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**Responding to Policy Reform:
Indian Agriculture during the 1990s and after**

by
Ashok Gulati
Kathleen Mullen

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Stanford University
John A. and Cynthia Fry Gunn Building
366 Galvez Street | Stanford, CA | 94305-6015

The authors are, respectively, Director and Senior Research Assistant, Markets, Trade and Institutions Division, International Food Policy Research Institute, 2033 K Street NW Washington DC 20006, USA.

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ABSTRACT

The policy environment for Indian agriculture in the 1990s underwent an array of changes from broad-based domestic economic reforms launched in 1991, to the signing of the Uruguay Round Agreement on Agriculture in 1994, leading to a series of reforms in agricultural trade policies. These changes were accompanied by a slump in international prices of several agro-products after 1997, which led to confusion, roll backs in tariffs, and hardened stand on further liberalization. All this was happening in the backdrop of fast changing consumption patterns towards high value agriculture: from staple cereals to fruits and vegetables, dairy, poultry, and fish.

The decade of 1990s represents a transition period in Indian agriculture from state-led to market-driven growth; and while this evolution is still in progress and several roadblocks remain, it is useful to evaluate the performance of the agriculture sector during the reform process. To this end, this paper seeks to disentangle the major factors influencing the performance of Indian agriculture during the 1990s, and to identify the policy and institutional reforms needed to foster continued growth. While the overall growth rate in agriculture was largely unchanged in the 1990s vis-à-vis the 1980s, the composition of the production mix has changed in favor of high-value commodities. The change in the production portfolio is a result of changing domestic consumption patterns and increasing exports of high-value products. Continued growth in the agriculture sector will require innovative institutions that link consumers' preferences to production structures, from 'plate to plough,' through vertical coordination in search of cutting down transaction costs in a small holder dominated agriculture and fast emerging urban middle class in the country. Also, it would be important that policies support private sector-led investments in post-harvest technologies, from storage to processing and retail chain industry, especially for high value agriculture. Simultaneously, one will have to work for building of rural infrastructure that can augment supplies, raising incomes and increasing demand for agricultural products, all without backtracking and while continuing to build on the progress made thus far in liberalizing agricultural trade.

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Responding to Policy Reform: Indian Agriculture during the 1990s and after

I. Backdrop and Issues

The decade of the 1990s saw a sea change in the policy environment of the Indian economy. Sweeping reforms in exchange rate policies and industrial protection began in 1991, although it was not until later in the decade that direct reforms in agriculture started to take hold. Agricultural policy reforms began at the border and have just begun to spill over into the domestic policy arena. Underlying the reform process were the broad-based domestic economic reforms launched unilaterally in 1991, and the changing global context manifest in the signing of the Uruguay Round Agreement on Agriculture (URAA) in 1994 within the framework of the World Trade Organization (WTO). Nevertheless, Indian agricultural reforms are more a result of unilateral liberalization than of reduction commitments required by the URAA.

The indirect taxation of the agricultural sector through industrial protection and overvalued real exchange rates imparts a greater burden on the sector (two-thirds of the total) than direct taxation (one-third of the total) (Krueger, Schiff and Valdes, 1991). Thus, while the majority of the disincentives to agriculture in India may have been reduced with the economy wide reforms taken in the 1990s, work remains to eliminate the remaining direct taxes on the agricultural sector. Given the progress of economy wide and agricultural reforms, the current debate on Indian agriculture has evolved around the central question: How have the economic reforms in general, and agricultural trade and domestic policy reforms in particular, affected the performance of the agricultural sector since 1991?¹ Some skeptics point out that macroeconomic and trade policy reforms in India have affected the agricultural sector adversely and that it is worse off now than in the 1980s. Also, it is feared that as India integrates with the global economy, trade liberalization would trigger a deluge of cheap (often subsidized) imports,

¹ This question (and its corollary: have reforms eliminated the anti-agriculture bias?) are taken up in detail in Gulati, et al. (2003).

which would wipe out the production base of a large section of domestic agriculture. This in turn would lead to increasing dependence on food imports and threaten food security at the national as well as at the household level. Some have also voiced concerns that liberalization would expose small and resource-poor farmers to dramatic fluctuations in prices, which would push them to the very brink of destitution.

Contrary to this belief, Srinivasan and Jha (2001) demonstrate that freeing of food grain trade by India leads to greater domestic price stability, although annual world food grain prices over the period 1964-65 to 1994-95 are more volatile than domestic food grain prices. Sekhar (2003) using monthly prices finds that in general the intra-year variability in prices for wheat, rice, palm oil, groundnut oil, soybean oil, coconut oil, sugar, cotton, tea and coffee is higher in domestic markets, while the inter-year variability is higher in the international markets.

Given these results, how realistic are the fears of liberalization? Has Indian agriculture really performed worse during the 1990s compared to say the 1980s? Has trade liberalization really led to a deluge of imports threatening India's food security, as some feared it would? These are hard questions to answer and need a dispassionate analysis of the policy changes and their impact on incentive structures and performance of agriculture. Through the estimation and analysis of nominal protection coefficients for major agricultural products, and the examination of growth rates, exports, stocks, and investments in agriculture we attempt to link the effects of the changing policy environment to agricultural performance.

To this end, in the next section we review the major trade and domestic policy changes implemented in the 1990s and after. In the third section, we explore the impact of this changing policy environment on incentives, trade flows, investments, and on the overall performance and structure of the agricultural sector. In the last section, we conclude with an agenda for continued policy reform to 'set the house in order' given the changing structure of the agricultural sector.

II. Policy Reforms

It is well known that for a long time, Indian agriculture thrived in an autarkic environment, with panoply of controls governing international trade – through tariffs and non-tariff barriers including quantitative restrictions, import licensing, and marketing and export controls. These controls were implemented with a view to balance domestic demand and supply, export potential, and the balance-of-payment situation. Imports of several major agricultural commodities were canalized through State Trading Enterprises (STEs), as were exports (barring a few traditional export commodities). Domestically too, there was a plethora of controls – ranging from procurement, movement and storage restrictions to high levies on raw agricultural commodities.

When India embarked on broad-based macro-economic reform in 1991, this was largely restricted to the non-agricultural sector. With the signing of the URAA in 1994, some adjustments were made. However, in the initial years, even this was limited. A series of steps have been taken since 1994 to gradually open up the agricultural sector, but it was not until the abolition of quantitative restrictions in 2001 that the complexion of Indian agricultural policy seems to have changed in a fundamental way. The next sections describe the trajectory of changes in external (import and export) and internal policies (support prices, market intervention, stockholding, public distribution, input prices, etc.)

II.1 Reforms at the Border

The economic reforms introduced in 1991 led to a substantial liberalization of India's external trade regime. However, the progress in phasing out quantitative restrictions on consumer products including agricultural products was very slow. Except for the liberalization of import licensing on sugar and cotton in 1994, most agricultural products remained subject to import controls. Given the limited change that the URAA implied initially, agricultural trade liberalization did not cause a major problem during the early years of implementation. India's import policy reform began in earnest with the

abolition of quantitative restrictions completed in 2001. On the export side, the reform process began in 1994 with the placing of rice and also durum wheat on the list of freely exportable goods and removing their minimum export prices (MEPs).² However, the Government may re-impose both quantitative ceilings and MEPs when it deems necessary (WTO, 1998). The most important trade policy features to come about during the 1990s and after are:

- Removal of quantitative restrictions,
- Tariff bindings at high rates,
- Partial liberalization of agricultural exports, and
- Freight subsidies for cereal exports.

Import Policy

Given the limited change that the URAA implied initially, agricultural trade liberalization did not cause a major problem during the early years of implementation. In 1997, with considerable improvement in its balance-of-payments situation, India agreed to phase out its quantitative restrictions over a nine-year period, but had to finally lift QRs by April 2001 because of the ruling of the appellate body under dispute settlement.³ When the QRs were finally abolished in 2001, it was feared that there would be a surge in imports. Primarily to allay these fears, the EXIM Policy 2001-02 provided for a "Standing Group" of Secretaries of concerned ministries and the Director General of Foreign Trade. According to the government, this group would function as a "war-room" in tracking, collating and analyzing imports of 300 sensitive items, as many as two-thirds of which are agricultural products. The GOI also started exploring options, which would permit the imposition of temporary quantitative restrictions to combat the adverse flow of cheap imports into the country. Furthermore, the Budget 2001 required that bio-security and phyto-sanitary permits and other packaging and labeling conditions already provided

² Public Notice No.59 /(PN)/EXP/92-97 and Public Notice No.56 /(PN)/EXP/92-97

³ For details see Gulati and Hoda (2002).

for by different legislations be enforced for imports of certain agricultural commodities.⁴ This represented a shift to non-tariff protection measures, apparently designed to counter the perceived threat of an import flood.⁵

Following the 1991 economic reforms, India progressively trimmed the list of products that were canalized for import. However, even towards the end of 2002, imports of a few critical commodities continue to be controlled by State Trading Enterprises. The EXIM policy for 2002-2007 retained import monopolies only in respect of copra and coconut oil (State Trading Corporation) and some cereals (Food Corporation of India).⁶

Tariff Bindings and Tariffs

India retained in its WTO schedule the tariff commitments it had made during the early rounds of GATT 1947 negotiations. These commitments included zero duties on certain cereals and milk products. In view of the impending phase out of import restrictions, in 1999 India renegotiated these commitments under Article XXVIII of GATT 1994 and the levels of bound tariffs were raised from zero to 60 percent for skimmed milk powder, and to 60-80 percent for cereals including maize, rice, sorghum and millet, and from 45 percent to 75 percent for rape, colza and soybean oils. A feature

⁴ For instance, import of primary products of plant and animal origin will be subject to 'Bio Security and Sanitary & Phytosanitary Permits' to be issued by the Ministry of Agriculture per the conditions set out in *Plants, Fruits and Seeds (Regulation of Import into India) Order, 1989*. Imports of meat and poultry products are to be subject to the conditions regarding manufacture, slaughter, packing, labeling and quality as laid down in Meat Food Products Order, 1973. Imports of food products, whose domestic manufacture and sale are governed by Prevention of Food Adulteration Act, 1954, will be subject to all the conditions laid down in the Act. Import of these products must comply with the quality and packaging requirements of the Standards of Weights and Measures (packaged commodities) Rules, 1977.

⁵ Soon after, in early May 2001, the Government also declared that imports of the 300 sensitive commodities could be routed only through 6 designated ports in India, whereas until then they could be imported through any port. These ports include Chennai, Mumbai, Kolkata, Vishakapatnam, Kochi and JNPT. In addition the 4 airports at Mumbai, Chennai, Delhi and Kolkata and the ICD at Tughlakabad can be used for imports. (Notification No.11(RE-2001)/1997-2002. May 2, 2001. May 8 notifications). While the bio-security permit requirement continues to be in force even today, the port-of-entry restrictions caused uproar from importers, who had invested heavily in facilities at other ports. The order was thus quickly withdrawn on May 21, 2001 – within less than a month of introducing it (Notification No. 13(RE-2001)/1997-2002 dated the 21st May, 2001).

⁶ Use of import monopolies is consistent with Article XVII of GATT 1994 as long as the agencies that have been granted these monopolies have a free hand in importing the canalized products. Since import tariffs for the canalized products remained high in general, imports had not been taking place until the end of 2002.

of the renegotiated tariffs was that for the first time India had tariff quotas with lower in-quota rates for maize, skimmed milk powder and rape, colza and mustard oil and its fractions (other than crude) (Gulati and Hoda, 2002).

India's modified tariff schedule came into effect on 15 March 2000. India's current bindings, after the HS 1996 revision and 1996 renegotiations, retain the overall structure that emerged from the Uruguay Round: 100 percent for commodities, 150 percent for processed products and 300 percent for edible oils. The departures from this pattern are mainly in respect of tariff lines that figured in the negotiations and renegotiations before the Uruguay Round, and the 1999 renegotiations (Gulati and Hoda, 2002).⁷

A closer look at the domestic and international prices of the products for which tariffs were renegotiated from zero (including milk, maize and rice) is warranted. For rice, domestic price is less than international price throughout the 1990s, implying that it does not pose a threat of an import flood (See NPCs in Section III.1). Domestic prices for milk and maize fluctuate above and below international prices during the 1990s, meaning that imports could come in some years if bound tariffs were left at zero (See NPCs in Appendix I). In addition, Sharma and Gulati (2003) conclude from an evaluation of effective incentives that the Indian dairy sector is competitive only if the export subsidies on dairy products by developed countries in general and the USA and the EU in particular are abolished.

The most striking feature of India's post Uruguay Round tariff structure is the wide gap between the bound and applied levels. Against the simple average bound tariff rate of 115 percent, the average applied rate of basic customs duty as of April 1, 2002

