Crisis in Indian Agriculture
Can It be Overcome?

M V NADKARNI

The crisis in Indian agriculture, which has been building up for decades, is not one of declining profitability but of non-viability of the bulk of landholdings. The number of these holdings is fast increasing, and even the extent of non-viable land in the total cultivable area is expanding. Merely boosting the productivity of smallholdings is not sufficient, and their non-viability hinders capital formation in agriculture. The main reason behind the crisis is that employment opportunities in non-agricultural sectors are not growing fast enough.

An earlier version of this article was delivered as the 15th Professor L S Venkataramanan Memorial Lecture at the ISEC, Bengaluru, on 14 February 2017. Thanks are due to Khalil Shah of the Institute for Social and Economic Change for promptly providing the requested data.

M V Nadkarni (*mvnadkarni1968@gmail.com*) is an economist and honorary visiting professor at the Institute for Social and Economic Change, Bengaluru.

Policymakers and agricultural experts often focus more on increasing the productivity of land than the welfare of the farmer. Increasing land and water productivity is important, but it is only instrumental in improving the welfare of the farmer and his family. The welfare of the people at large cannot be brought about by neglecting the farmer. Recognising the importance of the agricultural producer and "to take care of the needs of the farming community," the Government of India recently renamed the ministry of food and agriculture as the ministry of agriculture and farmers' welfare. When we speak of the farmer, however, the hired agricultural labourer is also included as he is also a producer in his own right. But, if the farmer himself is in penury, how can we expect him to pay a fair wage for labour? A crisis in agriculture affects all those who depend on it for livelihood, and that is a substantial part of the population.

Achievements and Progress

Before we discuss the crisis, let us take note of the huge progress that has taken place in the agriculture sector in the last six decades to get a balanced view. While India's population increased 3.5 times from 361 million in 1951 to about 1,270 million in 2014, India's foodgrain production increased during the same period by five times from 51 million tonnes to 253 million tonnes and milk production by 8.6 times from 17 million tonnes to 146 million tonnes. This made India self-reliant in food, mainly through an increase in yields and cropping intensity. The net sown area under cultivation increased between 1950–51 and 2012–13 by less than 18% in the course of 62 years. This happened not because it was needed for feeding the growing population but only to provide a source of livelihood to the poor. The gross irrigated area increased notably from 23 million hectares in 1950–51 to 93 million hectares in 2013–14, that is, by four times.

Tremendous diversification has taken place in agriculture in post-independence India. At the time of independence, agriculture was dominated by the production of foodgrains. In the following decades, not only crop diversification has taken place but substantial progress has been made in animal husbandry, horticulture, and floriculture. From being a net importer, India has become a net exporter. As a result, the annual compound rate of growth of the agricultural part of the gross domestic product (GDP) at constant prices increased from 2.18% between 1950–51 and 1970–71 to 2.96% between 1971–72 and 1990–91 and further to 3.02% between 1991–92 and 2012–13 (Nadkarni 2016: 80).

Another achievement in the agricultural sector may surprise a few, as it is contrary to what is normally believed. Instability in the production, area, and yield of foodgrains, not necessarily at the individual farm levels or even at the district levels, but at the aggregated national level has decreased. While analysing the three periods 1950–51 to 1970–71 (20 years), 1971–72 to 1990–91 (20 years), and 1991–92 to 2012–13 (22 years), it was found that the coefficient of variation adjusted for the trend consistently declined from period to period in production, area as well as in the yield per hectare of foodgrains (Nadkarni 2016: 76). The same thing was observed in the agricultural GDP at constant prices between the same periods (Nadkarni 2016: 80). This decreasing instability may have been due to an increase in irrigation and agricultural diversification. There may be considerable fluctuations at the disaggregated levels, but the country as a whole has the resilience to deal with downfall anywhere by rushing support to those who suffer. Where then is the crisis? Our agricultural sector may have done fairly well so far, but unless its unhealthy internal contradictions are

resolved it may collapse, with tragic human implications.

Farmer Suicides

A high incidence of suicides by farmers since the 1990s (Deshpande and Arora 2010) has been witnessed. Going by the National Crime Records Bureau of India statistics, nearly three lakh farmers committed suicide in India between 1995 and 2013. Ballabh and Batra (2016) observe that the actual number of farmers' suicides may have been higher because some states did not initially report suicides during this period. Also, some of the suicides were not included in the statistics because according to the police those committing them were not recorded as farmers. Only those owning land were considered as farmers and those taking land on informal lease and cultivating were not. Actually, these informal tenants are more vulnerable and face higher risks. Reports on some suicides were deliberately suppressed or underestimated by state governments (Ballabh and Batra 2016: 381). Farmers' suicides are the most telling and poignant symptom of the human crisis facing Indian agriculture. It is a systemic or structural crisis, if not a total crisis in all aspects. This crisis has not suddenly emerged, but has been building up since decades and needs to be analysed.

