

**CHAPTER 6**  
**COMPETITIVENESS OF AGRICULTURE SECTOR IN HARYANA**

## CHAPTER 6

### COMPETITIVENESS OF AGRICULTURE SECTOR IN HARYANA

The objective of this chapter is to examine the resource use efficiency and the competitiveness of the existing cropping pattern in Haryana. In broad sense, the concept of aggregate measure of support (AMS) can be considered as a measure of competitiveness of a country (Bhalla (2004) and Gulati (2003)). AMS is the sum of product specific and non-product specific support given to agriculture. The product-specific support that is the difference between the border price and the domestic price gives an idea about the competitiveness of commodities in nominal terms. The result from the previous chapter show that the product specific AMS to Haryana agriculture under both import and export hypothesis was negative during the period 1981-82 to 2004-05. However, the product specific support is not a strict measure of the competitiveness because the input subsidies are not specifically allocated to different crops and transport charges from the production to the consuming centres are not taken into account in the calculation.

Therefore, it is important to measure the competitiveness of agriculture by estimating the other indicators, which provide the clear picture of efficiency and comparative advantage of existing cropping pattern in Haryana. For this, four indicators of competitiveness i.e. Nominal Protection Coefficient (NPC), Effective Protection Coefficient (EPC), Effective Subsidy Coefficient (ESC) and Domestic Resource Coefficient (DRC) are estimated under exportable and importable hypothesis. This chapter measures the competitiveness of four major crop of Haryana i.e. wheat, rice, cotton and sugarcane under importable and exportable hypothesis by estimating the above mentioned four indicators of economic efficiency and competitiveness of agriculture sector.

#### 6.1 REVIEW OF LITERATURE

It is important to note that the macro policy framework and total scenario in agriculture underwent a significant change after the launching of the economic reforms in 1991. Before 1991, agriculture remained largely a protected sector in the Indian economy.

During this period, the main policy objective was to ensure stability of domestic prices of agricultural items in India. Due to the priority given to the needs of the domestic market, agricultural export was treated as a residual. Das (2003) and Bhattacharyya (2004) pointed out that in 1991, India introduced radical policy reforms in various economic sectors, including trade. Economic reforms started in 1991 gave a major boost to agricultural exports. The main factor for this impressive export growth was that international prices of several agricultural commodities were well above the domestic prices and liberalisation provided the opportunity to exploit this advantage. In 1991, Indian government devalued the rupee by 19 percent which also led to the competitiveness of agriculture sector. This led to the belief that Indian agriculture was highly competitive and generated a favorable environment for free agriculture trade. This happened at a time, when the Agreement on Agriculture (AoA) came into effect from 1<sup>st</sup> January, 1995, which marked the beginning of a new era of agricultural trade policy in India.

The liberalisation of the Indian economy during the early nineties gave hopes to the agricultural sector that the opening up of the economy would go a long way in removing discrimination against tradable agriculture and would bestow immense benefits to this sector through increased exports. Further, the signing of General Agreement for Trade and Tariff (GATT) accord would be instrumental in promoting multilateralism and in increasing international trade in agriculture. It was expected that the cutting of the export subsidies by the developed countries would result in bringing immense increase in agricultural exports of developing countries. It was expected that India would be benefited by signing the GATT agreement due to comparative advantage in the production of agriculture commodities in early 1990s.

It was in this context that many scholars predicted a bright future for agricultural exports. Gulati (1994) found that on an average during 1987-88 to 1993-94, domestic prices of wheat, rice, and cotton were well below the prices prevailing in the world market i.e. agriculture sector was net taxed. This gives a measure of the potential increase in farm income arising from trade liberalization. This led to conclude that Indian agriculture is

highly export competitive and that free trade would help the country to harness vast export potential.

Debroy (1996) concluded that India's exports can obtain an additional competitive advantage under WTO. There were several estimates to show that beyond 2005 world trade was likely to increase from \$ 200 billion to \$ 300 billion per year as a result of GATT agreement. With a 0.5 percent share of India in the world exports, this implies additional Indian exports of \$ 1.5 billion to 2 billion per year. Of course, these estimates were based only on liberalisation in agriculture, textiles and clothing and the reduction on tariffs. If the other areas were to be included, the gain would naturally be greater. Even, the study done by Bhalla and Singh (1996) brings out that Punjab is internationally competitive and can profitably export rice and cotton to the rest of the world.

