

NOTE ON RAINFED AGRICULTURE FOR THE HYDERABAD CONSULTATION ON RURAL LIVELIHOODS AND THE 12TH PLAN

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1. Agricultural Growth in 11th Plan: Implications for Rainfed Agriculture

One of the key reasons for the continuing poverty and backwardness in the country is the poor performance of Indian agriculture. Livelihood of over 60% of the population is still dependent on agriculture. A broad review of the performance of Indian agriculture over the last six decades shows that there is clear evidence of **a remarkable slowing down of real GDP growth in agriculture** and allied activities in recent years. This slowing down is much more marked in the 1990s, which, as generally acknowledged, were not been good years for Indian agriculture (Table 1).

TABLE 1
LONG TERM PERFORMANCE (TREND GROWTH RATES) OF INDIAN AGRICULTURE
1949-50 TO 2002-2003

Crop	1949-50 to 1964-65			1967-68 to 2002-03			1991-92 to 2002-03		
	Area	Prod	Yield	Area	Prod	Yield	Area	Prod	Yield
Foodgrains	1.4	2.8	1.4	(-) 0.1	2.4	2.1	(-) 0.1	1.0	1.1
Non-Foodgrains	2.4	3.7	0.9	1.3	3.1	1.6	0.4	1.7	1.1
All Crops	1.6	3.2	1.2	0.3	2.7	1.9	0.1	1.3	1.2

Source: Balakrishnan (2008)

Area expansion had ceased to be a major source of agricultural growth since mid-sixties. The rate of growth of production and yield of the crop sector as a whole has distinctly gone down in the period 1991-92 to 2002-03. Growth of agricultural GDP was around 2% between 1997-98 and 2004-05 (GoI, 2007) and was well below 4% in both 9th and 10th Plans.

Against this background, the 11th Plan had hoped to accelerate agricultural growth to 4% per annum. There was some revival of rate of growth in the second half of 10th Plan, where agricultural growth reached 5.8% and 4% respectively in 2005-06 and 2006-07. This trend continued in the first year of 11th Plan as well. However, on account of several factors, growth slumped to less than 2% subsequently, showing signs of a slow revival in the first quarter of 2010-11. However, it is quite unlikely that the 11th Plan will reach its planned rate of agricultural growth of 4% (Table 2).

TABLE 2
RATE OF GROWTH OF AGRICULTURAL GDP, 2004-2010

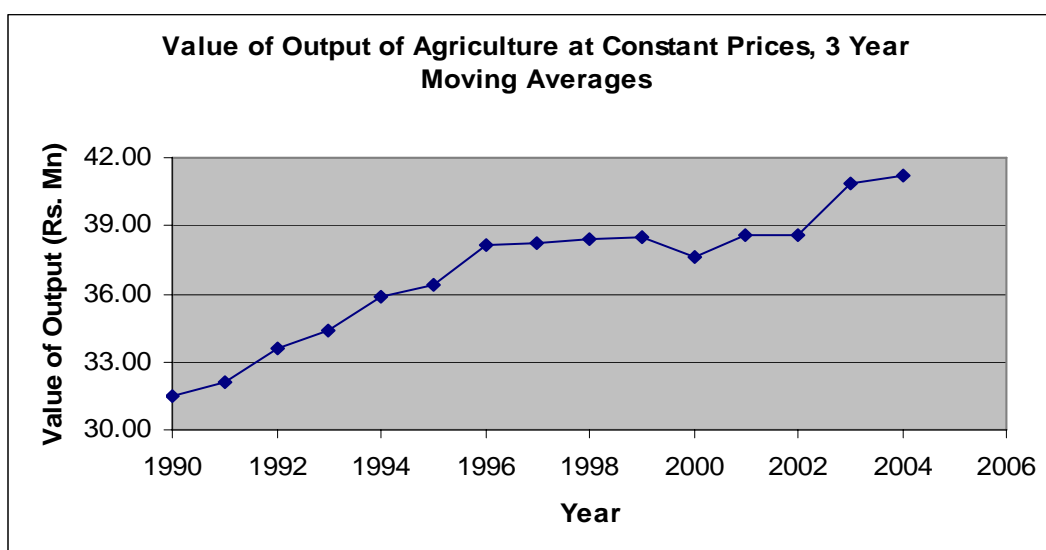
Year	Agriculture and Allied Sectors	Agriculture

