

INDIAN AGRICULTURE UNDER ECONOMIC REFORMS: A PRELIMINARY REVIEW

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Agricultural development in post-independence India is marked by a historic failure of the state to resolve the agrarian question, i.e., ending the extreme concentration of land ownership and use and weakening the factors that fostered disincentives in investment and technology adoption, tied workers to a social system with considerable pre-modern features and compressed purchasing power. While this failure has shaped the pattern and nature of agricultural growth in India after 1947, the implementation of economic “reforms” after 1991 has introduced new dimensions to the contradictions of the earlier regime. In the 1990s and 2000s, some of the fundamental contradictions of the post-independence agrarian economy have persisted; on the other hand, some of the pillars on which the earlier regime rested have been undermined.

This paper deals with the performance of India’s agricultural economy in the post-independence period, with specific emphasis on the period of economic reforms. First, the paper delineates the different phases of agricultural growth in India after independence (Section 1). Secondly, it discusses the major policies, factors and processes associated with the differential performance of agriculture in these phases (Section 2). Thirdly, it critically analyses the official agricultural policy after 1991 and attempts to relate the outcomes of policy shifts to the patterns of growth across time (Section 3). Section 4 is a concluding section.

I

QUANTIFICATION OF AGRICULTURAL GROWTH PATTERNS

In India, data on agricultural production are available from two major sources. First, the Ministry of Agriculture (MoA) releases the index numbers of area under cultivation, production and yield of a set of 46 crops, called as forecast crops. While this index can be used to study changes in area, production and yield of individual crops or crop groups, its exclusion of non-forecast crops in the estimation of the index for “all crops” is a major limitation. Secondly, the National Accounts Statistics, compiled by the Central Statistical Organisation (CSO), provides the Gross Value of Output (GVO) for a set of crops that include the non-forecast crops. However, the base year for the calculation of GVO of crops has changed at frequent intervals, and alongside, the weights attached to different crops in the estimation of overall GVO

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have changed. For instance, when the base year changed from 1980-81 to 1993-94, the weights attached to fruits and vegetables (non-forecast crops) were revised upwards.²

Rates of growth across phases

Data from the MoA and the CSO show that five phases of growth could be delineated in the evolution of India's agricultural economy.³ The first is the period of British colonialism from the 18th century up to India's independence. The second is the period of the first fifteen years after national planning began in 1950-51 till 1964-65. The third phase – often called the “early green revolution phase” – roughly spans the period between the mid-sixties till the beginning of the eighties. The fourth phase – called the “late green revolution phase” – begins from the early eighties till the early nineties. The fifth phase covers the period after 1991-92, when there were major changes in the agricultural policies towards domestic liberalisation and integration with the global economy.

There is scholarly consensus that colonialism was a phenomenon that frustrated all possibilities of growth of the Indian economy. Over the fifty years that preceded independence in 1947, food grain output in India grew at a meagre 0.1 per cent per annum (Blyn, 1966). In the period following independence, agricultural growth in India began to pick up. Between 1949-50 and 1964-65, the index of agricultural production (IAP) grew by 3.1 per cent per annum, driven by high growth rates in both food grain and non-food grain production (Table 1). The growth rate of IAP, however, fell to 2.3 per cent in the period between 1967-68 and 1980-81. There was a recovery in the growth rate of IAP in the period between 1981-82 and 1991-92, with the IAP growing at 3.4 per cent. In the final period between 1992-93 and 2005-06, the growth rate of IAP fell to a meagre 1.2 per cent. Significantly, for the first time after independence, the rate of growth of IAP fell behind the rate of growth of population in the last period. The above periodisation remains valid when we consider the GVO data from CSO also (see Table 2).⁴

There were also important crop-specific differences in the growth of production in the 1990s and 2000s compared to the 1980s (see Table 1 and 2). While the growth rate of index of production and GVO for cereals, paddy and wheat declined significantly in the 1990s, the corresponding growth rates for coarse cereals like jowar and ragi were negative. The index of production as well as GVO for pulses and oilseeds recorded

² In the series with base 1993-94, fruits and vegetables account for 30 per cent of the gross value of output though they are cultivated in only 4.5 per cent of the total cropped area (Sen, 2002). See also Bedi (2006).

³ This periodisation of the economy builds on, and extends, an earlier exercise by Rao (1998).

⁴ There has been a moderate pick up in agricultural growth rate between 2005-06 and 2006-07. However, as the Planning Commission itself has noted: “not only is the period too short to reach firm judgment on trends, the prolonged deceleration over several years has meant that despite the improvements, per capita output of cereals, pulses, oilseeds, and also of some major vegetables and fruits (e.g., potatoes and bananas) in 2006–07 remained below 1996–97 levels” (GoI, 2008, p. 5).

negative growth rates between 1992-93 and 2002-03; after 2002-03, there appears to have been a moderate recovery that pushed their growth rates into positive figures, though still less than 1 per cent between 1992-93 and 2006-07.

However, there are discrepancies between the data from the CSO and from the Ministry of Agriculture regarding production of fruits and vegetables. While the index numbers from the Ministry show a decline in the growth rates of production through the 1980s into the 2000s, CSO data on GVO show a significant increase in rate of growth in the 1990s compared to the 1980s and then a moderate fall in the rate of growth in the 2000s (see Table 1 and 2). The difference between the results from MoA data and CSO data could be due to the unduly large weight given to fruits and vegetables in the estimation of the new CSO series (see Sen, 2002; Bedi, 2006).

Table 2 *Compound growth rates of value of production of major crops in India, estimates from National Accounts Statistics, 1950/51 to 2006/07, in per cent per annum*

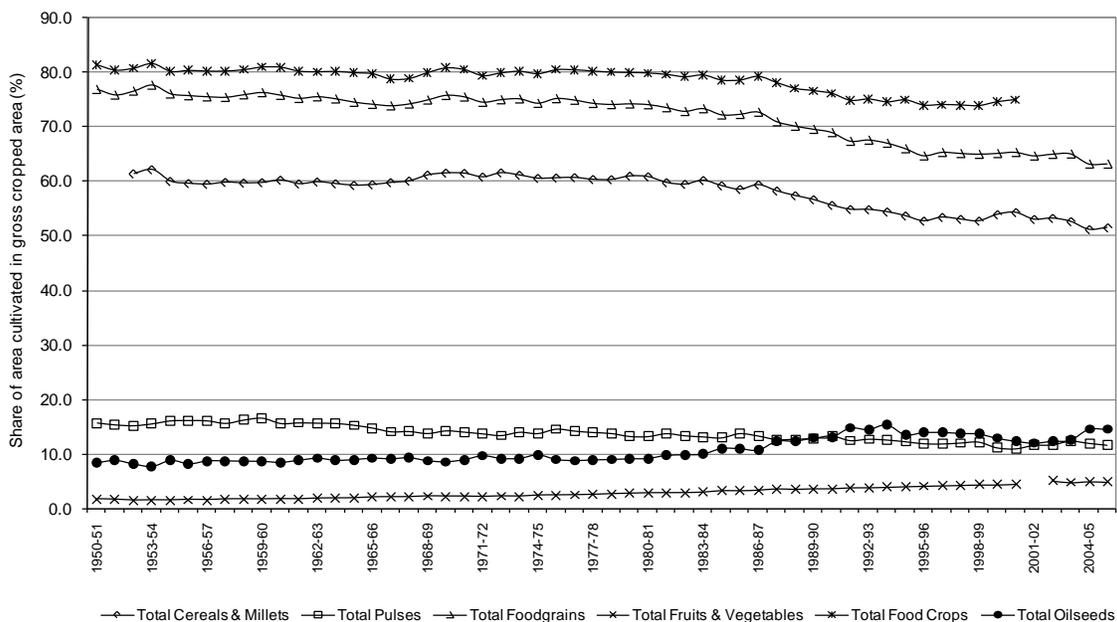
Crop group	Compound growth rates of VOP (per cent per annum)				
	1950/51 – 1964/65	1967/68 – 1980/81	1981/82 – 1991/92	1992/93 – 2002/03	1992/93 – 2006/07
Cereals	3.6	2.6	3.1	0.9	1.0
Paddy	4.4	2.2	4.0	0.9	1.0
Wheat	3.9	5.6	3.3	1.9	1.3
Jowar	2.7	1.8	-1.1	-4.8	-4.0
Bajra	2.5	-0.5	0.4	-1.2	1.5
Maize	4.2	0.6	2.2	2.1	3.3
Ragi	3.2	3.7	-0.6	-2.6	-2.5
Pulses	1.7	-0.2	0.8	-1.2	0.3
Oilseeds	3.0	1.0	5.9	-1.2	0.9
Fruits and vegetables	1.7	4.2	2.3	5.9	4.2
Agriculture	2.8	2.2	2.6	1.9	2.1

Source: Computed from National Accounts Statistics, Central Statistical Organisation.

Data from other sources too indicate a slowdown in agricultural growth after 1991 when compared to the 1980s. Sen (2002) has argued that if adjusted for terms of trade, the growth rate of real agricultural income fell from 4.5 per cent in the 1980s to 2.5 per cent in the 1990s. Sen also noted that per capita agricultural output and income declined after 1996-97 due to the low yield growth in many crops and the loss of terms of trade in many non-cereal crops. Farm business incomes, from the Cost of Production Surveys, also show a decline in growth rate from 3.6 per cent in the 1980s to 1.5 per cent in the 1990s (*ibid.*).

There have been important changes in the cropping pattern in Indian agriculture through the different phases. Between 1981-82 and 1991-92, there was an *absolute* fall in the area cultivated with food grains, cereals, jowar and bajra. In the period after 1991-92, *additionally*, there was an *absolute* fall in the area cultivated with pulses. Further, the area cultivated with oilseeds declined sharply after 1991-92. Between 1950-51 and 2005-06, the share in gross cropped area cultivated with food crops, food grains and cereals and millets continuously declined, particularly after the mid-seventies (Figure 1). The share in gross cropped area cultivated with oilseeds rose between 1980-81 and 1993-94, and declined afterwards. The share in gross cropped area cultivated with pulses declined after the late-eighties. On the other hand, beginning from the early seventies, there was a regular increase in the share in gross cropped area cultivated with fruits and vegetables.

