of years as indicated by the estimated NPC, EPC and ESC, however the extent of competitiveness is greater under importable hypothesis. DRC also indicated that comparative advantage in the production of rice has been increased over the period of time. The pace of expansion of the world trade in rice in the future may depend on production and domestic policies for the major rice-producing and consuming countries. India continues to expand rice production mainly because of technological progress in the irrigated ecosystem, the provision of input subsidies for fertilizers, pesticide, irrigation and providing price support to large commercial farmers through compulsory procurement of surplus rice at pre-determined prices

## CONCLUSION

The economic environment for India's food grain sector has changed considerably since the Green Revolution of the 1960s and 1970s, but policies have not. Higher incomes are diversifying consumer demand away from staple food grains. More open borders are increasing linkages between domestic and global markets and prices. And, slowed growth wheat and rice productivity is signaling the need to boost lagging investment in new technology and improve the performance of input markets.

Despite the several constraints in production and marketing of agricultural commodities, performance of Haryana agriculture and particularly the rice sector is noteworthy in Indian and global context. For certain commodities like basmati rice and spices; Haryana has a niche market access in spite of stiff competition in the global market. Haryana has competitive and comparative advantage in the production of rice crop since its inception; however, the rice market is still facing many challenges like transportation, high fees and taxation at the local level, high extent of levy, handling and storage facilities at the port, and fluctuated government export policy which need to be tackled carefully.

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