2003-04	10.0	10.8
2004-05	0.0	0.1
2005-06	5.8	6.0
2006-07	4.0	4.1
2007-08	4.9	5.0
2008-09	1.6	1.7
2009-10	0.2	0.1
2010-11 (1 st Qtr)	2.8	NA

Source: Economic Survey, 2010; Reserve Bank of India, 2011

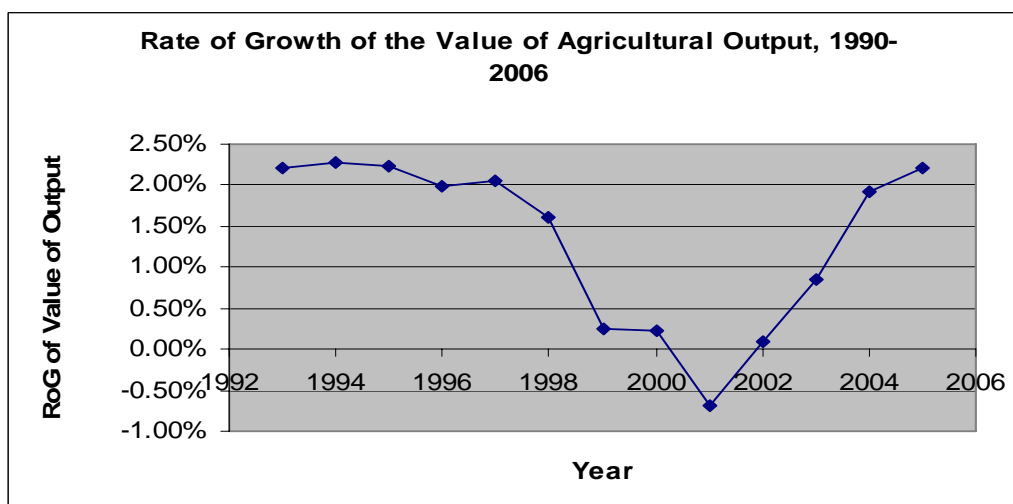
Three year averages of value of output from agricultural sector alone and growth rates of value of output are shown in Figure 1 and 2. The prolonged stagnation in value of output in the second half of 1990s is clearly visible. Figure 2 show that the three-year moving growth rates had become negative around 2000-01 and have revived subsequently. However, the rate achieved is still around 2%, half of the target for the 11th Plan.

FIGURE 1



Source: Indian Agricultural Statistics 2008

FIGURE 2



Source: *Indian Agricultural Statistics 2008*

It is useful to look at rates of growth of output in physical terms in addition to value terms. The long term trends in production of important crops and crop groups are shown in Table 3.

TABLE 3
RATES OF GROWTH OF PRODUCTION OF PRINCIPAL CROPS, ALL INDIA

Crop	1960/63 to 1970/73	1970/73 to 1980/83	1980/83 to 1990/93	1990/93 to 2005/08
Rice	1.87	2.15	3.72	1.60
Wheat	8.28	4.51	3.73	1.92
Coarse Cereals	0.90	1.16	0.81	0.88
Pulses	(-) 0.92	0.35	1.41	0.59
Total Foodgrains	2.41	2.36	2.94	1.51
Oilseeds	1.79	1.98	6.19	2.34
Cotton	0.88	2.54	3.28	5.28
Sugarcane	1.78	3.81	3.15	2.03

Source: *Indian Agricultural Statistics, 2008*

The table shows that the period after 1990 was not a happy decade for Indian agriculture. The growth rates of production of nearly all crop groups declined during this period compared to the earlier decade. In particular, the growth rates of coarse cereals, pulses and oilseeds (covering about 45% of total cropped area and grown mostly in the rainfed drylands) was distinctly lower than what has been achieved in the previous decade. This re-emphasises the fact that the gap between irrigated and dryland agriculture has steadily widened, with the productivity of the latter being less than half of the former. This has been a direct and predictable consequence of the strategy adopted in the mid-1960s, whereby massive investment flowed to the already well-endowed regions and farmers of the country, leaving aside the poorer and less endowed regions.

