

Keynote paper on Agriculture
Structural Reforms and Agriculture: Issues and Policies¹

S.Mahendra Dev
Chairman, CACP

1. Introduction

The performance of Agriculture in India is important as the sector not only contributes to overall growth of the economy but also provides employment and food security to majority of the population in the country. The 11th Five Year Plan also indicates that agricultural development is an important component of inclusive growth approach. Structural reforms were introduced in India in a big way in 1991. These reforms were followed by India becoming founder member of WTO in 1994. The structural reforms and obligations of WTO have positive and negative effects on Indian agriculture². The negative effects can be reduced and benefits from overall reforms can be realized by following pro-agriculture macro policies and easing of supply side constraints in agriculture. In this context, this paper provides an over view of issues and policies on two aspects: (a) Impact of structural macro policy reforms on agriculture and (b) reforms needed in agriculture in order to benefit from overall economic reforms and cope with the emerging challenges in the post-reform era.

2. Structural Macro Policy Reforms and Agriculture

The structural reforms and stabilization policies introduced in India in 1991 initially focused on industry, tax reforms, foreign trade and investment, banking and capital markets. The economic reforms did not include any specific package specifically designed for agriculture. It was viewed that freeing agricultural markets and liberalising external trade in agricultural commodities would provide price incentives leading to enhanced investment and output in that sector, while broader trade liberalisation would shift inter-sectoral terms of trade in favour of agriculture (Balakrishnan, 2000)

On the positive side, the reforms have improved terms of trade for agriculture and opened up new opportunities such as benefits from trade and specialization, widening choices in new technology including bio-technology, increase in private investment in irrigation and marketing infrastructure like storage and transport. It is viewed that protection to industry in the form of import substitution policies like tight import controls and high import duties have hurt the agriculture till 1991. Disprotection to industry since 1991 are supposed to correct this bias and increase terms of trade for agriculture. “This would create a potentially more profitable agriculture, which would be able to bear the economic costs of technological modernization and expansion” (Manmohan Singh, 1995, p.2)³.

A look at terms of trade (TOT) in post-reform period shows that it was favourable to agriculture with fluctuations (Table 1). Agricultural growth was 3.7% per annum in the first six years of the reform period (1991-97). The terms of trade in agriculture improved during this period due to

¹ Keynote paper for the 92nd Annual conference of the Indian Economic Association 27th-29th December, Bhubaneswar, Orissa

² There is a vast literature on structural reforms, globalization and agriculture. See Rao (2003,2005), Bhalla (1995), Vyas (2007), Deshpande (2004), Dev (2008)

³ Also see Ahluwalia (1996)

dis-protection to industry, devaluation of rupee and increase in minimum support prices. Then the growth rate started declining since mid-1990s. The TOT deteriorated during this period. Agricultural growth has picked up again and growth was more than 4% during the period 2004-08. There seems to be a revival in TOT again during this period. Thus, the favourable TOT in agriculture has some impact on agriculture in the post-reform period. Similarly, private investment in agriculture improved in the post-reform period although there has been stagnancy in recent years. Terms of trade for agriculture based on GDP implicit price deflators indicate the TOT increased significantly since 2004-05. Particularly, the TOT for agriculture increased significantly in 2007-08 and 2008-09 and they are the highest in the last two decades (Table 2).

Trade reforms are expected to have positive impact on agriculture. There has been significant increase in agricultural exports after economic reforms were initiated. Agricultural exports rose from \$3.2 billion in 1991-92 to \$6.86 billion in 1996-97 but thereafter it declined. Increase in exports initially was due to significant reduction in the import duties and devaluation of Indian rupee. The economy wide reforms seem to have benefited agriculture because of increasing business transactions between agriculture and rest of the economy over time (Mishra and Rao, 2003). Sharp reduction in global commodity prices and East Asian crisis could be the principal reasons for decline in agricultural exports in the late 1990s. They picked up again from 2004-05 and continued till the financial crisis in 2008.