Inefficient Use of Irrigation Water

First, we need to note that India's agriculture is even now largely rain-fed, and rainfall is tending to become more erratic and uncertain. Marginal lands which were and should have been left as forests are now being cultivated. The bulk of cultivated area in India is quite vulnerable to climate change. It is common now for farmers in some parts of the country to experience prolonged droughts and unseasonal rains, resulting in huge crop losses.

India's situation becomes clear when contrasted with China. While China has over three times more total land than India, its arable area is only about 112 million hectares, which is less than India's 155 million hectares in 2012–13. In other words, while only 11.3% of total land area is under agriculture in China, nearly 53% of land is under agriculture in India. But the proportion of irrigated area in China is over 65%, compared with India's less than 43%. Rain-fed areas in India produce nearly half of the country's crop output. This is one reason why the average productivity per hectare in Indian agriculture is lower than in China. Under the circumstances, one of the biggest challenges for India has been to develop some resilience at least against minor droughts. Whatever success we have had in the past in meeting this challenge is no guarantee of its success in the future.

It is particularly distressing that though the proportion of irrigated area is on the whole low in the country, several states have already reached the upper limits of sustainable irrigation, with groundwater being overexploited. It was tube well irrigation which gave a boost to the green revolution, but it is precisely in the major foodgrain producing states that the extraction rates of groundwater are unsustainably high. These states are Punjab, Haryana, Uttar Pradesh, Rajasthan, Karnataka, and Tamil Nadu. The incidence of failed wells is also fairly high. Only in a few states, the potential of groundwater irrigation is not yet fully realised. These are mainly the eastern states such as Bihar, West Bengal, Assam, Jharkhand and Odisha (Sasmal 2014: 231–32). The scope for further extending canal irrigation by building more big dams is limited because they have huge negative externalities in the form of loss of forest areas and displacement of human beings. There is, however, scope for minor projects, including watershed development, rainwater harvesting, and recharging groundwater aquifers (Chandrakanth et al 2004; Chandrakanth 2015).

Despite scarcity of water, irrigation is not practised efficiently. Large chunks of irrigated areas have gone out of cultivation due to salinity which occurs due to over-irrigation or growing water-intensive crops in places where lightly irrigated crops are more desirable. There have been some technological breakthroughs in recent years in the method of cultivation of water-intensive crops like rice (like the System of Rice Intensification), which have shown that an economical use of water can actually increase productivity not only per unit of water, but also per unit of land. Growing more sugar cane than we actually need is one of the instances of how political pressures from vested interests have come in the way of more equitable and economical use of water. With a more economical and equitable use of water and rational choice of crops, it should be possible to irrigate more lands now even with the given availability of water.

The development of wise irrigation management and adaptation strategies to face water shortage is becoming critically important in the face of global warming or climate change. Birthal et al (2014) have warned that their projections indicate a loss of agricultural productivity in India due to rising temperatures by 6% in the short term (by 2035), 12% in the medium term (by 2065), and 16% in the long term (by 2100). The rise in temperature will require more irrigation to alleviate its impact on agriculture. An economical use of water to extend the benefits of irrigation to more areas is thus urgent. Birthal et al (2014: 484) further observe that it is possible to extend irrigation to further 25% to 30% of area by conservation in existing irrigated areas and also by rainwater harvesting. Narayanamoorthy and Deshpande (2005) have pointed out that technologies like drip irrigation, which conserve water and enable the extension of given irrigation water to more areas, even though capital intensive, are economically viable. This would be even more so if water is taken into account at its ecological or scarcity value and not the face value at which the farmer gets it.

Surplus Workforce in Agriculture

We can price inputs scientifically at their scarcity value for an industry if it is commercially viable. If it is not, and if the survival of the industry is important for the economy and from a humanitarian angle, as in agriculture, there should be limits to treating it as a normal business enterprise which could be charged rationally for the inputs. Subsidisation and support would be inevitable no matter what the World Trade Organization (WTO) might say. Ironically, even industries that are in a much more favourable situation get direct and indirect subsidies as incentives for investment and employment creation. The structural weaknesses of agriculture have been pointed out before by several economists including

V M Dandekar (1976, 1994), V K R V Rao (1983), V M Rao (1994) and Rao and Hanumappa (1999), but they are worsening with the passage of time. Dandekar had summed up the situation thus:

> (T)he problem of Indian agriculture is the disproportionately large burden of population which it has to bear and which causes net capital consumption rather than capital creation in agriculture. Hence, to transform traditional subsistence agriculture into commercially viable agriculture, the surplus population must be withdrawn from agriculture, that is, from current operations of cultivation, and conditions must be created whereby capital from outside agriculture may flow into agriculture. (1994: 29)

How can the surplus population from agriculture be absorbed into other sectors? This can happen only if the economic growth in other sectors is not only significant but also creates employment and does not cause displacement of labour. Unfortunately, despite the growth, these sectors have not been able to absorb much of the surplus labour because they believe in economising on labour. The proportion of workforce engaged in agriculture, taking both cultivators and labourers together, has declined only slowly over the decades, from 69.8% in 1971 to 64.9% in 1991, and further to 54.6% in 2011. In contrast, the share of agriculture in GDP at constant prices fell much more sharply from 39.7% in 1970–71 to 29.5% in 1990–91 and further to a mere 11.3% in 2010–11. The ratio of per worker income in agriculture to the same in non-agricultural sectors, which was already low at only 0.28% in 1971, crashed to 0.15% in 2011 (Table 1). Thus, the relative position of workers is worsening fast.