In fact, dryland agriculture, covering nearly 60% of the total cropped area and accounting for about 45% of total value of production, has emerged as the biggest constraint on agricultural growth (and therefore on overall economic growth) of the country. There is a dominant strand of thinking in agricultural policy which treats the drylands as a hopelessly “low potential” area and hence a lost bet. However, we should caution ourselves against such a hasty conclusion. Even at their low productivity levels, the quantitative significance of dryland agriculture is by no means small. It accounts for 53% of total cropped area, 48% of the area under food crops and 68% under non-food crops. In terms of production, drylands account for nearly 80% of the output of coarse cereals, 50% of maize, 65% of chickpea and pigeonpea, 81% of groundnut and 88% of soyabean. Half of the output of cotton in the country is from the dry districts. Given its large size and extremely low productivity levels, a unit rise in productivity in this sector is likely to have the largest impact on aggregate crop productivity. There is clear evidence that the yield potential of dryland varieties is much higher than what has been achieved on the farm. It is more appropriate to view the drylands as a source for future growth, a hidden potential waiting to be unlocked.

However, India's agricultural policies still remain deeply rooted in the high-input, unsustainable Green Revolution paradigm. The extension of this singular paradigm across the country, and the resultant widespread adoption of water and chemical demanding crops have resulted in several distortions, including a growing groundwater crisis (described in the next section), growing soil fatigue, and a rapidly burgeoning fertilizer subsidy. While the GR had dramatic success in raising food production at a time when India faced a major challenge in feeding its population, the paradigm is increasingly being proved irrelevant to the rainfed drylands of India. This natural exclusion endemic in the resource-intensive GR paradigm produced a specific geographical distribution of poverty in India which largely overlaps with the geography of the rainfed drylands.

To achieve a breakthrough in dryland agriculture and to generate sustainable livelihoods, it is necessary to move to a new paradigm, based on the cropping systems approach. The scale of effort required has to be of an entirely different magnitude than what has been attempted in the 11th Plan. This new approach could form the core of the agricultural policy of the 12th Plan. The consultation planned on rural livelihoods in Hyderabad on 15th and 16th of December 2010, could come up with the **programmatic elements** of this new approach to **revitalizing rainfed agriculture** as also spell out the magnitude of investment effort required to set the programmes in motion.

In our view, the approach broadly involves the following interlinked components:

- **soil** productivity improvement and control of land degradation;
- location-specific public investments in **water** infrastructure;
- carefully designed **land use** policies, giving equitable weights to the diverse claims on land use in rainfed areas (food, fodder, firewood etc.);
- **agricultural** package of locally appropriate seeds and low-cost, sustainable agricultural practices;
- strengthening **livelihood options** based on animal husbandry, fisheries, agro-processing and forests;
- better **support systems** through credit, marketing, agricultural research and extension;
- **mobilization** of communities around natural resource rights (land rights, forest rights, rights over CPRs);
- Innovation systems for **learning** from local contexts on the possibilities and limitations of different interventions.

The establishment of the **National Rainfed Areas Authority (NRAA)** was a serious response to the crisis in rainfed areas. It pointed to the growing recognition, in mainstream policy making, of the problem of rainfed areas and the need to do something about it. Despite this seeming recognition, the NRAA has achieved very little success in the articulation of a relevant national level shift in agricultural policy in favour of the rainfed areas. With appropriate institutional re-engineering, the NRAA could become the focus of the overall agenda of revitalization of rainfed areas in India.

2. Public Investment in Agriculture

One of the reasons often quoted for the poor performance of Indian agriculture has been the decline in public investment in agriculture since mid 1980s. However, recent estimates by the CSO show that the Gross Capital Formation (GCF) in agriculture and allied activities has maintained a steady figure as a percent of the total GCF in recent years and has shown an increase as a percent of GDP originating in agriculture (Table 4).