However, the outcome of AoA has not been beneficial to the developing countries as was expected. Numerous distortions and market access barriers, still present in the developed countries have adversely affected the agricultural exports of the developing countries. India's agricultural trade performance since 1995 has not been satisfactory. Bhattacharyya (2004) indicates that India's agricultural growth rate since 1995 has shown extreme volatility. After registering positive growth rates in 1995-96 and 1996-97, agricultural exports from India showed negative growth rates for the next three years. In 2000-01, the growth rate has turned positive but the value of agricultural exports in 2000-01 was less than that of the year 1995-96. Share of agriculture in total exports has gone down steadily in the post 1995 period.

Bhalla (2004), Chand (2002), Gulati and Narayanan (2003) and Bhattacharyya (2004) observed that the Indian government started raising administered prices of rice and wheat in the 1990s, with a view to gradually eliminating the so called discrimination against agriculture and bringing these in alignment with the world price. To begin with the world prices were also rising and hence the competitiveness of agricultural exports from India was not adversely affected. But after 1996, the world prices of agricultural commodities

started falling and the price hikes started making a dent in the competitiveness of India's exports and a slow down of growth in agricultural exports.

Bhalla (2004) measured the competitiveness of Indian agriculture sector in 1990s under import and export hypothesis. On the basis of import hypothesis, most of the crops except oilseeds, some coarse cereals, and sugar were competitive. In the case of these commodities also, the picture would change in case the developed countries agree to withdraw their domestic support to agriculture.

However, the import competitiveness is getting reduced overtime because of several factors. Bhalla (2004), Chand and Jha (2001), Vyas (2001) mentioned the following reasons for this trend. First, the price hike given to these commodities. Secondly, the productivity growth rates in these crops have decelerated during the recent years which are primarily due to inadequate investment and non-availability of new technology. Thirdly, competitiveness is also adversely affected due to huge export subsidy and domestic support being given by the developed nation which cause decline in international prices. As far as export competitiveness is concerned, some of the major crops like rice and wheat became non-competitive during some recent years because of fall of their international price combined with a big increase in their domestic price due to increase of MSP.

Though, in absolute terms, India's imports of agricultural products have been increasing over the decades, the import dependency in terms of share in total import has been decreasing. The share of agricultural imports in India's total import has come down to a single digit level in the last twenty years after reaching its highest level (31 percent) in 1970. Though India is a very large producer and consumer of agricultural commodities, it is a marginal player in international trade. India's share of agricultural exports in world agricultural exports was 2 percent in 1960, which came down to .09 percent in 1990. The share of India's agricultural imports in world agricultural imports decreased to .75 percent in 1998 from about 2 percent in 1960. Thus, India's participation in world agricultural trade has been declining during the last 40 years (Bhattacharya, 2004).

Ghuman (2001) concluded that the export competitiveness of Indian agriculture, in general, and Punjab agriculture, in particular, has been adversely affected under the liberalised trade regime. Indian agriculture may have smaller exports surplus and limited export competitiveness due to almost stagnating yield, diminishing returns, declining global prices of primary commodities, rigid cropping pattern and shrinking expenditure on research and development. Factor that adversely affects the global competitiveness of Indian agriculture is the comparatively low average yield compared to other countries. For example, China's average yield of paddy is 117 percent higher than that of India. In wheat, the average yield of France and China is higher by 146 percent and 54 percent, respectively than that of India.

About the variability of international prices of agricultural commodities, Nayyar and Sen (1994) found that world prices have been more volatile than Indian prices. Based on this it is inferred that dismantling trade barriers on imports would increase the volatility of Indian prices and farm income, but Gulati (1994) anticipated that the variability of international price would reduce.

The analysis of intra-year price instability shows that during the last 18 years neither domestic nor international prices of rice and wheat follow any clear trend in monthly price variability. The variability in international prices, in most years, was higher than domestic prices in India. Long run series of international prices for wheat, rice, coarse grain, cotton, sugar and edible oils show cyclical movement. These prices have a tendency to rise for 4-5 years and then decline for about same number of years. International prices of agricultural commodities are characterized by high volatility, which is a crucial factor for trade policy and strategy. If the shocks due to high volatility in international prices are transmitted to domestic market, then it would destabilize cropping pattern and supply. Such volatility would cause uncertainty in farmer's income. Indian farmers are either small or marginal and they do not have resources and capability to move from one kind of cropping pattern to another kind year after year. (Chand, 2002)

Domestic prices are less volatile in comparison to international prices not because of low instability in domestic demand and supply factors. It is due to government intervention to maintain stability in domestic prices. Given the volatility of international prices, domestic markets must be insulated from temporary shocks in international markets. The shocks arising due to low prices in any particular year can be kept in check through appropriate tariffs.