Figure 1 Share of cultivated with different crops/crop groups in gross cropped area, India, 1950-51 to 2005-06, in per cent



In the early 1960s, large parts of India were characterised by low levels of agricultural productivity, measured as value of output per unit area (Bhalla and Singh, 2001). If we use Bhalla and Singh's classification, 222 out of 281 districts in the country were in the low-productivity category (less than Rs 5000 per ha) in 1962-65. The districts of high productivity were mainly in the southern States. Data for 1980-83 show that there was a significant increase in the number of high productivity districts compared to the 1960s. The number of low productivity districts declined to 147 in 1980-83, and the area covered by low productivity districts as share of gross cropped area decreased from 83 per cent in 1960-65 to 56 per cent in 1980-83. In 1990-93, the number of low productivity districts fell further to 94, but the area covered by these 94 districts still accounted for 37 per cent of the gross cropped area. These low productivity regions

were rainfed and primarily belonged to the States in the central region. If we take the period between 1960s and early 1990s, the largest increase in the number of high productivity districts took place in the eastern and southern States.

II *POLICIES, FACTORS AND PROCESSES*

At the time of independence, India had an increasingly lopsided agricultural economy, marked by low, and at times declining, yield of crops, low share of irrigated area, large extent of cultivable land left fallow, deterioration of soil quality and the use of poor quality seeds and poorly yielding livestock (Nanavati and Anjaria, 1947). Food grain availability per head, which was about 200 kg at the triennium ending in 1918, fell to about 150 kg by 1947 (Blyn, 1966).

The reasons for the deteriorating state of agriculture under colonialism are many and complex. Nevertheless, *the* one overarching reason was the backward and oppressive relations of production in agriculture. Big landlordism was the dominant feature of agrarian relations. All the land systems of British India, though diverse in their features, were however united in their outcomes: sub-division and extreme fragmentation of operated land, sub-infeudation of holdings, insecurity of tenures, rack-renting, illegal cesses and usury. There was an increase in landlessness among rural households alongside an increase in the share of agricultural labourers in the population and the work force.

Post-independence agricultural policy

After independence, the Indian state embarked on a system of national planning for the economy. The necessary condition for a rapid increase in the growth of the agrarian economy was a radical transformation of land relations. However, notwithstanding the emphasis on the land question in the plans, agricultural policy after independence never really considered the reform of property rights in land as a means of eliminating structural inequalities in the economy and expanding the home market (Rao, 1994). On the whole, land reforms in India were a major failure. In fact, a supply side orientation was the overriding feature of the plans. It has also been argued that agriculture was viewed as a “bargain sector” i.e., a sector where output can be increased with very little additional investment (Chakravarty, 1973).

Through the five year plans, agricultural policy focussed on raising public investment in irrigation, which was envisaged as the prime mover of farm growth. However, while about 20 per cent of the plan outlay was kept aside for irrigation in the first plan, the share fell from the second plan onwards to roughly 8 to 10 per cent of the plan outlay. As a result, the share of irrigated area in the total area has increased only very slowly over the years. The slow rise in the area under irrigation has been one factor behind the slow growth of crop yields. In the absence of any significant rise in

yields, most of the increase in production between 1949-50 and 1964-65 originated from an increase in the area under cultivation (Narain, 1977; Vaidyanathan, 1986).

By the mid-sixties, the possibilities of expanding the cultivated area had been exhausted and agricultural production slowly headed towards a plateau. This phenomenon raised serious questions regarding food availability for the growing population. There were fears that food imports to India under the PL-480 scheme from the United States would be discontinued. This apart, the food crisis also threatened to derail the planning process itself. A significant assumption in the planning process was that of government control in the supply of wage goods. With the wage goods bottleneck building up, an increase in agricultural production was essential to sustain industrial growth rates. The shift of agricultural strategy in the mid-sixties has to be seen in this context.

The New Agricultural Strategy of the 1960s

In response to the fears of inadequacy of food production, a number of programmes for “intensive agricultural development” were introduced. These programmes aimed at encouraging the adoption of a “package” of high yielding inputs, combining improved technology, credit, high yielding seeds and assured irrigation (Dantwala, 1986). The experiments of intensive agriculture were extended to cover the entire country after 1966-67. It is this New Agricultural Strategy (NAS) that is credited for what came to be known as the “green revolution”.

While the NAS was mainly a technology-led programme, it was supported critically by four forms of economic support – *price* support, *credit* support, *input subsidy* support and *marketing* support. First, the adoption of the new technologies was seen as requiring price incentives, i.e., higher product prices. The Agricultural Prices Commission (APC) was established in 1965 to advise the government on the level of prices that would act as an incentive for the adoption of technologies as well as a guide for the rational utilisation of land and other resources. The APC was to suggest two sets of administered prices: a minimum support price and a procurement price. The Food Corporation of India (FCI) was established in 1965 as a link in the policy of procurement and buffer stock management; it was to be the agency that would make food available for the poor at affordable prices and also maintain inter-temporal price stability.

Secondly, the policy of nationalisation of commercial banks in 1969 helped to significantly raise the availability of credit for the peasants. Bank nationalisation helped to mop up the new liquidity in the rural areas, improve the geographical spread and functional reach of public banks and weaken the hold of usurious moneylenders in rural areas (Shetty, 1997; Ramachandran and Swaminathan, 2001; Chavan, 2002).

Thirdly, the subsidy policy of the 1970s covered the pricing of important inputs like fertilisers, pesticides and electricity for irrigation. Prices of important inputs like fertilisers were controlled to promote their adoption.

Fourthly, the Agricultural Produce and Marketing Committee (APMC) Act and the Essential Commodities Act were passed in States to regulate the marketing of farm produce by minimising distortions in exchange. Under the APMC Act, a number of regulated markets were set up across the country (Acharya and Agarwal, 1987).

With all its technological advantages, the outcomes of the NAS were far below potential in its early phase. The rate of growth of agricultural production in the early green revolution period was *lower* than in the early planning phase (Tables 1 and 2); the push from the well-endowed regions was not high enough to compensate for the stagnation in other crops and regions. The yields of food grains in the two periods were almost the same, mainly because of a fall in the growth rate of rice yields. The limitations of the NAS were endogenous and its features actually exacerbated the structural inequalities in the rural economy.

The above critique of NAS is not a dismissal of its contributions towards reducing food insecurity in India. Indeed, the NAS was instrumental in transforming the “ship-to-mouth” predicament of India in the 1960s and, as M. S. Swaminathan pointed out, “established the linkage between [national] sovereignty and food self-sufficiency”.⁵ As Mohan Rao argued, the limitations of the strategy have to be seen in terms of the “failure of planners...to see agriculture as a strategic, system transforming sector” that would have required a “focus away from the supply side to the centrality of property relations and mass demand as a propellant for the whole economy” (1994, p. 133). Given that the effectiveness of organisational forms and the structure of property rights are closely related, the implementation of land reform was a crucial factor in determining the extent of technological diffusion. The failure of the NAS lied in its circumvention of this strategic choice. Consequently, the benefits of green revolution remained unequal with a “*region-wise, crop-wise and class-wise* concentration of production” (P. Patnaik, 1975, p. 28). The NAS focussed on regions well-endowed with irrigation, on just two crops (rice and wheat) and on sections of the peasantry that could mobilise the investment necessary for adopting the new technology.

The agricultural recovery of the 1980s

The poor growth record of the early green revolution period was reversed after 1980-81, a period we call as the “late green revolution period”. As Bhalla and Singh (2001) noted, the 1980s represent a period of the spread of green revolution to larger areas and more crops. Some authors have called the 1980s as the phase of “wider technology dissemination” (Chand, 2004). Food grain yields increased at an annual rate of 3.2 per

⁵ “For an ‘Evergreen Revolution’”, Interview to Parvathi Menon, *Frontline*, 16 (27), 1999.

cent between 1981-82 and 1991-92 (Table 1). A sharp increase in rice yields accounted for most of the increase in food grain yields; rice yields grew annually at 3.3 per cent between 1981-82 and 1991-92 compared to 1.5 per cent between 1967-68 and 1980-81. The agricultural GDP also registered an impressive annual growth rate of 3.4 per cent in the 1980s (Sen, 2002; Bhalla, 2004). There were two important factors that contributed to the turnaround in the 1980s: first, there was a major jump in production in the eastern region of the country, particularly in the State of West Bengal. Secondly, there was a major improvement in the production of oilseeds in the central Indian region.

Studies have traced the production achievements of West Bengal in the 1980s to the tenancy reforms undertaken in the State after 1977-78 by the Left Front government (Mishra, 1991; Rao, 1995; Ramachandran, 1997; Rawal, 1999; Mishra and Rawal, 2002). Two major achievements of tenancy reforms in West Bengal – called *Operation Barga* – were the provision of security of tenure to tenants and the fixation of fair rents. Sharecroppers across the State were registered in the land records through political mobilisation. According to Mishra (1991), about 1.4 million sharecroppers were registered till 1990. The State government acquired about 1.4 million acres of ceiling-surplus land; out of this, about 1.1 million acres were distributed to about 2.5 million households. These measures, combined with adequate public supply of credit and other inputs to small farmers, were instrumental in West Bengal registering the highest growth rate in agricultural production among all States in the 1980s (Ramachandran, Swaminathan and Rawal, 2003).

Between 1980-81 and 1990-91, the area cultivated with oilseeds grew at 2.4 per cent and the yield grew at 2.2 per cent per annum. As a consequence, the index of production and GVO for oilseeds recorded a growth rate of 6 per cent per annum in the same period. This quantum jump in the production of oilseeds in the 1980s was mainly due to a breakthrough in technology accompanied by public support on various fronts. The Technology Mission on Oilseeds was launched in 1986 to reduce dependence on imports and achieve self-reliance. The Mission's first achievement came in 1987-88, when in spite of a drought, oilseeds production was significantly higher than the earlier years (MoA, 1988).

The advocacy for liberalisation in the 1990s

By the late-eighties and the early-nineties, the official policy on agriculture followed until then came to be criticised. This critique of the earlier policy was led by a section of economists as well as international financial institutions, such as the World Bank, all wedded to the ideas of the Washington Consensus (Parikh, 1993, 1997; World Bank, 1986; 1991; Pursell and Gulati, 1993). It was argued that the earlier policy deliberately skewed the terms of trade against agriculture through protectionist industrial and trade policies and an overvalued exchange rate. It was argued that once we “get the prices right”, the incentive structure in agriculture would improve, and farmers would

respond to higher prices by producing more. According to Gulati and Sharma (1997), if domestic prices were aligned with world prices, average incomes in agriculture in the early-1990s would have been 16 to 25 per cent higher than what they actually were.

