Indian Agriculture through Challenges - Old and New

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Traditional Agriculture and its Challenge

Agriculture in India is believed to have been started at least five thousand years ago, i.e. around 3000 BC (Reader 1990: 183). Agriculture in most of the countries is not even half as ancient as in India, with the exception of China. Our agriculture has withstood intensive cultivation for centuries without turning cultivated lands into deserts, though agriculture has extended to marginal lands in India. In 2011, about 53 percent of geographical area was under the plough in India, compared to China's 12 per cent and USA's 22 percent. The contrast becomes evident when we note that though China is over three times larger than India in terms of total land area, arable land in India was over 157 million hectares in 2011, while China had only 112 million hectares. China's agriculture is restricted to relatively favourable conditions, with nearly 60 per cent of arable land under irrigation, compared with India's 42 per cent as recently as in 2011.[1] Thus India's agriculture is even now largely rain-fed, and in spite of their lower productivity, rain-fed areas contribute nearly half of India's crop output. Under the circumstances, one of the biggest challenges for India since the past was to have some resilience or sustainability in agriculture at least against minor droughts.

India's rain-fed agriculture tried to achieve resilience in its eco-system through a long history of adaptation and development of practices, which became a part of its established tradition, custom and culture. Its farmers developed strategies to maintain the productivity of soils in spite of cultivation year after year for centuries, and facilitate the survival of humans and cattle through harsh adversities. Growth was not the purpose of this adaptive pattern of behaviour. Growth as a goal and as a phenomenon has been very recent in the long history of Indian agriculture - only since India's Independence. Growth of agriculture can be based only on a healthy and resilient eco-system. Practices evolved over centuries to keep the ecosystem healthy and stable. They included a system of rotational fallowing, crop diversification, and replenishment of soils through organic manure. Where lands were less fertile, there was fallowing for a whole year in alternative years in parts of holdings by rotation so that each part enjoyed the benefit of fallowing at least once in two or three years. Where the lands were more fertile, there was seasonal fallowing. This was coupled with a judicious choice of crop pattern, which included nitrogen-fixing crops, and crops that could grow on soil moisture in dry seasons. Farmers doggedly maintained diverse crops both as a survival strategy in the face of yield uncertainty and for preventing soil exhaustion. They lovingly nurtured a wide variety of millets and pulses, fruits and vegetables, - with varieties within each crop, which is not easy to come across in other countries. Farmers also adopted a number of exotics like potato, tomato, chillies and papaya, absorbing them in the traditional crop pattern. When farmers cultivated such a variety, their diet too contained variety, providing a nutritionally balanced mix of calories, proteins, minerals, vitamins and fibre.

Maintaining cattle and small ruminants was also an important part of the strategy of taking care of the soils. Cow dung and droppings of small ruminants were carefully collected and used. Even cow urine was not wasted, but collected neatly in cowsheds and made to flow into compost pits nearby. Goats and sheep were penned at night in the fields, to enrich the soil with their droppings. When farmers did not have their own small ruminants, they welcomed others owning them including nomads to pen their animals in the fields, and paid for the service. Trees were grown around or near the fields which gave leaf manure. Common grazing lands were an essential part of the ecosystem of semi-arid agriculture, collectively managed to ensure sustainable use. A system of tanks to store excess rainwater was developed in semi-arid areas, formed in a downward chain so that excess water from upper tanks flowed into tanks downward. Local communities devised their own management of tanks to de-silt them from time to time and equitably distribute water. The silt taken out from the tanks served as manure.

