



## Emerging Issues in Agriculture

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### Abstract

The assistance provided to agriculture has diminished, with a decrease in public funding and a lack of responsiveness from institutions. Without any advancements in cost-saving technologies, the increasing prices of inputs have rendered farming unprofitable. Consequently, this has led to the emergence of agrarian crises, sometimes culminating in severe distress and farmer suicides. (Expert Group on Agricultural Indebtedness, 2007)

### INTRODUCTION

During the last four years of UPA government in the Centre, a number of initiatives have been taken up to revive agriculture and alleviate the farmers' distress. The National Commission on Farmers (NCF) prepared voluminous reports and finally suggested a National Policy on Farmers which was adopted by the Government in 2007. The Government launched the National Horticulture Mission, the National Bamboo Mission and more recently, the National Food Security Mission (NFSM) and Rashtriya Krishi Vikas Yojana (RKVY) and set up the National Rainfed Area Authority. 'Bharat Nirman' and universalization of National Rural Employment Guarantee Scheme are some other important pro-grams intended to generate socio-economic infrastructure and improve livelihood of rural masses. Several committees and working groups were also constituted during this period to suggest measures for agricultural development and abating agrarian crisis. Among them, the Expert Group on Agricultural Indebtedness (GoI, 2007b) is the recent one which candidly admitted the persistent neglect of agriculture in the post-reform period and suggested a number of recommendations for its revitalization and reducing farmers' indebtedness. Positive results of these initiatives are yet to come. However, it appears that the government relied more on the instruments of input subsidy and MSP to augment the farm production and productivity, not much on enhancing the public investment in agricultural infrastructure, natural resource management, R&D, extension, technology, irrigation, power, market, and post-harvest handling and processing, not to speak of alternative agriculture based on revival of traditional knowledge and organic farming. The huge input subsidy on irrigation, power and fertilizer is not only crowding out the real investment in the sector but also distorting the cropping pattern and creating ecological and environmental problems. The *Alternative Economic Survey* (AES) has examined a number of issues related to the agrarian crisis and farmers' distress in its earlier volumes and also suggested measures to revitalize the agriculture and alleviate the distress. In this paper, some key and emerging concerns of the Indian agriculture are examined

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### AGRICULTURE FOR DEVELOPMENT

The *World Development Report 2008*, after a gap of 25 years, once again, has placed agriculture at the centre of the development agenda. It recognizes the importance of agriculture as an effective engine for growth and removal of rural poverty in developing countries. The report says '*Slower growth in the agriculture sector, a rapidly growing non-agricultural sector, and labor markets strongly segmented by labor skills have widened rural-urban income gaps, adding political pressure to invest in agriculture and rural development.*' The report appreciates India's National Rural Employment Guarantee Scheme that intends to create safety nets for the rural poor households by providing employment and generating socio-economic infrastructure. It emphasizes on the four policy objectives: diversification of small farming towards high-value products; extension of the green revolution in food staples to areas bypassed by technological progress; development of infrastructure to support the diversification of agriculture and rural economy; and promotion of the rural non-farm economy and investment in skill formation of rural people.

Economic and Social Survey of Asia and the Pacific entitled *Sustaining Growth and Sharing Prosperity* (ESCAP, 2008) also shows that persistent poverty and widening inequalities in the Asia-Pacific region are the results of decades of neglect of agriculture. The survey says that 218 million, a third of the region's poor, could be lifted out of poverty by raising average agricultural labour productivity to the level in Thailand, for instance. The productivity is to be improved through increased investment in R&D, human capital, extension services, irrigation and rural infrastructure.

It may be mentioned that a large number of rural poor directly or indirectly depend on agriculture. Growth in the agricultural sector creates increased demand for basic rural non-agriculture wage goods and services that are mostly produced and consumed locally. A high growth in agriculture has great potential for generating employment and income in the rural non-farm sector. The WDR argues that agricultural growth is four times as effective in reducing poverty and inequality as growth in non-agricultural sectors. The message is obvious that a much higher public investment in agriculture and rural infrastructure is the only way to raise the incomes of rural poor people in India. The positive aspect of the report is that it strongly argues for heavy investment in agriculture in developing countries like India. However, the prescriptions suggested in the report for the agriculture development are more towards commercialization, diversification and corporatization of farming.

It may be noted that the rate of decline in poverty was greater during the relatively higher agricultural growth period of 1980s than during the low agricultural growth period of 1990s. For instance, rural poverty in India declined by 9 percent point between 1993–94 and 2004–05 while between 1977–78 and 1987–88, it declined by 14 percent point. However, agricultural growth would be more effective in reducing rural poverty when supported by adequate investment in human development components such as health and education. National Commission on Farmers, in its reports, has also stressed on raising investment in education and health in rural areas

### FOOD PRICES AND FOOD SECURITY

Global food shortages and steep rise in the prices of food products in the international market have become major concerns of developing countries. According to the World Bank President, Robert B. Zoellick, a doubling of food prices over the last three years could potentially push 100 million people in low-income countries deeper into poverty. Figure 1 shows the trend in the prices of three important cereals — wheat, rice and maize — in the world market. The figure shows that there has been tremendous increase in the prices of these cereals during the last two years. Average prices of rice, wheat and maize increased, respectively, by 91, 44 and 32 percent between 2007 and 2008 (up to April 2008).