Liberalisation of agricultural trade was put forward as an important step towards imparting efficiency to Indian agriculture. These arguments were derived primarily from the standpoint of the neo-classical trade theory, in which free trade and openness would maximise efficiency and gains. It was argued that India has major comparative advantages in diversifying its cropping pattern in favour of high value, export-oriented crops like fruits, vegetables and flowers. Further, restrictions on private stocks and internal trade should be eliminated, which would help to evolve a national market in agriculture.

Terms of trade was biased against agriculture also because the policies of input subsidies and output support prices had suppressed domestic prices. According to one author, subsidies in agriculture were “fiscally unsustainable...inefficient and costly to farmers” (Parikh, 1997, p. 11). In this view, the long term decline of public investment could be reversed by cutting down on subsidies (Gulati and Sharma, 1995). The government should gradually retreat from the functions of procurement of food, as “government cannot manage commodity trade in an efficient way” (Parikh, 1997, p. 12). The large buffer stocks of food should be gradually brought down. In its place, private trade could be relied up on to “import or export..., build or shed inventories, as and when they expect tightness or slack in the domestic market” (Parikh, 1997, p. 12). Parikh also argued that optimal private holding of stocks would be greatly assisted by the “creation of futures markets” for agricultural products. It was also argued that food subsidies should not be universally accessible, and need targeting (Jha and Srinivasan, 2004).

The agenda for the liberalisation of the agricultural sector included a few additional components. *First*, as part of the larger programme of financial liberalisation, the policy on agricultural credit underwent significant changes towards deregulation. *Secondly*, it was argued that the existing laws on agricultural marketing discriminated against farmers by not allowing them to interact directly with the big buyers. Contract farming was seen to be beneficial to farmers in their efforts at crop diversification. It was argued that land ceilings have to be raised so that rich peasants and agri-business firms can freely lease in land. The underlying belief was that if permitted, land leasing could provide economies of scale by attracting potential investors, including corporate players, into agriculture. *Thirdly*, though the official policy often reaffirmed its commitment to encourage public agricultural research, private sector research was to be promoted in a large number of sectors. An IPR regime was to be endorsed in agricultural research. *Fourthly*, the agricultural extension system was to be reorganised by encouraging more public-private ventures as well as NGO-based extension networks.

We have already noted that the period of implementation of the liberalisation policies in agriculture in India have also been the period of a significant slowdown in agricultural growth. Rate of growth of food grain production, especially rice and wheat, slowed down significantly. The per head food grain availability (the sum of domestic output, net imports and change in stock) fell from about 175 kg in the triennium ending 1992 to 163 kg in the triennium ending 2001 (U. Patnaik, 2001). The availability per head of pulses and coarse cereals also fell in the period after 1991-92.⁶ Pulses have been the main source of protein for the poor, who could not afford to consume animal protein sources like milk in adequate amounts. Coarse cereals are richer sources of vitamins, minerals and fibre than rice and wheat, and have historically been the major source of protective nutrients for the poor.

In spite of these obvious adverse outcomes, it is required that each argument raised in the 1990s in favour of liberalisation of the agricultural economy be examined more closely.

III

A CRITICAL ANALYSIS OF AGRICULTURAL POLICY AFTER 1991-92

Price incentives and output growth

The argument of the proponents of the new policy has been that once terms of trade improve, price incentives would generate a significant supply response. However, the vast literature on the supply responsiveness of farmers has shown that the relationship between prices and output is very weak (Rao, 1988, 1989; Sen, 1992; Ghosh, 1992; Nayyar and Sen, 1994; Hazell *et al*, 1995; Vaidyanathan, 2000). There are, of course, major issues related to the accuracy of economic models used to estimate supply response in agriculture, such as the measurement and control of different effects. Yet, the range of long run supply elasticity of aggregate agricultural output has historically been between 0.1 and 0.5 in developing countries (Rao, 1989). According to Rao, the resulting “efficiency loss is quite small” (1989, p. 41).⁷ Studies also show that the responsiveness of yield-raising inputs to output prices is not significant. In fact, it is the non-price factors – inputs, technology, institutions and infrastructure – that dominantly determine growth in farm output.

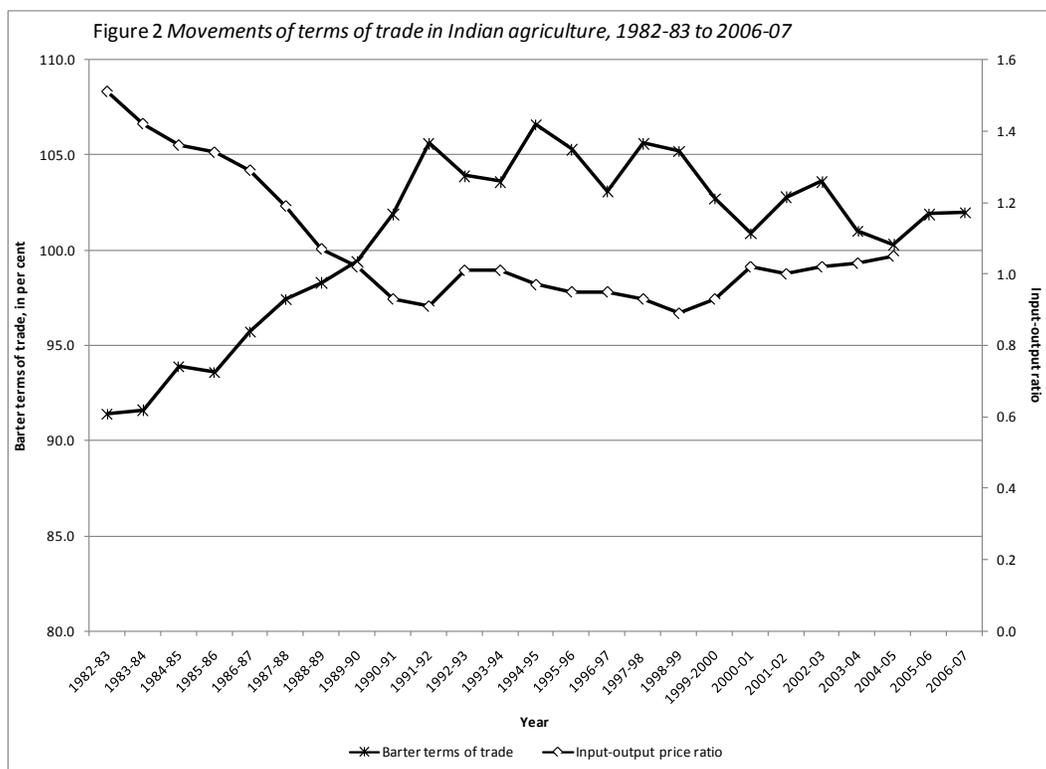
Studies have also questioned the basic premise of the argument in favour of “price-incentives” and the alignment of domestic prices to world prices. First, the analytical

⁶ Overemphasis on rice and wheat during the green revolution years had already led to a reduction in the availability of pulses per head in the 1960s and 1970s. While this decline was partly reversed in the 1980s, the absolute fall in the production of pulses in the 1990s had reduced availability to levels lower than in 1951.

⁷ As Vaidyanathan (2000) argued, “even a 15 per cent improvement in TOT with a price elasticity of aggregate supply of 0.3, will raise output by about 5 per cent, equal to less than the additional output in two years at present growth rates. Hardly the basis to project a *sustained* increase in the growth rate!”.

construct of the terms of trade argument is very narrow, given their excessive concern with static allocative efficiency and ignorance of inter-temporal considerations (Nayyar and Sen, 1994). Also, it assumes that resources have perfect substitutability across uses and perfect mobility across sectors, both of which underestimate the structural rigidities in the economy. Secondly, the shift in allocations of area between crops in response to price changes is significantly constrained by the specificities of soil, climate and irrigation, which are diverse across regions (Vaidyanathan, 2000). Thirdly, current world prices (based on which simulations are run) may be poor predictors of future world prices, particularly given that world prices are subjected to significant volatility and that the world market is dominated by monopoly or monopsony power (Rao, 1989; see also Gill and Brar, 1996). Fourthly, even if terms of trade is depressed by import substitution in industries, the resulting growth in non-agricultural employment can lead to a faster growth in per capita agricultural incomes than in the protected scenario (Sen, 1992).

The empirical case of the 1990s also militates against the terms of trade argument (see Figure 2). The barter terms of trade had begun to move in favour of agriculture from the 1980s itself, even before trade liberalisation was initiated. In the 1990s, the barter terms of trade continued to rise until 1996-97; the rise in the 1990s was partly because of the falling levels of industrial protection and partly because of the rising administered (procurement) prices of food grains, particularly rice and wheat. However, the barter terms of trade began to fall sharply after 1996-97, owing to the sharp fall in international prices of primary commodities. On the other hand, the input-output price ratio was falling in the 1980s, denoting a shift in favour of agriculture. In the 1990s and 2000s, the input-output price ratio began to rise, denoting a shift against agriculture. However, irrespective of whether the terms of trade rose or fell in the 1990s and 2000s, the corresponding agricultural output growth rates slowed down significantly.



Chand (2004) has argued that there was no significant relationship between terms of trade and output growth in Indian agriculture. He observes three sets of patterns of output-price interaction in Indian agriculture in the 1990s: output growth of cereals slowed down while prices were rising. Output growth of fruits and vegetables improved when the extent of price rise was small. Output growth of oilseeds fell along with a fall in prices. From these results, Chand argued that “attempts to increase production by raising prices alone do not produce results if efforts on technological fronts, input use, irrigation are ignored” (*ibid.*, p. 15).