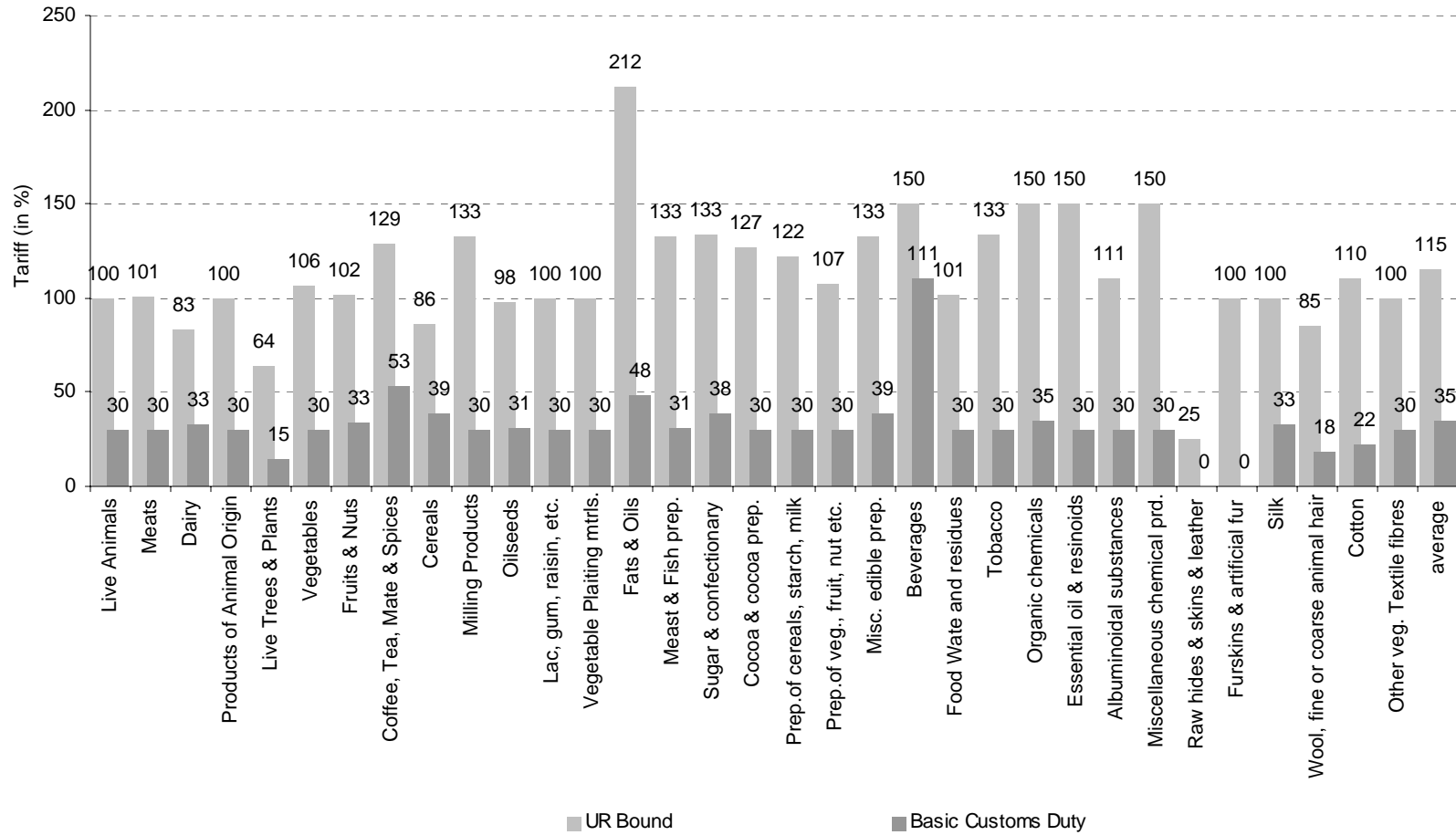
⁷ Among the more important items in international trade, lower bound rates apply to certain meats (35 percent), certain dairy products (40-60 percent), certain temperate zone fruits (30-55 percent), cereals (60-80 percent), rape seed oil (75 percent), soybean oil (45 percent), certain prepared meat and vegetable products (55 percent), certain fruit juices (85 percent), hides and skins (25 percent) and wool (25 percent).

was 35 percent.⁸ The chapter-wise divergence between the bound rates of duty and the applied rates of basic customs duty is shown in Figure 1.⁹ It should be noted that this pattern is certainly not unique to India, Hoda and Gulati (2003) analyze the agricultural tariff profiles of 11 developing countries (Argentina, Brazil, India, Indonesia, Korea, Mexico, Pakistan, Philippines, Thailand, Tunisia and Venezuela) and find that the post Uruguay Round applied rates were far lower than the bound rates in all these countries except Thailand. Excluding Thailand, the average bound rate for these countries in 1998 was 64 percent compared to an average applied rate of 26 percent.

⁸ In calculating the averages for bound tariffs the modified Schedule after the HS 1996 revision and the 1999 renegotiations have been taken as the basis. Identification of the corresponding applied levels of basic customs duty as on 1 April 2002 presented some difficulty as the latest duty rates have been notified by the Government of India on the basis of HS 2002, while the tariff Schedule remains on the basis of HS 1996. In the chapter-wise averaging, however, this variation is of little consequence. In all these calculations two of the Tariff Sub-Headings (0802.11, Almonds In Shell and 0802.12, Almonds Shelled) have been excluded as tariffs on these are specific and not ad valorem. The WTO reports the simple average applied tariff on agriculture (WTO definition) as 41% in 2001/02 and 37.5% in 2002/03. The WTO figures are slightly higher because they may include special additional duties (SAD) (WTO, 2002).

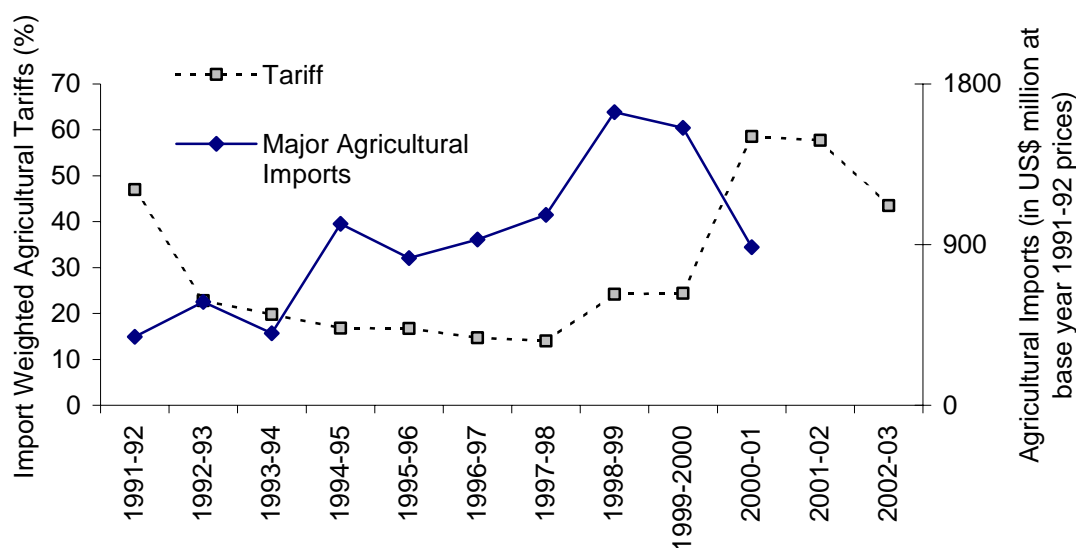
⁹ It can be concluded from our calculations of NPCs in Section III, that not only are there wide gaps between bound and applied duties, but also between applied and necessary tariff levels. We show that Indian agriculture is reasonably competitive on an import substitution basis, thus calling into question the need for high applied tariff rates under the current price setting.

Figure 1—India's Bound Rate and Basic Customs Duty 2002-03



Given the limited change that the URAA implied initially, agricultural trade liberalization did not cause a major problem during the early years of implementation. In fact, this period saw a general reduction of average tariffs on agricultural products and unilateral import liberalization in some commodities. High world prices in 1995-97 meant that despite these policy changes agricultural imports were not large enough to generate concern (Figure 2).¹⁰

Figure 2—Agricultural Imports and Tariffs in India



Sources: RBI (2001); Ahluwalia (2002)

Notes: Agricultural Imports include Cereals & Cereal Preparations, Edible Oils, Pulses, Sugar and Cashew Nuts.

Overall, until well into the 1990s, agricultural imports were not so large as to cause panic (Figure 2). This was despite a decline in tariffs (import weighted averages), largely due to the QRs that were in place. When QRs were removed, imports remained at modest levels because of the high reigning international prices between 1995-97. With international prices crashing to extraordinary lows thereafter, imports increased. By 1999

¹⁰ Demonstrating the jump in agricultural prices, the IMF index of market prices of food (1995=100) climbed from 91.2 in 1993 to 108.2 by 1996.

the IMF index of market prices of food (1995=100) had fallen to 77.6 and by 2002 had only reached 81.4. Interestingly, from 1999-2000 to 2000-01, following the removal of QRs, imports show an apparent decline, perhaps due to increases in tariff levels. Between 1999-2000 and 2000-01, the import weighted agricultural tariff jumped from 24.4 percent to 58.6 percent. This increase was largely the result of the U.S. proposal for the 1999 WTO Ministerial Conference to “eliminate the disparities between applied and bound rates.” (USTR, 1999). The late 1990s experience shows that the major agricultural imports have been wheat, maize, pulses, edible oils and milk.

Export policy

Throughout much of the 1980s, the Indian economy was burdened with export restrictions and overvalued exchange rates, which taken together imparted a considerable anti-export bias to the economy. During the 1990s, the excess of the free trade exchange rate over the official rate increased from about 30% at the beginning of the decade to 40% to 50% by the end of the decade (Gulati and Pursell, 1993). On the other hand, with a view to improving the competitiveness of exports, the Government of India also provided support to exports through three instruments: (a) cash incentives to manufacturers of export oriented processed foods (b) subsidization of freight costs and (c) income tax exemption on income from exports. Thus, it had ‘one foot on the brake and another on the accelerator’ (Gulati and Hoda, 2002).

Exports of agricultural goods have been restricted through myriad controls including prohibitions, licenses, quotas, marketing controls and minimum export prices for the sake of domestic food security. A limited number of items, such as wheat and wheat products, barley, maize and other coarse cereals and their flours, ghee (butter oil) and hydrogenated vegetable oils were allowed for export subject to ceiling limits. For a number of products the quantitative controls on exports were administered through trading enterprises in the public and cooperative sectors.¹¹ Following the 1991 economic

¹¹ For example, onions could be exported only through National Agricultural Cooperative Marketing Federation (NAFED) while the State Trading Corporation had the monopoly of exports of castor oil and sugar.

reforms, India terminated its policy of granting cash incentives to exports, but retained income tax exemptions for export profits. Since income tax exemption was not one of the export subsidy practices listed in Article 9 of the Agreement on Agriculture, India was not required to undertake any reduction commitments.

India's agricultural exports policies began to change in 1994. They have been progressively liberalized since then, barring the occasional reversal. The Ministry of Commerce, through the Director General of Foreign Trade, notifies the imposition or elimination of export restrictions in order to promote exports, while ensuring an "adequate" domestic supply of essential commodities at "reasonable" prices.

The policy reforms leading to the liberalization of exports include reductions in products subject to state trading, relaxation of export quotas, the abolition of minimum export prices (MEPs), and increased credit availability for exports. In addition, to encourage exports of agricultural products, the Government established agricultural export zones (AEZs) with the purpose of sourcing raw agricultural products and completing their processing and packaging in one geographical region in the EXIM policy for 2002-2007.¹² This "cluster approach" involves states identifying the regions in which products with export potential have comparative advantage. Through December 2002, the Central Government had sanctioned 41 AEZs in 17 states.

In the EXIM policy for 2002-2007, quantitative export controls applied only to a limited number of products.¹³ Besides these, export restrictions have been applied on other products for environmental and moral reasons.¹⁴ Although, the policy keeps changing from year to year, and sometimes even within a year, export licenses are generally required for goods such as cattle, milk, cereals, edible oils, and pulses.¹⁵ Overall, India's export policy is liberal compared to the past. The abolition of MEPs and

¹² GOI (2001d).

¹³ Including onions (exports allowed through STEs and subject to quota); paddy, de-oiled groundnut cakes, fodder, rice bran and certain seeds and planting material (exports permitted under licence); and niger seeds, certain seaweeds and gum karaya (exports allowed through STEs).

¹⁴ For example, exports of beef and tallow fat and/or oil of animal origin, excluding fish oil, are prohibited.

¹⁵ In addition, exporters of all categories of semi-processed hides and skins, and wet blue hides and skins must register with the Council for Leather Exports (indicating price, quantity to be exported etc.) before the products may be exported, Ministry of Commerce, Notification No. 45(RE-99)/1997-2002.

export quotas is encouraging, but the gradual pace and occasional policy reversals point out that the GOI is keeping in mind what the system can bear without taking the risk of any social or economic explosions. Although MEPs could theoretically come back at anytime, the probability is low that they will return given the state of the overall reform process.

India’s export subsidization has rarely been an issue in the past. However starting in 2000, India switched to a policy of export support for cereals in reaction to a combination of unique circumstances. The late 1990s saw world cereal prices crash to very low levels blunting India’s competitive edge, while, at the same time, increases in domestic support prices for wheat and rice led to increased production and procurement. As a result, food grain stocks at home grew to mammoth proportions. A major decision was taken in November 2000 to offer wheat for export at a price “equal to the economic cost minus two years carrying cost but not lower than the central issue price for BPL.”¹⁶ In the following year, the scheme was expanded to cover rice as well. This decision has led to growth in India’s exports of food grains to unprecedented levels (Table 1).

Table 1—Quantities lifted for Exports by Private and Public Sectors (Million MT)

Year	Wheat	Rice	Total
2000-2001	2.08	0.06	2.14
2001-2002	3.90	2.32	6.22
2002-2003 up to October, 2002	3.08	3.62	6.70

Source: Department of Food and Public Distribution. The figures are provisional

The Government of India justifies its export support policy under the exemption for developing countries from reduction commitments contained in Article 9.4 of the

¹⁶ *Annual Report: Department of Food and Public Distribution, 2000-01, page 25.*

Agreement on Agriculture with respect to export subsidies for reducing the costs of marketing and providing favorable internal transport charges on export shipments.¹⁷

Now that we have highlighted the course of agricultural trade policy over the 1990s, let us turn to a discussion of the domestic policy developments in the 1990s and after. As we shall see, progress in domestic policy reform has and continues to lag behind the reforms implemented at the border.

II.2 Reforms Behind the Border: Lagged Response

The domestic support policies for agriculture have remained largely unaffected by the economic reforms of 1991. Both before and after the implementation of the Agreement on Agriculture, domestic support has been provided mainly through support prices for agricultural outputs and subsidized inputs. Basic staples in India continue to be subject to Minimum Support Prices (MSP).¹⁸ Wheat, rice, sugar, and edible oils procured by the Government continue to be provided to consumers through the Public Distribution System (PDS), via a network of outlets or Fair Price Shops (FPS). The PDS, which is aimed at ensuring food security, has been criticized for its failure to effectively serve the poorest segments of the population and for its urban bias. To address these concerns a Targeted Public Distribution System (TPDS) was introduced in 1997.¹⁹ Some of the

¹⁷ It must be noted that currently the subsidies for reducing the costs of marketing exports are given at a flat rate without taking into account the f.o.b. realization and the marketing expenses incurred for each transaction. Due to these discrepancies, Indian export subsidies on food grains could be liable to challenge under the WTO Agreement (Gulati and Hoda, 2002). India has however, made export subsidy notifications to the WTO for the years 1996-97 to 2000-01 showing that it has been providing relatively small amount of export subsidies for fresh fruits and vegetables, plants and flowers and eggs by way of international airfreight assistance. For this, it has claimed exemption from reduction commitments under Article 9.4 of the Agreement. India's most recent notification for export subsidies was made in March 2002, covering the marketing years 1996/97, 1997/98, 1999/00 and 2000/01 (WTO document G/AG/N/IND/3, 1 March 2002).

¹⁸ Minimum support prices are fixed for paddy, wheat, coarse cereals, maize, barley, pulses (i.e. gram, arhar moong, urad), sugarcane, cotton, groundnuts, jute, rapeseed/mustard, sunflower, soyabean, safflower, toria, tobacco, copra, sesamum, and niger seed (GOI, 2001c). There is also a Market Intervention Scheme (MIS), an *ad hoc* measure that applies to horticultural and other agricultural commodities not covered by the MSP scheme.