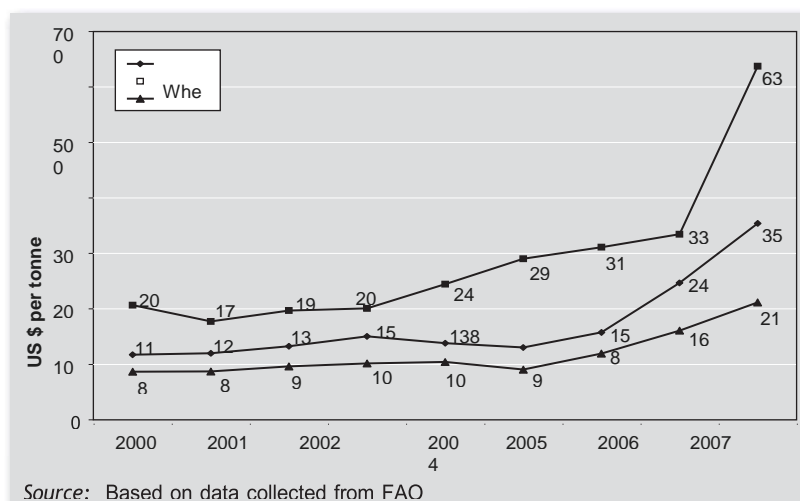
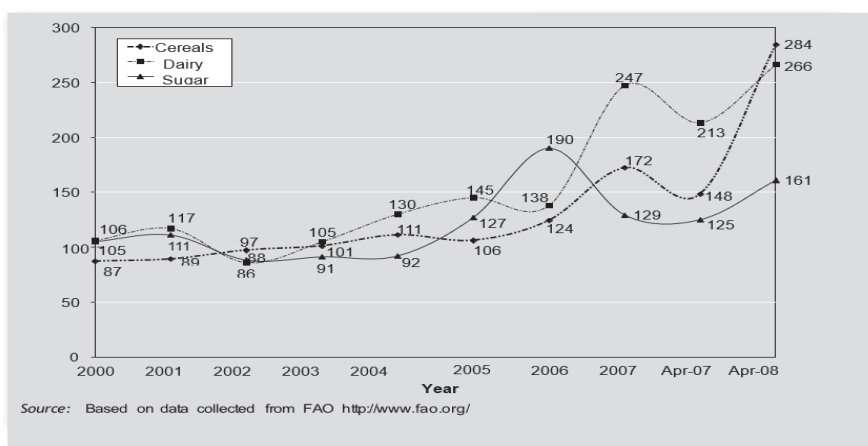


FIGURE 1: Trends in Food Commodities Price Indices (Base 1998–2000=100)

Figure 2 depicts the trends in the price indices of cereals, dairy products and sugar since 2000. The magnitudes of the indices fluctuate across the years, though showing a rising trend. The indices increased significantly between April 2007 and April 2008. In case of cereals, the index rose from 148 in April 2007 to 284 in April 2008, registering a two-fold rise. Similarly, the index of dairy products went up from 213 to 266 during the same period. Sugar price index also increased but relatively at a slower rate.



In India also, prices of food grains have steeply increased during the last two years. The WPI of cereals (base 1993–94 =100) increased from 187 in 2005–06 to 217 in 2007–08 (up to December, 2007), a net increase of 30 points. The price indices of rice and wheat increased, respectively, from 175 and 192 in 2005–06 to 194 and 236 in 2007–08 (GoI, 2008). The FAO considers three major reasons for the steep rise in the food prices. These are: diversion of land towards producing bio-fuel crops and increasing use of cereals to produce ethanol; the increased consumption of meat products; and climate change severely affecting crop production. The collapse of Australia's paddy production is another contributing factor to the global increase in rice prices.

Energy prices affected the food prices in two ways: First, rapid increase in the prices of petroleum products motivated the government to go for producing bio-fuels. For instance, over 20 percent of maize production in the US is being used to produce ethanol. In India also, the government has initiated policy to produce bio-diesel from jatropha plants and ethanol from molasses. The increasing production of bio-fuel reduced the availability of foodgrains for consumption and thus raised the prices. For instance, the quantity of corn required to fill one gas tank with ethanol fuel could feed one person for the entire year (Davis, 2008). Second, increasing energy prices have made agricultural production more expensive via raising the cost of mechanical cultivation, inputs like fertilizers and pesticides, and transportation of inputs and outputs. The high cost of cultivation deters the farmers, especially small and marginal ones, to use modern farm practices and inputs required to augment food production. If food prices are controlled through banning exports or reducing import duties as being done by several countries, including India; farmers would get disincentive to produce more foodgrains that adversely affects the food supply. Therefore, the price stabilization should obviously come through raising food production and productivity that require increased investment in agriculture, in addition to providing incentives to farmers to grow more food.

According to the *Economic Survey 2007–08*, foodgrains production grew at the annual rate of 2.5 percent between 1950–51 and 2006–07, slightly higher than the 2.1 percent population growth rate. However, during 1990–2007, the foodgrain production grew only by 1.2 percent per annum while population increased by 1.9 percent per year. Consequently, per capita annual consumption of cereals declined from a peak of about 171 kilograms in 1990–91 to 150 kilograms in 2005–06, indicating a decline of over 13 percent during this period. The consumption of pulses declined from 15.33 kilograms to 12.05 kilograms per capita per year during the same period. Trade liberalization and the fast growing income of middle class households are the main causes of diversion of cultivated area from foodgrains to high-value horticulture, floriculture and other cash crops. The area under foodgrains has declined by 6 million hectares between 1990–91 and 2005–06. It is argued that the food security should not be linked only to the supply of foodgrains because the dietary pattern of people is changing due to increase in per capita income, urbanization, and more availability of fruits/vegetables and livestock products. Nevertheless, a high growth in these products may not help the common masses to improve their nutritional status as they have little or no access to fruits and livestock products. The findings of NSS surveys show that poverty reduction among agricultural labour and farm households in 1990s has associated with reduction in undernourishment among them. Cereal consumption among poor is the main source of calorie intake and pulses are the major source of protein, a decline in the per capita availability of cereals and pulses have increased food insecurity among them (Singh, 2005). It may be relevant to note that the report of National Family Health Survey-III (NFHS) reveals that anaemia among women and children have increased in 2005–06 as compared to 1998–99 (Singh, 2007). Hence, appropriate output-mix is necessary to strike a right balance between 'wage goods' and 'high value goods' for the point of view of food security. It may be mentioned that of the world's 146 million malnourished children, 57 million are in India, i.e., 47 percent of the children under five years in the country (*The Times of India*, 5 May 2006).