Agricultural trade liberalisation

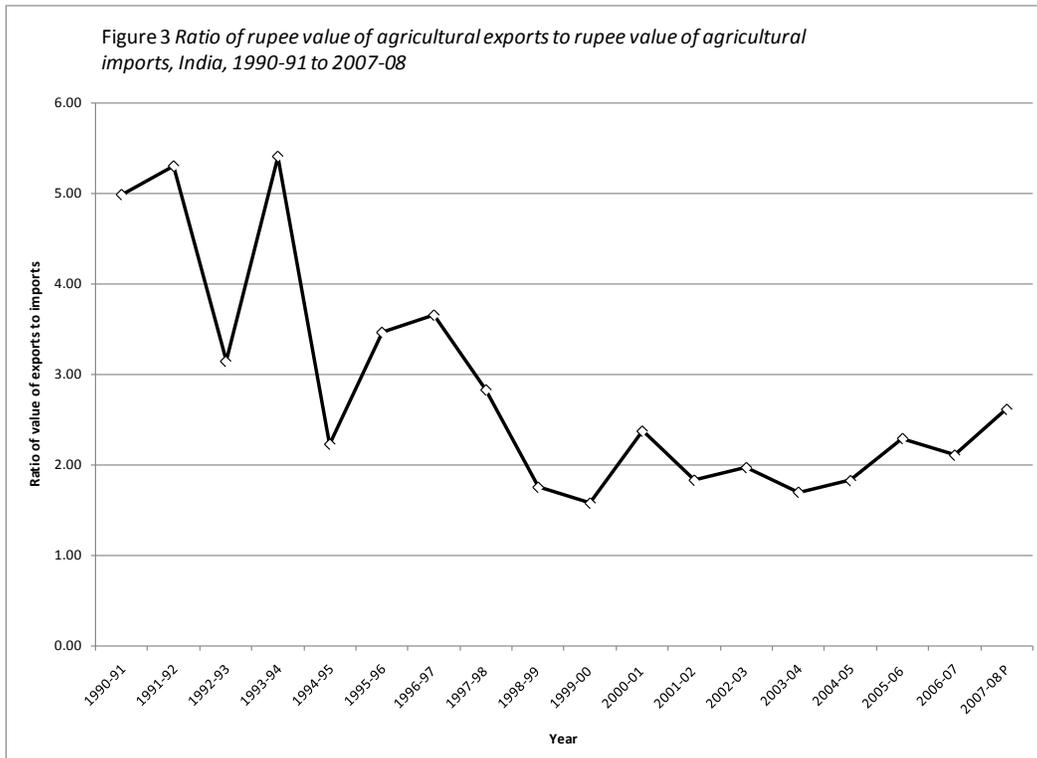
Trade liberalisation in Indian agriculture involved a series of policy measures beginning from the rupee devaluation of 1991. First, the subsidies on the exports of a set of commercial crops, such as tea and coffee, were withdrawn. Secondly, consequent to India’s signing of the WTO agreement in 1995, export controls on almost all the crops were gradually phased out. Thirdly, quantitative restrictions on the imports of commodities like wheat and wheat products, rice, pulses and oilseeds were removed from 2000 onwards. In fact, the use of quotas as an instrument of trade policy was discontinued. Fourthly, the trade policy began to use tariffs as the primary instrument of regulation. Right through the late-1990s and 2000s, the tariffs on the imports of most crops significantly declined and were kept much below the bound levels of tariffs set by the WTO agreement.

Indeed, one of the most important arguments put forward in support of trade liberalisation was that it would improve the prospects of an export-led growth process in agriculture. However, this promise has remained unfulfilled, as data till 2007-08 show. Driven by a surge in agricultural imports, the difference between rupee value of farm exports and imports significantly narrowed after the mid-1990s, when the WTO agreement was signed (see Figure 3). The Planning Commission's mid-term appraisal of the Ninth Plan provides a different set of estimates, which again supports our argument (GoI, 2005). The ratio of dollar value of agricultural exports and imports fell from about 5 in 1996-97 to 2.2 in 2003-04. The share of agricultural exports in total merchandise exports declined from 21 per cent in 1996-97 to 12 per cent in 2003-04. The ratio of agricultural exports to the GDP from agriculture also fell from 7.6 per cent in 1995-96 to 6.9 per cent in 2003-04. Exports and imports in agriculture also displayed significant instability in the period after 1995-96.

Perhaps the most significant impact that trade liberalisation had on Indian agriculture was the sharp fall in domestic prices of many commodities after the mid-1990s. In the background of greater integration between domestic and international markets, domestic prices of cotton, tea, coffee, spices and many fruits and vegetables fell following a sharp fall in the corresponding international prices. Due to the absence of quota controls as in the pre-WTO period and the ineffectiveness of low tariffs, the surge in the imports of various crops contributed in different degrees to the decline in their domestic prices (Bhalla, 2004; Ghosh, 2005). The case of fall in cotton and oilseed prices is a good example in this regard. If less than 2 per cent of the domestic cotton production was imported till the late-1990s, more than 10 per cent of the domestic production was imported in the early-2000s. The import of oilseeds increased from 1 million tonnes in 1995-96 to 4 million tonnes in 1999-2000 and has remained at that level since then.

The increased alignment of domestic and world prices after trade liberalisation also effectively imported the volatility of international prices – formed in highly imperfect and monopolised market environments – into Indian agriculture (U. Patnaik, 2002; Ghosh, 2005). The volatility of domestic prices created different types of problems in their internal adjustment; while on the one hand, it increased the uncertainties in cultivation, on the other hand, it also provided misleading price signals to domestic producers of specific crops. Such misleading price signals have encouraged cropping pattern shifts that are ecologically unsound and economically unviable in the medium term.⁸ Thus, the fall in prices of crops, combined with price volatility, significantly eroded the competitiveness of Indian farm exports in the post-WTO period.

⁸ Examples of misleading price signals leading to cropping pattern shifts are the cases of vanilla in Kerala and soyabean in Maharashtra. The most important reason for the rapid adoption of vanilla crop in upland Kerala was that while the prices of all the other major crops grown in the region were falling, vanilla prices were increasing. In 1995-96, the domestic price of processed vanilla was Rs 2,000 per kg, which rose to Rs 8,000 per kg in 2001-02. In 2002-03 and 2003-04, the domestic price shot up to Rs 15,000 per kg. The rise in the price of processed vanilla was due to a cyclone-led fall in the



The reduction of subsidies

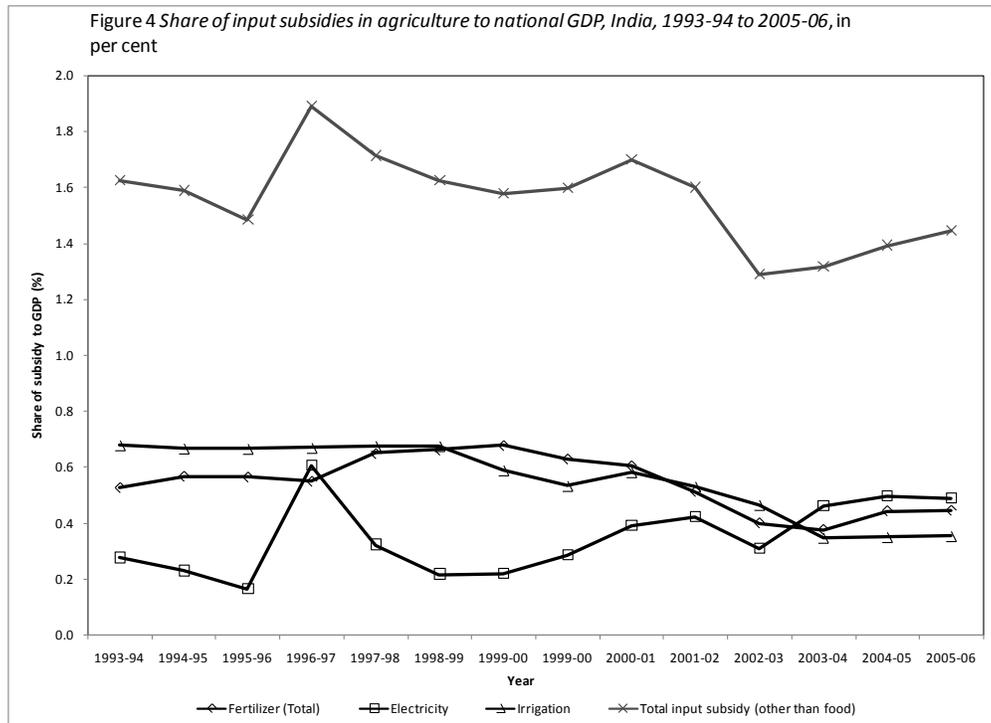
In India, subsidies are provided primarily for the following inputs: fertiliser, power, irrigation and credit. In addition, food subsidies are also provided by the state. Here, we shall be dealing only with subsidies on fertiliser, power and irrigation. The issues of food subsidy as well as credit subsidy are being separately discussed in two other papers in this conference.

It may be instructive to begin with the levels of and trends in input subsidies in India. The share of input subsidies (on fertilisers, power and irrigation) in the GDP rose sharply in the 1980s, and generally declined from the early-1990s (see Figure 4 for a plot the new data series after 1993-94). In the early 1990s, roughly 1.6 to 1.9 per cent of the GDP was spent on input subsidies, which fell to roughly 1.3 to 1.4 per cent between 2003 and 2006.⁹ On the other hand, the share of input subsidies in the

production in Madagascar, which is the most important vanilla-exporting country. Production in Madagascar increased after June 2004, when the gestation period for the replanted crop ended. As a result, vanilla prices fell sharply to Rs 1,618 in January 2005. Many farmers, who had replaced their coffee plantations with vanilla, were left helpless as a switch-back to coffee would have involved another gestation period of at least 3 years (see Nair and Ramakumar, 2007).

⁹ If we take the old data series on input subsidies, the share to GDP was 0.6 per cent in 1980-81, which rose to 2.5 per cent in 1990-91 and then fell to 2.1 per cent in 1999-2000 (see Gulati and Narayanan, 2003).

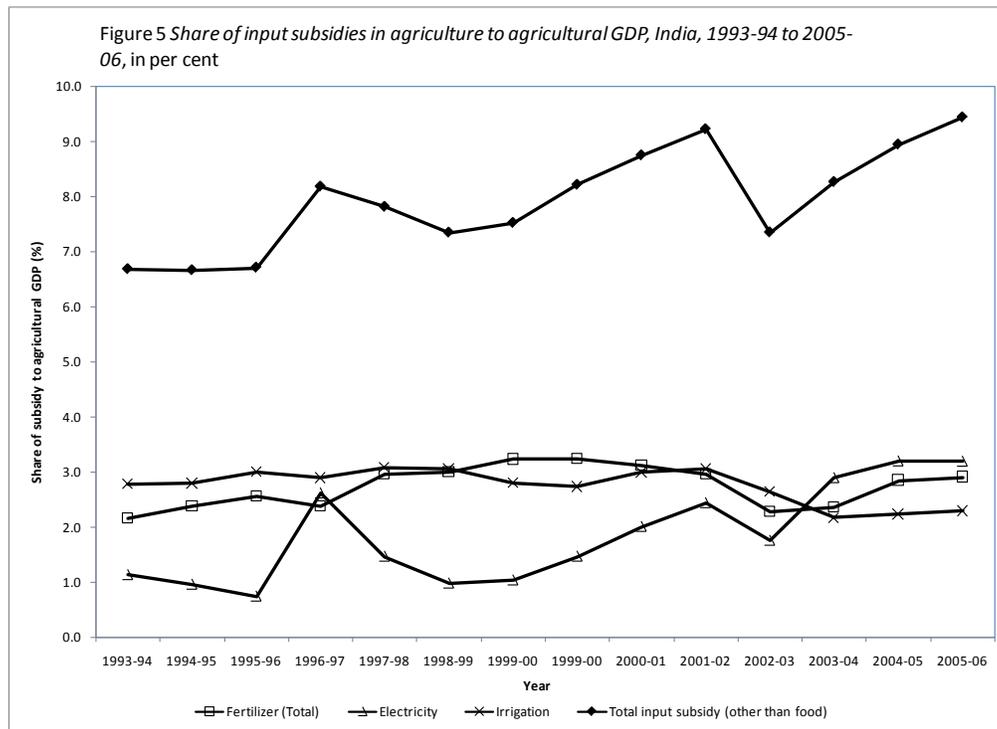
agricultural GDP shows a general rise from the mid-1990s (see Figure 5). In 1993-94, the share of input subsidies in the agricultural GDP was 6.7 per cent, while the corresponding figure for 2005-06 was 9.4 per cent. However, almost all of the increase in the share of total input subsidy to agricultural GDP after the mid-1990s appears to have originated from an increase in electricity subsidies. In fact, the shares of fertiliser subsidy and irrigation subsidy in agricultural GDP fell after the late-1990s, and particularly in the 2000s.