Traditional farming was thus a part of an ecosystem with many complementarities. However, it had its limitations. Indian agriculture was hardly free from droughts and famines particularly before Independence in 1947, in spite of all the nurture of soil that went into traditional agriculture. Countless people died of hunger and starvation during famines before Independence, as the system of storage of food-grains to meet emergencies was private and hardly reached the poor. Meeting the challenge of droughts and famines had to wait until Independence and emergence of democratic governance. A major strategy of drought-proofing was through extension of irrigation, particularly canal and tube-well irrigation. On the eve of planning in 1950-51, a mere 17 percent of cropped area was irrigated. The proportion increased to 34 per cent in 1990-91 and further to 45 per cent in 2010-11. A number of other measures were taken through state initiative. To achieve greater resilience against droughts, soil and water conservation works like contour bunds and land levelling, with watershed as a unit of planning, were executed on a massive scale only after Independence, significantly supplementing private efforts. They also created significant employment opportunities. It was not enough only to counter the drop in food production during droughts. As Amartya Sen has stressed repeatedly, famines were caused not so much because of lack of food, as because of the lack of entitlements of the poor to food (Sen 1881). Relief employment, offered earlier in a very limited way, was therefore enlarged to a massive scale after Independence, particularly since the drought of 1972-73, and was subsequently made a regular feature not confined to drought years. The rural employment guarantee programmes relieved the misery of people and prevented starvation during drought years. During droughts, there used to be migrations on a massive scale, combined with sale of productive assets by even not so small farmers, which made return to agriculture difficult even when normal rainfall returned. Such calamities were prevented significantly, if not fully, by rural employment guarantee schemes. The Public distribution scheme for food-grains further contributed to prevention of food deprivation. The challenge of famines was thus met with good success, but the battle against under- and mal-nourishment of the poor in normal years, particularly of children and mothers was yet to be satisfactorily met.

Apart from the failure to meet the challenge of severe droughts, the traditional way of managing the eco-system had other problems too. It was quite labour intensive; cheap and

abundant labour could be ensured mainly because of the caste system, which deprived a sizeable part of the population of equitable access to means of production and even education. However, the upper caste domination in the economy and society was challenged, and new education and employment opportunities were opened up, in which the policy of reservation or positive discrimination helped. The rural employment guarantee schemes helped in raising the minimum supply price of labour even among the rural landless labour. Free labour became difficult to get to de-silt tanks, bring leaf manure from forests, collect organic manure and to do many such tasks needed in maintaining the health of traditional agriculture. The burden of water and soil conservation shifted from private to public initiative and sphere. Agriculture became too commercialised to continue the traditional ways of conserving the eco-system. This in turn created the risk of making agriculture unsustainable.

There was another serious problem with traditional agriculture. It was designed to *maintain* long-term health of soils, and to meet the challenge of instability arising out small failures of rainfall, but not the challenge of growth. It could not achieve any significant growth in production or yields. Since extensive methods of increasing production were already reaching their limits, only a sustained increase in yields could meet the challenge of feeding increasing population. When severe droughts emerged in the context of significant population growth, the traditional system simply could not cope with the challenge. Such a situation arose in the severe drought of 1965-66, succeeded by another year of drought. Since the preceding year, 1964-65, was a very good year rainfall-wise, it had to some extent compensated the drought of 1965-66 due to the use of carry-over stocks of food-grains, but when 1966-67 also turned out to be a drought year, the system seemed to collapse. The government had to depend on massive imports under PL 480 from the USA. At the end of the First Five Year Plan, India's imports of cereals (mainly wheat) were less than 0.6 million tonnes in 1955, which increased to 5.1 million tonnes in 1960, 7.5 million tonnes in 1965, and 10.3 million tonnes in 1966. It appeared to be a deep crisis, and then promptly appeared a book, '*Famine 1975!'* by Paddock brothers predicting the worst, writing off India as a hopeless case which 'can't be saved'. It advised the American government to adopt the strategy of 'triage' (used in war-time military medicine) so that it could save its limited resources for more hopeful cases (Paddock and Paddock 1967). However, India not only saved itself, but also did remarkably well on the food front under its Green Revolution, keeping pace with its population growth through its own production. Let alone facing the predicted apocalyptic Famine 1975, India could do away with imports of cereals by 1977, and even started exporting them. It could also build up comfortable stocks of food-grains to tide over crises of food shortage. Shortage of food production as such was no longer a cause of hunger, though access to food for the poor may still have been a problem.

Growth and Instability in Food-grains

India's growth performance in food-grains as well as instability therein may be seen through three periods: (1) 1950-51 to 1970-71 (21 years), which includes the early plan years up to first phase of the Green Revolution; (2) 1971-72 to 1990-91 (20 years), which includes the maturing of the Green Revolution, and (3) 1991-92 to 2012-13 (22 years), the Economic Reform years. Table 1 below presents a few main features of this performance.