Production of wheat and rice failed to match the growth in the consumption worldwide. It is predicted that the demand of cereals would further increase in future. As Indian prices of cereals are lower than the international prices, India could get an opportunity to enhance her share in the world export. As land and water are scarce inputs and have competitive uses not only in agriculture but also in non-agricultural activities, future enhancement in the foodgrains production to meet out the rising demand can be possible through improving the resource-use efficiency and productivity. The National Food Security Mission has targeted to increase the production of rice, wheat and pulses by 10, 8 and 2 million tonnes by the end of the 11th Plan. The foodgrains production targets can be met by reducing gaps between actual and the potential yields through improved practices. India is in a position to increase production of wheat by about 40 percent, and double

paddy production by bridging the existing gap in the actual and potential crop yields. For instance, four States — Uttar Pradesh, Bihar, Madhya Pradesh and Rajasthan — together have potential of 25.04 million tonnes of additional wheat production (Sud, 2008).

Steering Committee on Agricultural and Allied Sector (GoI, 2007a) estimated elasticity of agricultural GDP with respect to various factors and also estimated the pre- and post-reform growth rates in the magnitudes of these factors. Table 1 shows that the area under fruits and vegetables has the high coefficient of elasticity, followed by technology, rainfall and public investment. Fertilizer, which has the highest growth among all the factors in both the periods, has the lowest elasticity.

A perusal of the table reveals that public investment has the negative growth during 1981–2004, though it improved its growth during 1992–2004. Three critical factors in improving productivity — technology, private investment and fertilizer — have recorded relatively much lower growth rates during 1992–2004 as compared to the rates achieved during 1981–1991. Agricultural GDP growth rate also declined from 3.29 percent in 1981–91 to 2.55 percent in 1992–2004.

**TABLE 1:** Elasticity of GDP Agriculture with respect to Selected Variables and their Growth Rates

Factor	Elasticity	Growth Rate in Each		
		1981–2004	Factor 1981–1991	1992–2004
Technology	0.308	2.69	2.93	1.81
Public investment	0.174	–1.40	–4.07	1.76
Private investment	0.128	3.93	4.05	2.83
Area under fruits/vegetables	0.458	2.75	3.06	2.30
Fertilizer	0.122	5.02	8.18	3.20
Rainfall	0.186	–	–	–
GDP Agriculture		3.04	3.29	2.55

Source: Government of India (2007a).

Table 2 shows that the annual growth rate in various indicators have significantly declined during 1996–97 to 2003–04 as compared to the previous periods. The growth in gross irrigated area, NPK use, electricity consumption, terms of trade, total net fixed capital stock, total cropped area, net sown area and cropping intensity declined respectively from 2.62, 2.45, 9.44, 0.947, 2.055, 0.43, 0.04 and 0.39 during 1990–91 to 1996–97 to 0.51, 1.33, –0.86, –1.693, 1.282, –0.48, –0.55 and 0.70 during 1996–97 to 2003–04.

**TABLE 2:** Trend Growth Rate in Area, Input Use, Credit and Capital Stock in Agriculture (percent/year)

Indicators	1980–81 to 1990–91	1990–91 to 1996–97	1996–97 to 2003–04
Gross Irrigated Area	2.280	2.620	0.510
Fertilizer (NPK) Use	8.170	2.450	1.330
Electricity Consumed in Agriculture	14.070	9.440	–0.860
Area under Fruits and Vegetables	5.600	5.600	4.800
Terms of Trade	0.189	0.947	–1.693
Public Sector Net Fixed Capital Stock	3.856	1.917	1.419
Private Sector Net Fixed Capital Stock	0.562	2.179	1.165
Total Net Fixed Capital Stock	2.004	2.055	1.282
Credit Supply	3.728	7.513	14.366
Total Cropped Area	0.430	0.430	–0.480
Net Sown Area	–0.080	0.400	–0.550
Cropping Intensity	0.510	0.390	0.070

Source: Government of India (2007a).

Electricity consumption in agriculture, terms of trade, gross and net cropped area have recorded negative growth during 1996–97 to 2003–04, while growth in the cropping intensity is almost zero. Area under fruits and vegetables experienced remarkable growth rates during all the periods, though magnitude of growth slightly decelerated during 1996–97 to 2003–04.

Credit supply to the agriculture has tremendously increased in the recent year as is obvious from the estimated growth rate of 14.27 percent per year for the period 1996–97 to 2003–04. It may be pointed out that the access to credit facility is not the solution of the problem of the agriculture. What needed most is the increase in the real investment in agriculture. Although private investment in agriculture as percent of agricultural GDP has increased moderately from 4.09 percent in 1986–90 to 4.8 percent in 2000–03, public investment has been constantly declining since 1985. Public investment and subsidy are found inversely related (Figure 3). The steady rise in the subsidy as percentage of agricultural GDP crowded out the real investment in the agriculture.

FARMERS' INDEBTEDNESS AND WAIVING OFF OF SMALL FARMERS' LOANS

In his budget speech, the Finance Minister announces that all institutional agri- cultural loans disbursed up to 31 March 2007 and overdue as on 31 December 2007 will be covered under the scheme. Marginal farmers (land holding up to 1 ha) and small farmers (land holding 1–2 ha) will get a complete waiving off of all loans which remained unpaid until 29 February 2008. For other farmers, a rebate of 25 percent will be given against payment of the balance of 75 percent for one time settlement of the dues. In order to examine the implications of loan waiving off scheme, we briefly discuss the magnitude and composition of farmers' indebt- edness in the country. As per the NSS 59th Round (2003), out of 89.35 million farmer households, 43.42 million (48.6 percent) were indebted in 2003.