Another issue related to export competitiveness is export subsidy. High exports subsidies in developed countries continue to be a major constraint inhibiting exports from efficient producers despite agreed reductions in export subsidies by developed countries. Due to export subsidies a handful of countries are able to maintain their competitiveness at the expense of those, which are not able to use export subsidies but are efficient producer of a wide variety of agricultural commodities. The commitment to reduce export subsidies under WTO is also very modest in comparison to the expectations of the most developing countries.

The current agreement under WTO does not include export credit schemes under the reduction commitments. These are obviously nothing but a form of export subsidies because they can lead to price discount for buyers, affecting the quantity of exports and lead to trade diversion away from those countries that don't offer subsidies on export credit. This will neutralize the benefits of reductions in exports subsidies for countries that are efficient producer and don't subsidize their exports (Sharma, 2000).

India hardly provides any export subsidies in agriculture, except for a very small sum as freight subsidy for some horticultural products. However, there is a general exemption of export income from income tax, irrespective, of whether the income is from exports of agriculture or non-agriculture commodities. Sooner or later, it would come under focus of WTO negotiations, which has escaped so far (Gulati, 2001).

The purpose of the agreement on export subsidy is to establish competition oriented export trade in agriculture produce under WTO regime. The hindrances to the fulfilment

of this objective are the developed countries, which frequently and extensively make use of different prohibitive forms of export subsidy. This is a serious threat to agricultural exports of the developing countries.

Gulati, Mehta and Narayanan (1999) indicate that export subsidies reduced the export competitiveness of India. Therefore, it would be in India's interest to demand these two. First, complete wiping out of export subsidies by the developed countries, especially the European Union (the dairy sector in particular) and Eastern Europe. Second, if India fails in achieving this end, then it should press for line-by-line reduction commitment on export subsidies. At present, the chief drawback of the rules on export subsidy is that commitments are defined over commodity aggregates rather than individual lines.

It is noteworthy that due to the diverse climatic and soil conditions, and an enterprising peasantry as well as a trading class, India has the necessary qualifications to emerge as a leading exporter of agricultural commodities. It is important now to design a strategy which should give us benefit of external trade (Vyas, 1999). Alagh committee (2003) revealed that much of our competitiveness is lost due to infrastructure factors. It is worth mentioning that the government is free to provide certain infrastructure and research facilities to the agricultural sector, which will not come under AMS calculation. The real gain from trade can only accrue if the country improves its competitiveness by increased productivity. Thus, the main target of the government should be to build up coordination in research institutions and farmers, build up storehouses, and improve irrigation and transportations facilities.

## **6.2 METHODOLOGY**

To examine the economic efficiency and competitiveness of existing cropping pattern of Haryana agriculture under the open environment, various indicators like DRC, NPC, EPC, and ESC is used. Here, it is interesting to examine the deviation between the domestic and world prices of major agricultural crops with a view to understand the extent of potential gains, that external trade can provide by allocating the resources more efficiently.



Although, this price comparison offers some indication of the potential gains from the trade, it fails to capture the Full Resources Cost Analysis, which attempt to capture the true resource cost of producing any crop at home vis-à-vis the option of importing from the world market. It also takes care of various subsidies and distortion in the pricing of non-tradable factors of production ranging from water to land. These four indicators are very useful for indepth analysis of competitiveness of agriculture sector in Haryana. It is noteworthy that, if an indicator of a crop is less than one then that particular crop is competitive and the resources has efficiently utilised in the production of that crop.

### 6.2.1 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 the international price adjusted for transport costs, marketing costs and processing cost necessary to make the commodity comparable. Another point deserves to be mentioned that these indicators of effective incentive can vary significantly depending upon whether they are estimated under import hypothesis or export hypothesis. In operational terms, the real difference is that while for import competitiveness, it is the foreigners who have to pay for the transportation and handling charges to the point of consumption inside India, for exports these charges have to be borne by Indian exporters. The estimated NPC of a crop is less than one than 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  $i$ , adjusted for transportation, handling and marketing expenses.