Table 1: Growth and Instability in Food-grains in India

	Period 1	Period 2	Period 3
Annual Compound Growth Rate (%)			
Production	2.90	2.90	1.63
Area	1.02	0.15	0.01
Yield per hectare	1.86	2.74	1.62
Coefficients of Variation (%) after adjusting for trend			
Production	8.52	6.55	5.84
Area	2.66	2.35	2.04
Yield per hectare	6.72	5.84	4.51
Largest Deviations from trend estimate in Production in million tonnes			
Negative	- 15.54 (17.3%) (1966-67)	- 17.08 (13.5%) (1979-80)	- 34.91 (16.6%) (2002-03)
Positive	+ 10.01 (11.5%) (1970-71)	+ 10.50 (7.5%) (1983-74)	+ 18.79 (7.8%) (2011-12)
Lowest, Highest, and Mean levels of Production in million tonnes			
Lowest	50.82(1950-51)	97.03(1972-73)	168.38(1991-92)
Highest	108.42(1970-71)	176.39(1990-91)	259.29(2011-12)
Mean	76.82	132.44	207.97

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Source: Calculated from *Agricultural Statistics at a Glance 2008,* and – *2013,* Directorate of Economics & Statistics, Ministry of Agriculture, Government of India, New Delhi.

Though food-grains production in India has continued to record positive and statistically significant growth rates in all the three periods, there has been a decline during the last period to 1.63 per cent per annum, from 2.90 per cent per annum during both of the earlier periods. This is disturbing because the rate of growth of 1.63 per cent per annum in food-grains production during 1991-92/2012-13 has been lower than the rate of growth of population during the period. The latter was 1.97 per cent per annum between 1991 and 2001, and 1.64 per annum between 2001 and 2011. No wonder, per capita net availability of food-grains per day declined from 510 grams in 1991 to 416 grams in 2001.[2] However, it improved to 463 grams per day in 2011, but the position as in 1991 was yet to be attained. Food-grains are basic to the food security of India's poor, and we cannot afford a decline in their production below the increase in population.

Growth in area was significant only during the first period, and yield increase was a major contributor to growth in production during all the three periods including the first. There has been some instability in the growth, but it has been steadily declining as indicated by the coefficient of variation adjusted for trend in the case of all the three – production, area, as well as yield, through the three periods, as seen from Table-1. In terms of points of largest deviations, particularly in absolute terms, however, the fluctuations around trend have increased. The table shows that the largest negative deviations from the trend estimate have increased from -15.54 million tonnes during Period-1 (in 1966-67), to -17.03 million tonnes during Period-2 (in 1979-80), and further to -34.16 million tonnes during Period-3 (in 2002-03). The highest positive deviations or the peaks also shown an increase through the periods, but less so, from 10.01 million tonnes during the first (in 1970-71) to 10.30 million tonnes during the second (in 1983-84) and further to 18.79 million tonnes during the third (in 2011-12). The gap between the lowest and the highest deviations around trend has thus tended to increase. Ignoring trend coefficients and taking note of simply the lowest trough and highest peak points, there has been a growth in both through the three periods. Between 1950-51 with lowest level of 50.82 million tonnes production during Period-1, and 2002-03 with the lowest level of 168.38 million tonnes during Period-3, there was an increase by 230 percent in 52 years or an average of 4.4 per cent per year. On the other hand, between 1970-71 with the peak level production of 108.42 million tonnes during the first period, and 2011-12 with its peak of 259.29 million tonnes during the third period, there was an increase by 139 per cent in 41 years or an average of 3.4 per cent per year. The trough levels of production of food-grains seem to have rising more than the peak level production, suggesting a tendency to convergence. This picture tallies with what is indicated by the coefficients of production adjusted for trend, both pointing to a decline in instability.

Growth rates in production also have declined, but we cannot conclude that therefore growth is combined with instability. During the first two periods, growth rates in food-grain production remained the same at 2.9 per cent per annum, but CVs adjusted for trend declined from 8.52 in the first to 6.55 per cent in the second period. Yield rates increased between the first two periods, but CVs adjusted for trend also declined. Increase in the proportion of area irrigated may have played an important role in reducing instability in Indian agriculture, and so have the extensive soil-and-water conservation works in semi-arid areas. The benefits of high yielding and drought resistant varieties of food-grains particularly in coarse cereals and pulses, also have contributed to a combination of growth with greater resilience. We cannot, however, be complacent about the declining instability in food-grain production, given the significant fluctuations in their per capita net availability (see Note-2). We cannot take droughts as events of only the past. The slump in food-grain production in 2002-03 was as serious in percent terms as the infamous droughts of 1965-67, and even more serious than them in absolute terms as compared with the trend estimates for respective years. The battle against droughts is not yet finally won.