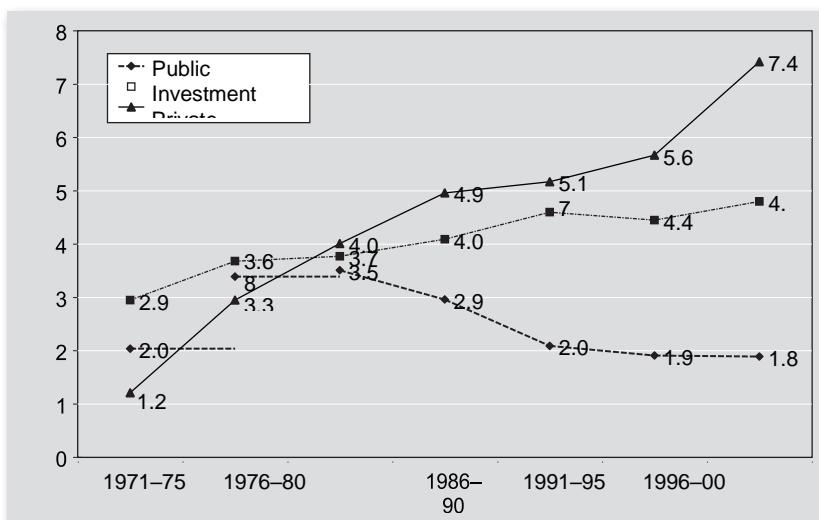


FIGURE 3: Trends in Investment and Subsidies in Agriculture as Percent of GDP Agriculture

About 58 percent of the outstanding amount was from institutional sources and the balance from non-institutional sources. Estimated prevalence of indebtedness among farmer households was highest in Andhra Pradesh (82.0 percent), fol- lowed by Tamil Nadu (74.5 percent), Punjab (65.4 percent) and Kerala (64.4 per- cent). The NSS report reveals that although at the national level 51 percent of loan of marginal and small farmers was from institutional sources, the percentage varies significantly across States. For instance, it is as low as 24 percent in Andhra Pradesh and as high as 81 percent in Kerala (GoI, 2005). Table–3 shows that out of 7.50 crore small and marginal farmer households, 3.47 crores were indebted, with average amount of Rs. 8,870 as outstanding loan. Total amount of loan outstanding to the marginal and small farmers in 2003 was about Rs. 6,500 crore. Of which 48.7 percent (Rs. 32,386 crore) was from non-institutional sources, not covered under the loan waiving off scheme. Thus, nearly half of marginal and small farmers will not get any benefit from the scheme.

Several issues may arise in context of the benefits of the proposed scheme. The Expert Group on Agriculture Indebtedness (EGAI) in its report published in July 2007 observes that the root cause of the current crisis is not indebtedness alone — it is just a symptom. The main reasons are stagnation in agriculture, increasing production and marketing risks, institutional vacuum and lack of alternative livelihood options. The low investments in irrigation, power, R&D, extension, marketing, insurance and post-harvest handling, storage and process- ing are main causes of agrarian distress (GoI, 2007b). The loan waving can be a temporary relief to the farmers and will not solve the persistent problem of low productivity and profitability and high risk of technology and market failures. The Finance Minister followed ‘one cap fits all heads’ approach by proposing the scheme for all regions uniformly. There is no doubt that Indian farmers have been in distress for quite sometimes and need financial assistance to come out of it. However, it is also true that all small and marginal farmers in all the regions of the country are not in distress. The scheme could be more effective if it were made region- specific. Indebted farmers in the distress regions (for instance, Bundelkhand in UP, Vidharbha in Maharashtra, and several other rainfed and semi-arid regions of the country) should have only been covered under the scheme. It may be noted that some farmers could have ability to pay but not willingness to pay the outstanding loan. A few years ago, many farmers of agriculturally developed western region of Uttar Pradesh did not pay electric- ity charges in the anticipation that these would be waived off by the State gov- ernment. Farmers’ leaders encouraged them not to pay the dues and to put pressure on the government to waive off the same. This scheme may motivate the farmers not to repay the future debts.

TABLE 3: Size of Holding Class-wise Incidence, Amount and Source of Indebtedness among Farmers in 2003

Size of Land Possessed (ha)	Class of Farmer	Total of Farmer Households (in '00)	Total Indebted Farmer Households (in '00)	Percentage of Outstanding Loan		Sources of Loan	
				Total Indebted Households (%)	per Incidence of HH (%)	Institutional	Non- Institutional

## Emerging Issues in Agriculture

< 0.01	12594	5708	1.3	6121	45.3	22.6	77.4
0.01–0.40	292867	130112	30.0	6545	44.4	43.3	56.7
0.41–1.0	283610	129211	29.8	8623	45.6	52.8	47.2
1.01–2.0	160600	81920	18.8	13762	51.0	57.6	42.4
Up to 2.0	749671	346951	79.90	8870	46.3	51.3	48.7
.01–4.0	93504	54409	12.5	23456	58.2	65.1	34.9
4.01–10.0	42581	27734	6.4	42532	65.1	68.8	31.2
10.0+	7748	5148	1.2	76232	66.4	67.6	32.4
All Size Classes	893504	434242	100	12585	48.6	57.7	42.3

Source: NSS 59th Round Report No.498: Indebtedness of Farmer Households, 2003.

The inequity in the distribution of benefits of the scheme is another issue. It deprives those honest farmers who repaid their outstanding loans by curtailing their current consumption needs. Furthermore, a large number of marginal and small farmers do not have access to the institutional credit due to both supply and demand side constraints, especially in the regions where rural banking infra- structure is poor and farmers do not have much banking habit (e.g., small and marginal farmers of eastern and north eastern regions). Therefore, those farmers who took loans from non-institutional sources will not get any benefit from the scheme. Another problem is using one standard of '2 hectares or less' to classify marginal and small farmers for the entire country, irrespective of the quality of land possessed by the farmers. The loan waiving package excludes all the farmers on dry land and rain-fed land having more than 2 hectares, even though they are among the worst affected from the agrarian crisis.<sup>1</sup> Also, small tenant farmers will be out of the coverage of the scheme as they could not get institutional loan due to lack of land titles in their names. The farmers having landholding above 2 ha of the distress regions would get little benefits from the one time settlement because if they are in distress how they could repay 75 percent of the outstanding loan. Will these farmers be given fresh bank loans to repay the 75 percent of the outstanding loan to avail the 25 percent waiving off?