¹⁹ While the eligibility to receive the supplies remained universal, the central issue price for the food grains meant for distribution to families below the poverty line (BPL) was fixed at 50 percent of the "economic cost" and for the families above the poverty line (APL) at 90 percent. The economic cost includes the cost of food grains, procurement incidentals and the distribution costs, and excludes the cost of carrying buffer

subsidies, e.g. the fertilizer subsidy, and under-pricing of power and irrigation, have also become environmentally harmful.²⁰ In addition, in order to make seeds available at "reasonable" prices and in time for the sowing season, the costs of transporting seeds is subsidized in some states.²¹ India's major domestic agriculture policies have, by the late 1990s and after, resulted in:

- Massive increases in procurement of food grains,
- Reduced offtake from the public distribution system, and
- Continuation of major input subsidies for fertilizer, irrigation, and electricity.

As a result, in the years 2001 and 2002 the government remained saddled with stocks, which were considerably higher than the minimum buffer stock norms for food security purposes.²² The outcome is that the associated food subsidy bill increased from Rs 28.5 billion in 1991/92 to Rs 120 billion in 2000/01 (at current prices). For 2001/02 the food subsidy is estimated at Rs 136.7 billion, of which Rs 56.8 billion accounts for buffer stock subsidy or the carrying cost of the public stock of foodgrains.²³ In the longer run, however, the Government acknowledges, "open-ended procurement by the FCI at a high price and disposal at a heavily subsidized price is not sustainable."²⁴ Moreover, in

stocks. Later in 2000 and 2001, when off take from the Public Distribution System declined, the government reduced both the APL and BPL prices, the former quite drastically. As of 1 February 2001, sugar supplied through the PDS is available only to BPL families, with the exception of the special category states, hill states, and the two island union territories, where sugar is available under the PDS to BPL and non-BPL families. Several additional schemes for domestic food aid have recently been introduced in order to liquidate the large accumulation of food stocks For details on these programs, see Gulati, et al., 2003.

²⁰ GOI (2001a).

²¹ The subsidy is provided in: the Eastern States, Sikkim, Himachal Pradesh, Jammu and Kashmir, Uttaranchal and the Hill Areas of West Bengal (Department of Agricultural and Co-operation [Online]. Available at: <http://agricoop.nic.in/2seeds.htm> [21 November 2001]).

²² For example, foodgrain stocks in July 2002 reached 63.0 million tons, against a minimum norm of 24.3 million tons (GOI, 2003b).

²³ According to the CAG the cost of the food subsidy has risen quickly because of increased costs incurred by the FCI for storing, handling, and transporting foodgrains. The CAG's Reports No. 2 and 3 of 2000, conclude that this subsidy should be redesigned (CAG, undated, "Report of the CAG on the Union Government for the year ended March 2000" [Online]. Available at: http://www.cagindia.org/reports/civil/2001_book1/index.htm [25.07.2001]).

²⁴ GOI (2002b, Part A, paragraphs 27-28).

recent years, input subsidies have increased and now seem to be financially unsustainable.

In his Budget Speech 2002/03, the Minister of Finance highlighted, *inter alia*: an increased allocation of resources for rural roads (Rs 25 billion in addition to Rs 50 billion provided thus far); irrigation and credit; electrification of villages (Rs 1.6 billion for the Accelerated Rural Electrification Programme); rural employment, including through payment in the form of foodgrain; as well as measures to improve diversification of crops.²⁵

Beginning in 2002, several small steps have been taken to liberalize domestic agricultural markets. Among these changes are the temporary removal of licensing requirements, stocking limits, and movement restrictions of wheat, paddy/rice, coarse grains, edible oilseeds and edible oils under the Essential Commodities Act, 1955;²⁶ removal of the restrictions on futures trading on 54 commodities including wheat, rice, oilseeds and pulses that were prohibited from futures trading under the Forward Contract (Regulation) Act, 1952;²⁷ and the reform of the Milk and Milk Products Order to no longer restrict investments in new processing capacity.^{28, 29} In addition, the GOI has adopted a multi-stage, group-wise concession scheme for urea pricing as of 1 April 2003 based on the recommendations of the Expenditure Reforms Commission (2000) (GOI,

²⁵ To encourage farmers to upgrade their machines, the Budget also proposes a reduction in import duty on agricultural machinery and implements from 25% to 15% (GOI, 2002b, Part A, paragraphs 20-26; and Part B, paragraph 143).

²⁶ In February 2002, the Government of India issued the Removal of (Licensing requirements, stock limits and Movement Restrictions) on Specified Foodstuffs Order, 2002. The Order mandates that “any dealer may freely buy, stock, sell, transport, distribute, dispose, acquire, use or consume any quantity of wheat, paddy/rice, coarse grains, sugar, edible oilseeds and edible oils and shall not require a permit or license therefore under any order issued under the Essential Commodities Act, 1955.” G.S.R.104E
http://fcamin.nic.in/noti_15feb.htm

²⁷ The Government of India announced on 20 February 2003 the removal of restrictions on futures trading for the remaining 54 commodities including wheat, rice, oilseeds and pulses that were prohibited from futures trading under the Forward Contract (Regulation) Act, 1952. Futures trading in these commodities are subject to the regulations of the Forward Market Commission.
<http://www.fas.usda.gov/gainfiles/200302/145884788.pdf> and http://fcamin.nic.in/press_rel.htm

²⁸ MMPO, 1992 revised on 25 July 2001, <http://dahd.nic.in/milkorder.htm> (accessed March 25, 2003)

²⁹ According to the Union Budget 2003-04, Implementation of Budget Announcements, “The Milk and Milk Products Order, 1992 has been amended on 26th March 2002. There is no restriction on creation of new processing capacity and registration will only be required for maintaining quality standards and food safety measures.” See also <http://pib.nic.in/archieve/lreleeng/lyr2002/rapr2002/05042002/r050420028.html>.

2003b), which can be seen as very modest progress towards reform. However, the main market intervention schemes including market support prices, input subsidies and the public distribution system remain intact.

III. Impact on Incentives, Investments and Performance

The reforms in the exchange rate, industrial protection and agricultural policy in the 1990s and after have lead many to question the effects of the changing policy environment on the sector's performance in the 1990s vis-à-vis the 1980s. How has liberalization affected incentives and trade flows? Is Indian agriculture competitive under this more liberalized trade regime? How have reforms affected public and private sector investments in agriculture? And what have been the effects of reforms on the overall performance and structure of the agricultural sector? In this section, we take up each of these questions in turn, beginning with the impact on incentives and trade flows.

III.1 Impact on Incentives and Trade Flows

To explore the effects of liberalization on incentive structures and trade flows, we have computed nominal protection coefficients (NPCs), a crude but very useful indicator of price competitiveness as well as the level of incentives to cultivators, for major agricultural crops for the period 1965 to 2002. The analysis here focuses on wheat, rice and oilseeds; NPCs for maize, jowar, gram, oilseeds, sugar, cotton and milk are given in Annex I.³⁰ Before one starts interpreting these estimates, it is better to understand how they have been generated. For most of the crops, NPCs have first been estimated for the important states growing that crop, and then aggregated to all India level using the production weights.³¹ For crops such as wheat and rice, which are both importable and

³⁰ For additional details on these commodities, see Hoda and Gulati (2002) and Sharma and Gulati (2003).

³¹ NPCs computed here for wheat and rice use the Minimum Support Price as the surrogate domestic price 1981-2001. For the importable hypothesis, we compare MSP with seasonal international prices. For the exportation hypothesis, the MSP for a product is marked up by a margin representing internal transport cost

exportable, depending upon the years, we have worked out NPCs under the two hypotheses: importable and exportable, and obviously the results differ depending upon the share of transportation costs in the overall price of the product concerned. Transportation costs play a critical role in these estimates as they are adjusted differently under the two hypotheses (Pursell and Gulati, 1993; Gualti and Kelley, 1999; Gulati, et al., 2003). In this study, the exchange rates are from the IMF International Financial Statistics. In other studies (e.g. Gulati and Kelley, 1999), shadow exchange rates taken at an average of 20 percent higher than official exchange rates over the period 1970-90 are employed in the NPC computations. Further, the domestic taxes such as purchase tax, etc. have been excluded from the calculations, as they do not represent real costs. Additional information on the methodology of calculating NPCs used here is detailed in Pursell and Gupta (1998).

Indian agriculture seems reasonably competitive and trade liberalization per se would not necessarily have an adverse impact. Commodities such as rice and wheat, India's major staples, turn out to be not only efficient import substitutes but also export competitive in several years. The only major uncompetitive commodities – even as import-substitutes – seemed to be oilseeds and edible oils, which are produced at high cost in India (Figures A.4-A.8).

The story of India's liberalization in fact lies in the details. What are the major imports and how have they behaved over the period in question? To see what has happened at the commodity-specific level, it would be useful to step back and see where India stood in terms of price competitiveness during the Uruguay Round negotiations and what was expected from trade liberalization in terms of changes in trade flows. Earlier research on this subject shows that with trade liberalization, while India is likely to be exporting 3 to 4 million tons of rice, about 5 million tons of wheat and half a million tons

and handling charge so that f.o.b. India is compared with the f.o.b. price of efficient exporting countries. This internal transport cost is the average proportion of rail freight rate per ton (from Ludhiana, Punjab, to Kandla port during 1990/91 to 2000/01) in relation to MSP for rice and wheat. It is equivalent to 9.3% of MSP of rice (derived from paddy MSP) and 13.2% for wheat. Handling charges have been accounted for as 5% of freight cost. Taxes and other statutory levies have been excluded from these calculations as they represent merely transfer payments in the economy.

of cotton, there would be sizable imports of edible oils, almost to the tune of 1.5 to 2 million tons (Gulati and Kelley, 1999). These predictions were quite different from extant research that concluded that India would be a major *importer* (anywhere between 36 and 64 million tons by 2020) of grains in the long run (Bhalla, Hazell and Kerr, 1999). The major reason for the difference in the results is that Bhalla et al. (1999) predict that domestic feed demand would increase up to 108 million tons per year by 2020 given their assumptions on the expenditure elasticities for meat and eggs (1.25) that are much larger than in other studies. The authors note that when market prices adjust, the increase in demand for cereals that they estimate would be dampened by the increase in price. The results predicted by Gulati and Kelley (1999) are based on filling the wedge between domestic and external prices (f.o.b. in case of rice, wheat and cotton and c.i.f. in case of oilseeds and other commodities) for the period 1990-93. This would depend, among other things, on factors such as changes in world prices, trade policies etc. In reality, volatile world prices and India's evolving trade policy regime meant that things turned out a bit differently.³²

Edible Oils

Perhaps the most dramatic illustration of the impact of import liberalization on domestic sectors in India is the case of *edible oils*. India had been following an import substitution strategy since 1986 when it launched the Technology Mission on Oilseeds (TMO) and accorded high protection through trade policy. As a result, oilseeds production grew more than 100% between 1980 and 1993-94 (from 10 million tons to 21 million tons). By the 1990s, India was competitive enough to be able to export oil meals (World Bank, 1999). The protection also brought greater production stability by bringing about greater diversity in crops and across regions. During this time, non-tariff barriers were in place designed to protect the nascent oilseed sector. India did import some edible oils during the 1980s though this was tightly controlled through canalization (State

³² For additional details see Gulati and Kelley (1999).

Trading Corporation and the Hindustan Vegetable Oil Corporation). Imports of oilseeds, also canalized, were practically non-existent.

A noteworthy feature of the policy was that protection was targeted to protect more the oil crushers rather than oilseed farmers. Interestingly, oil processors were relatively less efficient than oilseed farmers. The main reason for this was that oil processors were unable to take advantage of economies of scale as the processing of groundnut and mustard, India's two largest oilseeds, is reserved for small-scale industries.³³ The nominal protection coefficients (NPCs) reflect this (Figure 3). However, an effective protection rate (EPR) that takes into account tariffs on inputs such as oilseeds may be a better measure of protection for processing industries than the NPC if tariffs on oils are higher than tariffs on oilseeds. Indeed the NPCs for the edible oil sector may underestimate the industry's inefficiency since the tariffs on oils (65% on vegetable oils in 2002-03) are higher than the tariffs on oilseeds (averaging 31% in 2002-03). Given this protection, by the early 1990s, India had almost achieved self-sufficiency in edible oils but domestic prices were about 60% higher than world prices.

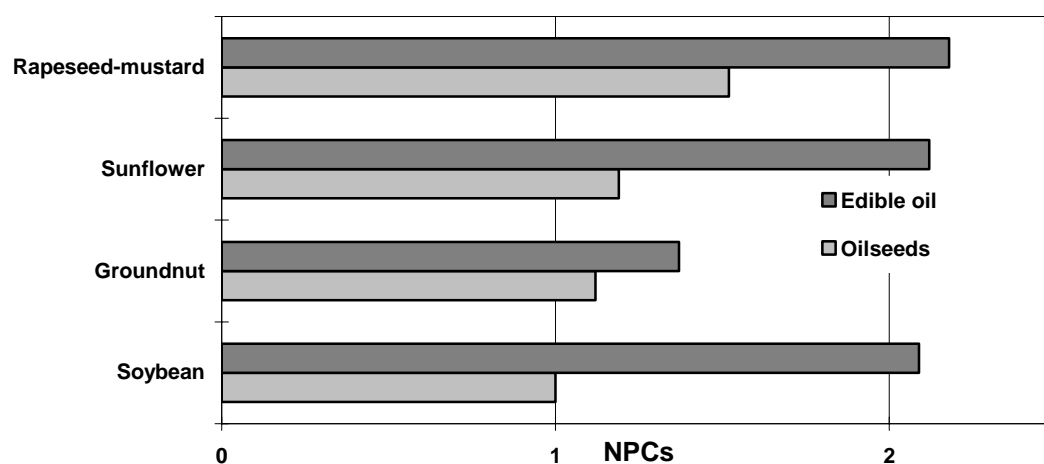
Starting in 1994, far-reaching reforms were undertaken. The Government freed imports of major edible oils (palmolein first, others a year later with the notable exception of coconut oil) and started reducing import duties over successive years – from 65% in 1994 to 30%, then to 20% and finally 15% on crude oils by December 1999.³⁴ Not much import came in until 1997. This was the time when the international prices were rather high. Soon after, as the world prices crashed, there was a flood of imports crossing 5 million tons in 1999, and 4 million tons each in 2000 and 2001 (Figure 4).³⁵ India's self-sufficiency in oils eroded drastically – from 97% in 1993 to only 55% in 2001.

³³An industrial undertaking in which the investment in fixed assets in plant and machinery whether held on ownership terms on lease or on hire purchase does not exceed Rs.10 million with effect from 21.12.1999. These norms are revised periodically.

³⁴ See Annex I Table A.1 for detailed import duty schedule.

³⁵ These refer to vegetable oils (edible and non-edible).