### 6.2.2 Effective Protection Coefficient (EPC)

Although, NPC measures the divergence between domestic and international commodity prices, it does not account for discrepancies in the prices of various tradable inputs, used in the production of these commodities. 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 to 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 trade inputs used to produce one unit of output. Thus, if the purchased inputs make up only a small part of the cost of production, the EPC may differ significantly from the NPC. The estimated EPC of a crop is less than one then that crop is competitive and vice-versa.

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

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  $j^{th}$  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:

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

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

Value added here refer to the difference between the output price and the per unit value of all traded inputs used to produce one unit of output. Thus, if the purchased inputs make up only a small portion of the total cost of production, there will be very little divergence between the NPC and the EPC. However, if purchased inputs form a large part of the cost of production, then the EPC may differ significantly from the NPC. Hence, the EPC of a crop will be greater (less) than the NPC of that crop if the weighted average NPC of tradable inputs going into the production of that crop has a lower (higher) NPC than the NPC of the crop output.

### 6.2.3 Effective Subsidy Coefficient (ESC)

EPC though a better measure of effective incentive than the NPC still leaves non-tradable inputs out of its purview. Thus 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.

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

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

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

$T_j$                               Tax on the  $j^{th}$  non-traded input

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

### 6.2.4 Domestic Resource Cost (DRC)

The DRC may be defined as the value of domestic resources (primarily, non-traded factors of production such as land, labor and non-traded capital) needed to earn or save a

unit of foreign exchange through the production of the commodity under the consideration.

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

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 subsidies 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;

$\sum_{j=1}^k A_{ij} P_j^w$  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;

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

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

This expression provides the true cost of domestic resources that are needed to save a unit of foreign exchange by production of commodity  $i$ . DRC is the most widely used and comprehensive measure of resource efficiency in an economy. The value of non-traded inputs like land, labour and capital has to be in terms of their shadow prices to take care of any market distortions. The shadow price of a resource is defined as the value of benefits foregone by the society in employing that resource in the production of a particular commodity. 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 in real term, that crop is competitive and vice-versa.

### 6.3 DATA SOURCE

- Government of Haryana: Statistical Abstract of Haryana. (Various Issues)
- Reports of the Commission for Agricultural Cost and Prices, Ministry of Agriculture, New Delhi. (Various Issues)
- Monthly Statistics of Foreign Trade of India, DGCIS, Calcutta. (Various Issues)
- Reports of Currency and Finance, Reserve Bank of India. (Various issues)
- Fertiliser statistics in India, Fertiliser Association of India, New Delhi. (Various Issues)
- Annual Report on the Working of State Electricity Board and Electricity Departments, Planning Commission. (Various Issues)
- National Account Statistics. (Various Issues)
- Water and related statistics, central water commission. (Various Issues)
- Financial aspects of irrigation projects in India, central water commission. (Various Issues)
- Agricultural Statistics at a Glance, Ministry of Agriculture. (Various Issues)
- Website of Haryana Electricity Regulatory Commission (URL: <http://herc.nic.in/>)
- Custom Manual of India (Various Issues)

## 6.4 ESTIMATES OF EFFICIENCY AND COMPETITIVENESS

The estimated result of economic efficiency and competitiveness of existing cropping pattern under both exportable and importable hypothesis are as follows:

### 6.4.1.1 Wheat (Exportable Hypothesis)

The NPC was greater than one during 1990-91 to 1992-93 indicating that wheat was not competitive during that period. It turned out to be less than one till 1998-99 except in 1996-97 implying that wheat was competitive during that period. However, 1999-00 onwards, the NPC was greater than one. The EPC, which adjusts the NPC for the protection of the relevant tradable input, was greater than one in most of the year and show the almost same trend as in the case of the NPC.

**Table 6.1**  
**VARIOUS INDICATORS OF THE COMPETITVENESS OF WHEAT<sup>1</sup>**  
**(Exportable Hypothesis)**

YEAR	NPC	EPC	ESC	DRC
1990-91	1.32	1.34	1.49	0.75
1991-92	1.53	1.53	1.73	0.86
1992-93	1.33	1.34	1.53	0.87
1993-94	0.80	N.A	N.A	N.A
1994-95	0.90	0.92	1.11	0.59
1995-96	0.77	0.75	0.88	0.49
1996-97	1.00	1.05	1.19	0.61
1997-98	0.90	0.93	1.08	0.59
1998-99	0.89	0.91	1.04	0.52
1999-00	1.10	1.11	1.30	0.63
2000-01	1.28	1.36	1.65	0.93
2001-02	1.44	1.53	1.85	1.05
2002-03	1.52	1.58	1.89	1.09
2003-04	1.36	1.48	1.82	1.03
2004-05	1.14	1.26	1.60	0.81