Now the question is: Could there be any better alternative option available for the Finance Minister? Answer is yes. The Minister gave reference of report of the EGAI. This report provides 47 recommendations for solving the problem of farmers' indebtedness and revival of agriculture. The Group among others, recommended inclusion of financially excluded farmers, setting up of the Price Risk Mitigation Fund and a Moneylenders Debt Redemption Fund. The group suggested that since the indebtedness may arise from time to time due to various factors like crop failure, natural calamity, etc., and there could be need for specific relief packages in such circumstances, the government should have flexible and transparent guidelines for choosing the debt distressed districts. In the event of natural calamities, the Group suggested for rescheduling of loans of all the affected families and giving fresh loans to them. The Expert Group also suggested that in the event of crop failure for two consecutive years in rain-fed areas, in addition to rescheduling of the crop loan, interest for the extended one year period should be waived and financial burden equally shared between the Central and State governments. The government could save a large part of the proposed loan waiving amount through intelligently designing the scheme, making it more region-specific. The money, thus saved, could be invested in minor irrigation, watershed development and rain-water harvesting activities in the distressed rain-fed and dry-land regions for improving the sustainability of people's livelihood

### MARGINALIZATION OF HOLDINGS

The increase in the number of marginal and small holdings points towards marginalization of the agricultural workforce. Table 4 shows the trends in the number of operational holdings and area under each category of holdings. It is evident from the table that the number of marginal holdings (below one ha) increased significantly from 35.68 million in 1970–71 to 76.12 million in 2000–01, recording more than two-fold rise. Its percentage share in the total number of holdings increased from 50.5 to 63.0 during the same period. Number of small holdings (1–2 ha) also increased from 13.43 million in 1970–71 to 22.82 million in 2000–01. The combined share of marginal and small holdings increased from 69.7 percent in 1970–71 to about 82 percent in 2000–01. If we compare the data of Agricultural Census 1990–91 to that of 2000–01, we find that except for marginal and small holdings, number of all other categories of holdings has declined. Table 4 also shows that the area under marginal holdings also increased from 14.55 million hectares in 1970–71 to 30.09 million hectares in 2000–01, thus registering more than two-fold increase. The area under small holdings also increased from 19.28 million hectares to 32.26 million hectare during the same period. It is significant to note that 63 percent of total farmers of the country have average holding size of only 0.40 ha. Another 18.9 percent farmers have 1.41 hectare as an average size of operation holdings. How to make agriculture for these 82 percent of total farmers of the country an economically a viable venture is a big issue for the policy-makers

**TABLE 4:** Distribution of Operational Holdings in India, 1970–71 to 2000–01

Category	1970–71	1980–81	1985–86	1990–91	1995–96	2000–01
<b>Number in 1000</b>						
Marginal	35682 (50.6)	50122 (56.4)	56147 (57.8)	63389 (59.4)	71179 (61.6)	76122 (63.0)
Small	13432 (19.1)	16072 (18.1)	17922 (18.4)	20092 (18.8)	21643 (18.7)	22816 (18.9)

Semi-medium	10681 (15.2)	12455 (14.0)	13252 (13.6)	13923 (13.1)	14261 (12.3)	14087 (11.7)
Medium	7932 (11.3)	8068 (9.1)	7916 (8.1)	7580 (7.1)	7092 (6.1)	6568 (5.4)
Large	2766 (3.9)	2166 (2.4)	1918 (2.0)	1654 (1.60)	1404 (1.2)	1230 (1.0)
<b>Total</b>	<b>70493 (100)</b>	<b>88883 (100)</b>	<b>97155 (100)</b>	<b>106637 (100)</b>	<b>115580 (100)</b>	<b>120822 (100)</b>
<b>Area in 1000 ha</b>						
Marginal	14545 (9.0)	19375 (12.0)	22042 (13.4)	24894 (15.0)	28121 (17.2)	30088 (18.82)
Small	19282 (11.9)	23169 (14.1)	25708 (15.60)	28827 (17.4)	30722 (18.8)	32260 (20.18)
Semi-medium	29999 (18.5)	34645 (21.2)	36666 (22.3)	38375 (23.2)	38953 (23.8)	38305 (23.96)
Medium	48234 (29.8)	48543 (29.6)	47144 (28.6)	44752 (27.0)	41398 (25.3)	38125 (23.84)
Large	50064 (30.9)	37705 (23.0)	33002 (20.1)	28659 (17.3)	24163 (14.8)	21124 (13.21)
<b>Total</b>	<b>162124 (100)</b>	<b>163797 (100)</b>	<b>164562 (100)</b>	<b>165507 (100)</b>	<b>163357 (100)</b>	<b>159903 (100)</b>
<b>Average Size of Operational Holding (ha)</b>						
Marginal	0.41	0.39	0.39	0.39	0.40	0.40
Small	1.44	1.44	1.43	1.43	1.42	1.41
Semi-medium	2.81	2.78	2.77	2.76	2.73	2.72
Medium	6.08	6.02	5.96	5.90	5.84	5.80
Large	18.1	17.41	17.21	17.33	17.21	17.18
<b>Total</b>	<b>2.3</b>	<b>1.84</b>	<b>1.69</b>	<b>1.57</b>	<b>1.41</b>	<b>1.32</b>

If we look at the State-wise figure, the problem of marginalization becomes even more serious. Among the 15 major States, Kerala has the highest share of number of marginal holdings in the total operational holdings (95.16 per cent), followed by Bihar (84.18), West Bengal (80.44 percent), Uttar Pradesh (76.88 percent), and Tamil Nadu (74.39 percent). Bihar and Uttar Pradesh are the two States among them where incidence of rural poverty is quite high. Punjab has the lowest percentage share of marginal holdings (12.34), followed by Gujarat (29.41 percent), Rajasthan (31.78 percent) and Madhya Pradesh (38.56 percent). In Punjab percentage share of number of marginal holdings declined from 18.7 percent in 1995–96 to 12.3 percent in 2000–01 (GoI, 2007d). Punjab witnessed a phenomenon of ‘reverse tenancy’ under which marginal farmers started leasing out their land to medium and large farmers. This is also obvious from the area under marginal holding which declined from 122 thousand hectares in 1995–96 to 78 thousand hectares in 2000–01. The Steering Committee on Agriculture and Allied Sectors (GoI, 2007a) suggests that small and medium farmers should be provided easy institutional credit for purchasing land to make their holdings economically viable and also amend the leasing laws so that they may lease-in land to enhance their size of operational holdings.