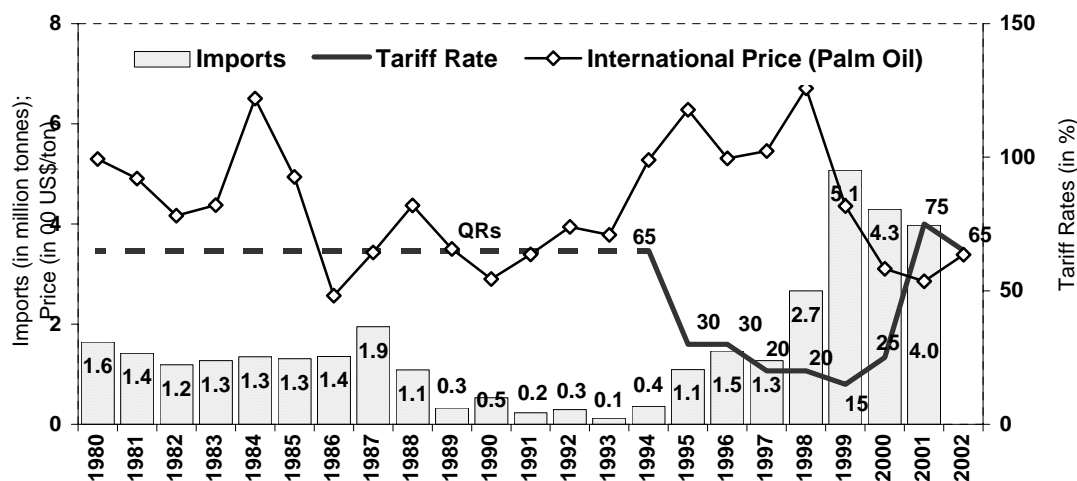
Figure 3—Competitiveness of oilseeds cultivators vs. edible oil processors 1990-95



Source: Gulati and Kelley (1999)

Note: NPCs for edible oil are much larger than that for oilseeds implying that oil processors are less competitive than oilseed farmers.

Figure 4—Vegetable Oils Imports in India 1980-2001



Note: For refined oils, the prevailing tariff rates are higher than for crude oils, which are presented here
 Source:FAO.Self-sufficiency Ratio from Solvent Extractor's Association of India (2000)

Vegetable Oils include castor oil, coconut oil, cotton oil, groundnut oil, linseed oil, maize oil, mustard oil, olive oil, olive residues oil, palm and palm kernel oil, rapeseed oil, rice bran oil, safflower oil, sesame seed oil, soybean oil, sunflower oil, tung oil, other vegetable oils

In the face of immense domestic pressure from the vegetable oil industry, the Government then had to hike up the import duty on oils to 25% in November 2000, and to 75% in the 2001 budget and subsequently brought it down to 65% by October 2001 where it stands as on March 2002.³⁶ With these changes, and aided by a good oilseed harvest, the total import of vegetable oils between November 2001 and April 2002 declined and was less than 27% of the previous year's imports for the same period (The Solvent Extractors' Association of India, 2002).

Rice

Trade policy reform in the cereals sector started in 1994-1995, when India decided to open up exports of common *rice*. The following year, 1995-1996, India's exports of rice went up from less than 1 million to about 5 million tons, making India the second largest exporter of rice in that year (Figure 5). During this time, domestic prices in India were far lower than the reigning international prices. However, with the international prices crashing in the late 1990s, India's rice exports turned sluggish. In fact, 1999-2000 and 2000-01 even saw some rice imports coming in. This was because now the domestic prices were comparable to the international prices, blunting India's competitive edge to some extent. This gets reflected in the NPCs during this period.³⁷

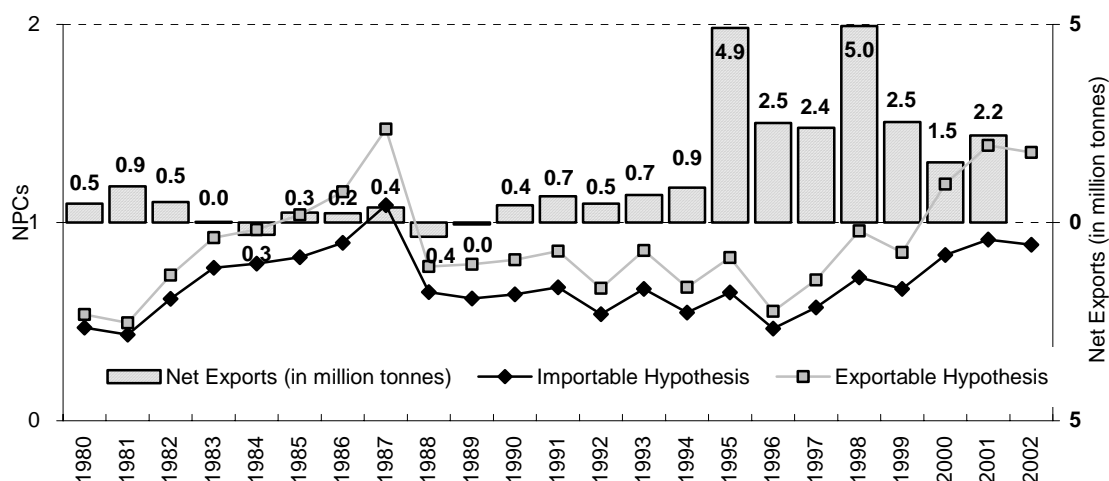
Although NPCs still remain broadly below 1, domestic taxes and fees on rice such as purchase tax, mandi tax, etc. are not accounted for in NPC computations. These domestic taxes are making exports more difficult than is conveyed by the NPC values. To push up exports of rice during 2001 and 2002, Indian government has been giving some support to exporters in terms of marketing costs and freight etc. (See Section II.1). Earlier research by Pursell (1996), however, had shown that if India exports more than 4 million tons of rice, the world price is likely to fall to the Indian price level. Thus, it

³⁶ Refined oils attract a higher import duty – it was 70% in November 2000, and then 90% in the 2001-02 budget. The Government then introduced specific duties on refined oils starting August 3, 2001.

³⁷ However, as international prices recover to their long-run average, India is expected to regain its competitiveness in rice exports, and emerge as an important exporter. The dereservation of the rice milling industry from the Small Scale Industry (SSI) list during the mid-1990s and the consequent modernization of the rice milling industry too has played an important role in making India an emerging rice exporter.

would be advisable to impose an optimal export tax on Indian rice, beyond 4 million tons of exports.

Figure 5—Rice Trade and Protection in India 1980-2002



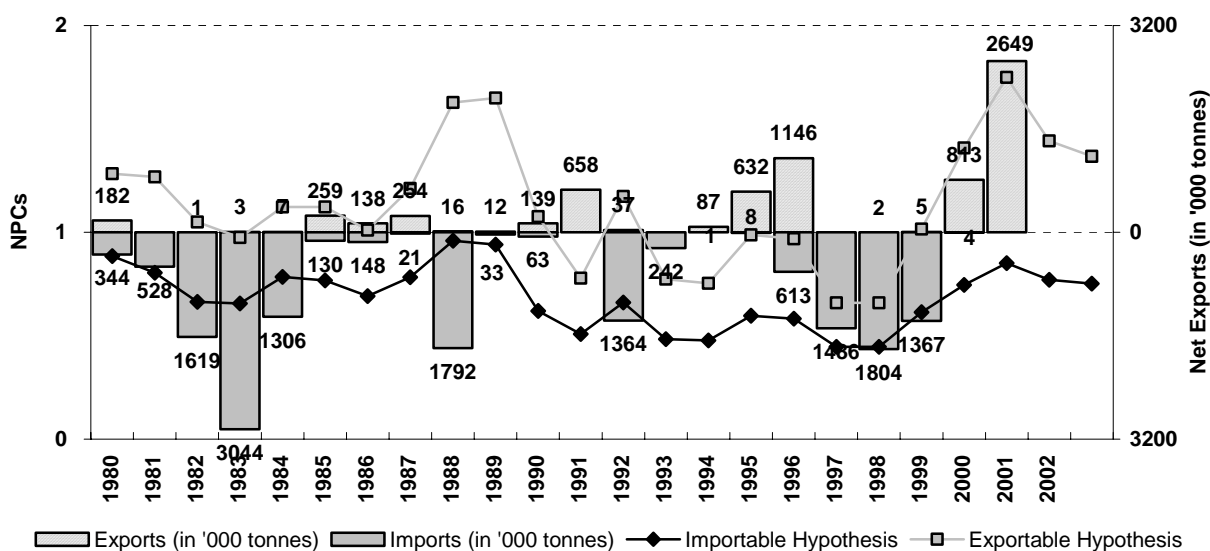
Source: Trade data is from FAO

Wheat

Encouraged by phenomenal growth in rice exports soon after abolishing its MEPs and moving it onto the list of freely exportable goods, India opened up exports of *wheat* in 1995. As exports started picking up, there was pressure on domestic prices of wheat and the government hastily banned exports of wheat in 1996 (Figure 6).³⁸

³⁸ Public Notice No. 377 dated 1 October 1996.

Figure 6—Wheat Trade and Protection in India 1980-2002



Source: Trade data is from FAO

Instead, it opened up imports of wheat at zero import duty. The motivation behind this policy change reflects an interesting aspect of the political economy of trade policy. Roller flourmills in southern India (which is primarily rice growing) have always complained about the constraints they face in procuring wheat (grown mainly in the northern states). They argue for instance, that the northern industry, which is closer to the centre and has better bargaining power, gains from discriminatory pricing of the Food Corporation of India's open market sale of wheat (Business Line, 2001). In 1997, they succeeded in securing the right to import wheat freely for all Roller Flour Mills,³⁹ although initially not much came of this in the country, as domestic prices were way below world prices. But in the coming years, especially from 1998 onwards, the world prices of wheat and most other agricultural commodities collapsed in the wake of the East Asian crisis. As a result, wheat imports increased dramatically, despite bumper crops at home. This led to a situation where imports were coming in even as the foodgrain stocks

³⁹ Public Notice No.30/97 dated 12 August 1997 permitted import of wheat on behalf of Roller Flour Mills by the State Trading Corporation (STC) and the Projects Equipments Corporation (PEC). A later Public Notice No. 45 dated 5 October 1998 permitted Roller Flour Mills to freely import wheat directly under Actual User Condition or through STC, PEC or MMTc for milling purpose only.

that the government procured from farmers domestically accumulated reaching an unprecedented level of 62 million tons as of July 1, 2001. The government was forced to raise import duty from zero to 50% on December 1, 1999. Alongside, the Government also started offloading wheat stocks to private traders for export at concessional rates.⁴⁰

In general, India's agricultural exports face several constraints that arise from conflicting domestic policies relating to production, storage, distribution, food security, and pricing concerns.⁴¹ Higher domestic prices in comparison with international prices of exportables such as wheat and rice in some years make Indian exports less competitive in the international market.⁴² And although some gradual progress has been made to liberalize domestic and trade policies, frequent policy reversals impede the promotion of trade based on long-term comparative advantage. While the analysis here has focused on the incentive structures and trade flows in the edible oils, rice and wheat sectors; the maize, onion and cotton sectors (Gulati and Hoda, 2002), for example, and the dairy sector (Sharma and Gulati, 2003) also suffered from rapidly changing, and at times conflicting policy signals during the 1990s. The bottom line is that Indian agriculture is relatively efficient on the basis of import substitution. This calls into question the need for high applied tariff rates as shown in Section II. Indeed there is water in the tariffs between bound and applied tariff rates as well as between applied and necessary tariff rates.

A related question that is often posed is whether Indian agriculture as a whole is 'net-taxed' or 'net-subsidized.' The Producer Support Estimate (PSE) defined as "an indicator of annual monetary value of gross transfers from consumers and taxpayers to support agricultural producers measured at the farmgate level, arising from policy measures, regardless of their nature, objectives or impacts on farm production or income"

⁴⁰ Of late, there has been debate as to whether this constitutes an export subsidy on wheat. The Government of India claims it is merely defraying the costs of internal transport, which is permissible under the URAA (Gulati and Hoda, 2002).

⁴¹ For example, the practice followed by state governments of announcing state advised prices (SAPs) for sugar, which are generally much higher than the Statutory minimum prices announced by the Central Government, the small size of processing plants, and obsolete machinery, are the main factors contributing to the high cost of sugar production.

⁴² GOI (2001c).

can be used to answer this question.⁴³ Like NPCs, PSE can be calculated under importable and exportable hypotheses. Under the importable hypothesis, one is testing whether domestic production can efficiently substitute for imports, while under the exportable hypothesis one is testing whether the country can be an efficient exporter.

Gulati and Narayanan (2003) calculate PSEs for India that capture both the price wedge between domestic and world reference prices and the budgetary outlays to the sector distributed through fertilizer, irrigation, power and credit subsidies. India's PSEs (based on 13 commodities) under the importable hypothesis for the period 1986-2000 vary from -101.85 percent in 1997, to -5.93 percent in 1987 (Gulati and Narayanan, 2003). If the commodities are regarded as exportables, the magnitude of implicit net taxation is less than under the importable hypothesis. In fact, PSEs under the exportable hypothesis are positive in 1986-88, implying that agriculture is net subsidized in these years. PSEs again turn positive in 2000 (and presumably remain positive in 2001-02) as a result of declining world grain prices and increasing domestic support prices, particularly for wheat and rice. Thus, in most years, the large negative wedge between domestic and world price outweighs the input subsidies accruing to farmers.⁴⁴ Overall, one could conclude that Indian agriculture remains 'net taxed' throughout the period 1986-2000 under the importable hypothesis and for most years under the exportable hypothesis, but becomes 'net subsidized' when world prices are really at their rock bottom. We turn now to an analysis of the effects of liberalization on investments in agriculture.

III.2 Impact on Investments in Agriculture

What has been the impact of this changing policy environment and resulting incentive structures on investments in agriculture? More precisely, has trade liberalization adversely affected investments in agriculture during the 1990s vis-à-vis the 1980s? The data on investments in agriculture is generated by the CSO, and has two main

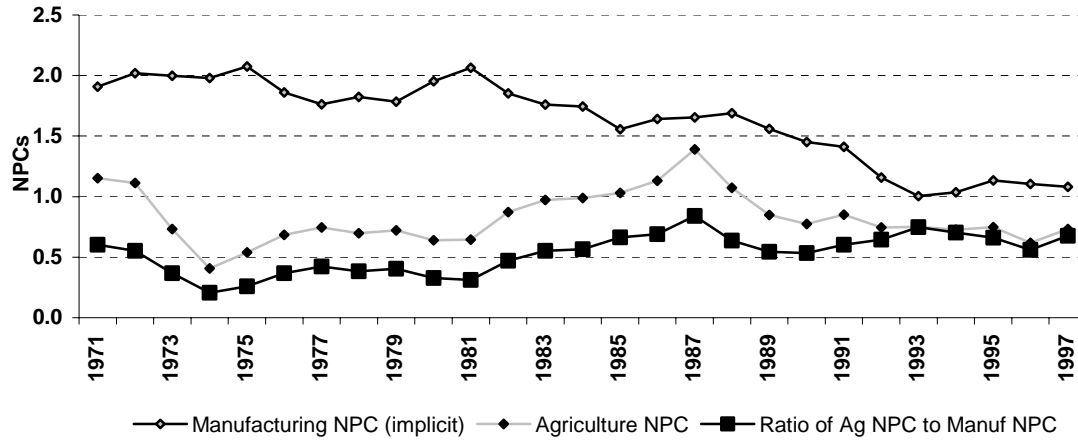
⁴³ OECD (2000).