Growth and Instability in Agricultural GDP

Our focus on food-grains has some justification, because of their large importance both in production, claiming a large share in total cropped area, and also in the diet of the

bulk of Indians. Food-grains accounted for 74 per cent of India's total cropped area in 1950-51, and after 60 years in 2010-11, the share declined only to 64 per cent, in spite of all the diversification that has taken place. Nevertheless, their share is declining, and it would be worthwhile to subject GDP from agriculture (excluding fishery and forestry) at constant prices to a similar analysis as above. Thanks to a much faster increase in non-agricultural GDP, the share of agriculture in the total GDP of the country has been steadily declining over the years. It was a good 51.6 per cent in 1952-53, and sixty years later, it fell sharply down to a mere 11.8 per cent in 2012-13. However, agriculture is much more important than what is indicated by its share in GDP, particularly because a major part of our workforce continues to depend on agriculture for its livelihood. Moreover, a fall in GDP from agriculture has cascading effects on other sectors of the economy due to indirect repercussions. Similarly, a boost in agricultural GDP produces a boost in GDP from other sectors of the economy, particularly dependent on processing and trading agricultural produce. A growing agriculture is still essential for the healthy growth of the rest of the economy. This is true from the point of view of market demand also. Our economic growth is driven mainly by domestic demand, and agriculture remains an important source of it. The proportion of rural population which was 82.7 per cent in 1951, remained as high as 68.8 per cent even in 2011. The labour force in agriculture as a proportion of total workforce which was 70 per cent in 1951, also remained as high as 55 per cent after 60 years in 2011. The sheer size of the population still dependent on agriculture suggests that the total economy cannot be taken to be improving fast without taking these people on board.

Table-2 below presents a picture of growth and instability in GDP from agriculture (excluding fishery, forestry and logging) at constant prices (as in 2004-05) during the same three periods that were taken up above for food-grains.

Table-2: Growth and Instablity in Agricultural GDP (at 2004-05 prices)

	1950-51 to 1970-71	1971-72 to 1990-91	1991-92 to 2012-13
Annual Compound Growth Rates (%)			
	2.18	2.96	3.02
Coefficients of Variation after adjusting for trend (%)			
	5.63	5.27	4.27
Largest Deviations from the trend estimates (Rupees in Billion)			
Negative	- 270 (13.3%)	- 310 (13.0%)	- 492 (10.3%)
	(1966-67)	(1979-80)	(2002-03)
Positive	+154 (8.3%)	+166 (5.2%)	+299 (4.3%)
	(1970-71)	(1990-91)	(2012-13)

Source: Calculated from CSO (2014)- *National Account Statistics 2004-05 Back Series*; RBI (2014) –*Handbook of Statistics on Indian Economy, 2013-14,* Mumbai.

Table-2 shows that the annual rate of growth of real GDP from agriculture in India has increased during the three periods, from 2.18 per cent to 2.96 per cent and further to 3.02 per cent respectively. These growth rates have been higher than the rate of growth of population in the country. This picture of rising growth rates in agricultural GDP is unlike the case of food-grains, which showed a decline in growth rates between the last two periods. The coefficients of variation (CVs) in GDP from agriculture adjusted for trend dropped continuously from 5.63 per cent during Period-1 to 5.27 per cent in Period-2, and further down to 4.27 per cent in Period-3, as happened in the case of food-grain production too. The CVs have been lower in the case of GDP from agriculture than in food-grains production as expected. The declining instability in Indian agriculture as seen from these CVs, is further confirmed by converging deviations from trend estimates. The percentage deviations from trend estimates are declining, much more so in the case of negative deviations. This is heartening, especially because an increase in instability was feared following the climate change impact. Notably, CVs have declined not only in overall GDP from agriculture but also in the case of total food-grains production. The overall instability must have declined because of mutually offsetting instabilities across individual crops and regions, but such instabilities in individual instances may not have declined independently of each other.

Structural Crisis

An important significance of GDP from agriculture is the light it throws on the human dimension of agriculture. As noted above, the share of agriculture in the total GDP has been sharply declining, but not the extent of dependence of the workforce on agriculture for livelihood. As a result, the value added per worker in agriculture has been declining relatively to the same in non-agricultural sectors. Table-3 below presents this picture. Only persons with principal status of a worker are taken here for calculations of value added per worker, excluding marginal workers since their number is not available for all the years for comparison over time. Agricultural workers include both cultivators and agricultural labourers.