At aggregate level, 1.32 ha is the average size of operational holding as per the agricultural census 2000–01. However, the average size varies significantly across States. Out of the 15 major States, five States have average size less than one hectare. It is lowest in Kerala (0.24 ha), followed by Bihar (0.58), West Bengal (0.82 ha), Uttar Pradesh (0.83 ha) and Tamil Nadu (0.89 ha). Assam, Orissa and Andhra Pradesh also have the average size of holding less than the national average. The 11th Plan has special focus on enhancing the production and productivity in agriculture of the eastern region (Assam, Bihar, Orissa, etc). This region has great potential for agricultural development as groundwater, one of the key determinants of productivity, is not as scarce an input as is in other regions of the country. However, per farmer land availability is quite low and restricts the farmers to go for using the modern farm practices and technologies. Reducing the dependence on agriculture through creating more non-farm employment opportunities in the rural areas and making institutional reform (e.g., evolving group farming) may improve the productivity and profitability of agriculture in this region.

Another issue that needs serious attention of policy-makers is the decline in the aggregate areas under operational holdings from 165.51 million hectares in 1990–91 to 159.90 million hectare in 2000–01, a net decline of 5.61 million hectares. This trend, if not arrested, may adversely affect food, employment, and income securities as per hectare productivity of major crops have either decelerated or stagnated during the last one decade and scope of bringing more land under cultivation is limited. Therefore, a national policy is required in context of using agricultural land for non-agricultural purposes.

#### **DISPARITIES: SECTOR-WISE AND REGIONAL**

Disparity in the agriculture and non-agricultural income has enormously increased during the last one decade because

agriculture grew relatively slower than the non-agriculture. The ratio of per worker productivity in non-agriculture to agriculture has increased from 4.12 in 1993–94 to 5.12 in 2004–05. The ratio varies significantly across States. It was highest in Maharashtra (11.71), followed by Karnataka (8.13), and Gujarat (8.08). It was lowest in Punjab (2.0), followed by Haryana (3.25), Kerala (3.49) and West Bengal (3.52). Bihar and Uttar Pradesh are the other two major States where the ratio was below the national average. In Maharashtra, where farmers committed suicides, average per worker productivity in agriculture was only Rs. 9,130 while it was Rs. 1,06,912 in non-agriculture. Gujarat had Rs. 12,934 as per worker productivity in agriculture against Rs. 1,04,512 in non-agriculture.<sup>2</sup>

We compare the relative growth performance of agriculture and non-agricultural sectors in the pre- and post-reform periods. A perusal of Table 5 reveals that none of the States achieved more than 4 percent growth in agriculture sector and over 7 percent growth in non-agriculture sector during 1991–92 to 2003–04 (post-reform period). The best performing States (in both agriculture and non-agriculture sector) during 1981–82 to 1990–91 (pre-reform period) namely, Haryana, Maharashtra and Rajasthan are among the worst performers in agriculture sector during the post-reform period, though they retained higher growth rates in non-agriculture sector. Punjab, which experienced the highest growth rate in agriculture (4.91 percent) during pre-reform period could achieve only a little more than two percent during the post-reform period.

All the States except Bihar and Andhra Pradesh have achieved much higher growth rates in agriculture sector during the pre-reform than in the post-reform period. The only welcoming fact that can be drawn from the table is Bihar's remarkable agricultural growth during 1991–92 to 2003–04 which is above four percent. The table shows that during the pre-reform period, almost 50 percent of the total States achieved over 3 percent annual growth in agriculture while during the post-reform period, except for Bihar and West Bengal all the other States could achieve less than 3 percent agricultural growth. Eight out of the 15 States achieved even less than 2 percent growth in the agriculture

In order to examine trend in the inter-State disparity in agriculture output, we have calculated Gini Coefficients for NSDP in agriculture and non-agriculture sectors for the period 1981–82 to 2003–04 and results are shown in Figure 4. It is evident from the figures that the disparity across the States is much higher in non-agriculture income than the agriculture one. In case of non-agriculture income, average value of Gini coefficient for the entire period is 0.314 while for the agriculture income, it is only 0.028. The magnitude of Gini coefficient varies from 0.295 to 0.331 in non-agricultural income while it varies from 0.001 to 0.058 for agricultural income. This shows that although inter-State disparity is higher in non-agricultural income, in case of agriculture it has much variation across years. There is a strong evidence of cyclical nature of the disparity in agricultural income across States.<sup>3</sup>