Table 1: Declining Relative Income per Worker in Agriculture

Share (%) of Agriculture in:	1971	1991	2011
GDP at constant prices	39.7	29.5	11.3
Total workforce	69.8	64.9	54.6
Ratio of per worker GDP in agriculture to per worker GDP in non-agricultural sectors	0.28	0.23	0.15

Source: Calculated from National Accounts Statistics of CSO and Population Census.

Relative Income per Farm Worker

Let us now look at the situation in India in an international context. The declining share of agriculture both in GDP and total employment has been observed in all countries due to the faster growth of both income and employment in non-agricultural sectors. That has indeed been the pattern of economic growth almost all over the world. The relative income per agricultural worker declines only if employment absorption from the agricultural into non-agricultural sectors is slower than the rate of growth of agriculture. Table 2 compares an Indian agricultural worker's relative income with that in other countries.

The ratio is generally lower than one in all countries except Kenya, where it is above two. Kenya is followed by Malaysia, Israel, the United States (US) and Australia which also have high ratios, indicating practically no disparity between agriculture and non-agricultural sectors in average per worker income. According to the ratios in 2011, India ranked the third lowest among the selected 30 countries. What is particularly sad about India is that its position in this respect has worsened over the last four decades, which is also the case with the Philippines, Indonesia, Vietnam, Bangladesh, Mexico, and Sri Lanka.

However, quite a few countries have improved the per worker relative income in agriculture—the most noticeable being Malaysia, Israel and the US. These countries prove that per worker income in agriculture need not be worse than that in other sectors. They have achieved this mainly by drawing a significant portion of their agricultural workforce into other sectors. Thus, the share of agriculture in the total workforce which was as high as 48% in Malaysia in 1971 declined to 11.5% in 2011. In the US, it was already low at 4% in 1971 and fell further to a mere 1.6% in 2011.

Table 2: Ratio of per Worker Income in Agriculture* to per Worker Income in Non-agricultural Sectors in Selected Countries
(in Descending Order of the Ratio as in 2011)

	1971	2011		1971	2011
Kenya	–	2.1889	Philippines	0.5536	0.2959
Malaysia	0.430	0.995	Brazil	0.2865	0.2888
Israel	0.7087	0.9491	Japan	0.2290	0.2816
US	0.565	0.854	Indonesia	0.4571	0.2753
Australia	–	0.8480	Vietnam	0.3510**	0.2378
Algeria	–	0.7791	Bangladesh	0.3661	0.2378
New Zealand	–	0.7345	S Korea	–	0.2327
UK	–	0.6247	Chile	–	0.2304
S Africa	0. 1878	0.5361	Mexico	0.2354	0.224
Russia	–	0.4942	Sri Lanka	0.3648	0.2156
Pakistan	0.4157	0.4281	Tanzania	–	0.2046
Egypt	–	0.4119	China	0.1211	0.1974
Uzbekistan	–	0.3748	India	0.2610	0.1890
EU	–	0.3565	Thailand	0.1223	0.1888
Nigeria	–	0.3033	Iran	–	0.1802

*Including forestry and fishery. ** For the year 1991.
Source: Calculated by the author from data in World Bank (2016).

The case of Kenya is conspicuous. It has the highest relative income per worker in agriculture, which is more than twice as high as compared to average per worker income in non-agricultural sectors. Kenya gained independence in 1963, and since then its population has doubled. Only 15.9% of its workforce in 2011 was in agriculture, contributing 29.3% of its gross national product (GNP). Less than one-fifth of Kenya's land is under cultivation. The secret of Kenya's high relative income per worker in agriculture lies in the cultivation of high-value crops. It is a leading producer of tea and coffee and also a leading exporter of fresh produce: cabbage, onions, mangoes, and flowers. However, the country is not yet self-sufficient in food.

There are striking differences between India and Kenya. In 2011, India had a population density of 382 people per square kilometre; Kenya had only 66 people per square kilometre. The per capita total GDP of India in 2011 was $1,460, while it was only $1,025 in Kenya. While the headcount ratio of poverty in India around 2011 was 22%, it was 42% in Kenya. Yet, it seems that on an average an agricultural worker in Kenya, by which one means both cultivators and hired workers, must be earning more than their Indian counterparts.