The ESC, which adjusts the EPC for subsidies or taxes on non-traded inputs, was greater than one in all years except 1995-96. This indicator also led to conclude that wheat was

<sup>1</sup> Data on cost of cultivation of wheat in Haryana is not available for the year 1993-94, therefore the EPC, ESC and DRC are not estimated for this year.

not a competitive crop. The ESC varied between 0.88 in 1994-95 and 1.89 in 2002-03. The result related to the DRC of wheat brings out that it remains less than one in all years except 2001-02 to 2003-04. It means the domestic resources were efficiently utilized in case of wheat crop in Haryana and also indicate that Haryana had comparative advantage in the production of this crop. The DRC varied between 0.49 in 1995-96 to 1.09 in 2002-03. However, this comparative advantage is shrinking in recent years due to lower international price of wheat and increase in cost of cultivation in Haryana.

Overall, Haryana was not competitive in the production of wheat under export hypothesis, especially in recent years, as indicated by the estimated NPC, EPC, and ESC. Though, the DRC was less than one for many years, it was approaching towards one and even it was more than one in recent years. Thus, in real terms also the comparative advantage in the production of wheat had declined.

#### **6.4.1.2 Wheat (Importable Hypothesis)**

Under importable hypothesis, the NPC remained less than one during 1990-91 to 2001-02, which means that wheat was competitive. However after that the NPC was greater than one which indicates the uncompetitiveness of Haryana in recent years. The EPC show the same trend as in the case of the NPC. Wheat was competitive till 2001-02, but after that the EPC became more than one.

In case of the ESC, it remained less than one till 2001-02 except in 1999-00. it became more than one after 2001-02. However, the DRC remains less than one in all the years which means domestic resources were efficiently used in the production of wheat. In real terms, Haryana had comparative advantage in the production of wheat. The DRC was 0.40 in 1990-91 and became 0.84 in 2004-05. It indicates that the DRC is approaching towards one, which means that Haryana had comparative advantage in the production of wheat but this advantage was declining over the years.

**Table 6.2**  
**VARIOUS INDICATORS OF THE COMPETITIVENESS OF WHEAT<sup>2</sup>**  
**(Importable Hypothesis)**

YEAR	NPC	EPC	ESC	DRC
1990-91	0.65	0.65	0.73	0.40
1991-92	0.62	0.62	0.70	0.37
1992-93	0.58	0.57	0.66	0.40
1993-94	0.62	N.A	N.A	N.A
1994-95	0.49	0.49	0.59	0.35
1995-96	0.60	0.58	0.68	0.42
1996-97	0.70	0.72	0.83	0.46
1997-98	0.69	0.70	0.81	0.49
1998-99	0.73	0.74	0.85	0.46
1999-00	0.90	0.89	1.04	0.54
2000-01	0.80	0.79	0.96	0.60
2001-02	0.87	0.87	1.05	0.66
2002-03	1.26	1.28	1.54	0.98
2003-04	1.08	1.13	1.41	0.87
2004-05	1.07	1.18	1.52	0.84

Above analysis leads to conclude that Haryana was not competitive in case of wheat under importable hypothesis as shown by the estimated NPC, EPC, and ESC. However, Haryana had efficiently used its domestic resources in an open environment as indicated by the estimated DRC.

#### **6.4.2.1 Rice (Exportable Hypothesis)**

Under exportable hypothesis, the NPC was less than one from 1990-91 to 1993-94 indicating that rice was competitive during that period. It was more than one till 1998-99, implying that rice was uncompetitive during 1994-95 to 1998-99. However, the NPC became less than one during 1999-00 to 2004-05 except in 2002-03 and therefore, rice was competitive during this period under exportable hypothesis. The EPC was less than one during the 1990-91 to 1992-93, but after that it was more than one till 1998-99.

<sup>2</sup> Data on cost of cultivation of wheat in Haryana is not available for the year 1993-94, therefore the EPC, ESC and DRC are not estimated for this year.



However, rice again became competitive for the next three years and after that, it was uncompetitive.