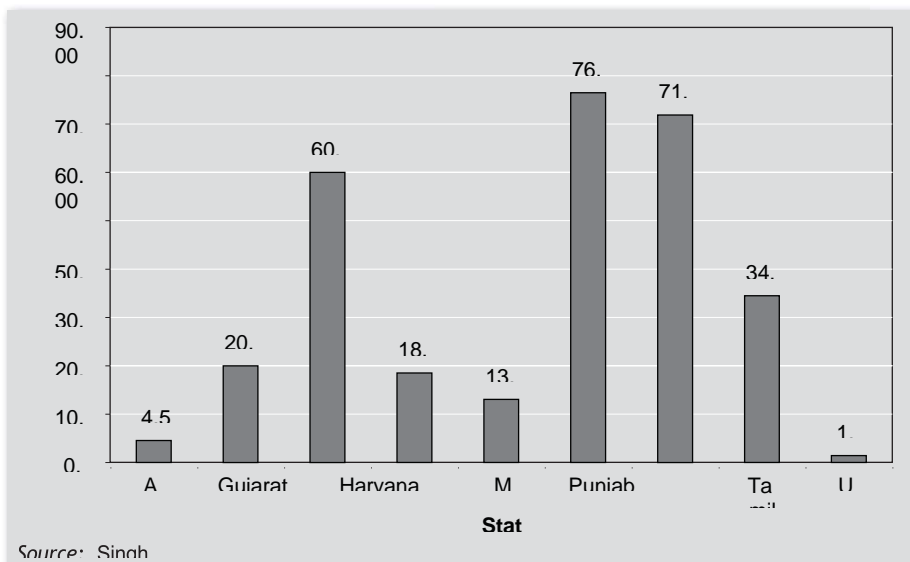
### GROUNDWATER SUSTAINABILITY

Groundwater irrigation is preferred on the equity, efficiency, productivity and private investment grounds. It also facilitates diversification of small and marginal farming from traditional to high-value vegetable crops as these crops require small doses of water on demand at frequent interval which can be possible through tube-well irrigation. However, due to the government policies related to agricultural credit, subsidy, inputs, and energy; and lack of effective regulation, groundwater sustainability has become one of the major issues in the country. Although at aggregate level, only 58 percent of 399.25 bcm of net annual available groundwater of India is being utilized, the extent of utilization varies significantly across regions. States like Punjab, Haryana, Gujarat, Tamil Nadu, Karnataka, Rajasthan, have significant development in the groundwater resource, while some other States such as West Bengal, Bihar, Orissa and Assam have further scope for its development. Out of 18 major States of India, nine States have some districts with over 100 percent groundwater exploitation (Figure 5). The percentage is highest in Punjab (76.47), followed by Rajasthan (71.88), Haryana (60), Tamil Nadu (34.48) and Gujarat (20).

Availability of cheap/subsidized electricity and flat rate system of power encourage farmers to over-exploit the groundwater as the marginal cost of drawing water from electrified tube-wells is almost zero. Per capita consumption of electricity in agriculture is closely associated with the groundwater development. Singh (2008) estimates that a one percent increase in the per capita power consumption tends to increase the level of groundwater development by a 0.26 percent point. Figure-6 shows that State-wise number of electric operated tube-wells per 1000 hectares of net sown area (NSA) is highest in Tamil Nadu, followed by Andhra Pradesh, Punjab, Maharashtra, Karnataka and Haryana. These are the States where groundwater exploitation is relatively high.

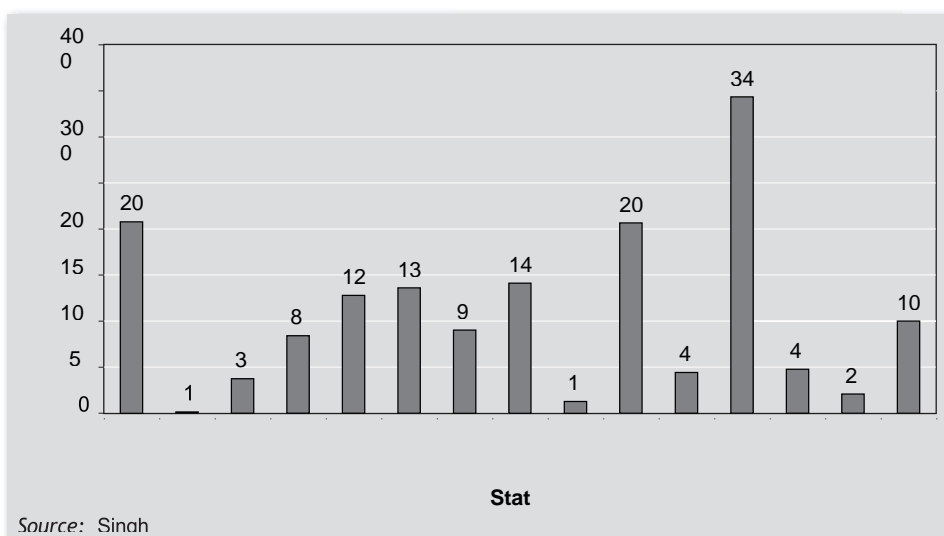
Over-exploitation of groundwater makes the accessibility of water to the small and marginal farmers difficult. Big farmers can afford to deepen their wells and have larger pumps or install submersible wells to draw water while small and marginal ones, many of whose wells are supported by shallow aquifers, are at the receiving end. On an average, growth of deep tube-wells is relatively higher in the water crisis States like Andhra Pradesh, Maharashtra, Karnataka, Rajasthan, Madhya Pradesh, Tamil Nadu, Haryana, Punjab and Gujarat (Table A1).





**FIGURE 5:** State-wise Percentage of Districts with over 100% Ground Water Development

To achieve efficiency, equity and sustainability in groundwater development, integration of water policy with land, energy, food, price, credit, and subsidy policies, and with ecosystem conservation is essential. Several policy instruments, such as, subsidized inputs, cheap institutional credit, price supports and subsidized power may have some implications on groundwater sustainability. For instance, water is one of the crucial inputs in achieving the food security. The above-stated policy instruments encourage the farmers to install more energized irrigation pump-sets to raise the food production, adversely affecting the sustainability of groundwater, especially in those regions where public procurement of foodgrains through MSP mechanism is relatively high. It is pertinent to note that the input subsidy as a policy instrument has become questionable on environment, equity, and efficiency grounds. An existing flat rate power tariff system in most of the States causes depletion in the groundwater table; distorts the cropping pattern; and adversely affects the sustainability of agriculture. It benefits more the big farmers as they have relatively lower unit-cost due to larger size of farm. Price support policy is widely used to achieve multiple policy goals, including price stabilization and income support. However, it also interplays with the groundwater policy. For instance, price incentives for wheat and paddy and high procurement rate of these cereals in Punjab induce the farmers to follow the water intensive paddy-wheat cropping pattern. Therefore, price policy, if properly interfaced with the water policy, can be used as an instrument to improve the efficiency, productivity and sustainability of groundwater. For instance, the development of groundwater in eastern and north-eastern States is still in the nascent stage; through appropriate price policy and an effective public procurement system, these States may be made the major source of food production and procurement for the country. Therefore, region-specific policy issues become quite relevant for evolving an effective groundwater policy



**FIGURE 6:** State-wise No. of Electric Tube Wells per 1000 hectares of Net Sown Area

The existing flat-rate system needs to be changed to the meter-tariff system. However, farmers should be compensated by providing subsidy on procurement of modern water-saving technology, such as, sprinkler and drip irrigation, especially in those regions where water table has significantly gone down due to over-exploitation of groundwater. The problem of high transaction cost of metering system can be solved through handing over the responsibility of billing and collection

of electricity charges to the Gram Panchayat (GP). The GP should have about 10 percent share in the revenue collection. Since GS represents the entire village community, the collective action of the people in this regard would be more effective. It may be noted that GPs have already been implementing various rural development schemes at the village level, such as, NREGA. There should be a better synergy between groundwater policy and these programs.