The fall in share of input subsidies in GDP after 1991 was the result of a conscious official policy that aimed at restricting subsidy provision, particularly for fertilisers (see Gulati and Narayanan, 2003). The argument in favour of reducing subsidies is put forward based on three reasons: first, subsidies constitute a substantial burden on the finances of the government; secondly, subsidies crowd out public investment by diverting resources; and thirdly, the prices of inputs do not reflect their scarcity value and hence these inputs are prone to overuse resulting in environmental degradation and fall in soil quality (see Gulati and Sharma, 1995; Mahendra Dev, 1997; Vaidyanathan, 2000; Gulati and Narayanan, 2003; Gulati and Mullen, 2003).

The “fiscal” argument for reducing subsidy, it must be noted, is based on the *existing* levels of revenue-expenditure relationship of the government. The argument of fiscal stress may cease to hold once this relationship changes; that is, if the revenues of the government rise. In India, public provision of social and economic services has always been constrained by poor revenue collections. For instance, tax-GDP ratios in India

are one of the lowest in the world. Nevertheless, the question can still be posed as to whether the withdrawal of input subsidies in India is a desirable step in itself.



The rationale for the provision of input subsidies has historically been to provide farmers with remunerative as well as stable prices so as to enable them to adopt new technologies and raise yields. Also, subsidies help to compensate for imperfections in the capital market and the risks associated with the adoption of new and high-cost technologies. There is by now wide agreement that input subsidies have significantly aided the process of adoption of new technologies in the post-green revolution period. Sen (1992) argued that the agricultural growth of the 1980s was primarily due to a more intensive use of fertilisers and pesticides; there was a perfect negative correlation between yield of food grains and prices of fertilisers relative to food grains. Also, higher yields due to faster diffusion of technologies could restrain the growth of food prices to the extent that government and industry could keep their price-indexed wage bills low (Acharya, 2000). There is also evidence that marginal and small farmers benefited significantly from input subsidies. Estimates in Acharya and Jogi (2004) show that 36.4 per cent of the total input subsidies were availed by marginal and small farmers, while their corresponding share in the ownership of operated area was 36 per cent. Acharya and Jogi also estimate that input subsidies were used mainly in the production of food crops, particularly rice and wheat.

Given these benefits of subsidies, would it be desirable to withdraw subsidies, even if we assume that all of the reduced amount would be invested in agriculture? It appears

certain that that there would be significant short-term and adverse effects of withdrawal of subsidies on the levels of profitability in agriculture. That prices of inputs would rise with the withdrawal of subsidies is obvious. Viability of agriculture depends critically on the ratio between the output price and the input price. If profitability is to be maintained at the same level, it would require a more than proportionate increase in the output price; according to an estimate in Sen (1992), maintenance of relative prices consequent to a one rupee cut in fertiliser subsidy would require a transfer of 10 rupees to farmers either from the government or from the consumers. Both forms of transfer have significant fiscal and welfare implications.

Even if one argues that output prices (procurement prices) could be raised by the government to compensate for the input price rise (as in Parikh, 1997), there are two further issues (see Sen, 1992; Acharya, 2000; Acharya and Jogi, 2004). First, a large share of farmers in India does not generate a marketable surplus; most of the production of marginal and small farmers goes into household consumption and these groups would be adversely affected by the higher price of inputs. Secondly, procurement operations of the government take place only in a few States and regions. As such, the geographical reach of a rise in procurement price rise may be limited. The essence of these arguments is that input subsidies and public investment cannot be treated as “substitutes”, as Gulati and Mullen (2003) do. Also, an increase in the efficiency of production can be achieved with measures other than cut in subsidies; witness the example of West Bengal in the 1980s and 1990s, where tenancy reform and decentralisation were the key drivers of agricultural growth.

All of the input subsidies in India do not reflect a transfer of income to farmers. For fertilisers, a large share of the subsidy is a transfer to the fertiliser producers, who presently have no incentive to improve efficiency in production. Similarly, in the case of power subsidies, a large share of the subsidy is a transfer to the electricity boards, which are plagued with problems like inefficiency in power generation, high transmission and distribution losses and non-recovery of bills (Acharya and Jogi, 2004). Electricity boards have also historically inflated the share of power used by the agricultural sector (where free power is provided) to conceal the poor collection of dues from other users. There is significant inefficiency in the management of irrigation systems as well. Thus, there appears to be significant scope for reducing subsidies *without raising input prices* through an improvement in the efficiency of production and management in the fertiliser, power and irrigation sectors. However, the actual policy practise in India in the period after 1991-92 has been to effect increases in input prices to cover for the high costs of production, especially in the case of fertilisers.

The case of fertiliser subsidies

The policy on fertiliser subsidy in India is an illustration of the perils of adopting a strictly “fiscal” approach to the reduction of input subsidies. Till 1992, fertiliser prices in India were controlled, and the maximum retail prices of various fertilisers were set

by the government.¹⁰ A partial decontrol of fertiliser prices was undertaken in 1992, as part of the economic reform programme. The prices of phosphate (P) and potash (K) fertilisers were decontrolled, while the prices of urea (N) continued to be under control. As a result, there were major increases in the prices of phosphate and potash fertilisers, while urea prices continued to be moderate. In 1990-91, the price per tonne of Urea, Di-Ammonium Phosphate (DAP) and Muriate of Potash (MOP) were Rs 2350, Rs 3600 and Rs 1300 respectively. The corresponding prices in 1995-96 were Rs 3320, Rs 9800 and Rs 4450 respectively. After 1997, there was an effort to restore the parity in prices through a concession scheme, and in 2003 the RPS on urea was replaced with a Group Pricing Scheme (GPS). Nevertheless, the relative price differences have persisted; in 2003-04, the prices the three fertilisers were, respectively, Rs 4830, Rs 9350 and Rs 4455.

The relative price shifts among fertilisers induced by economic reform have had a major impact on the final consumption of each fertiliser. One of the thumb rules in agronomy is the need to stabilise the consumption of N, P and K at a ratio of 4:2:1 in order to sustain soil quality. In 1955-56, the NPK ratio was highly imbalanced at 10.8:1.3:1 (Table 3). From the 1950s onwards, and through the period of green revolution, the NPK ratio was slowly, but steadily, approaching the stability ratio of 4:2:1. In 1991-92, the NPK ratio stood at 5.9:2.4:1. However, after decontrol in 1992, the NPK ratio literally went haywire owing to the unscientific relative price signals. As a result, the consumption of nitrogenous fertilisers increased rapidly, while that of phosphate and potash fertilisers fell in relative terms. In 1996-97, just four years into decontrol, the NPK ratio stood at an appallingly imbalanced 10:2.9:1. The imbalance in use has led to a declining fertiliser response in the fertile irrigated regions as well as a depletion of micro-nutrients from the soil, leading to a deterioration of soil fertility in different degrees (GoI, 2008).¹¹

Table 3 *The ratio of use of Nitrogen, Phosphorus and Potash fertilisers (N:P₂O₅:K₂O) in Indian agriculture, 1955-56 to 2006-07*

Year	N	P ₂ O ₅	K ₂ O
1955-56	10.8	1.3	1
1960-61	7.2	1.8	1
1970-71	6.3	2.3	1
1980-81	5.9	1.9	1
1991-92	5.9	2.4	1
1992-93	9.5	3.2	1

¹⁰ The control regime was based on the Retention Pricing Scheme (RPS) for urea in 1977 and for complex fertilisers in 1979. Under this regime, the subsidy to farmers represented the difference between the normative cost of production for each company *plus* the distribution cost and the retail price.

¹¹ Another important outcome of the differential reduction of subsidies was the relative benefit gained by those crops (and regions) that required the application of more nitrogenous fertilisers than phosphatic and potassic fertilisers (GoI, 2008).

1993-94	9.7	2.9	1
1994-95	8.5	2.6	1
1995-96	8.5	2.5	1
1996-97	10.0	2.9	1
2003-04	6.9	2.6	1
2006-07	5.9	2.4	1

Source: Different official data sources.

It was only in 2006-07 that the NPK ratio returned to a more balanced and scientific proportion. However, while the above is the national picture, the corresponding ratios in all the agro-ecological regions have not yet returned to a balanced state. The long-run impact that the fertiliser imbalance had on the sustainability of agriculture has not yet been studied in detail, but has necessarily been highly adverse.

Fall in profitability in agriculture

An important outcome of the policy changes in agriculture in the 1990s was the changes in the profitability of cultivation, which varied across crops and regions (Sen, 2004; Sen and Bhatia, 2004; Surjit, 2008). Using data from the Cost of Cultivation Surveys, Sen (2004) argued that there was a general slowdown in the diffusion of yield-increasing technologies and inputs in the 1990s compared to the 1980s. On the other hand, mechanisation in agriculture grew faster in the 1990s than the 1980s, though at varying rates across regions. Sen noted that “the profitability of crop production has been influenced by the pattern of technological change and also by output price movements” (2004, p. 38). To summarise Sen’s conclusions:

During the 1980s, when yield growth was higher and prices of most crops tended to rise faster than the cost of living, the real per hectare margin of GVO over cost...increased for all crops except maize...During the 1990s, with yield growth slowing down for most crops and prices of crops other than cereals and sugarcane rising slower than the cost of living, the real GVO-cost margin fell for most crops other than wheat, sugarcane, barley and tur...Across States also, increases in GVO-cost margins were less evident during the 1990s than during the 1980s (Sen, 2004, p. 38).