Table-3: Value Added per Worker in Agriculture and Non-agricultural Sectors (Rupees in 2004-05 prices)

Year	Value Added per Agric. Worker (Rs)	Value Added per Non-agri. Worker (Rs)	Ratio of (2) over (3) (%)
(1)	(2)	(3)	(4)
1961	12,300	45,517	27.0
1971	15,592	73,030	21.4
1981	16,865	79,709	21.2
1991	17,729	103, 685	17.1
2001	27,992	137,388	20.4
2011	35,358	255,156	13.9

Sources: Calculated from *Compendium of Selected Indicators of Indian Economy*, Vol. II, Social Sector, CSO, 2013; *Agricultural Statistics at a Glance 2013*; other sources as in Table-2.

Table-3 shows that though value added per worker in agriculture has been growing even at constant prices, it is declining as a ratio. In 50 years since 1961, the average income of an agricultural worker, cultivators and agricultural labourers together, has declined to nearly half of the income of non-agricultural workers. This is a serious decline, which has made agriculture much less attractive now than it was some 50 years back on the eve of the Green Revolution. The decline has occurred despite all the growth in agricultural production and yield her hectare. The main factor behind it is the failure of non-agricultural sectors in absorbing enough workers from agriculture, and in relieving the pressure on agriculture for livelihood.

This is reflected in a continuous decline in the average size of operational holdings in India - from 2.28 hectares in 1970-71 to 1.55 hectares in 1990-91, and further down to 1.15 hectares in 2010-11, as seen from the respective Agriculture Censuses. The number of total operational holdings nearly doubled during the forty years, from 71 million to 138 million. The number of marginal and small holdings (below 2 hectares), which are mostly not enough to make a viable living, had accounted for 70 per cent of total holdings in 1970-71; their proportion increased to 85 per cent by 2010-11. Thus a huge bulk of cultivators are not able to make a decent living in spite of whatever increase in yields and diversification they may achieve to grow high value crops. Their share in the total area operated also has been increasing, - from 21 per cent in 1970-71 to 45 per cent in 2010-21. Thus, it is not only the bulk of cultivators, but also a significant part of agriculture itself is tending to become non-viable. What land reforms could not achieve, has been achieved with vengeance by demographic pressure, turning more and more cultivated land into marginal and small holdings. Professor M L Dantwala had once characterised the earlier Indian agriculture as dominated by small *farmers* but not by small *farms*. Now, it is dominated by small farmers as well as by small farms! Thus, the basic structure of agriculture is now such that it cannot support the existing population living on it. This is not exactly a new challenge, as it has been in the making since long, but it is new in the sense that it has now emerged with a new sharpness and urgency. Earlier, only the bulk of cultivators were nonviable, now even the bulk of agricultural land is tending be under non-viable holdings.

An important implication of the emerging situation is that small holdings are much more vulnerable to vicissitudes of agriculture, and would need more and more protection of the state for survival. Diversification is one of the timeworn strategies to deal with such vicissitudes, but satisfactory diversification needs viable holdings. Even the medium and large holdings are becoming more vulnerable due the size of their holdings becoming less and less viable. Thus, the average size of medium and large holdings together (that is, of holdings above 4 hectares) has steadily declined from 9.2 hectares in 1970-71 to 7.5 hectares in 2010-11. The viability of even the larger holdings is thus declining. The new

crisis is affecting all sizes of holdings. Increasing number of suicides among farmers in India are a conspicuous symptom of this sharpening crisis. (Deshpande and Arora Ed. 2010).

Indian agriculture is responding to this crisis through increasing proportion of its workforce leaving cultivation and becoming labourers. This trend started becoming evident since 1981 itself. The per cent share of agricultural labour in total agricultural workforce increased from 22.7 in 1981 to 40.3 in 1991, to 45.6 in 2001, and further to 54.9 in 2011. The share of cultivators correspondingly declined. Between 2001 and 2011, there was for the first time a decline in the absolute number itself of cultivators from 127.3 to 118.7 million, while there was an increase from 106.8 to 144.3 million in the number of agricultural labour between the same years. Agricultural labour have now outnumbered cultivators for the first time. For quite a lot of cultivators, cultivation is now less paying than wage labour. This is a sign of the deepening crisis in agriculture.