TABLE 4

GROSS CAPITAL FORMATION IN AGRICULTURE AND ALLIED ACTIVITIES (AT CONSTANT 2004-05 PRICES)

Year	Agriculture and Allied Activities (Rs. Crore)		GCF/GDP in Agriculture and Allied Activities (%)	GCF in Agriculture and Allied Activities as share of total GDP %
	GCF	GDP		
2004-05	78848	560308	14.07	2.66
2005-06	93121	589697	15.79	2.87
2006-07	94400	611409	15.44	2.65
2007-08	110006	640315	17.18	2.83
2008-09	138597	650461	21.31	3.34

Source: *Economic Survey, 2010*

The trend of decline in public investment in agriculture seen in earlier decades could, therefore, have been reversed in the 10th and this trend seems to have continued in 11th Plan as well. However, it is noteworthy that while public sector capital formation in agriculture as a proportion of total public investment has shown a steady rise, private capital formation in agriculture as a proportion of total private sector capital formation has declined from 13.7% in 2001-02 to 6.6% in 2007-08. The share of agriculture and allied sectors in total GCF has shown a steady decline, which is perhaps in consonance with the declining share of agriculture in GDP.

What is more important than the levels of aggregate flow of investments is to look into the sectoral composition of these investments and the precise forms that they take in specific programmes. The consultation could spell out the sectors/areas where more public investment is required as also spell out ways in which public investment programmes could be imaginatively designed to foster livelihoods in rainfed agriculture. A quantification of the investment requirements in rainfed areas could be one of the expected outcomes of this consultation.

Along with public investment, there has also been an increase in the flow of **subsidies** to agriculture. Total volume of subsidies has increased from Rs. 12158 crore in 1990-91 to Rs. 129243 crore in 2008-09, an increase by 10.6 times. The fertilizer subsidy has increased from Rs. 4389 crore in 1990-91 to Rs. 75,849 crore in 2008-09 representing an increase of over 17 times. As a percentage of GDP, this represents an increase from 0.85 percent in 1990-91 to 1.52 percent in 2008-09 (Figure 2). The fertilizer subsidy in India as percentage of the GDP varied from 0.47 in 2002-03 to 1.52 percent in 2008-09. The total food subsidy has jumped to Rs. 43627 crore in 2008-09 from 2450 crores in 1990-91, about 18-fold increase in

less than two decades in absolute terms (Sharma and Thaker, 2010). It is shown by this IIMA study that though part of the subsidies, and fertilizer subsidy in particular, flow to the rainfed areas as well and the share of rainfed areas in total fertilizer subsidy has increased over the years, it is still largely irrigated areas and farmers with high irrigation facilities who largely benefit from subsidies. For instance, the study shows that 60% of the fertilizer subsidy is accounted for by three crops, rice, wheat and sugarcane. A re-allocation of subsidies in favour of rainfed areas and the precise form such subsidization should take is an important point which needs elaboration.