Most of the hired agricultural labour in Kenya is organised into a country-wide union to fight for their rights. In spite of the differences between the two countries, we have to see if we can learn from Kenya's experience in boosting income from agriculture through high-value crops, without ignoring the fact that it is yet to achieve self-sufficiency in food and yet to remove poverty. It is likely that there is great inequality in the Kenyan agricultural sector, more than in India, particularly between cash crop producers and subsistence producers and between cash crop cultivators and labourers. This would suggest that merely aiming for a high relative income per worker on an average may not solve the problem of poverty within agriculture.

This article tries to probe whether there is any evidence of the relative income per agricultural worker vis-à-vis that of non-agricultural worker increasing with the increase in per capita GDP across countries. However, the rank correlation coefficient between the ratio of income per agricultural worker over income per non-agricultural worker and the per capita total GDP across the 30 selected countries turned out to be only +0.30, which was not statistically significant, though positive. The case of Kenya is one of a negative relation between the two.

However, several high-income countries have also higher ratios of relative income per agricultural worker. Relatively high-income countries like Malaysia, Israel, the US, South Africa and Japan and middle-income countries like China and Thailand achieved an increase in the relative income per agricultural worker along with economic growth compared to their position in 1971. However, the Philippines, Indonesia, Vietnam, Bangladesh, Mexico, Sri Lanka, and India suffered a decline in this regard. Pakistan and Brazil maintained or very slightly improved their position. A declining ratio is worrisome in the case of India because even in 1971 the relative position of the agricultural workers was already low, and it has significantly deteriorated in the 40 years thereafter.

Declining Size of Landholdings

The continuously declining average size of holdings in India due to its agriculture being "crowded" has been noted by many (Joshi 2015). The average size of an operational holding has declined from 2.28 hectares in 1970–71 to 1.84 hectares in 1980–81, to 1.33 hectares in 2000–01, and further down to just 1.11 hectares in 2010–11. This is not due to agricultural areas being put to non-agricultural uses, since the decline in the total operated land has been relatively small, only 2.3% over the four decades. But, during the same period, the number of operational holdings nearly doubled, increasing from 70 million in 1970–71 to 138.3 million (Table 3).

One may say, averages can hide inequality. Dantwala had once observed that Indian agriculture might have been dominated by small farmers but not by small farms, since the proportion of large and medium farms together, that is all those holdings above the size of two hectares which were expected to be viable, accounted for over 78% of the total operated land in 1970–71. In 2010–11, this proportion declined to 55%. We may feel that even now they operate a little over half of the total area, but that is not likely to be so in future, say in 2020–21. The proportion of the number of holdings above two hectares declined from 30% to just 15% between 1970–71 and 2010–11. These holdings have also been facing a fast decline in their average size, though not as much as in the overall average for all holdings.

The proportion of holdings which cannot earn enough income for the farmer to feed his or her family and invest in his or her farm, that is below two hectares, increased in number from 70% in 1970–71 to 85% in 2010–11. The average size of these small and marginal holdings together increased somewhat from 0.48 hectares in 1970–71 to 0.60 hectares in 2010–11. But this is small consolation as it has taken place because of the subdivision of viable holdings due to population pressure. Unless the population pressure on agriculture is reversed, Indian agriculture would be dominated not only by small farms but also by small farms accounting for more than half of the total land.

Table 3: Growing Structural Weakness in Indian Agriculture

	1970–71	1980–81	2000–01	2010–11
Proportion (%) of operational holdings with 2 hectares or below	70	75	82	85
Proportion (%) of area operated by holdings with 2 hectares or below	22	26	39	45
Proportion (%) of operational holdings with more than 2 hectares	30	25	18	15
Proportion (%) of area operated by holdings with more than 2 hectares	78	74	61	55
Average size of all holdings	2.28	1.84	1.33	1.11
Average size of holdings with 2 hectares or below	0.48	0.48	0.63	0.60
Average size of holdings with more than 2 hectares	6.00	5.33	4.43	4.25
Total number of operational holdings (in million)	70.1	88.8	119.9	138.3
Total operated area (in million hectares)	162.1	163.8	159.4	158.3

Source: *Agricultural Statistics at a Glance.*

Well, why not increase the productivity of smallholdings to make them viable? This was exactly what the green revolution did, but it also commercialised agriculture as never before. The farmers had to buy inputs like seeds, fertilisers, and pesticides from the market. Farm operations had to be completed in the shortest time possible. The larger holdings could easily overcome the disadvantage of having less family labour per hectare through mechanisation of farm operations. They could go for bore wells or tube wells which the small farmers could not afford. Credit was also more easily available to the large farmers than to the smaller ones. Though it was claimed by the enthusiasts of the green revolution that it was scale-neutral because inputs like seeds and fertilisers were quite divisible according to the size of the holdings, in actual practice, small farmers were put under stress. They had to buy inputs from the market, whereas earlier they were self-reliant, using home-grown seeds and farmyard manure. The monetisation of inputs made the viability question sharper still.