Crop-specific studies on costs of cultivation show results that are in concurrence. Surjit (2008) has studied the growth of farm business incomes from paddy cultivation in seven most important paddy-growing States in India. He argued that in four out of seven States, the growth rate of farm business incomes was positive for the 1980s and negative in the 1990s (see Table 4). In two other States, the growth rate slowed down between the 1980s and 1990s.

The squeeze on public investment in agriculture

Gross capital formation in agriculture

There is considerable difference of opinion on how to estimate the total public expenditure in agriculture. Most of the early studies had used data on agricultural investment from the CSO as the basis (see Shetty, 1990). However, in the 1990s, it has been argued that the data provided by CSO does not fully capture all the components of agricultural investment (Chand, 2000; Gulati and Bathla, 2001; Sawant *et al*, 2002; Thulasamma, 2003). Each of the above studies have tried to expand or modify the definition of agricultural investment, and tried to construct a new series.

Chand (2000) argued that the CSO data does not include public expenditure on roads, electrification and provision of market infrastructure in the rural areas. He constructed a new series of data by adding to the CSO series the figures for capital expenditure on selected items from the Finance Accounts of central and State governments. He found an underestimation in CSO series by about 52 per cent. Gulati and Bathla (2001) tried to redefine investment in agriculture based on the United Nations System of National Accounts (UNSNA). They added to the CSO series two sets of additional figures: budgetary capital expenditures on agriculture by central and State governments and investment by government in the power sector that enters agriculture. Sawant *et al* (2002) excluded forestry and fisheries from the purview of public investment and also used data from the All India Debt and Investment Survey (AIDIS) of the NSSO to arrive at estimates of private investment in agriculture. Thulasamma (2003), in her use of data from the budget papers, used data on both revenue and capital expenditures in agriculture, as revenue expenditures may also have significant capital components.

Table 4 *Growth rates of farm business incomes from rice cultivation, by period, by State, 1973-74 to 2002-03, in percent per annum*

State	Growth rate of farm business income in (per cent per annum)		
	TE 1973-74 to TE 1983-84	TE 1983-84 to TE 1993-94	TE 1993-94 to TE 2002-03
Andhra Pradesh	0.4	0.5	3.5
Karnataka	-4.7	1.8	-2.1
Orissa	-0.2	3.7	-4.5
Punjab	13.7	1.6	0.4
Tamil Nadu	4.8	NA	0.9
Uttar Pradesh	0.8	3.3	-2.1
West Bengal	-2.4	3.7	-8.0

Source: Surjit (2008), citing official reports of the Commission for Agricultural Costs and Prices in various years.

Notes: * - this is the growth rate for the period from TE 1983-84 to TE 2002-03.

TE = Triennium Ending; NA - Not Available

Overall, data collected on the basis of all the methods listed above provide certain clear trends (Thulasamma, 2003; see Table 5 in this paper for the CSO data). First, gross capital formation in agriculture from the CSO, as a share of agricultural GDP, began to decline from the early 1980s and continued to decline in the 1990s. In the 2000s, the share began to rise, settling at 12.5 per cent of the agricultural GDP in 2006-07. Secondly, public investment in agriculture, as a share of agricultural GDP, began to decline from the early 1980s and continued to decline in the 1990s up to 2004-05. For the three years after 2004, there was a moderate improvement in public investment; in 2006-07, the share was 3.7 per cent, which was still considerably lower than the share for the early-1980s. Thirdly, private investment in agriculture after stagnating in the 1980s rose moderately in the 1990s and more rapidly in the 2000s. While the rise in private investment in the 1990s was insufficient to compensate for the fall in public investment, the rise of total investment in the 2000s was aided significantly by the growth in private investment.

One of the characteristic features of investment in Indian agriculture has been the complementarity between public and private investment (Shetty, 1990; Storm, 1993; Dhawan, 1998). In a growing economy, public investment induces or “crowds in” private investment by farmers. Data till the early-1980s show that in periods when public investment increased, private investment also increased. The concurrent fall of public and private investment in the 1980s was due to this complementary relationship. Estimates of the elasticity of private investment with respect to public investment ranged from 0.6 to 0.7 for the period till the mid-1980s (Shetty, 1990; Storm, 1993). Dhawan (1998) reported a regression analysis for the period 1971-91, according to which one rupee of public investment led to one rupee of private investment.

Table 5 *Gross capital formation (GCF) in agriculture as a share of GDP from agriculture, India, 1980-81 to 2006-07, in per cent*

Period/Year	GCF in agriculture as a share of agricultural GDP		
	Public sector	Private sector	Total GCF
1980-81 to 1984-85	5.0	5.5	10.5
1985-86 to 1989-90	3.5	5.2	8.7
1990-91 to 1994-95	2.4	5.9	8.4
1995-96 to 1999-00	2.0	5.9	7.9
2000-01	1.8	7.8	9.6
2001-02	2.0	9.1	11.1
2002-03	2.0	9.8	11.8
2003-04	2.1	8.0	10.2
2004-05	2.8	8.3	11.1
2005-06	3.2	8.5	11.7
2006-07	3.7	8.9	12.5

Source: GoI (2008).

What has been significant about the 1990s and early-2000s has been an apparent shift in this relationship; private investment increased even when public investment fell. However, it would be an error to reduce complementarity to a strictly statistical framework; in reality, private investment decisions involve a complex interplay of several inter-related factors. There is no evidence yet to argue that public and private investments are not complimentary. In fact, the All India Debt and Investment Survey (AIDIS) of 2003 shows new patterns in the trends and composition of private investment. The AIDIS data show that the increase in private investment in the 1990s and early-2000s was confined to a smaller section of cultivators than in the 1980s. The share of cultivator households reporting investment in farm business fell from 19.3 per cent in 1972 to 11.9 per cent in 1992 and 10.3 per cent in 2003. Also, the new private investments were mostly in the construction of wells; within private fixed capital formation, the share of construction of wells increased from 21 per cent in 1992 to 33 per cent in 2003.

Public investment in research and extension

There was a significant slowdown of public expenditure in two specific sectors within agriculture: research and extension. Historically, agricultural research and extension have been sectors where the government invested heavily and where private investment was not significant. Extensive public support was encouraged, as these were considered as “public goods.” As public goods are prone to market failures, the state was considered as necessary to step in and invest. It has been documented that the rates of return from public investment in research and extension are significant. The marginal rate of return on public investment in agricultural research has been estimated to be in the range of 57 to 64 per cent (Kahlon *et al*, 1977; Evenson and McKinsey, 1991; Rosegrant and Evenson, 1992; Evenson, Pray and Rosegrant, 1999). For agricultural extension, the corresponding figures range from 52 to 55 per cent (Rosegrant and Evenson, 1992; Evenson, Pray and Rosegrant, 1999). According to Vaidyanathan (2000), “the widespread nation-wide network of specialized research stations under the ICAR and the agricultural universities, working with and through the National Extension Service, have contributed significantly to raising productivity by developing and diffusing better varieties and practices.”

With the beginning of economic reform in the early-1990s, there were major shifts in the official policy on agricultural research and extension. The new policy focussed on encouraging private sector investment in research and extension. As per the new industrial policy of 1986, seed and biotechnology firms were re-classified as core industries, with the result that the entry of large firms became easier. As per the new Seed Policy in 1988, the domestic seed industry was further liberalised with considerable incentives offered to private players to enter into seed production. After 1991, 100 per cent foreign equity was allowed in the seed industry and seed imports were allowed for research purposes under the Open General License (OGL). The

introduction of IPRs in plant breeding was an important component of the WTO agreement in 1995. A Seeds Bill was introduced in the Parliament in 2004; Sharad Pawar, the Union Minister for Agriculture, stated in November 2004 that “in the proposed Seeds Bill of 2004, we aim to bring in provisions for a more liberalised climate for investment by the private sector in the seed industry.”

In the sphere of agricultural extension, the neo-liberal argument has been that agricultural information is increasingly acquiring the characteristics of a “private good” (see Reddy, 2008 for a review). According to the National Agriculture Policy of 2000, “the government will endeavour to move towards a regime of financial sustainability of extension services through effecting...a more realistic cost recovery of extension services and inputs” (cited in Reddy, 2008). The new policy argued that the supply-emphasis of the earlier T&V system was misplaced, and should be replaced with a demand-driven and competitive extension network. In this view, the government was to withdraw subsidies on extension services, so that it can compete with the private sector on a level playing field.

In the 1990s and 2000s, there was a decline in the rate of growth of public spending on agricultural research and extension compared to the earlier decades (Table 6).¹² The growth rate of public spending on agricultural research fell from 6.3 per cent in the 1980s to 4.8 per cent in the 1990s and 2000s. The corresponding figures for agricultural extension were 7 per cent in the 1980s and 2 per cent in the 1990s and 2000s. If we consider public spending on research and extension as a share of agricultural GDP, then a slightly different set of results emerge (Table 7). As a share of agricultural GDP, public expenditure on research shows a moderate rise in the 2000s, while public expenditure on extension shows a clear decline. The rise in the share of public expenditure on research in the 2000s was the result of the fall in growth of agricultural GDP exceeding the fall in growth of expenditure.

Table 6 *Growth in real public expenditure on agricultural research and extension, in per cent per annum*

Period	Growth rate of public expenditure in	
	Research and Education	Extension and Training
1960s	6.5	10.7

¹² At the international level, donors of CGIAR have reduced their funding for research and are asking CGIAR centres to focus on own-revenue generation by commercialising their research findings and partnerships with the private sector in developing and acquiring new technologies. Shrinking resources to agricultural research are showing up in the outcomes of research efforts as well. Lipton, Sinha and Blackman (2002, p. 123) summarise their argument as following:

“The farm changes of 1950-1990 were based on the adoption of mainly public sector research by smallholders, employment-intensively and with irrigation or fairly secure rainfall. But agricultural research has shifted to the private sector [since 1990]; its results have become less smallholder-friendly and less employment-intensive; poverty has concentrated in rural areas with little water control; and rural water shortages are intensifying. The positive connections between agricultural research and human development have sharply weakened.”

1970s	9.5	-0.1
1980s*	6.3	7.0
1990-2005	4.8	2.0

Source: Balakrishnan, Golait and Kumar (2008).

Note: For Extension and Training, the figure for 1980s is for 1980-1994.