⁴⁴ For more details on fertilizer, irrigation and power subsidies in Indian agriculture see Gulati and Narayanan (2003).

components, private and public. Of these two main institutional sources of investment in agriculture, private and public, the private sector investment is a dominant one accounting for more than three-fourths of the total investment in agriculture. On *a priori* basis, it is the private sector investments in agriculture that should respond to changing incentive structures. For cultivators, the key factor affecting their investment decisions would be the expected rates of return, which would be strongly influenced by the terms of trade between agriculture and industry. In an earlier study (Gulati and Pursell, 1993, 2000), it was hypothesized that with trade liberalization the protection on industrial goods in India would come down and that dis-protection on agricultural goods would be reduced turning the terms of trade in favor of agriculture. This would reduce the typical anti-agriculture bias, and therefore, should attract more private sector investments in agriculture. Has that happened?

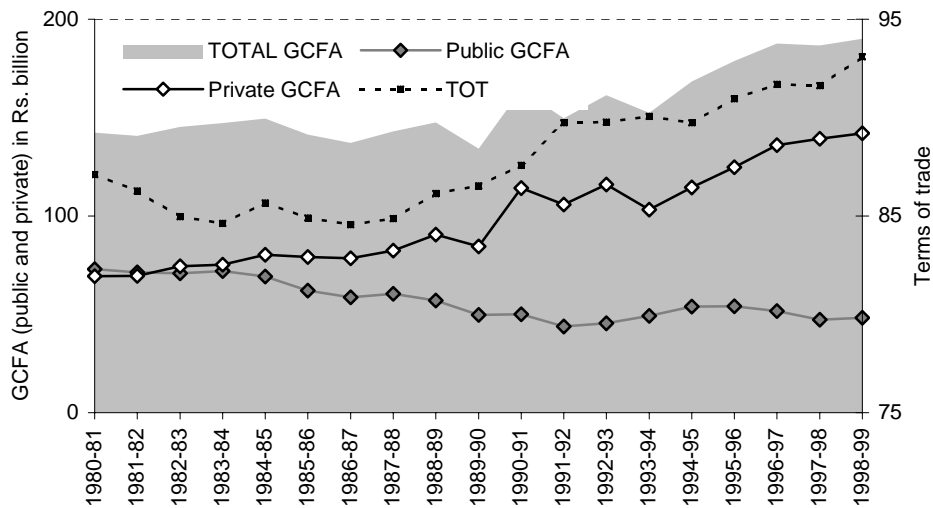
Figures 7 and 8 reveal that indeed this pattern. The terms of trade have improved for agriculture not only as a result of trade liberalization in agriculture, but perhaps more due to bringing down the protection on industry. Also, domestic policy raising support prices for wheat and rice, especially during the second half of 1990s seems to have played an important role in improving terms of trade for agriculture, though with occasional hiccups. Smoothing out year-to-year fluctuation in terms of trade through a three-year moving average, Gulati and Bathla (2002) also find that it is correlated with private sector investments in agriculture (Figure 8). The authors calculate the correlation coefficient between one year lagged terms of trade and private investment in agriculture to be equal to 0.838 over the period 1980-81 to 1998-1999. The authors find that the terms of trade in agriculture (taken as an index of three-year moving averages, lagged one year) is indeed an important factor explaining private investment in agriculture. Their regression results indicate that the elasticity of private sector GCFA with respect to lagged TOT is between 1.77 and 1.9.

**Figure 7—Relative Incentive Structures: Manufacturing & Agriculture
NPCs – 1971-97**



Source: Gulati and Pursell (2000)

Figure 8—Terms of Trade and Investment in India 1980-81 to 1998-99



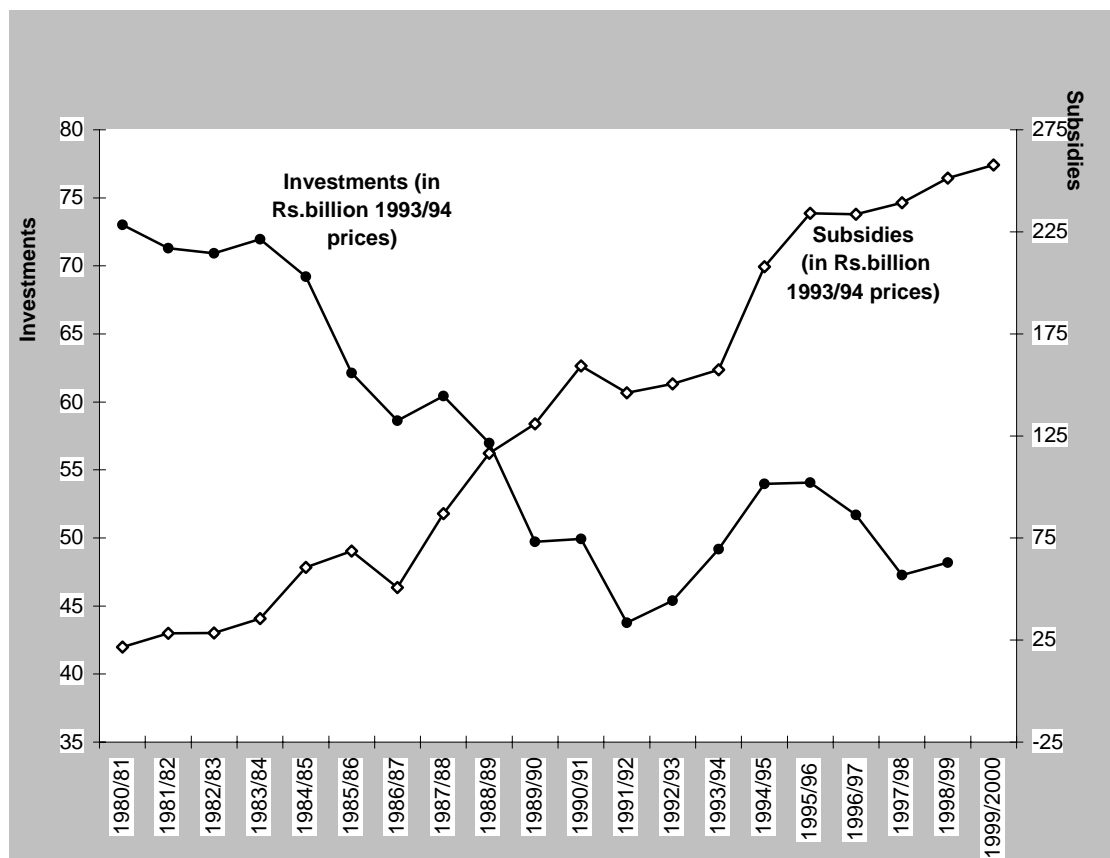
Source: Gulati and Bathla (2002)

The TOT, therefore, appears to be a very important driver of investment, which, in turn powers growth.⁴⁵ The allocation of private and public resources to any sector (in this case agriculture) depends not just on its own profitability, but also rather on its profitability relative to other sectors in the economy. In India, TOT between agriculture and manufacturing sectors reflects a bias against agriculture (remaining below 100), right through the period 1980-81 to 1997-8 (Figure 8). However, starting in the mid-1980s, but particularly after 1990-91, there is a pronounced, even dramatic, improvement in favor of agriculture. Clearly the reforms have improved TOT for agriculture considerably.

Interestingly, these two decades also constitute the period when real public investment in agriculture (public sector Gross Capital Formation in Agriculture), has shown declines, despite intervening periods of temporary increase. Often this trend in public investment has raised alarm bells, since it is also an important determinant of growth. Over the past two decades, subsidies have been rapidly increasing, while the converse is happening to public investment (Figure 9). Mounting subsidies compete for scarce resources and limit the government's ability to invest in key areas like irrigation and rural infrastructure (Gulati and Narayanan, 2003). Deceleration in food grain output growth may be attributed, at least in part, to falling public investments in irrigation projects during the 1980s and early 1990s. This possibly acted as a drag on private investment in cultivation of cereals, although surely there must have been other constraints as well, particularly the demand constraints, given the level and distribution of income in the economy.

⁴⁵ See Gulati and Bathla (2002) for empirical estimates of the impact of private and public GCFA and TOT on agricultural growth.

Figure 9—Subsidies versus Investments: A Comparison of Trends



Source: Gulati and Narayanan (2003)

On the other hand, the share and response of private sector in agriculture to market incentives, represented by the TOT, is somewhat under-played (Gulati and Bathla, 2002). In this context, it is significant that in the Indian case, the improvement in terms of trade, since the 1980s, has spurred on *private sector investment*, despite contrasting decline (or stagnation) in public sector investment. Moreover, private investments, among other factors, appear to have spearheaded a fundamental shift in the pattern of agricultural production in India from food grains led growth during 1970s and 1980s, towards growth led by horticultural products, livestock products and fishery (Gulati and Bathla, 2002). There could be an important lesson here as far as incentives

are concerned. The interests of private investors in cultivation of fruits and vegetables and other high value agriculture are possibly related to their response to market incentives, being influenced by changing consumption patterns.⁴⁶

The above analysis thus underscores the powerful role of macroeconomic and trade (including exchange rate) policies in driving investment, particularly in the private sector, through terms of trade eventually affecting agricultural growth. Whether such incentives improve in the future, or lapse back to the much lower levels of the past would depend on the government pressing ahead with broad-based reform not just on the trade front but in an equally critical area of domestic reform.

Given the impact of reforms on incentives, trade flows and investments, how has liberalization affected the overall performance and changing structure of agriculture? In the next section, we address just this question.

III.3 Impact on Performance

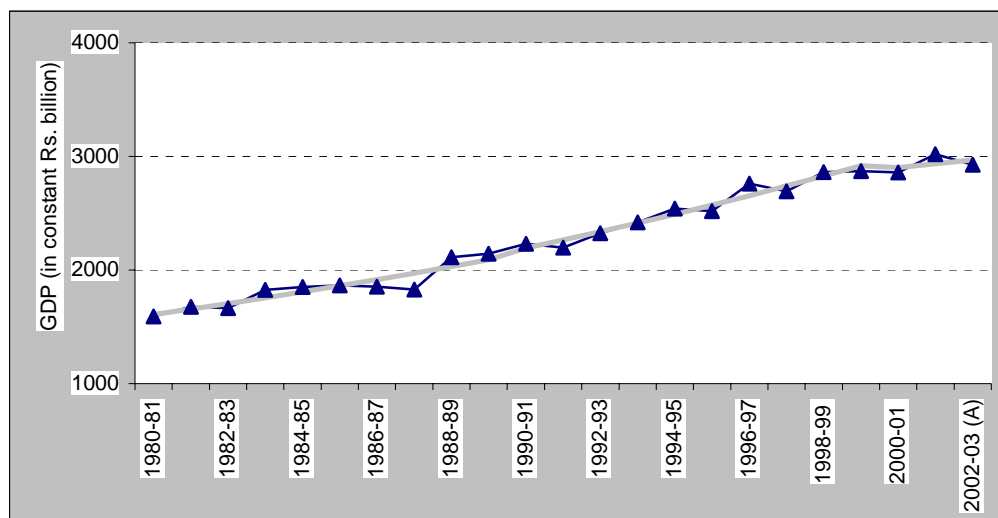
There is reason to believe that *private investments have actually sustained marginally higher levels of growth* in agricultural GDP in the 1990s (at 3.18% per annum) over that in the 1980s (at only 2.91% per annum).⁴⁷ Nevertheless, there is a concern that the growth rate during the second half of the 1990s through 2002-03 seems to be slowing down (Figure 10). The trend growth rate in 1997-98 to 2002-03 (1.64%) is significantly lower than the trend growth rate in 1992-93 to 1996-97 (3.85%), but a word of caution should be given in interpreting growth rates for such a short period, especially since in 2002-03 India experienced the second (only to the drought in 1987-88) worst drought in decades.⁴⁸ Thus, the annual average growth rate for 2002-03 is estimated at -3.1%, according to the CSO's latest estimates.

⁴⁶ Expenditure elasticities are higher for fruits and vegetables in both rural and urban areas (fruits: 0.442 & 0.360 and vegetables: 0.385 & 0.253) compared to that for rice (0.064 & 0.016) and wheat (-0.056 & -0.080) as based on various rounds of household consumer expenditure surveys (NSS) (Kumar 1998).

⁴⁷ This refers to the trend growth rate for the periods 1980-81 to 1989-90 (denoting the 1980s) and 1990-91 to 1999-2000 (denoting the 1990s). The rate of growth is for agriculture and allied sectors. This figure is sensitive to choice of years to denote the periods and method used in computation (average annual or trend rates). See Table A.2.

⁴⁸ Chow test shows no break in trend growth rates in 1980-81 to 1989-90 versus 1990-91 to 2002-03.

Figure 10—GDP of Agriculture and Allied Sectors (Forestry and Fishing) at 1993/94 Prices



Source: CSO GDP by Economic Activity; Data for 2002-03 is from Advance Estimates of National Income, 2002-03, 17 February 2003.

However, the growth rates measured as the value of output (as distinct from that of agricultural GDP) for many of the sub-components of agriculture (such as cereals) during the 1990s have come down, but that of horticulture (fruits and vegetables) has gone up substantially (Gulati and Bathla, 2002 and Annex Table A.3). It appears that Indian agriculture is under some significant structural transformation from cereal led growth to high value agriculture (horticulture, dairy, poultry, etc.) led growth, which is being triggered by changing consumption patterns and increased exports of high value agricultural products (Joshi and Gulati, 2003).⁴⁹ And as discussed above, private investments are focused in the areas of high value agriculture (Gulati and Bathla, 2002). Thus, while the growth rates for the entire agricultural sector have remained relatively

⁴⁹ Although a thorough examination of technology change in Indian agriculture is beyond the scope of this paper, it is important to note that in addition to the movement away from food grains to high value agriculture, the sector is also undergoing a major structural change from water and chemical-intensive green revolution technology to new technologies based on watershed management and rain harvesting, non-chemical organic fertilizers and pest control methods, and biotechnology.

constant in the 1990s vis-à-vis the 1980s, the composition of the production mix has changed in favor of high-value commodities (Joshi and Gulati, 2003).