3. The Food Security Context

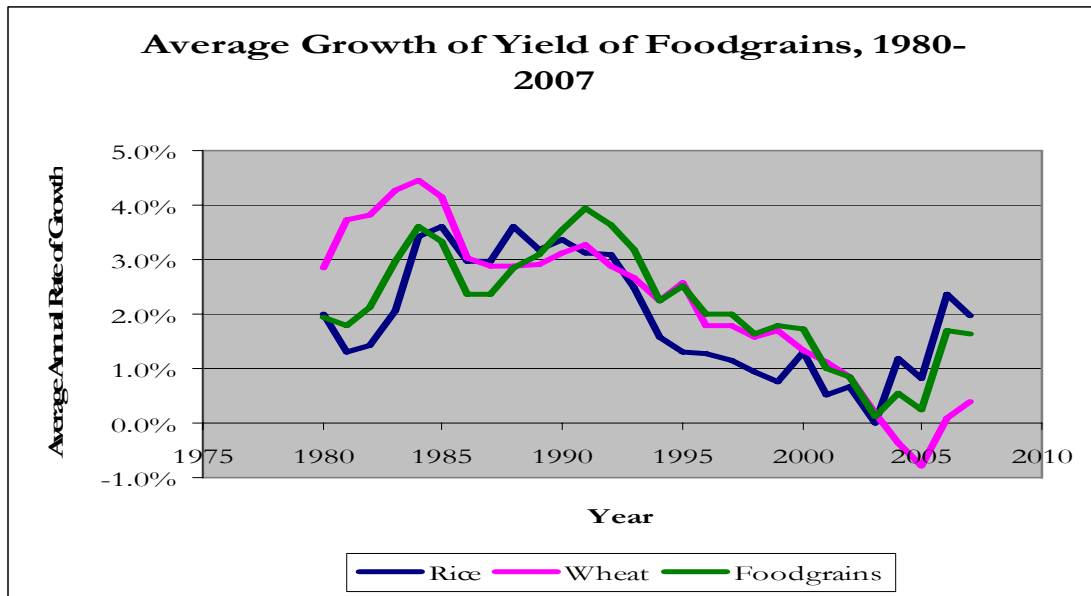
One of the major achievements of India's planned development has been the remarkable rise in foodgrain production since mid-sixties, which outstripped the rate of growth of population till early 1990s. Over the years India has built up a strong food security system, with public procurement, support prices and distribution through a network of PDS shops. Area under foodgrains in 2007-08 was 124 million hectares (about 64% of the gross cropped area producing about 230 million tonnes (MT) of grain at an average productivity level of 1864 kg/ha (Economic Survey, 2009). The foodgrain production in 2008-09 is estimated to be 229.85 MT. For maintaining food security, the 11th Plan proposed to increase foodgrain production by another 20 MT by the end of the plan period, taking the total production to about 250 MT. However, there are also estimates which have a larger time horizon and estimates foodgrain demand by 2020 (Table 5):

TABLE 5
ESTIMATES OF FOODGRAIN DEMAND BY 2020

Study	Year of Study	Estimated Demand (MT)		
		Cereals	Pulses	Foodgrains
Kumar (IFPRI)	1998	265.7	30.9	296.6
Hanchate & Dyson	2004	217.6	16.0	233.6
CESS, Hyderabad	2003	260.0	--	--
Mittal (ICRIER)	2009	245.1	42.5	287.6
Chand (NCAP)	2009	261.5	19.1	280.6
Kumar et.al. (IFPRI)	2009	233.6	19.5	253.2

Whichever projection one accepts, it is clear that sustained increase in productivity of foodgrains needs to be sustained for several more years to maintain the gains of food security. The recently observed trend of "yield fatigue" in irrigated agriculture, therefore, poses a serious threat to maintaining food security in India. There has been a significant slowing down in the rate of growth of per hectare yields of important food crops like rice and wheat, even under irrigated conditions. The rates of growth of productivity in these two crops at present are less than half the level in mid-1980s, indicating a plateauing of yields. (Figure 3). There is some revival in yields visible towards the end of the period, which, however, does not seem to have continued in the first two years of 11th Plan (as discussed in the previous section).