**Table 6.3**  
**VARIOUS INDICATORS OF THE COMPETITIVENESS OF RICE<sup>3</sup>**  
**(Exportable Hypothesis)**

YEAR	NPC	EPC	ESC	DRC
1990-91	0.81	0.79	0.87	0.55
1991-92	0.91	0.90	0.99	0.63
1992-93	0.92	0.92	1.02	0.72
1993-94	0.82	N.A	N.A	N.A
1994-95	1.13	1.21	1.44	0.95
1995-96	1.14	N.A	N.A	N.A
1996-97	1.05	1.10	1.27	0.73
1997-98	1.06	1.10	1.28	0.82
1998-99	1.05	1.09	1.27	0.84
1999-00	0.96	0.96	1.17	0.81
2000-01	0.82	0.81	0.98	0.68
2001-02	0.72	0.70	0.84	0.59
2002-03	1.02	1.05	1.24	0.91
2003-04	0.99	1.01	1.22	0.88
2004-05	0.91	N.A	N.A	N.A

The ESC was less than one in 1990-91 and 1991-92. In recent years (except 2000-01 and 2001-02), the ESC was more than one, which means that rice was not a competitive crop if subsidies on non-traded inputs were adjusted. The DRC of rice was less than one in all years. It means that the domestic resources were efficiently utilized in case of rice crop and also indicate that Haryana had comparative advantage in the production of this crop.

Thus, Haryana was competitive in the production of rice under export hypothesis as shown by the estimated NPC and DRC. This conclusion differs, when the estimated EPC and ESC are used as a measure of competitiveness.

<sup>3</sup> Data on cost of cultivation of rice in Haryana is not available for the year 1993-94, 1995-96 and 2004-05. Therefore the EPC, ESC and DRC are not estimated for these years.

#### 6.4.2.2 Rice (Importable Hypothesis)

The NPC was less than one during 1990-91 to 2004-05. It means Haryana is competitive in the production of rice under importable hypothesis, whereas under exportable hypothesis, rice was competitive for only some years. The EPC was less than one in all years and show the almost same trend as in case of the NPC.

**Table 6.4**  
**VARIOUS INDICATORS OF THE COMPETITIVENESS OF RICE<sup>4</sup>**  
**(Importable Hypothesis)**

YEAR	NPC	EPC	ESC	DRC
1990-91	0.68	0.65	0.72	0.49
1991-92	0.54	0.51	0.56	0.38
1992-93	0.73	0.70	0.78	0.59
1993-94	0.69	N.A	N.A	N.A
1994-95	0.92	0.94	1.13	0.80
1995-96	0.94	N.A	N.A	N.A
1996-97	0.86	0.86	1.00	0.62
1997-98	0.86	0.86	1.00	0.69
1998-99	0.85	0.84	0.99	0.71
1999-00	0.78	0.75	0.92	0.69
2000-01	0.74	0.71	0.86	0.64
2001-02	0.72	0.69	0.83	0.64
2002-03	0.77	0.74	0.88	0.71
2003-04	0.78	0.76	0.92	0.73
2004-05	0.73	N.A	N.A	N.A

In case of the ESC, it remained less than during all the years except 1994-95 to 1997-98. The DRC of rice was less than one in all years. It means that the domestic resources were efficiently utilized in case of rice crop in Haryana and also indicate that Haryana had comparative advantage in the production of this crop.

<sup>4</sup> Data on cost of cultivation of rice in Haryana is not available for the year 1993-94, 1995-96 and 2004-05. Therefore the EPC, ESC and DRC are not estimated for these years

In brief, Haryana was competitive in the production of rice as shown by the estimated NPC, EPC, ESC and DRC under importable hypothesis.

#### 6.4.3.1 Cotton (Exportable Hypothesis)

The NPC was less than one during 1990-91 to 2002-03 except in 1993-94 and 1994-95 indicating that cotton was competitive under exportable hypothesis during that period.

**Table 6.5**  
**VARIOUS INDICATORS OF THE COMPETITIVENESS OF COTTON<sup>5</sup>**  
**(Exportable Hypothesis)**

YEAR	NPC	EPC	ESC	DRC
1990-91	0.71	0.68	0.75	0.48
1991-92	0.68	N.A	N.A	N.A
1992-93	0.82	0.79	0.91	0.54
1993-94	1.24	N.A	N.A	N.A
1994-95	1.92	1.96	2.18	1.10
1995-96	0.64	0.62	0.69	0.35
1996-97	0.45	0.40	0.48	0.42
1997-98	0.75	0.70	0.94	0.84
1998-99	0.91	0.89	1.11	0.86
1999-00	0.93	0.92	1.09	0.64
2000-01	0.87	0.85	1.07	0.71
2001-02	0.88	0.70	1.98	3.44
2002-03	0.99	0.97	1.25	0.99
2003-04	1.00	0.98	1.22	0.88
2004-05	1.07	N.A	N.A	N.A