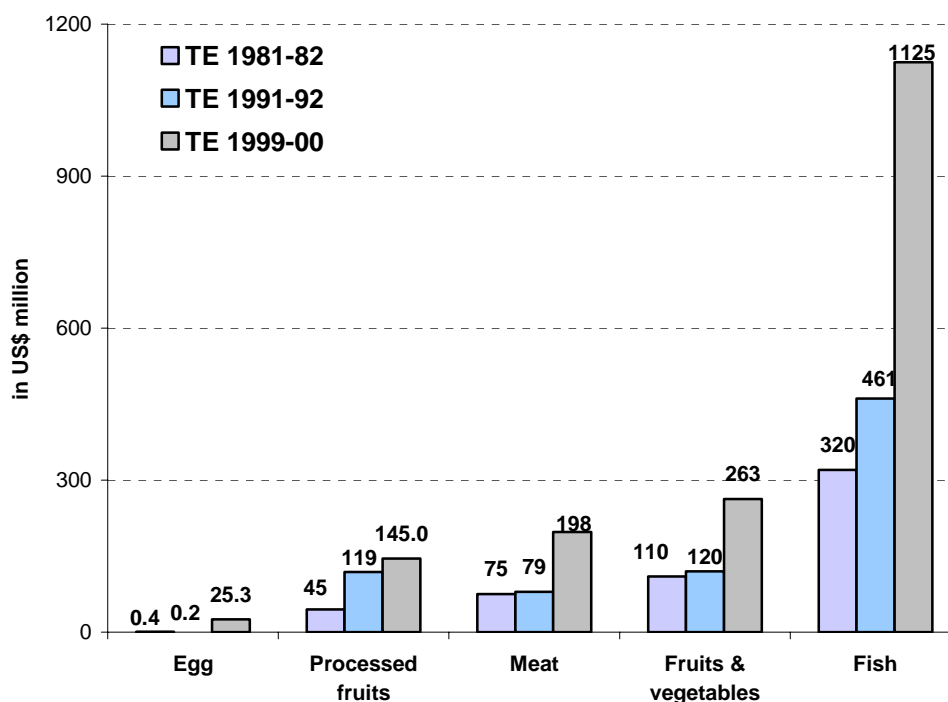
This leads to the question of how have India's agricultural exports performed during 1990s vis-à-vis 1980s? Agricultural exports as a share of total exports have been decreasing in recent years, from 20 percent in 1996-97 to some 14 percent in 2000-01 (WTO, 2002).⁵⁰ India's agricultural exports during 1990s have extended beyond the traditional exports of tea, coffee, spices, etc. to non-traditional exports of rice (common), fish and horticulture products.

It is in the area of non-traditional exports that India has seen remarkable growth. The 90s for instance have indeed seen a growth of fruit and vegetable exports in both fresh and processed forms, in addition to increases in meat and fish exports (Figure 11). Here the issue of whether India can compete internationally boils down to non-price factors. While one crucial factor that will enable India to compete internationally is the availability of infrastructure and supporting institutions for storage, transport and processing, the most important element is the producers' ability to meet the rising sanitary and phyto-sanitary (SPS) standards and increasing technical requirements (labeling, etc.) that importing countries have in place. This is true of *fish* and *poultry* exports as well (Gulati and Hoda, 2002).

Although exports of traditional commodities can be expected to continue in the future, India must also contend with competition from other developing countries that are becoming increasingly important as exporters, such as Sri Lanka in case of tea, Guatemala for cardamom, etc. Indeed, India's share in world exports has shown a steady decline in several cases though this could partly be attributed to increasing domestic demand.

⁵⁰ For comparison, during 1996/97 to 1999/00, agro-imports were in the range of 4%-7% of total merchandise imports (WTO, 2002).

Figure 11—Exports of Non-Traditional Agricultural products: 1980s and 1990s



Source: Joshi, Gulati, et al (2002)

One should not overlook the progress made, albeit largely as a result of government intervention, in the food grain sector. In 1992-93, India was importing 3 million tons of wheat, while in 2002-03 it exported about 10 million tons of wheat and rice, though with some subsidies on freight, etc. This period also saw tremendous growth in food grain stocks. As recently as April 2000, central food grain stocks were just 21.7 million tons, as compared to the mammoth 63 million tons of stocks that had accumulated by July 2002 (GOI, 2003b).⁵¹

If the performance of the agriculture sector, measured by growth rates, exports and stock accumulation has fared reasonably well, why is there a lurking fear about the competitive strength of the sector in the face trade liberalization? There seem to be two

⁵¹ The highest food grain stock levels reached during the 1980s were 29 million tons in July 1985 (GOI, 1998a).

possible reasons: first, may be that the growth rates achieved in agricultural GDP fell much short of the targeted growth rates in five year plans (FYP) (at 4 to 4.5% during the ninth and tenth FYP); and secondly, import surges in case of edible oils and massive accumulation of food stocks during late 1990s are forcing a re-examination of the policy changes and their impacts.⁵²

IV. Conclusions and Policy Implications

From our analysis, we can conclude that as a whole, Indian agriculture has fared reasonably well during the 1990s. Rice and wheat, India's major staples, turn out to be not only efficient import substitutes but also export competitive in several years. The only major uncompetitive commodities – even as import-substitutes – are oilseeds and edible oils. Based on our analysis of the effects of policy on private investments, we conclude that the improvement in the terms of trade since the 1980s, has spurred on private sector investment, particularly in the high value sector, despite declining (or stagnating) public sector investment.

There is still much work to do to set the house in order, since domestic agricultural reforms have lagged behind both broad economic reforms beginning 1991 and reforms at the border beginning in 1994. Trade policy reforms implemented in the 1990s gave the agricultural sector an external shock that pushed the system in disequilibrium. Now, against the backdrop of bulging food grain stocks and unsustainable input subsidies, domestic reforms are needed to restore equilibrium in the system. Given the sequence of reforms in India's agricultural policy, with liberalization at the border leading the process, and reforms behind the border lagging, several high level committees starting in 1998 with the High Powered Fertilizer Review Committee chaired by C H Hanumantha Rao (GOI, 1998b), have been convened to offer recommendations on how the domestic reform process should proceed in order to catch

⁵² GOI (2001a)

up with the progress made at the border.⁵³ The recommendations of the various committees can be grouped into three categories: rationalizing incentives (getting markets right, getting prices right and rationalizing input subsidies), fostering investments (particularly in research, development, extension, technology and rural infrastructure), and bringing about institutional reforms. These categories cover both recommendations that are purely agricultural reforms (e.g. reform of the MSP, permanent removal of marketing and movement restriction, and revamping of agricultural research, development and extension) and other reforms that affect agriculture (e.g. power sector reforms, small-scale industry reservations, infrastructure and rural development, and governance issues).

Perhaps because the most comprehensive recommendations of the various committee reports are on getting markets right, or simply because of the government's own impulse, most of the reforms taken to date are in the area of marketing (e.g. removal of restrictions on commodity movement and futures markets). Only very recently have modest reforms been made to urea subsidies, and reforms are still needed in the power sector, in irrigation charges and services, and in food grain pricing. In order for the pricing policy to be consistent with the liberalized market policy, market forces should determine prices, and MSPs should be used only to provide farmers with a safety net when prices fall to levels less than out of pocket expenses (A2 cost of production), not at levels higher than the total (C2) cost of production as is currently the case for wheat and rice.⁵⁴ The safety net against abrupt price falls could also be in the form of insurance

⁵³ Among the major policy proposals pertaining to agriculture released since 1998 are the: High Powered Fertilizer Review Committee (GOI, 1998b), Recommendations of the Mahajan Committee on Sugar Industry (GOI, 1998c), National Agriculture Policy (GOI, 2000a), Policy Framework for Agricultural Extension (GOI, 2000b), Expenditure Reforms Commission Report on Rationalizing Fertilizer Subsidies (GOI, 2000c), Report of the Task Force on Processed Foods (GOI, 2000d), Recommendations of Prime Minister's Economic Advisory Council (GOI, 2001b), Draft Approach Paper to the Tenth Five Year Plan (GOI, 2001a), National Water Policy (GOI, 2002e), Report of Inter-Ministerial Task Force on Agricultural Marketing Reforms (GOI, 2002f), High Level Committee Report on Long Term Grain Policy (GOI, 2002d), and the Tenth Five Year Plan (GOI, 2002g). For a summary of the major recommendations of these committee reports, see Gulati et al. (2003).

⁵⁴ This would result in a significant reduction in the MSP because, for example, for wheat in major producing states in 1999-00, the A2+FL (operational costs) comprise 54 percent of the total (C2) cost of production.

schemes financed by premiums paid by farmers or market support operations by the government in the short run.

It is important to emphasize that reforms to rationalize incentives must be pursued hand-in-hand with reforms to foster public and private sector investments and with institutional reforms. By and large, the policy proposals recommend that public sector investments be used to improve rural infrastructure, which, as pointed out by the National Agriculture Policy (GOI, 2000a) and the Economic Advisory Committee (GOI, 2001b), may only happen if input and output price subsidies are reduced, thus freeing resources for public sector investments. Most of the reports recommend that a combination of public and private sector investments be used to support extension services and further agricultural research and development (especially that geared toward practical application), and that private investments be encouraged in the areas of marketing infrastructure including agro-processing. It may be desirable to support private sector investment in storage infrastructure through legal reforms that permanently remove stocking, movement and licensing requirements, instead of through direct subsidies. The private sector must be ensured that marketing restrictions cannot be reinstated at any moment before large-scale private investments will be made. In addition, the private sector should be permitted to purchase existing storage facilities that are currently under the ownership of the FCI, as its role is reduced to maintaining buffer stocks of 10 million tons in private godowns.

The investment reforms must be dovetailed with reforms to rationalize incentives (to free public sector resources for investments and to offer opportunities for the private sector investments) and institutional reforms (to provide safety nets, to remove legal constraints on private sector investment, and to increase the transparency and accountability of public sector investments). Firstly, institutional reforms are needed to ensure that there are adequate safety nets for the poor. Among other anti-poverty programs, several committee reports have recommended expanding the employment guarantee scheme that has the benefit of providing employment to the rural poor and developing rural infrastructure. The public distribution system is highly inefficient taking

Rs. 5.37 to transfer Rs. 1 of income (Radhakrishna, et al., 1997). Instead of relying on the public distribution system, a food coupon program could be embedded in the food for education programs by directing it to the families of children (especially girls) attending school.

Secondly, institutional reforms are needed in the area of enforcing regulations and standards including food safety and quality standards, monitoring, and certifications through the introduction of HACCP and ISO 9000. These activities are necessary to support liberalized agricultural markets and ensure that exports meet international standards. In addition, amendment of the APMC Acts to allow contract farming will require legal institutions to enforce contracts. Land reforms are also necessary to allow for consolidation and ease coordination between farm production and delivery. Before negotiable warehouse receipts, futures markets, and pledge financing become fully operational, supporting legal institutions must be in place as well as institutions to set and certify standards. Thirdly, institutional reforms are needed to ensure the transparency and accountability of government operations. Involving the private sector in agricultural marketing, extension, input supply, and management of resources such as water, as is recommended by the majority of the reports will reduce existing inefficiencies.

Changing consumption patterns driven by rising income levels, changing relative prices between cereals and high value agriculture, increased urbanization, and a more liberalized trade regime are contributing to a shift from cereal led growth to high value led growth. To foster continued growth in the agricultural sector, policy reform should address the demand side and the supply side with equal intensity. Although the development of a detailed strategy for taking on the demand side is beyond the scope of this paper, it should be noted that programs to increase incomes through rural development, food for work schemes and other employment programs can effectively increase purchasing power of the rural poor and raise demand for agricultural products. In addition, increased commercialization of poultry and dairy production, for example, will support a shift from food grain to feed grain demand, as is already being witnessed in the poultry sector. Growing demand for high value agriculture at all income levels favors

reallocating resources (research and development, extension, infrastructure) from cereals to fruits, vegetables and dairy production. Supporting the expansion of livestock, dairy and horticulture production calls for institutional reforms to facilitate vertical integration.

In a nutshell, policy changes should support and not hinder the progress currently being made in high value agriculture, by facilitating vertical integration and deregulating markets to allow for greater private sector investment; by increasing public sector investments in basic infrastructure, research, and development; and by reforming institutions, including the power sector. Adopting contract farming and liberalizing rules governing the retail chain industry will support private sector-led investments in post-harvest technologies, from storage to processing to the retail channel, especially for high value agriculture. Reducing input subsidies will free public sector resources for building of rural infrastructure that can augment supplies, raise incomes and increase demand for agricultural products.