FIGURE 3



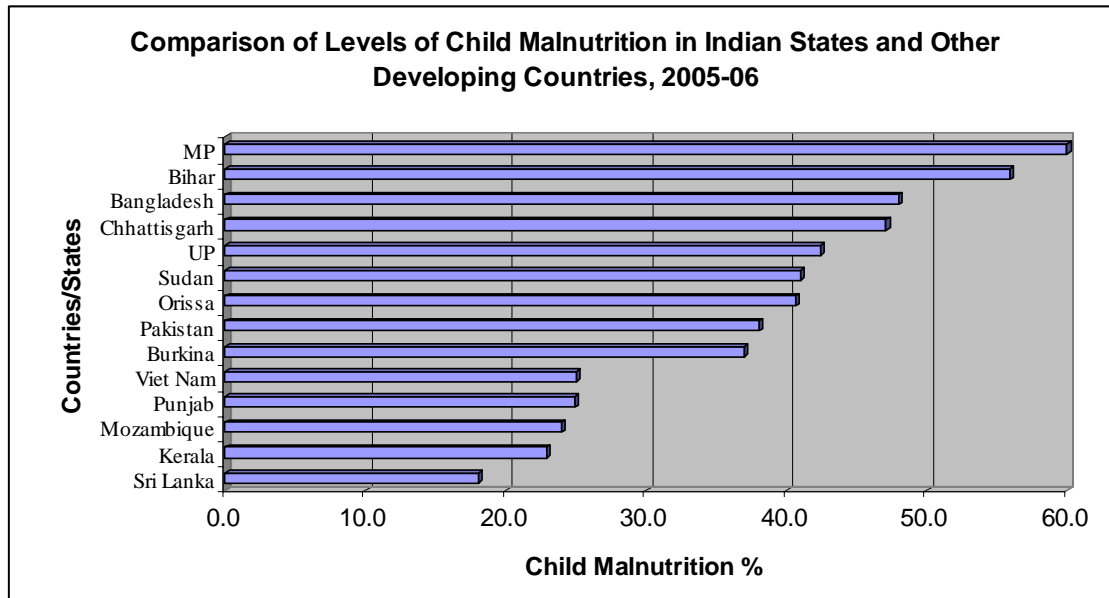
Source: Calculated from Indian Agricultural Statistics, various issues

The plateauing of yield levels in rice and wheat again brings us back to the need to focus attention (in terms of research, investments and organizational efforts) on rainfed dryland areas. It is indeed true (as the 11th Plan document says) that there are still substantial yield gaps in irrigated agriculture in all major crops, which must be utilized for raising productivity levels. For instance, India's yield levels of rice, wheat and maize are still lower than the world average. However, two points are worth considering here. First, application of the high input, high cost package of the Green Revolution has brought about a serious ecological damage in those areas which pioneered the revolution. There is now clear evidence of loss of soil fertility due to excessive use of agro-chemicals, decline in the levels of soil organic matter and severe depletion of groundwater resources in these areas. Closing the yield gap should not mean that we spread this ecological damage to a wider area, affecting a larger population than present. Second, calculations have shown that even after fully exhausting the potential of expansion of irrigated area and raising yield levels in irrigated agriculture, a substantial part (37%) of the future demand for foodgrains by 2020 will have to be met from rainfed areas. This underlines the fact that shifting policy focus to the rainfed areas is and imperative for maintaining food security.

It is also remarkable that in spite of the so-called food self sufficiency, several states in India still report very high levels of hunger and malnutrition. The latest National Family Health Survey-3 (2005-06) has brought out data on the shocking levels of nutritional deprivation prevailing in the country. The proportion of anaemic children under-3 has gone up from 74% to 79% between late 1990s and 2005-06. Nearly half of India's under-3 year children continue to remain underweight and this proportion has declined only marginally from 52% in 1992-93 to 46% in 2005-06. We must remember that these 13 years almost completely overlap with the "reform phase" in the Indian economy. Figure 4 shows that the

extent of child malnutrition in states like MP, Bihar and Orissa is worse than many other poorer countries of South Asia and Sub-Saharan Africa. One of the major challenges on our food security front, which the 11th and subsequent plans have to urgently address, is how to convert the food security gains into higher nutritional levels of large sections of the population, including children and women.