Interestingly, the crisis that is affecting agriculture now is not much due to increasing real costs or deteriorating terms of trade. These problems may have been major factors before (see Nadkarni 1987, 1988, 1993), but not anymore, at least at the aggregate sector level if not at the level of individual farmers and commodities. The ratios of agricultural output to inputs at constant 2004-05 prices (calculated from CSO National Accounts) have been more or less constant around the mean of 2.62 as between 1980-81 and 2012-13, and showed no statistically significant trend. The highest level of the ratio was 2.84 in 1996-97, and the lowest was 2.46 in 1987-88. As for the terms of trade of agriculture, calculated by dividing the GDP deflator for agricultural output by the same for agricultural inputs used in the National Accounts, they have gone increasingly in favour of agriculture since 1980-81. The terms of trade of agriculture so calculated, have recorded a positive and statistically significant 0.46 per cent annual compound growth between 1980-81 and 2012-13. In contrast, the terms of trade (calculated in the same way) were going against agriculture between 1970-71 and 1980-81, the index falling from 100 to 93 in the same years (Nadkarni 1993: 6). This is not to suggest that farmers have faced no problems in specific instances or individual crops in respect of cost recovery. Farmers have often faced crash in post-harvest prices in specific crops, and this is still a challenge to be met. However, as far as the agricultural sector as a whole is concerned, the crisis is structural, and is not so much on the cost or terms-of-trade front.

Summary and Conclusion

Let me now summarise and conclude. Indian agriculture can be said to have met the old challenges of achieving resilience against droughts and reducing instability as well as the subsequent challenge of growth satisfactorily, if not perfectly. The challenge of increasing real costs which was faced in the initial phase of the Green Revolution, has also been overcome more or less satisfactorily at the sector level; and so has been the challenge of the adverse terms of trade. The challenge at the sector level is one of structural crisis of agriculture becoming increasingly nonviable, simply because non-agricultural sectors are not absorbing enough workforce from agriculture. This problem cannot be met within the limits of agriculture alone. Increase in area irrigated, improvement in yields, minimum guaranteed prices, - all these and such other measures

may help to some extent, but will not meet the basic problem. This basic problem is not new, though it has reached a crisis point now, and the suicide of thousands of farmers is only a symptom of the deep malady. Dantwala had foreseen this problem in 1968 itself. He had said: 'The dark spot of the future is not food, but the farmer himself.' [3] The challenge can be met only through substantially increasing the employment-intensity of non-agricultural growth, absorbing significant parts of agricultural workforce, and allowing operational holdings to increase in size and employ tools that would greatly increase labour-productivity (apart from yields per hectare). With the structural problem remaining in agriculture, growth in agriculture would be greatly constrained. It would constrain consequently the growth of non-agricultural sectors. A boost to agricultural growth has a healthy impact on non-agricultural growth and poverty alleviation too, as the Indian experience has shown. Some innovative institutional experiments may be tried, like consolidating holdings on a large scale as corporate farms with farmers as shareholders and managing it, combining cultivation with agro-processing and even other allied non-agricultural activities. Skills need to be developed particularly among the poor both in the urban and rural sector to facilitate their absorption in varied types of jobs. The growth of non-agricultural sectors has to be planned in such a way as to maximise its employment impact, and not just GDP. The problem is essentially human, and the focus of development should be the human being. If agriculture can overcome its present crisis, it will boost the whole economy and its welfare. Even the adaptability of Indian agriculture to climate change and its ability to mitigate it would depend greatly on how far the structural crisis is resolved.

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Notes

1. The figures are from *Pocket Book of Agricultural Statistics 2013*. The proportion of area irrigated here is on net basis; it was a little higher at 45 per on gross basis.
2. Per capita net availability of food-grains (cereals plus pulses) per day after taking into account changes in government stocks, shows significant fluctuations, with no clear trend. It was only 390.9 grams in 1951, increased to 468.7 grams in 1961, fell sharply to 401.4 grams in 1967 (a severe drought), bounced back to 468.8 grams in 1971, but fell again to 454.8 grams in 1981 (with significantly reduced imports), improved to a record 510.1 grams in 1991, declined again to a record low of 416.2 grams in 2001 (the lowest after 1967), and improving again to 453.6 grams in 2011, and further to 510.8 grams in 2013 (provisional estimate, but highest so far, slightly surpassing the previous record of 1991). (Source: *Bulletins on Food Statistics,* and GOI *Economic Surveys*)
3. Cf. 'Rejuvenating Sick Agriculture: Indian Experience', *Netherlands Journal of Agricultural Science,* Vol. 5(1), 1968: 241-242; quoted in Dantwala (1996: 84).

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