In 2004-05, the NPC became more than one. It implies that Haryana had lost the comparative advantage in the production of cotton. The EPC was less than one during 1990-91 to 2003-04 except in 1994-95. Therefore Haryana was competitive in cotton during that period. The EPC was 0.68 in 1990-91, which increased to 0.98 in 2003-04.

<sup>5</sup> Data on cost of cultivation of cotton in Haryana is not available for the year 1991-92, 1993-94 and 2004 - 05. Therefore the EPC, ESC and DRC are not estimated for these years.

The ESC was less than one during the period 1990-91 to 1997-98 except in 1994-95. But after that the ESC remain more than one in all years. It means that in recent years, cotton was not a competitive crop if subsidy on non-traded inputs to rice crop was adjusted. However the DRC of cotton was less than one in all years except in 1994-95 and 2001-02. The DRC varied between 0.48 in 1990-91 and 3.44 in 2001-02. The DRC of cotton increased to 3.44 due very low yield in that year. The average yield of cotton per hectare is 11-12 quintals, but in 2001-02 it was 2.62 quintal only.

Therefore, Haryana was competitive in the production of cotton under export hypothesis as shown by the estimated NPC, EPC and DRC. This conclusion differs, if the ESC is used as a measure of competitiveness.

#### **6.4.3.2 Cotton (Importable Hypothesis)**

Under importable hypothesis, the NPC was less than one during 1990-91 to 2004-05, indicating that cotton was competitive during that period. The NPC was 0.44 in 1990-91 and 0.70 in 2004-05. The EPC was also less than one during 1990-91 to 2003-04 except in 1994-95 when the EPC was 1.67. The EPC varied between 0.57 in 2001-02 and 1.67 in 1994-95.

The ESC was less than one during 1990-91 to 2000-01 except in 1994-95. But after that the ESC remain more than one. The DRC of cotton was less than one in all years except in 2001-02. It means that the domestic resources are efficiently utilized in case of cotton crop in Haryana and also indicate that Haryana was an efficient producer of cotton. The DRC varied between 0.33 in 1995-96 to 3.13 in 2001-02. The DRC of cotton increased to 3.13 in 2001-02, due very low yield in that year.

**Table 6.6**  
**VARIOUS INDICATORS OF THE COMPETITVENESS OF COTTON<sup>6</sup>**  
**(Importable Hypothesis)**

YEAR	NPC	EPC	ESC	DRC
1990-91	0.44	0.60	0.67	0.45
1991-92	0.38	N.A	N.A	N.A
1992-93	0.51	0.71	0.81	0.50
1993-94	0.51	N.A	N.A	N.A
1994-95	0.55	1.67	1.87	0.97
1995-96	0.48	0.56	0.62	0.33
1996-97	0.22	0.36	0.44	0.40
1997-98	0.40	0.62	0.84	0.79
1998-99	0.60	0.79	0.98	0.79
1999-00	0.75	0.81	0.97	0.59
2000-01	0.68	0.75	0.94	0.65
2001-02	0.71	0.57	1.69	3.13
2002-03	0.71	0.85	1.09	0.91
2003-04	0.66	0.85	1.06	0.80
2004-05	0.70	N.A	N.A	N.A

Therefore, Haryana is competitive in the production of cotton under import hypothesis as shown by the estimated NPC, EPC and DRC. However, the ESC was higher than one in recent years, which implies Haryana was not competitive in the production of cotton.

#### **6.4.4.1 Sugar (Exportable Hypothesis)**

Haryana was not competitive in case of sugar. The NPC was more than one during 1991-92 to 2004-05. The NPC lied between 0.97 in 1990-91 and 1.74 in 2003-04. The EPC also shown the same trend as in case of the NPC and was more than one in all years except in 1990-91.

The ESC was more than one in all years. It was 1.03 in 1990-91 and 2.00 in 2003-04. So, Haryana was not competitive in the production of sugar. However the DRC of sugar was

<sup>6</sup> Data on cost of cultivation of cotton in Haryana is not available for the year 1991-92, 1993-94 and 2004-05. Therefore the EPC, ESC and DRC are not estimated for these years.

less than one in all years. It means that the domestic resources were efficiently utilized in case of sugar in Haryana.