Another way of improving the viability of small farmers is to shift to high-value crops like vegetables and flowers. Their dependence on market inputs may not decline by such a shift, but their dependence on the market for selling increases sharply. Unless these high-value crops are produced under arrangements like contract farming, their viability for farmers might not improve vastly. Unfortunately, even contract farming does not cover many farmers. The minimum support price regime is expected to protect farmers against a crash in post-harvest prices. But, the bulk of farm produce is not covered by this regime. Even where crops are eligible or are covered, farmers, particularly in distant corners, are either not aware of it or do not have access to it. Deshpande, therefore, has described this so-called facility as the "Moon in the Mirror" (Deshpande and Naika 2004). Uncertainty in prices is still a major challenge for all the farmers, particularly for the small, and this uncertainty specially affects producers of fruit and vegetables. Even at the retail level, tomato prices per kilo have fluctuated from ₹5 to ₹80 recently. Being perishable, the adoption of such crops is particularly risky. It is said

that the farmer is the only producer who is penalised for producing more.

Profitability Agriculture

There is a general impression that profitability of Indian agriculture has declined in general. At the national level, the ratios of agricultural output to inputs at constant prices (calculated from National Accounts Statistics) have been more or less constant around the mean at 2.62 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 (Nadkarni 2016: 83). The terms of trade of agriculture, calculated by dividing the GDP deflator for agricultural output by the same for agricultural inputs used in National Income Accounts, have gone increasingly in its favour since 1980–81 (Nadkarni 2016: 83).

In view of the near constancy in the ratios of agricultural output over inputs in real terms, an improvement of terms of trade in favour of agriculture does indicate an increase in profitability. Thus, the impression of a general decline in the profitability of agriculture is not true at least at the aggregate level. Therefore, this hypothesis has to be examined at the level of individual crops in selected individual states known for growing them (Table 4).

Table 4 presents a mixed picture. Taking the important crop of paddy first and ignoring Uttarakhand (which was a part of Uttar Pradesh during the first period, and no separate data for it is available), profitability has declined in five states out of eight and increased in the remaining three. Whether this difference is due to better procurement and support operations in these three states (Andhra Pradesh, Punjab and Uttar Pradesh) needs further probing. For wheat, another important cereal, there is an increase in profitability in all the four states for which data for both periods are available. We may recall that wheat is the best procured crop. As far as jowar is concerned, there is a decline in profitability in both the major jowar growing states, Karnataka and Maharashtra. The profitability of growing gram has declined in both the states for which data is available for both periods. If we look at groundnut, while profitability has increased in Andhra Pradesh, it has remained more or less the same in Gujarat. As for cotton, there is an increase in its profitability in Gujarat, but a slight decline in Maharashtra. The rates of return as calculated here are over costs, which include the imputed cost of family labour. The cash rates of return, therefore, should be higher and positive in most of the cases on an average.

Table 4: Average Rates of Profit (% over the C_1, C_2 and Revised C_2) in Selected Crops and States in India

Crop	State	TE 1983–84		TE 2013–14		
		Cost C_1	Cost C_2	Cost C_1	Cost C_2	Revised Cost $_2$
Paddy	Andhra Pradesh	51.6	7.7	72.4	13.6	13.3
	Assam	44.8[f]	11.0[f]	-7.2	-24.2	-24.2
	Bihar	110.2	24.4	17.3	-6.3	-6.8
	Odisha	71.4[d]	24.0[d]	6.0	-16.3	-16.9
	Punjab	63.0[g]	20.1[g]	163.0	39.6	39.5
	Tamil Nadu	53.7[a]	17.3[a]	31.6	9.7	9.7
	Uttar Pradesh	43.0	8.2	60.4	19.1	18.7
	Uttarakhand	–	–	42.9	9.5	6.7
	West Bengal	68.4[b]	20.1[b]	13.4	-11.6	-11.6
Wheat	Haryana	65.0	27.0	120.2	38.3	36.9
	Madhya Pradesh	74.2[f]	21.7[f]	137.5	49.0	48.8
	Chhattisgarh	–	–	27.0	-3.6	-3.6
	Punjab	59.3[g]	19.2[g]	178.2	42.9	41.7
	Uttar Pradesh	59.8[d]	22.8[d]	85.5	25.8	23.6
	Uttarakhand	–	–	85.4	27.3	24.5
Jowar	Karnataka	70.1	27.9	45.4	8.7	8.1
	Maharashtra	46.2[c]	18.2[c]	10.3	-6.9	-7.0
Gram	Madhya Pradesh	106.8[g]	36.7[g]	92.6	30.0	29.7
	Chhattisgarh	–	–	46.5	7.2	6.8
	Uttar Pradesh	90.0[f]	32.5[f]	47.5	5.5	4.8
Sugar cane	Maharashtra	79.3[e]	39.5[e]	94.4	46.8	46.2
	Uttar Pradesh	160.6	77.9	172.2	69.2	69.2
	Uttarakhand	–	–	151.2	74.5	73.8
Groundnut	Andhra Pradesh	39.7	-1.4	60.0	8.1	7.6
	Gujarat	47.4[c]	19.4[c]	48.3	19.1	18.8
Cotton	Gujarat	40.4	14.2	68.4	31.9	31.7
	Maharashtra	29.1	7.2	26.3	4.3	4.3