FIGURE 4



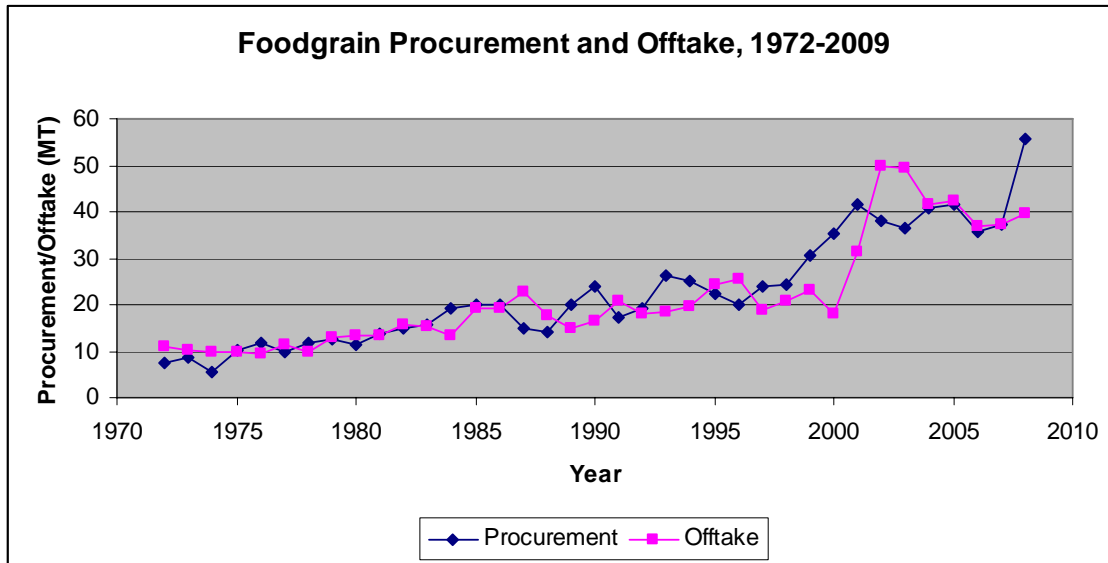
Source: NFHS, 2006; UNDP, 2009

The current food management system seems to be sadly incapable of tackling this issue of high nutritional poverty. India's system of foodgrain procurement and distribution has been characterized by ad-hocism and absence of a long term plan. Figure 5 shows the trends in procurement and offtake over the past several years. With the introduction of Targeted PDS (TPDS) in 1997, the gap between foodgrain procurement and offtake steadily grew, leading to the position of accumulation of over 50 million tonnes of grain as stock in 2002. The response to the public criticism of this policy has been two fold: first, to dispose of accumulated stocks partly through welfare programmes and partly even export at throwaway prices for two years 2002-03 and 2003-04; and second, to slightly *reduce* public procurement! Such "rationalization" of stocks brought them down to below 20 MT between 2004 and 2007. When foodgrain prices, especially wheat, rose subsequently, the government had no option but to import grain for the first time since mix-1960s. Now, again with procurement operations being stepped up, we have accumulated food stocks of about 36 MT in 2008-09 (Figure 8), which might go upto 40 MT this year.

Hence, the recommendation by the High Level Committee on Long Term Grain Policy (GoI, 2002) of re-introducing universal PDS needs serious consideration. The Committee says, "Given the balance between grain supply and demand, the persistence of regions with surplus and deficit grain production in the country, the underdeveloped nature of foodgrain markets in the country and undernutrition on a mass scale, there is still the need for

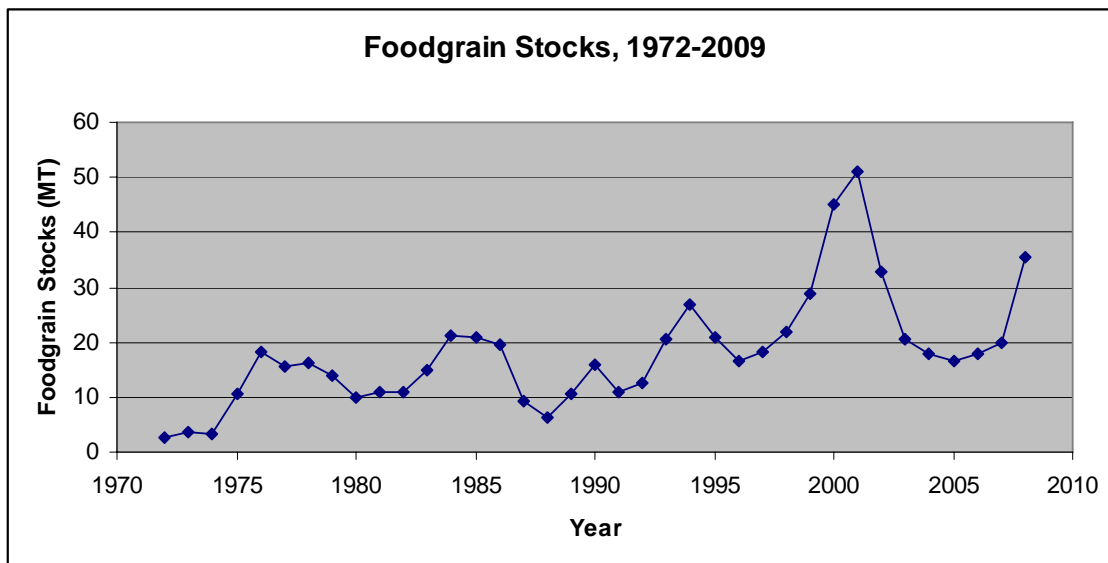
price stabilization nationally. The PDS plays a major role in this objective. This goal is best achieved by reverting to a system of allocation of grain at uniform issue prices with universal coverage” (GoI, 2002).