### POLICY OPTIONS

Solution of the problems of farmers lies both within and outside agriculture. We have suggested several policy interventions in the earlier volumes of the AES and also in the present paper. Here we list only some key policy action points.

#### Within Agriculture

Improve productivity and profitability in agriculture through enhancing public investment in agricultural infrastructure, R&D, extension, irrigation and water management, market, and storage and distribution.

Make agriculture for small and marginal farmers economically viable and environmentally sustainable through developing an institution of 'group farming.'

Develop market of hiring services of farm implements and machines such as tractor-operated power tillers, harvesters, threshers so that the competition among the service providers may bring down the cost of hiring of these services to the farmers.

Develop such a supply chain system for agricultural products that benefits both farmers and consumers. As per the ASSOCHAM study, the difference between MSP and wholesale price (WSP) for essential commodities was 33 percent. Further, the difference between WSP and retail prices was about 60 percent (*The Times of India*, 14 April 2008). Thus, if a farmer gets Rs. 100 for his produce; consumer pays more than Rs. 200 for the same. Efforts are, therefore, required to build up 'farmers groups' as stakeholders in the supply chain system. Effective linkage between farmers groups and consumers groups should be established so that the multi layers of intermediaries between farmers and consumers may be eliminated. It may be noted that due to inadequate post-harvest infrastructure about 10 percent of the foodgrain produce (about 20 million tonnes) go on waste every year which can be saved through developing better storage and distribution infrastructure.

Protect the farmers from technology and market failures and also from unforeseen natural adversities by developing an in-built system of insurance and price protection. Setting up of the Price Risk Mitigation Fund as suggested by the EGAI may be one of the options in this context.

Groundwater recharge and rainwater harvesting must be given priority in the groundwater depleting regions. Farmers should be encouraged to build tank/pond in their land holdings for aquifer recharging. Fifty percent of the cost of such tank should be met by the Central and State governments on the 50:50 basis.

Development of groundwater in the eastern and north-eastern States is still in the nascent stage; price and food procurement policies if properly interfaced with groundwater policy can make this region a major source of food production and procurement for the country.

To achieve the inclusive agricultural growth, special focus must be given to the agriculture of rain-fed and dry regions which constitute about three-fifth of total cultivated land.

Although institutional credit to agriculture enormously increased from Rs. 80,000 crore in 2003–04 to Rs. 2,80,000 crore in 2008–09 (targeted), the access to the credit is highly skewed. Bharat Kisan Card (BKC), as suggested by the EGAI for all types of loans (short term and long term) may be effective in providing access of institutional credit to farmers of those regions which are hitherto financially excluded.

Diversification of farming towards horticulture and livestock products is the new mantra being chanted by the policy-makers and the international institutions like World Bank for raising the income and employment of small holders. However, left to the market forces alone, it can do more harm than benefit to the small farmers. So far, the government has not evolved any solid price protection mechanism for these products. Formation of small farmers' organizations can help to give them both the selling power to sell their produce at remunerative prices and the buying power to obtain key inputs at the competitive prices.

#### Outside Agriculture

The solution of the problems of agriculture also lies outside agriculture. Agriculture cannot provide gainful employment to the large number of workforce that depends on it. Non-farm employment opportunities must be created for the rural households. Rural sector needs massive investment in five key areas — education, roads, healthcare, information technology, and electricity — to generate non-farm employment and income for the rural households. The investment in these areas would strengthen the rural-urban linkages and help in attracting private investment in rural manufacturing, agriculture and modern services. Many youths from farmer households do not have necessary education and skills required for the emerging knowledge economy. To improve their employability, affirmative actions must be taken in this regard. Farmers' distress may be alleviated to a greater extent if one person from each farmer household is provided regular job in the organized sector.

**TABLE A1:** Growth of Sallow and Deep Tube Wells in Major States of India (as per Minor Irrigation Census 2000–01)

State	Sallow Tube wells (Nos)				Deep Tube wells (Nos)			
	Up to 1993-94	Annual Simple Up to 2000-01 Net Increase	Growth Rate	Rate	Up to 1993-94	Annual Simple Up to 2000-01	Net Increase	Growth
AP	246770	656359	409589	23.71	32359	87482	55123	24.34
Assam	8654	78664	70010	115.57	610	760	150	3.51
Bihar	280874	651383	370509	18.84	5193	6190	997	2.74
Chhattisgarh	43557	86575	43018	14.11	3177	5227	2050	9.22
Gujarat	31277	53195	21918	10.01	47990	94182	46192	13.75
Haryana	207819	376352	168533	11.59	11703	24339	12636	15.42
Jharkhand	614	1124	510	11.87	22	28	6	3.90
Karnataka	163168	532348	369180	32.32	11	32	21	27.27
Kerala	2005	4680	2675	19.06	79	227	148	26.76
MP	97659	279024	181365	26.53	11023	36398	25375	32.89
Maharashtra	21191	59420	38229	25.77	21401	77223	55822	37.26
Orissa	12439	43881	31442	36.11	3535	4592	1057	4.27
Punjab	808475	1067117	258642	4.57	5921	9990	4069	9.82
Rajasthan	39413	112856	73443	26.62	14381	46764	32383	32.17
Tamil Nadu	107661	151250	43589	5.78	36462	84010	47548	18.63
UP	1571447	3525543	1954096	17.76	27403	35085	7682	4.00
Uttarakhand	33635	52099	18464	7.84	719	883	164	3.26
West Bengal	256545	603667	347122	19.33	4033	5139	1106	3.92

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