(i) TE – Triennial average ending with the year indicated.
(ii) C_1 = All actual expenses in cash and kind incurred in production by owner, interest on value of owned capital assets (excluding land), and imputed value of family labour.
(iii) $C_2 = C_1$ + rental value of owned land (net of land revenue) and rent paid for leased-in land.
(iv) Revised C_2 = Cost C_2 estimated by taking into account statutory minimum or actual wage whichever is higher.
(v) a = 1979–80 to 1981–82; b = 1982–83 to 1984–85; c = 1982–83 to 1986–87; d = 1983–84 to 1986–87; e = 1983–84 to 1987–88; f = 1984–85 to 1986–87; g = 1985–86 to 1987–88; and (-) = not available or undivided state.
Source: Computed from CACP Kharif and Rabi Price Policy Reports covering several marketing seasons Nadkarni (1993: 29).

The crisis in Indian agriculture is, therefore, neither one of decline or stagnation in productivity nor one of adverse terms of trade any more, though particular crops or states concerned may need some attention. There is no general crisis of profitability as such. A crop grown on a tiny farm, even if highly profitable in terms of rate of return over cost, may not make the farm viable in itself if the total absolute profit is not enough to take the family above the poverty level.

The crisis in Indian agriculture is structural in nature and is quite basic. It is a crisis of viability itself, arising from the non-viable size of holdings, and has deepened over the last several decades. Though the crisis of viability is not a crisis of profitability per se, it is certainly not good for private capital formation in agriculture and its long-term profitability. What profitability we may find today might not be sustainable in the long run as agriculture is becoming increasingly non-viable.

Viability Crisis

An important implication of non-viability of agriculture is its vulnerability to crises. A sufficiently viable holding should be able to earn enough for the cultivator so that he can not only meet his family's consumption needs and current inputs costs but also able to save something for investments and meet any exigencies like a crash in production either due to droughts or pest attacks.

The structural weakness of Indian agriculture makes it unprepared to tackle climate change and to remain resilient. Struck by a drought, a non-viable farmer tends to sell his productive assets like bullocks because he cannot get loans for meeting consumption needs in a drought. Even when the situation returns to normal, he would still be unable to cultivate due to the loss of productive assets.

Moreover, even if a farmer takes a loan for meeting investment needs, he should earn enough surplus over current costs and consumption to return the loan and pay interest by instalments at least. Non-viable farmers sometimes cannot do that because either the holding is not viable enough to make the investment paying,

or because of crop loss, or because of a post-harvest crash in the prices. When he cannot return a loan, he loses face, cannot get further loans, and thinks of an escapist solution in the form of suicide, with the hope that his family may get some relief or compensation from the government after his death. The increasing dependence on the government to tide over crises is a sure sign of increasing non-viability and vulnerability.

Earlier, the marginal and small farmers could survive because they had common lands where they could graze their animals and extract a good deal of their biomass needs both for their farms and homes. These common lands, which had earlier informally subsidised these farmers and made them viable, have greatly declined in size and number now and have become non-existent or at least insignificant in most places. Farmers, particularly with larger holdings, used to grow trees suitable for leaf manure and fodder. Now with increased pressure on land, resulting in subdivision of holdings, every inch of it tends to be used for crop cultivation with little space left for growing trees.

Regular rotational or seasonal fallowing was practised by farmers earlier in order to enable the soil to replenish its fertility. Now the farmers are not voluntarily following the practice and tend to leave their land fallow only during droughts. Considerations of sustainability are sacrificed on the whole now, making agriculture more vulnerable to climate change. Thus, the structural weakness of agriculture affects not only its viability, but also its sustainability.

The structural weakness of Indian agriculture is also affecting the health of the land adversely. It is estimated that about 96.4 million hectares of India's land area, which constitutes 29.3% of the total land mass of the country, was degraded during 2011–13. In 2003–05, for which a comparable estimate is available, the extent of degraded area was 94.5 million hectares (Chaudhury and Roy 2016). This trend is disturbing, for in less than a decade, nearly two million hectares of precious land have been lost to degradation or desertification. This has added to the structural crisis in agriculture since effective or usable land per cultivator has been further reduced.

To add to the woes of farmers, the Bharatiya Janata Party-led government in 2015 attempted to dilute the historic pro-farmer Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act of 2013 through an amendment. The amendment sought to make the acquisition of agricultural land by industries easier. When the attempt to amend the law through a series of land ordinances failed, the central government encouraged the states to pass their own land acquisition laws. It is reported that some states like Tamil Nadu, Gujarat, and Telangana have already passed laws or amendments which do not incorporate the safeguards built into the 2013 act (Ramesh and Khan 2016).