**Table 6.7**  
**VARIOUS INDICATORS OF THE COMPETITIVENESS OF SUGAR<sup>7</sup>**  
**(Exportable Hypothesis)**

YEAR	NPC	EPC	ESC	DRC
1990-91	0.97	0.98	1.03	0.38
1991-92	1.21	N.A	N.A	N.A
1992-93	1.04	1.05	1.13	0.51
1993-94	1.22	N.A	N.A	N.A
1994-95	1.27	N.A	N.A	N.A
1995-96	1.01	1.01	1.07	0.40
1996-97	1.05	N.A	N.A	N.A
1997-98	1.09	1.11	1.19	0.50
1998-99	1.13	1.14	1.23	0.48
1999-00	1.08	1.09	1.17	0.51
2000-01	1.22	1.23	1.33	0.59
2001-02	1.41	1.43	1.53	0.61
2002-03	1.61	1.67	1.83	0.92
2003-04	1.74	1.83	2.00	0.87
2004-05	1.43	N.A	N.A	N.A

It is obvious that Haryana was not competitive in the production of sugar under export hypothesis as shown by the estimated NPC, EPC and ESC. However, the estimated DRC show that Haryana was utilizing its resources efficiently and in real sense, had comparative advantage in the production of sugar.

#### 6.4.4.1 Sugar (Importable Hypothesis)

The NPC was less than one during 1990-91 to 1997-98 except in 1991-92. It means that Haryana was competitive during this period in the production of sugar under importable hypothesis. However, after that the NPC became more than one and Haryana lost its competitiveness in the production of sugar. The NPC was 0.91 in 1990-91 and 1.31

<sup>7</sup> Data on cost of cultivation of sugar in Haryana is not available for the year 1991-92, 1993-94, 1994-95, 1996-97 and 2004-05. Therefore the EPC, ESC and DRC are not estimated for these years.

in 2004-05. The EPC and the ESC also had shown the same trend as in case of the NPC. Both indicators were less than one till 1997-98 and after that became more than one. The DRC was less than one during 1990-91 to 2003-04. Therefore Haryana was competitive in sugar as per the estimated DRC. The DRC, which was 0.37 in 1991-92, became 0.67 in 2003-04.

**Table 6.8**  
**VARIOUS INDICATORS OF THE COMPETITIVENESS OF SUGAR<sup>8</sup>**  
**(Importable Hypothesis)**

YEAR	NPC	EPC	ESC	DRC
1990-91	0.91	0.91	0.95	0.37
1991-92	1.26	N.A	N.A	N.A
1992-93	0.82	0.82	0.89	0.42
1993-94	0.51	N.A	N.A	N.A
1994-95	0.89	N.A	N.A	N.A
1995-96	0.78	0.78	0.83	0.32
1996-97	0.77	N.A	N.A	N.A
1997-98	0.87	0.87	0.94	0.41
1998-99	1.02	1.02	1.10	0.45
1999-00	1.03	1.02	1.09	0.50
2000-01	1.02	1.02	1.11	0.51
2001-02	1.14	1.15	1.23	0.51
2002-03	1.27	1.29	1.42	0.75
2003-04	1.32	1.34	1.47	0.67
2004-05	1.31	N.A	N.A	N.A

The above analysis shows that Haryana was not competitive in the production of sugar under import hypothesis as shown by the estimated NPC, EPC and ESC. However, Haryana became competitive, if the estimated DRC is used as the indicator of competitiveness.

## 6.5 SUMMARY

The various indicators of competitiveness and resource efficiency show that the competitiveness has reduced in recent years, as most of indicators are approaching

<sup>8</sup> Data on cost of cultivation of sugar in Haryana is not available for the year 1991-92, 1993-94, 1994-95, 1996-97 and 2004-05. Therefore the EPC, ESC and DRC are not estimated for these years.

towards one. It occurred due to increase in the MSP overtime along with fall in the international price of agricultural commodities in recent years. However, the above analysis indicates that Haryana is competitive in real terms, as the estimated DRC is less than one for most of the commodities. However Haryana can efficiently exploit this opportunity, if huge export subsidy and domestic support given by the developed nations to their agriculture sector is withdrawn. There is also need for adequate public investment in infrastructure to generate export surplus and increase in productivity of agricultural commodities.