FIGURE 5



Source: Reserve Bank of India, 2009

FIGURE 6



Source: Reserve Bank of India, 2009

It is also possible, as recommended by the Committee in 2002, to use food stocks for major food-based employment schemes to develop rural infrastructure, expansion of the existing Antyodaya scheme of food support to become a food security system for the entire destitute population, expansion of the coverage of cooked Mid-day Meal Scheme (MDMS)

for all school-going children as well as for supporting and strengthening programmes for infants, children and women under ICDS. Only with such a targeted “direct attack” in the pockets where they are rampant can we tackle the problem of poverty and malnutrition in the country on a large scale.

The proposed National Food Security Act is an expression of such a commitment. One critical step required here is to strengthen the system of **local procurement and storage** of foodgrains (again, one of the crucial recommendations of the High Level Committee on LTGP). This system is being experimented in a few states. A new system of **local food reserve** could be proposed under which capacities are created at the block level to procure, store foodgrains and to allocate it to the PDS system falling within its geographical area. In addition to minimizing the transportation costs, this scheme also ensures that adequate grain is available for the programmes to run and paucity of food materials does not become a constraint on the performance of these crucial programmes. Local procurement will ensure that the grain provided through the programmes is fresh and of reasonable quality.

Capacities for local procurement already exist in many states. Still, they need to be **strengthened**. The existing system of local procurement is heavily biased towards some favoured crops (like rice and wheat) and the facilities for storage are largely concentrated at the district. We feel the capacity for local procurement and storage should be strengthened **at the block level**, which is at the cutting edge of implementation. We need more training and capacity building for this.

4. An Agenda for Rainfed Areas

In view of the above issues discussed, the consultation could come up with an agenda for the rainfed areas, which could form the basis of the agricultural policy in the 12th Five Year Plan. Briefly, this could involve:

- A review of **ongoing programmes** and their performance in the relevant sectors during the 11th Five Year Plan;
- Identification of important ongoing **state-level initiatives**, which could be upscaled at a national level;
- Documentation of ongoing **initiatives being implemented by non-government agencies** including civil society organizations, panchayats, people’s institutions like SHGs and the private sector actors, which are at a pilot stage but holds potential for upscaling;
- Identifying the components of **new programmes to be set in motion** during the 12th Five Year Plan to revitalize rainfed agriculture (such as national programme on soil fertility, millets, groundwater, decentralized foodgrain procurement; weather-based crop insurance etc.);
- Quantification of the **current level of investments** in rainfed areas through the existing and ongoing programmes, such as NREGA, IWMP, NRLM etc.;
- Quantification of **total investment** required to set in motion the

comprehensive programmes (restructuring the existing programmes and initiating new programmes) in rainfed areas;

- Tentative ideas about **financing** such a plan – possible sources, actors and amounts to be leveraged from banks and financial institutions through the loan component;
- A reviewing the roles of the **key institutional players** in rainfed areas; how have these performed during the 11th Plan period (NRAA for instance);
- Tentative ideas and suggestions on how to **re-engineer** these institutions to suit the needs of the rainfed areas and to enable them to become the agents of revitalizing rainfed agriculture.