The 2013 act not only requires fair compensation, rehabilitation and resettlement of farmers whose lands are to be acquired, but also calls for a proper social impact assessment of the project which involves land acquisition. This provision is perceived by many as not being business-friendly. There is no doubt that cultivation in India has been extended to even marginal lands and that the area under cultivation is relatively much higher than in other countries. However, a significant portion of this cultivated land is now degraded. This seems to suggest that there is a case for transferring some land, particularly if degraded, for non-agricultural uses. But this cannot be done arbitrarily without instituting safeguards for farmers.

The 2013 act does not ban the transfer of land from agriculture to non-agricultural sectors, but only imposes safeguards for protecting farmers' rights so that they do not become destitute. Any amendment or state law which can result in increasing the extent of destitution in agriculture, even if it is in the name of stepping up growth, is meaningless and has to be resisted. A further loss of land without reducing the dependence on agriculture as a source of livelihood for the rural population would only further reduce the size of holdings and undermine the viability of agriculture.

Agriculture in the country cannot develop further without addressing its basic structural weakness. Stepping up the productivity per hectare, growing high value crops, subsidising agricultural inputs, extending marketing support tailored to the needs of small farmers and other such measures can only help the farmers to a limited extent. These will not help in the long run because these do not address the basic structural weakness of agriculture which lies in the small or non-viable size of agricultural holdings. These holdings are tending to become smaller and smaller, and it is this problem that has to be solved.

Suggested Measures

Any measures undertaken to resolve the crisis in agriculture cannot ignore the lot of agricultural labourers or wage workers. Their proportion in the total agricultural workforce has been steadily increasing in India since 1961, from 24.0% in 1961 to 45.6% in 2001, and to 54.9% in 2011. For the first time, agricultural labourers have outnumbered farmers now. It is necessary that any policy on agriculture should seek to improve their living standards, but a real improvement in their conditions cannot be expected unless the viability of agriculture improves.

Some agricultural workers, both cultivators and labourers, have been trying to overcome this crisis by seeking employment in nearby towns or cities, without giving up agriculture altogether. They commute to cities almost daily for work while still residing in villages and cling on to their agricultural holdings as a source of security. However, this cannot be a sustainable solution to the viability crisis in agriculture.

To solve this problem, policymakers should aim to maximise employment in the non-agricultural and agricultural sectors, rather than concentrating on maximising economic growth rates per se. Between 2000 and 2010, India's national output grew at an unprecedented rate of 7.7% per annum, but employment grew only by a mere 0.3% per annum (Joshi 2016: 60). Such jobless growth has only increased the dependence on agriculture since it has to absorb the residual workforce.

More than a century ago, Mahatma Gandhi had given much thought to the relative poverty of farmers and their underemployment and had advocated supplementing their income by income from cottage industries, including hand-spinning and khadi, first in his book *Hind*

Swaraj (published first in 1909) and then in his subsequent writings (Parel 2010). His advice seems to have relevance even now. Things would have been better if we had cared to follow the Gandhian model of decentralised village-based development at least to some extent. This would have been environment-friendly and would have helped minimise the impact of climate change (Nadkarni 2015).

Economic sectors that have higher employment intensity should be identified. Decentralised industries, which are scattered all over the country, can provide either part-time or full-time employment in rural areas and should be particularly encouraged. Agro-processing units in the small-scale sector have a great growth potential and should be encouraged as far as possible without compromising on the quality of the product. The consumers, whether rural or urban, need to feel confident that the products of these industries are not inferior to those produced by large-scale industries.

These industries need to be given marketing support in innovative ways, which can be done even by the private sector. Private industrial enterprises, which can assure quality control and provide marketing support, can adopt decentralised small or cottage industries, and government banks can provide them with credit support on a preferential basis. Decentralised economic sectors can spread technical and artistic skills and enterprising spirit even in rural areas and can coexist with large industries, where economies of scale are conspicuous. An indiscriminate resort to labour-saving devices has to be checked somehow in large industries. Incentives may be devised for improving employment intensity of growth.

It is also necessary to improve the quality of education available for rural people. Currently, education standards are so poor that many students enrolled in middle school are not able to do simple arithmetic calculations, write a few sentences on their own, and read and understand a textbook properly. Children of poor farmers and agricultural labourers cannot hope to get more remunerative alternative employment opportunities with their poor educational qualifications and are forced to depend on agriculture for their livelihood.

In addition to maximising employment opportunities outside agriculture so as to absorb agricultural workers, there is also a need to directly address the problem of non-viability. Of course, measures like increasing the productivity of crops, growing high-value crops, and diversification of agriculture should continue. But, besides these, there has to be an effective and widespread movement for consolidation of non-viable holdings into viable ones. Farmers participating in this movement should be given special incentives.

Farmers selling non-viable holdings should be assured of not only a fair price for their land, but also alternative employment opportunities. Banks should extend credit to small farmers buying additional land to make their holdings viable. There should, however, be no force or unreasonable pressure applied to sell non-viable holdings. If the farmers are not willing to sell their non-viable holdings outright, they should be free to lease out tiny holdings to a farmer who can consolidate them into a viable one and pay a fair rent. The lease market may have to be liberalised and formally recognised so as to make it possible for tenants to access bank credit for investment.