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Annex I—NPCs for Selected Commodities

Figure A:1 Nominal Protection Coefficients for Maize in India 1965-2002

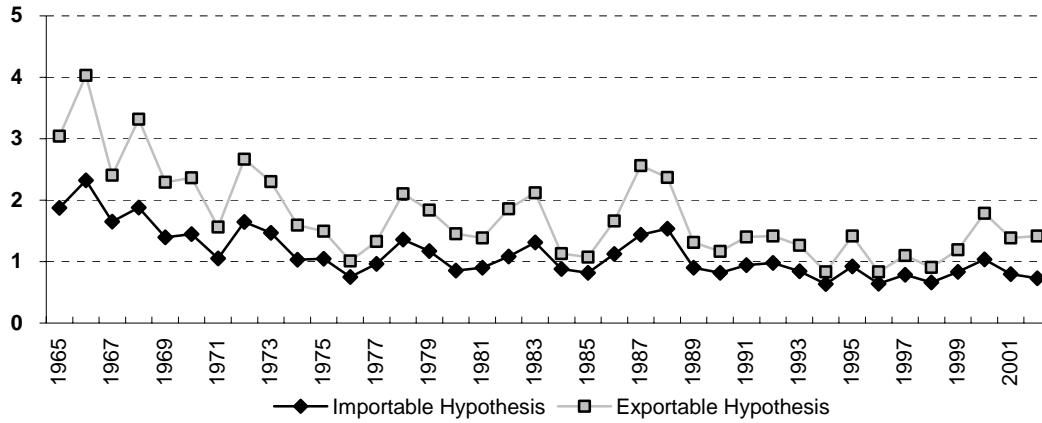


Figure A.2: Nominal Protection Coefficients for Jowar in India 1965-2002
(Importable hypothesis)

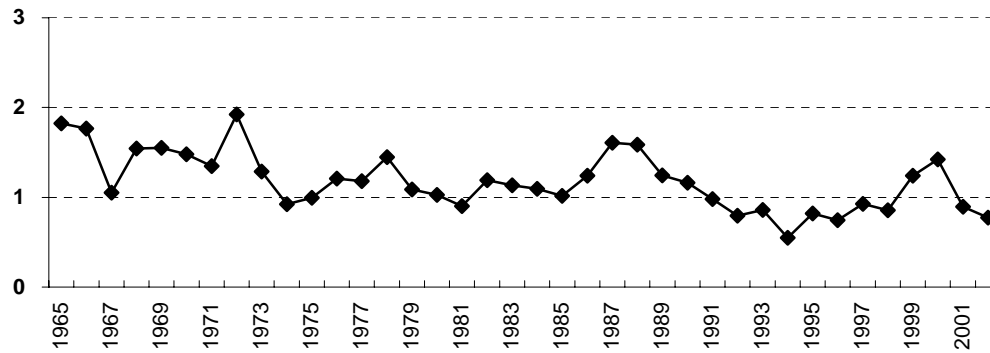


Figure A.3: Nominal Protection Coefficients for Gram in India 1965-2002
(Importable Hypothesis)

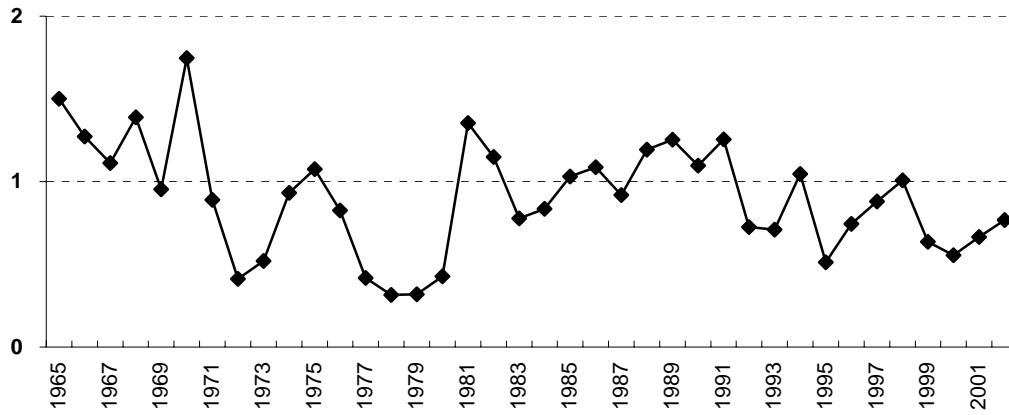


Figure A.4: Nominal Protection Coefficients for Soybeans in India 1965-2002

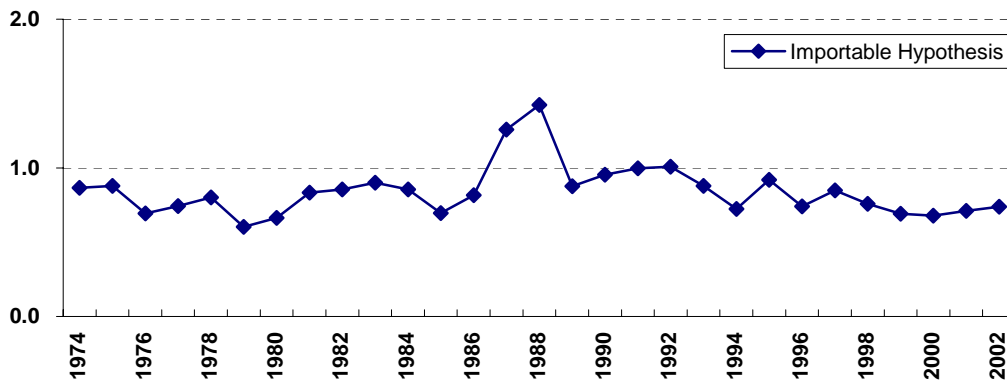


Figure A.5: Nominal Protection Coefficients for Mustard in India 1965-2002

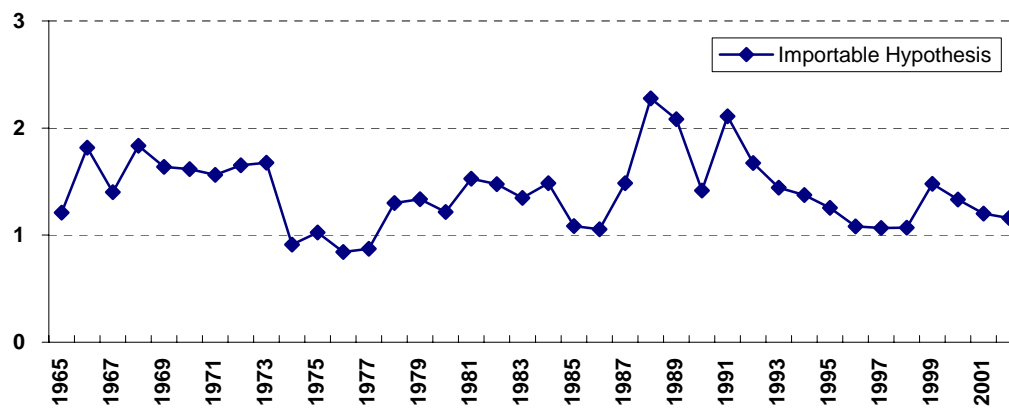


Figure A.6: Nominal Protection Coefficients for Copra in India 1965-2002

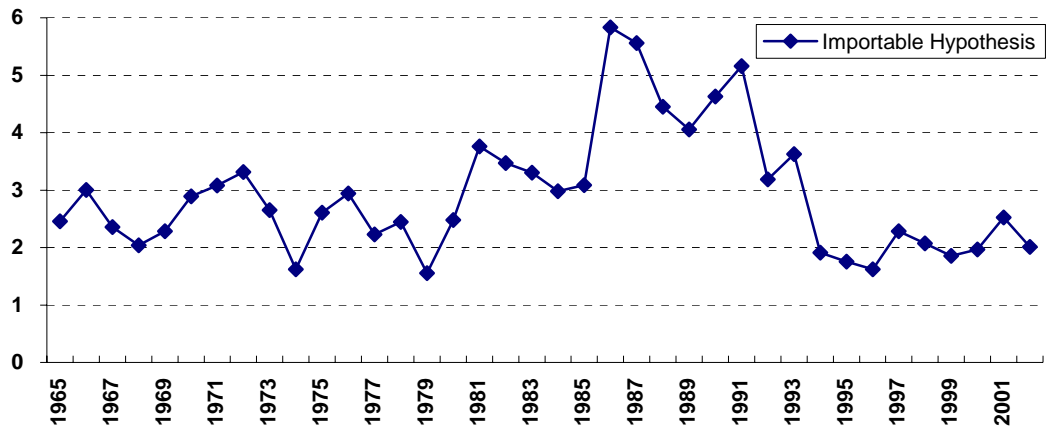


Figure A.7: Nominal Protection Coefficients for Groundnut in India 1965-2002

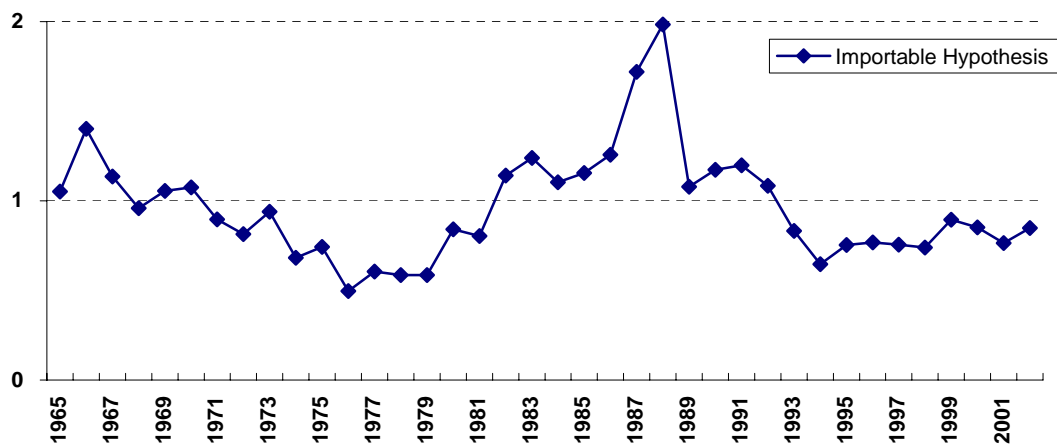


Figure A.8: Nominal Protection Coefficients for Sunflower in India 1965-2002

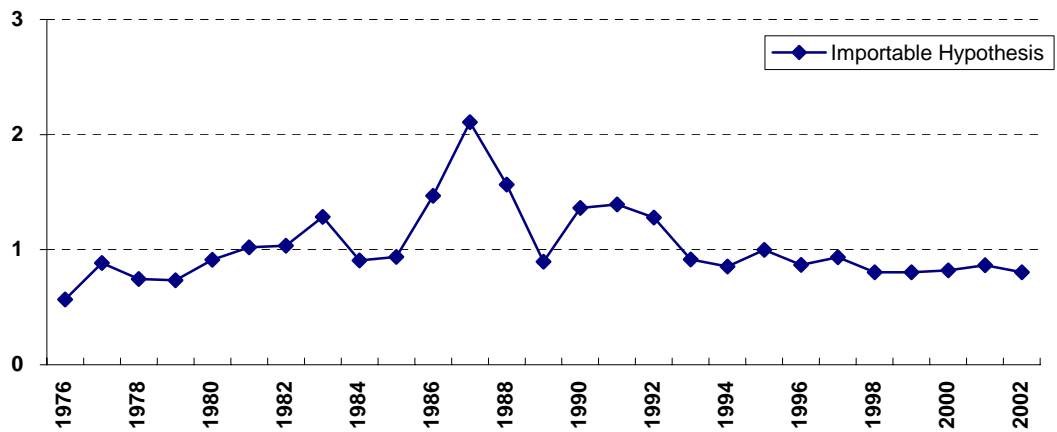


Figure A.9: Nominal Protection Coefficients for Sugar in India 1965-2002

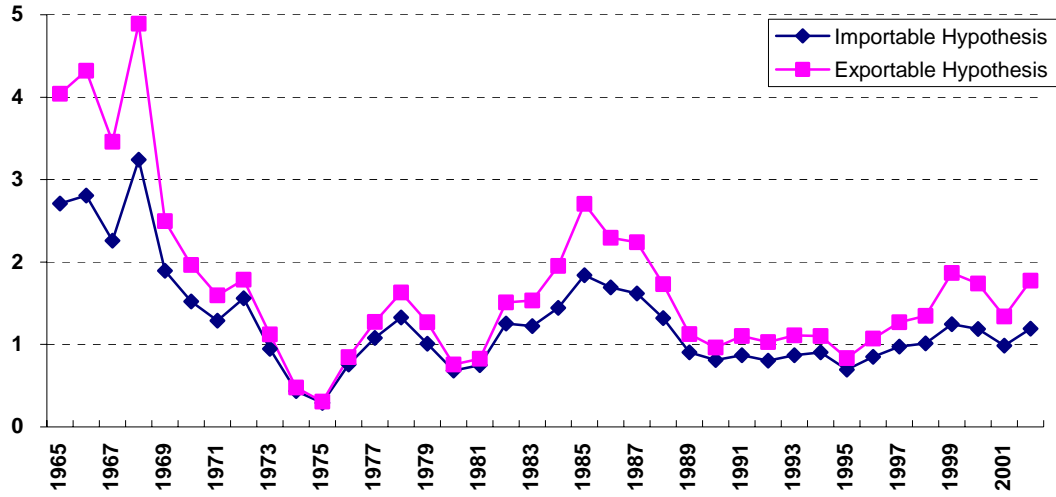


Figure A.10: Nominal Protection Coefficients for Cotton in India 1965-2002

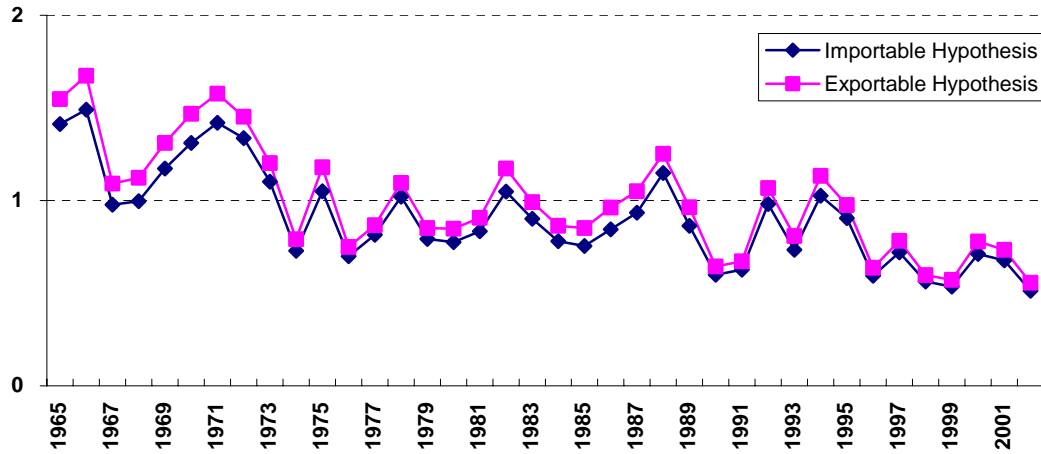
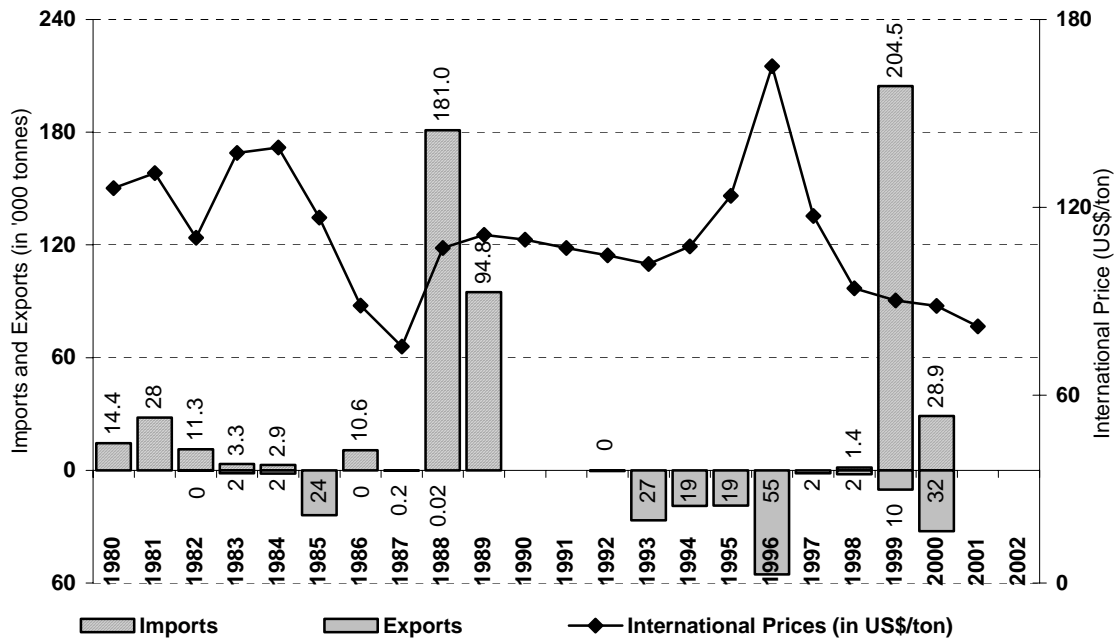
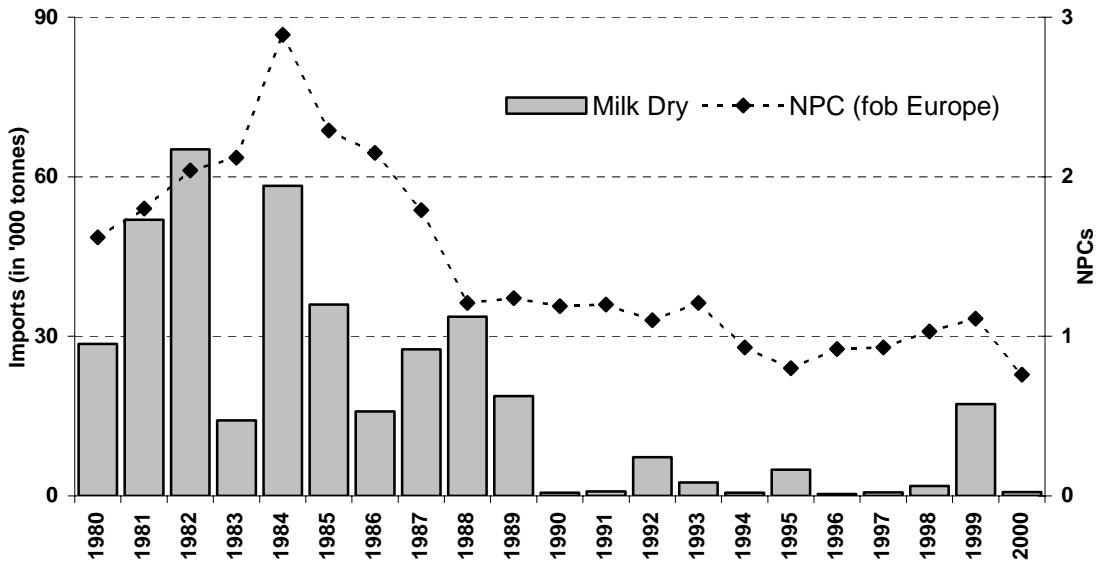