Table 7 *Public expenditure on agricultural research and extension as a share of agricultural GDP, in per cent*

Year/Period	As a share in agricultural GDP, expenditure in	
	Research and Education	Extension and Training
1960-62	0.21	0.09
1970-72	0.23	0.14
1980-82	0.39	0.11
1989-91	0.41	0.16
1992-94	0.40	0.15
1995-97	0.38	0.14
1998-00	0.44	0.15
2001-03	0.52	0.13
2004-06	0.52	0.13

Source: Balakrishnan, Golait and Kumar (2008).

Concurrent to the weakening of the public sector, there has been an increasing control of private firms over agricultural research and extension. Private sector research and extension has never in the developing world been a substitute for the public sector. Pardey and Beintema (2001) noted that private research across the world covered only a “small sub-set of the needs of the poor.” Technologies developed by the private sector were mainly suited to “capital-intensive forms of commercial agriculture with high value-added aspects off the farm.” Private sector research has focussed mainly on the development of herbicides, insecticides and technologies related to food storage, transport and processing technologies (see also Alston *et al*, 2000). In India too, private sector agricultural research is confined to a few crops, such as maize, sunflower, cotton, pearl millet, oil seeds and sorghum, where the expected profit levels are high. In most food grain crops like paddy and wheat, private agencies have had very little presence.¹³

¹³ In a recent interview to *Frontline*, M. S. Swaminathan noted that “the agricultural research system as a whole reflects the general malady of the country. There was a genuine commitment to poverty alleviation and to problems of national development in the 1950s and 1960s. But our vision is getting narrower...[and] we are getting increasingly parochial.” According to him, “scientists and students were fired with a lot of enthusiasm” in the days of the green revolution, which was missing now. Swaminathan explained that the success of agricultural research depends on the effectiveness of co-operation and linkage between research, extension, input delivery systems and an assured and remunerative marketing policy. However, the problem of agricultural research today is that “the strands of cooperation [and] the linkages among various actors [are] getting weakened” (available at <http://www.hinduonnet.com/fline/fl1627/16270940.htm>).

According to a Planning Commission review, the sluggish growth in Indian agriculture in the 1990s was mainly due to “weakened support systems”, and in particular, “unresponsive agricultural research, nearly broken down extension [and] inadequate seed production, distribution and regulation” (GoI, 2005, p. 197). The experience in Andhra Pradesh State is striking in this respect. A government commission noted that “the collapse of public agricultural extension services in the State has been one of the most important contributory factors to the generalised agrarian crisis” (see GoA, 2004). The decline in the quality of extension system and the weakening of the State Seed Corporation led to a sharp rise in the quantity of spurious seeds sold. Unscrupulous traders, who sold spurious seeds to farmers, were also doubling-up as moneylenders; the cost of seeds was considered as a loan at high rates of interest. It is clear that along with a reversal of the decline in public investment in agricultural infrastructure, a reversal of the slowdown in public investment in research and extension are also critical factors associated with the revival of agricultural growth in India.¹⁴

Shrinking credit to agriculture

Financial liberalisation has been perhaps the most important component of the set of economic reforms introduced in India after 1991. Since the nationalisation of commercial banks in 1969, the government had strongly pursued a policy of *social and development banking* in rural areas. As a result, formal institutions of credit provision, mainly commercial banks, emerged as important sources of finance to agriculture displacing usurious moneylenders and landlords. A vigorous branch expansion policy was followed by commercial banks in rural areas, as a result of which the number of rural bank offices rose from 1443 in 1969 to 35,134 in 1991 (Shetty, 1997). Banks were also required to implement schemes of sectoral targeting in rural areas in the form of priority sector lending (Chavan, 2005). About 40 per cent of the total lending was to be necessarily lent to the priority sectors, which primarily included agriculture. About 10 per cent of the total lending was to be directed to “weaker sections” that included small and marginal cultivators and agricultural labourers. The policy of social and development banking was a supply-led policy; it aimed at augmenting the supply of credit to rural areas, and that too at an affordable interest rate.

There is little quarrel among economists on the effect that this flow of credit had on agricultural growth. The regulations on banking and the promotional role of the government were premised on the recognition that rural credit markets are deeply imperfect. The social and developing banking policy consciously mopped up surplus-

¹⁴ The officially sponsored Indo-US Knowledge Initiative in Agriculture (KIA) is one of the latest steps towards the privatization of agricultural research in India. It has been noted that this agreement would weaken public sector research and promote private sector research on commercialized crops at the expense of food crops – an agenda identified by multinational corporations. The Board set up for the implementation of the KIA includes representatives of Wal-Mart and Monsanto.

savings from richer rural areas as deposits and diverted them as loans to savings-deficient areas (Ramachandran and Swaminathan, 2001). Increased availability of credit from public banks helped small and marginal farmers adopt the costlier new technologies and farming practises, which were a part of the NAS.

The policy of social development banking was criticised by the proponents of financial liberalisation after 1991. The RBI's Committee on the Financial System (Narasimham Committee) made a sharp pitch for delinking monetary policy from the objective of redistribution, which was at the centre of social and development banking (RBI, 1991). It was argued that banks should function on a commercial basis, and profitability should be the prime concern in their activities. It was also argued that administering interest rates led to "financial repression", which undermined the profitability of the operations of the banking system. Hence, the argument went, banks should be given a free hand to charge rates of interest as determined by the market forces of demand and supply. Priority sector lending was to be phased out. Banks were also to be permitted to close rural branches, in the name of rationalisation of branch networks. Recommendations of the Narasimham Committee, except a few, were implemented to a large extent in the 1990s.

The period of financial liberalisation has been a period of reversal of the achievements in rural banking that characterised the two decades after bank nationalisation. The flow of credit to the rural areas declined sharply in the 1990s (see Shetty, 1997; Ramachandran and Swaminathan, 2001, 2005; Chavan, 2002, 2005). The rate of growth of credit supply to rural areas fell from 12.6 per cent between 1980 and 1990 to 3.2 per cent between 1990 and 2000. The number of rural branches of commercial banks fell substantially between 1991 and 2000. Commercial banks repeatedly failed to meet the targets for priority sector lending, especially agriculture, in the 1990s. In 1990, if the target fixed for advances to agriculture was 18 per cent of total advances, commercial banks had actually lent 18.7 per cent of their total advances to agriculture (Chavan, 2005). In 2001, the corresponding share achieved was just 10.1 per cent. In the 2000s, there was a revival of agricultural credit, which however was mainly owing to an increase in indirect finance and a series of changes in the definition of "agricultural credit" (see Ramakumar and Chavan, 2007). A consequence of the squeeze of formal credit has been resurgence, in different degrees across India, of the informal sector of credit. Studies have shown that the expansion of the informal sector of credit sharply raised the costs of credit in agriculture in the 1990s (see the separate paper on agricultural credit in this conference for a detailed analysis).

The desirability of crop diversification

It has been argued by the proponents of economic reform that the slowdown in cereal production in the 1990s and 2000s does not reflect any structural weakness in Indian agriculture, but the changing consumption patterns driven by higher incomes, urbanisation and trade liberalisation (GoI, 2005; Gulati and Mullen, 2003; IFPRI,

2005). According to this view, the surplus food grain stocks, which have been a feature of the 1990s, indicated a slow growth in demand for food grains. Consumption patterns have shifted from cereals to high-value products like fruits, vegetables, milk products, meat, egg and fish. Hence, India should shift its cropping pattern from less-remunerative food grains to high-value and export-oriented crops. This shift should be guided by price disincentives; administered price support for food grains should be dismantled so that farmers are forced to shift way from these crops. For the high-value products, there is much promise for export earnings given the growth of market chains led by the private agri-business sector and retail supermarkets. An IFPRI paper argues that “India must liberalise its marketing and trade policies to encourage vertical coordination between farms, firms and forks (supermarkets)” (IFPRI, 2005, p. 6). The crux of the above argument is that the concept of food grain self-sufficiency in India has lost its meaning in a free-trade environment.

Data from the NSSO rounds show that along with the slowdown in cereal production in the 1990s, there was also a steep fall in the per capita consumption of cereals in rural India. Between 1951 and 1991, the per capita annual food grain availability had risen from 144 kg to 186 kg. In 2001, the corresponding figure had fallen to 152 kg. In the same period, there was an increase in the per capita consumption of fruits, vegetables, milk products, meat, egg and fish in the rural areas. *Prima facie*, this trend is a clear evidence for a shift in diet patterns, as argued in Gulati and Mullen (2003) and IFPRI (2005). However, the reason why many scholars do not believe so is that this phenomenon has been associated with a sharp fall in the levels of per capita calorie consumption. NSSO data also show that the per capita per day calorie intake in rural areas fell from 2266 Kcal in 1972-73 to 2183 Kcal in 1993-94, and 2149 Kcal in 1999-2000 (U. Patnaik, 2001; Swaminathan, 2006). This fall was sharpest for the lowest 30 per cent of households in respect of consumer expenditure. Given that overall calorie intakes, especially of the poor, has been falling and the extent of malnutrition that persists in rural India is appalling, the fall in food grain consumption has been widely interpreted as led by distress, and not by choice. Ongoing research using NSS data by Abhijit Sen suggests that among the relatively poorer sections, the share of income spent on food was increasingly squeezed in the 1990s by the growing shares of expenditures towards health, fuel, transportation and education (cited in Chandrasekhar, 2007).

The achievement of food self-sufficiency in the post-green revolution period had two important implications. First, it was seen as an affirmation of India’s political sovereignty, particularly given India’s experiences in the 1950s and 1960s with the use of food aid as a political tool by the West (Ramachandran, 2006). Secondly, the improvement of per capita food availability was seen as necessary for reducing malnutrition (Swaminathan, 2006). In 2004-05, India produced 191 million tonnes of cereals. A number of studies have tried to project India’s cereal requirements for the year 2020. The projected requirements for 2020 differ in each study; 224 million tonnes in Dyson and Hanchate (2004), 252 million tonnes in Kumar (1998) and 296

million tonnes in Bhalla, Hazell and Kerr (1999). The government's High Level Committee on Food Grain Policy assumed a requirement of 260 million tonnes for 2020. At the levels of growth of the 1990s, it has been estimated that the actual realisation in 2020 would be short of these requirements, forcing a dependence on imports.