The government should encourage cooperative farming under which not only a large number of non-viable holdings can be consolidated but even agro-processing industries can be started. Special incentives can be offered to such cooperative farming enterprises. However, highly individualistic attitudes come in the way of getting together in a joint cooperative spirit. Once economic benefits of mutual trust and sociability are realised, a mighty force of economic enterprise and growth can be released for the welfare of all involved. The formation of dairy and sugar cooperatives and water markets in rural India is an example of institutional innovation. Can we hope that the serious viability crisis affecting Indian agriculture might release this potential force, which can boost the formation of social capital in the rural society? In any case, agricultural policy in India should also take care of new institution building without giving up its old concerns like stepping up productivity.

REFERENCES

Ballabh, Vishwa and Pooja Batra (2016): "Farmers in Distress and Resources under Stress: A Completely Neglected Subject," *Vicissitudes of Agriculture in the Fast Growing Indian Economy,* C Ramasamy and K R Ashok (eds), New Delhi: Academic Foundation, pp 377–400.

Birthal, P S et al (2014): "How Sensitive Is Indian Agriculture to Climate Change?" *Indian Journal of Agricultural Economics,* Vol 69, No 4, pp 474–87.

Chandrakanth, M G (2015): *Water Resource Economics: Towards a Sustainable Use of Water for Irrigation in India,* New Delhi: Springer.

Chandrakanth, M G, B Alamelu and M G Bhat (2004): "Combating Negative Externalities of Drought: Ground Water Recharge through Watershed Development Programme," *Economic & Political Weekly,* Vol 39, No 11, pp 1164–70.

Chaudhury, Sriroop and Mimi Roy (2016): "Halting Desertification," *Deccan Herald,* 15 November, p 10.

CACP (various years): Kharif and Rabi Price Policy Reports, Commission for Agricultural Costs and Prices, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, New Delhi.

Dandekar, V M (1976): "Crop Insurance in India," *Economic & Political Weekly*, Vol 11, No 26.

— (1994): "Transforming Traditional Agriculture: A Critique of Professor Schultz," *Indian Economy 1947–92—Vol 1: Agriculture,* New Delhi: Sage, pp 96–126.

Deshpande, R S and Saroj Arora (eds) (2010): *Agricultural Crisis and Farmer Suicides,* New Delhi: Sage.

Deshpande, R S and T Raveendra Naika (2004): *Moon in the Mirror: Farmers and Minimum Support Prices in Karnataka,* Institute for Social & Economic Change, Bengaluru, Monograph 7.

Joshi, P K (2015): "Has Indian Agriculture Become Crowded and Risky? Status, Implications and the Way Forward," *Indian Journal of Agricultural Economics,* Vol 70, No 1, pp 1–41.

Joshi, Vijay (2016): *India's Long Road: The Search for Prosperity,* Gurgaon: Allen Lane.

Nadkarni, M V (1993): A*gricultural Policy: Issues, Concepts and Instruments*, Development Research Group, Study 5, Reserve Bank of India, Mumbai, February.

— (2015): "Gandhi's Civilizational Alternative and Dealing with Climate Change," *Journal of Social & Economic Development,* Vol 17, No 1, pp 90–103.

— (2016): "Indian Agriculture through Challenges—Old and New," *Vicissitudes of Agriculture in the Fast Growing Indian Economy,* C Ramasamy and K R Ashok (eds), New Delhi: Academic Foundation, pp 71–85.

Narayanamoorthy, A and R S Deshpande (2005): *Where Water Seeps!—Towards a New Phase in India's Irrigation Reforms,* New Delhi: Academic Foundation.

Parel, Anthony (ed) (2010): *Gandhi—Hind Swaraj and Other Writings*, New Delhi: Cambridge University Press.

Ramasamy, C and K R Ashok (eds) (2016): *Vicissitudes of Agriculture in the Fast Growing Indian Economy—Challenges, Strategies and the Way Forward,* New Delhi: Academic Foundation.

Ramesh, Jairam and Muhammad A Khan (2016): "Winking at the States," *Hindu,* 2 November, p 10.

Rao, V K R V (1983): *India's National Income—1950–80,* New Delhi: Sage.

Rao, V M (1994): "Farmers in Market Economy: Would Farmers Gain Through Liberalisation?" *Indian Journal of Agricultural Economics*, Vol 49, No 3.

Rao, V M and H G Hanumappa (1999): "Marginalisation Process in Agriculture: Indicators, Outlook, and Policy," *Economic & Political Weekly*, Vol 34, No 52.

Sasmal, Joydeb (2014): "Foodgrains Production in India—How Serious Is the Shortage of Water Supply for Future Growth?" *Indian Journal of Agricultural Economics,* Vol 69, No 2, pp 229–42.

World Bank (2016): "World Development Indicators."