Figure A.11—India's Maize Imports 1980-2000



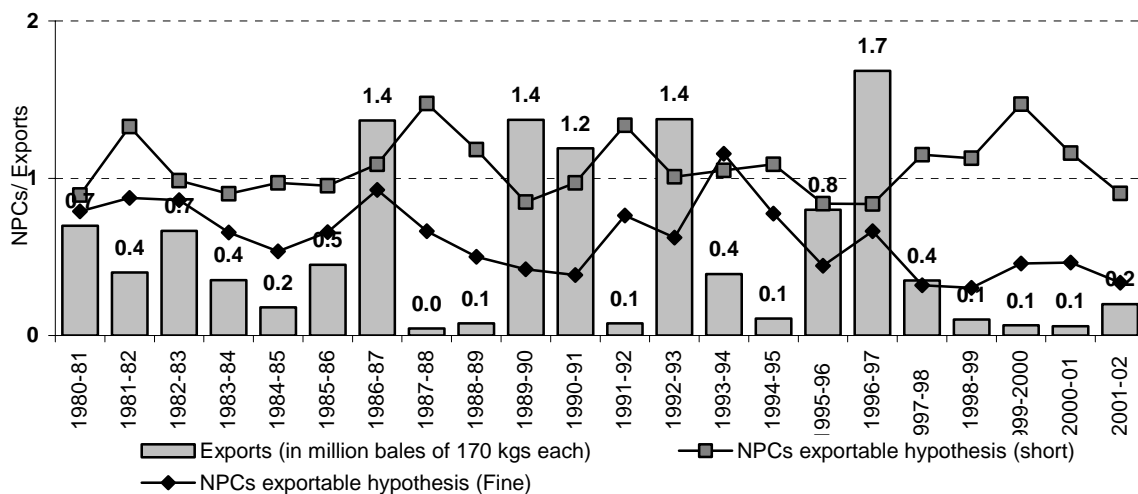
Source: Data is from FAO

Figure A.12—Imports of Dry Milk in India 1980-2000



Source: NPCs from Sharma and Gulati (2003), import data from FAO.

Figure A.13—Exports of Cotton and Competitiveness



Edible Oils

Of all vegetable oil imports in triennium ending 2000-01 (4.57 million tons per oil year i.e. November-October), palmolein and palm oil together accounted for 65%, soyabean oil (degummed and refined) about 20%, and sunflower oil about 10%. Rape oil accounted for about 3% with the rest made up by other oils. Sections of the industry felt that the Government was not justified in bringing down duties, especially for palmolein so drastically, particularly when the bound rates were set at sufficiently high levels. In fact, some pointed out that the only reason that this was done was to appease Malaysia for concessions in other sectors – in particular to secure a rail contract in return (Hegde, 2002).

Soyabean oil imports too was cause for complain. It may be recalled that for some oils, bound rates were renegotiated and raised from 45% to 75%. Among these, a notable exception is soyabean oil whose bound rate continues to be 45%. With dramatic increases

in soybean oil imports, there is now demand for renegotiation of bound rates to higher levels.⁵⁵

Table A.1—Import duty structure of oils in India

Period	Import Duty
Pre 1994	QRs
From April 10, 1994	QRs removed, 65% (concessional rate of 20% for STEs)
March 1, 1995 to February 1997	30%
March 1, 1997 to September 16, 1997	20 + 2% ad-valorem
September 16, 1997 to May 31, 1998	20+5% ad-valorem
July 10, 1998 to December 1999	15+1.5%
December 30, 1999	15% for crude oils for actual users
March 1, 2000	15% for crude oils for actual users
November 21, 2000	25% crude palm oil (70% for refined palm oil)
March 1, 2001	75% for crude palm oil (90% for refined palm oil)
August 3, 2001	Specific Duties on selected oils (RBD Palm oil etc.)
October 30,2001	65% for crude palm oil
March 1, 2002	65%

SOURCE: Solvent Extractors Association of India (2000); Economic Survey 2001-02.

NOTE: Tariff Rates mentioned are for actual users (such as refiners, vanaspati manufacturer). Typically imports by traders attract a higher import duty.

⁵⁵ Curiously, the issue of soyabean oil imports was hijacked by some NGOs in a completely different context. Around the time when imports began increasing, in August 1998, cases of dropsy occurred in Northern India caused by the adulteration of mustard oil. This invited a Government ban on oil crushing for a brief period. This was again seen as a conspiracy by foreign soybean oil traders to make entry into Indian markets.

Annex II—Performance of Indian Agriculture

**Table A.2—Growth Performance of Agriculture and Allied sectors
(fishery and forestry) (GDP at 1993-94 constant prices)**

RATE OF GROWTH		average annual	trend
1981-82 to 2002-03		2.90	2.99
<i>80s versus 90s</i>			
1980-81 to 1989-90	80s	3.48	2.91
1990-91 to 1999-2000	90s	3.03	3.18
<i>80s versus 90s until 2001-02</i>			
1980-81 to 1989-90	80s	3.48	2.91
1990-91 to 2002-03	90s until now	2.50	2.67
<i>1991-92 excluded</i>			
1980-81 to 1990-91		3.55	3.07
1992-93 to 2002-03	post reform	2.72	2.45
1992-93 to 1996-97		4.73	3.85
1997-98 to 2002-03		1.04	1.64
<i>1991-92 included as pre-reform</i>			
1980-81 to 1991-92	pre-reform	3.08	2.99
1992-93 to 2002-03	post-reform	2.72	2.45

Source: CSO GDP by Economic Activity; Data for 2002-03 is from Advance Estimates of National Income, 2002-03, 17 February 2003.

Table A.3—Value of Output from Agriculture and Livestock at 1993-94 prices, Rs. billion

	Cereals	Pulses	Oilseeds	Sugars	Fibres	Indigo,dye & tanning	Drugs & narcotics	Condiments & spices	Fruits & vegetables
	1	2	3	4	5	6	7	8	9
1980-81	512.63	99.03	113.01	101.8	58.65	0.03	28.1	37.22	262.14
1981-82	521.09	106.19	134.65	120.3	67.03	0.03	30.71	37.37	264.66
1982-83	499.35	108	119.27	123.19	66.74	0.04	31.39	40.73	274.85
1983-84	597.03	116.92	145.56	114.18	55.24	0.04	29.71	42.6	289.29
1984-85	571.46	108.78	149.3	110.4	71.25	0.05	35.14	42.29	316.66
1985-86	593.79	119.74	127.98	109.17	77.54	0.05	30.7	47.03	301.16
1986-87	568.16	106.79	131.62	116.7	58.67	0.05	31.84	45.48	325.76
1987-88	554.24	98.6	148.44	123.2	53.2	0.04	29.66	49.28	291.17
1988-89	677.83	126.36	204.87	128.93	72.19	0.05	37.33	55.83	327.02
1989-90	682.16	116.42	196.09	142.73	92.98	0.08	34.45	55.58	319.28
1990-91	702.73	130.1	212.53	152	82.48	0.05	36.49	55.61	341.41
1991-92	684.37	107.72	213.66	157.99	82.47	0.07	37.98	53.88	337.2
1992-93	714.74	117.51	228.81	144.62	93.72	0.07	35.95	62.67	367.46
1993-94	745.23	122.81	240.96	146.27	89.61	0.07	40.66	67.4	384.2
1994-95	776.98	128.68	248.43	171.61	99.72	0.09	39.59	68.03	402.98
1995-96	732.12	113.13	251.51	175.43	107.49	0.09	40.81	64.92	425.94
1996-97	802.52	132.13	277.8	175.01	119.44	0.11	45.71	72.76	484.55
1997-98	786.3	123.01	247.74	176.09	93.77	0.14	46.67	72.78	489.58
1998-99	825.19	141.72	289.66	180.65	105.7	0.12	48.17	81.03	537.54
1999-00	856.75	125.14	245.07	187.22	101.34	0.12	49.39	83.74	558.39
Trend Growth Rate									
1980-1989	2.97	1.24	5.31	2.19	2.33	8.24	1.83	4.76	2.36
1990-2000	2.29	1.15	2.61	2.68	2.78	10.5	3.75	4.63	6.17

Source: Data as on May 2001 obtained from CSO

Table A.3 (con't)—Value of Output from Agriculture and Livestock at 1993-94 prices, Rs. billion

	Other crops	By products	Kitchen gar	Value of Output Agr.	Milk group	Meat group	Eggs	Wool & hair	Dung
	10	11	12		1	2	3	4	5
1980-81	52.26	146.93	13.75	1425.55	226.53	59.65	9.62	1.23	55.76
1981-82	51.44	149.04	13.94	1496.45	243.01	63.56	10.41	1.28	57.72
1982-83	53.57	146.37	13.78	1477.28	253.97	66.77	10.94	1.36	57.72
1983-84	55.63	152.04	14.03	1612.27	274.24	72.35	12.11	1.43	59.03
1984-85	54.31	146.16	13.84	1619.64	292.77	78.17	13.48	1.51	61.13
1985-86	47.06	147.61	13.84	1615.67	313.6	80.59	15.02	1.58	59.29
1986-87	47.37	146.29	13.71	1592.44	326.17	84.97	16.12	1.61	61.45
1987-88	47.2	138.71	13.17	1546.91	332.98	87.54	16.17	1.66	62.52
1988-89	55.71	147.8	13.94	1847.86	346.08	92.72	17.51	1.66	64.07
1989-90	51.42	146.29	13.98	1851.46	368.16	98.14	18.77	1.65	62.21
1990-91	55.7	146.75	14.05	1929.9	385.37	102.34	19.6	1.6	62.34
1991-92	51.35	141	13.91	1881.6	400.18	107.02	20.45	1.45	62.07
1992-93	56.81	143.64	14.02	1980.02	413.64	120.22	21.27	1.68	62.41
1993-94	53.97	143.6	13.96	2048.74	434.08	125.38	22.82	1.78	62.14
1994-95	58.16	145.16	13.91	2153.34	459.55	123.58	23.76	1.81	62.88
1995-96	55.37	143.81	11.82	2122.44	475.49	128.21	25.15	1.86	63.96
1996-97	57.71	147.11	13.48	2328.33	494.48	130.17	25.36	1.95	65.83
1997-98	58.69	147.54	15.15	2257.46	507.36	133.52	26.28	2.01	67.53
1998-99	55.73	174.06	14.56	2454.13	534.57	137.06	27.78	2.04	67.05
1999-00	58.52	182.76	14.85	2463.29	558.9	140.27	28.56	2.1	68.13
Trend Growth Rate									
1980-1989	-0.51	-0.29	-0.09	2.46	5.47	5.6	7.92	3.62	1.35
1990-2000	0.81	2.23	0.57	3.13	4.22	3.23	4.31	3.73	1.17

Source: Data as on May 2001 obtained from CSO

Table A.3 (con't)—Value of Output from Agriculture and Livestock at 1993-94 prices, Rs. billion

	Silk worm & honey	Increment in stock	Value of Outp livestock	Aggregate Agr.& Livest.
	6	7		
1980-81	4.87	9.16	366.82	1792.37
1981-82	4.33	9.77	390.08	1886.53
1982-83	5.37	10.56	406.69	1883.97
1983-84	5.8	11.28	436.24	2048.51
1984-85	6.16	12.11	465.33	2084.97
1985-86	6.27	12.94	489.29	2104.96
1986-87	6.66	13.98	510.96	2103.4
1987-88	7.05	14.98	522.9	2069.81
1988-89	7.45	16.17	545.66	2393.52
1989-90	9.2	8.26	566.39	2417.85
1990-91	9.7	8.01	588.96	2518.86
1991-92	8.59	9.13	608.89	2490.49
1992-93	10.1	9.67	638.99	2619.01
1993-94	9.7	13.75	669.65	2718.39
1994-95	9.85	14.98	696.41	2849.75
1995-96	9.27	16.35	720.29	2842.73
1996-97	9.31	18.5	745.6	3073.93
1997-98	10.24	19.59	766.53	3023.99
1998-99	10.12	20.71	799.33	3253.46
1999-00	10.43	22.42	830.81	3294.1
	Trend Growth Rate			
1980-1989	7.1	3.1	4.99	
1990-2000	1.03	12.55	3.87	

Source: Data as on May 2001 obtained from CSO