It may be instructive at this juncture to refer to the report of the National Commission for Farmers (NCF), appointed by the government in 2004. According to the NCF, diversification of cropping pattern is desirable if and when it is "*economically, ecologically and nutritionally beneficial.*" Moving away from the emphasis of official policy on diversification into high value crops based on market signals, the NCF argued that diversification can be successful only if it (a) responds to market changes, shifts in food habits and food baskets; (b) increases employment/income-generation opportunities and judicious use of land, water, labour, biodiversity and other resources; (c) reduces the incidence and damage caused by pests and diseases; and (d) promotes resource conservation through the adoption of integrated farming systems (see NCF, Third Report, p. 86). Surely, the direction of official policy is divergent from this scholarly advice.

Reversal of land reform laws

An important corollary of the official policy focus on crop diversification was the encouragement to private agri-business firms to invest in the cultivation of high-value crops. Crop diversification was to be achieved by promoting economies of scale in agriculture, allowing free leasing in and leasing out of land, boosting agro-processing and facilitating the development of private post-harvest and marketing infrastructure in rural areas. Such an organisation of production demanded possession of large tracts of land with private firms, which was constrained by the ceilings on land possession in the land reform laws of States. New policies of the 1990s have aimed at removing the ceiling limits by amending these laws, so as to allow private firms to cultivate unlimited areas of land (see Ramachandran and Ramakumar, 2001; Athreya, 2003). Four States have already implemented these amendments in land reform laws: Karnataka, Maharashtra, Tamil Nadu and Gujarat.

In a country with a terrible track record on land reforms, lifting of land ceilings is widely expected to encourage absentee farming by large farmers and corporations (Ramachandran and Ramakumar, 2001). Further, it is expected to reduce the extent of ceiling-surplus land, while substantial number of households is still landless. In another study, Hirashima (2000, cited in Ramachandran and Ramakumar, 2001) has challenged the emerging ideas of dismantling ceilings on land ownership. Using data from 1900 onwards from Punjab, a classic example of a "free" land market in an agriculturally advanced region, Hirashima shows that the ratio of rental value to land price (R/P ratio, the discount rate, which theoretically should be higher than the market interest rate for investment to be made in land) in Punjab has been declining steadily from

1900. He shows that the R/P ratio never rose above 3 per cent, a rate at which banks find it impossible to lend for land purchase. According to Hirashima, raising land ceilings would “accelerate land concentration” in rural India. Landlessness is expected to increase when high land prices and imperfect credit markets would push landless and marginal farmers out of the free land market. To quote from Hirashima,

If the land leased out from small and marginal farmers to progressive farmers or landlords, whose objective of renting in land is to take advantage of economies of scale, then it would be difficult to terminate such a contract when land has already become an integrated part of scale farming. The land would remain leased out, or ultimately sold out (Hirashima, 2000, p. 3884, cited in Ramachandran and Ramakumar, 2001).

Deregulation of marketing and legalisation of contract farming

Under the new agricultural policy after 1991, the strategy of promoting high-value export-oriented crops is envisaged to be encouraged also through a deregulation of the marketing system. Reforms in agricultural marketing have been undertaken through amendments to the APMC Act and the Essential Commodities Act in different States. These reforms have had three major features: (a) the legalization of private corporate farming; (b) legalization of direct purchase of agricultural produce from farmers by global retail chains bypassing regulated markets; and (c) permission for private players to open and control new agricultural markets. It is argued that farmers would become free to sell produce to buyers of their choice and would obtain a higher price than before.

The impacts of these policy measures have not yet been studied fully, and the literature is scarce. However, there appears to be consensus among scholars that promotion of diversification through contract farming by corporate players may involve major social costs. The National Commission for Farmers (NCF) has discussed this issue in detail, and has noted three major impacts that a contract farming system may entail:

The *first* is that the purchaser is quite likely to be interested in short-term gains/profit maximization and may, therefore, suggest practices, which in the long run are not good for the land/other assets of the producer. The purchaser has the option of ‘moving on’ after a few years of ‘exploitation’ of an area. The *second* issue relates to possible shifts in favour of export-oriented crops at the cost of crops providing basic food. The *third* is the preference for the larger producers in choice of partners by the purchaser, ignoring the small landowners. Such practices over a long time could encourage the small farmers to enter into sub-agreements with the larger farmers there by adding a tier between the grower and buyer or to sell/lease out their land and work as labourers (NCF, Vol. 2, p. 422).

Field studies from Punjab, the State where there have been a number of experiments in contract farming, have reached similar conclusions (Singh, 2002; Ghosh and Thorat, 2003). Singh (2002) argued that contract farming did not at all address the real development problems of Punjab’s farm sector and that “the issue of diversification has

been tackled in an undesirable fashion” (pp. 1635-36). Singh went on to note that “what the state should have undertaken in participation with other actors has been left to the private corporate and multinational enterprises” (*ibid.*). The available evidence also suggests that contract farming systems are associated with increase in labour displacement in farms, intensified casualisation of labour, increased use of low-paid women workers and child labour and a propagation of monoculture in search of quick profits.

IV CONCLUDING COMMENTS

When we discuss the experience of Indian economy in the new global context, we cannot divorce the discussion from India’s specific historical experience in undertaking the “development project.”¹⁵ Over the last 60 years, India has shared much of the fundamental contradictions of a mixed economy with other comparable developing nations. These contradictions have not disappeared with the onset of economic globalisation; instead, the task of resolution of these contradictions has been rendered more complicated by the processes of economic globalisation (for a survey, see Ramachandran and Swaminathan, 2002; Byres, 2002).

In Indian agriculture, which continues to provide livelihood for more than half of the population, Washington Consensus-type policies after 1991 have had acute adverse effects. The green revolution of the 1960s and 1970s helped Indian agriculture overcome a “ship-to-mouth” existence and achieve self-sufficiency in production. This achievement was built on a platform of state support; there were price supports, subsidy supports, credit supports and marketing supports. The interventionist role of the state in the 1970s and 1980s led to the creation of a network of institutional support structures in rural areas. Given the unreformed agrarian economy with dwindling public investment in critical areas like irrigation, the benefits of these support structures were distributed unequally – across crops, classes and regions.

Economic “reform” after 1991 was based on an explicit rejection of the need to transform the institutional framework of Indian agriculture. It was argued that with increased openness, the barriers to raising agricultural surplus could be overcome by using external trade as an instrument. A firm resolve emerged to repeal land reform laws in many States, in order to encourage private corporate investment.

The reform process in India after 1991 significantly weakened the institutional support structures in agriculture. The protection offered to agriculture from predatory imports

¹⁵ By “development project”, we refer to the set of socio-economic policies and national goals that the newly independent colonies pursued in the 1950s and 1960s. In these countries, such as India, the bulwark of the development project was the nation state. Of course, most of these nation states were elite-controlled, and pursued elite interests.

was removed, resulting in a fall in prices of many commodities. As part of fiscal reforms, major input subsidies were brought down relative to the size of the agricultural economy. Public capital formation in agriculture continued to fall, and the growth of public expenditure on research and extension slowed down. The expansion of rural credit was halted, reopening the doors for the informal sector. Public resources were sought to be channelled away from food crops and towards high-value export-oriented crops. Regulated markets came to be treated as obstacles to efficient marketing.

Over the period of economic reform, agricultural growth rates slowed down significantly. Most importantly, the rate of growth of food grain production slowed down, and fell behind the population growth rates for the first time after independence. The per capita food grain availability fell from about 175 kg in 1992 to 163 kg in 2001. In a country where about half the children below the age of three are underweight and more than three-fourth of children aged 6-35 months are anaemic, the reduction in per capita food grain availability after 1991 has deeply worrisome implications.¹⁶ The spate of farmers' suicides reported from certain parts of the country reflects the distress state of agriculture after 1991. Between 1997 and 2006, there were about 150,000 suicides by "farmers" in rural India (see Nagaraj, 2008).

A reversal of neo-liberal policies in agriculture has become absolutely essential to revive the livelihood systems of rural households in India. However, I would like to argue here that resistance to neo-liberalism can be successful only if the struggle is fundamentally linked to the struggle to resolve the old agrarian question. The strength of the resistance to neo-liberalism in India would continue to depend on the mobilisation of poor peasants and agricultural labourers around demands that directly relate to their material conditions of life and work. Allowing for diversities, it remains the case that ending discriminations based on class, caste and gender in India depends critically on weakening the material basis of the landlord- and upper caste-hegemony in the villages. Imperialism has not changed this basic reality of the Indian village.

¹⁶ The data are from the National Family Health Survey of 2005-06.

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Table 1 *Compound growth rates of index numbers of area, production and yield per hectare of major crops in India, estimates of Ministry of Agriculture, 1949/50 to 2005/06, in per cent per annum*

Crop group	Area				Production				Yield			
	1949/50	1967/68	1981/82	1992/93	1949/50	1967/68	1981/82	1992/93	1949/50	1967/68	1981/82	1992/93
	to 1964/65	to 1980/81	to 1991/92	to 2005/06	to 1964/65	to 1980/81	to 1991/92	to 2005/06	to 1964/65	to 1980/81	to 1991/92	to 2005/06
Food grains	1.40	0.40	-0.30	-0.39	2.90	2.20	2.90	0.64	1.40	1.90	3.20	0.84
Cereals	1.20	0.40	-0.40	-0.39	3.40	2.60	3.20	1.13	1.90	1.70	3.10	0.79
Rice	1.30	0.70	0.60	0.13	3.50	2.20	3.90	0.88	2.10	1.50	3.30	0.99
Wheat	2.70	2.60	0.30	0.53	4.00	5.20	3.30	1.33	1.30	2.60	3.10	0.64
Jowar	1.00	-0.80	-2.00	-3.12	2.50	2.60	-0.10	-3.71	1.50	3.50	1.80	-1.18
Bajra	1.10	-1.00	-0.90	-0.66	2.30	-0.80	1.50	1.42	1.20	0.30	2.30	2.04
Maize	2.70	0.10	0.10	2.04	3.90	0.60	2.60	3.60	1.20	0.50	2.50	1.93
Pulses	1.90	0.50	0.10	-0.24	1.40	-0.20	1.30	0.24	-0.20	-0.70	1.10	0.04
Oilseeds	2.60	0.30	2.40	0.84	3.40	1.00	5.80	0.66	0.60	0.70	2.20	0.91
Fruits and vegetables	5.90	2.40	1.20	1.42	7.90	4.20	4.00	2.90	1.80	2.00	2.20	1.24
Non-food grains	2.50	1.10	1.70	0.31	3.50	2.40	4.30	1.26	0.90	1.30	2.60	0.73
All crops	1.60	0.50	0.50	0.35	3.10	2.30	3.40	1.15	1.30	1.70	2.90	1.02

Source: Computed from data collected from Department of Food and Agriculture, Government of India.