Trade liberalization in agriculture has been faster towards the end of 1990s in tune with WTO agreements. The impact of trade liberalisation on agriculture works through various channels such as volatile prices, problems in imports and exports, impact on livelihood and other employment opportunities. For farmers, perhaps the single most adverse effect has been the combination of low prices and output volatility for cash crops. Some prices such as those of cotton and oilseeds declined for long periods. Plantation crops like tea, coffee and rubber were also affected. This reflected not only domestic demand conditions but also the growing role played by international prices consequent upon greater integration with world markets in this sector.

But, monitoring of the imports for 300 sensitive products has indicated that such imports constitute only a small proportion of total agricultural imports in the country (GOI, 2003). Thus, the concern of significant imports due to trade liberalization has not been proved. India has considerable flexibility to counter flooding of the Indian market by cheap agricultural imports through imposition of tariffs (bound rates) under WTO. The major food and agricultural policies initiated in India are those of: Procurement policy, buffer stocking, public distribution system, public investment, input subsidies, and government support to research. Clearly, India does not have to change any of these policies because of Agreement on Agriculture. However, implementation of the WTO Agreement on Agriculture since 1995 has brought out the inadequacies inherent in the agreement⁴. The ongoing negotiations in the WTO on the AOA provide an opportunity for India to rectify these inadequacies and inequalities.

One problem with trade is that volatility in domestic agricultural prices will increase with globalization. Several studies have shown that volatility in global prices is higher than domestic commodity prices (Nayyar and Sen, 1994; Chand and Jha 2001; Sekhar, 2004). In a closed

⁴ See Alagh (2006) on WTO and agriculture

economy, lower output is normally accompanied by some price increase. With liberalization, we had a situation of lower production with lower prices. This pattern reflected the effect of the growing integration of Indian agriculture with world markets, resulting from trade liberalisation. There is a need for extreme vigilance so as to be able to take timely measures, within the existing tariff bindings to arrest heavy import of certain commodities (Rao, 2005).

India has done well in recent global food price crisis. The country almost insulated from this increase as compared to soaring global food prices during 2005-08. For example, global cereal prices increased by 150% as compared to 20% rise in India during 2005-08. There were food riots in many other countries. Although somewhat protectionist, India's trade policies and food management policies (support prices, buffer stock and PDS) were responsible for insulating India from global volatility.

The negative effects of structural reforms have been also due to fiscal and financial policies. In terms of fiscal policies, the reduced spending of central and state governments was the most significant feature in the 1990s. Due to tax reforms, the tax/GDP ratio declined at central level. Central transfers to state governments also declined. In the late 1990s, most state governments were in fiscal crisis and did not have funds for capital expenditures. This has been especially important since state governments are responsible for areas critical for agriculture such as rural infrastructure, power, water supply, health and education. At the central government level, capital expenditure declined as a share of national income, and all public expenditure directed towards the rural areas fell both as a per cent of GDP and in real per capita terms.

Financial liberalisation measures, including reduced emphasis on priority sector lending by banks, which effectively reduced the availability of rural credit, and thus made farm investment more expensive and more difficult, especially for small farmers. In addition to declining credit-deposit ratios in rural areas, the reduction in the number of rural bank branches and less manpower for rural service provision all meant that the formal sector was unable to meet the requirements of farmers, who were forced to turn to private moneylenders (who were often also input dealers and traders) in more exploitative relationships.

However, as shown below, the situation on public investment and credit has improved in the second half of this decade.

To conclude, slowing of agriculture growth occurred at a time when the economic reforms were undertaken in the country. It has been concluded by some that this slowing is linked directly to structural macro reforms in the country and globalization. This view is limited and the slowing in agriculture is not due to industrial and trade reforms including joining of WTO. Slowing down of agriculture growth could be attributed to the structural factors on the supply side such as decline in public investment, credit, technology etc. rather than trade and industrial reforms. The adverse effects of structural reforms were more to do with the manner in which reforms were undertaken in the country rather than intrinsic to structural reforms. Also, there have been positive effects on agriculture in terms of improvements in terms of trade, private investments, technology and specialization in agriculture. The negative effects can be reduced with a focus on supply side factors in agriculture.

3. Issues and Policies Relating to Reforms on Supply Side factors in Agriculture

Before going to these reforms, few words on the performance of agriculture are in order.

Agriculture sector has many problems. Growth decelerated from 3.5% during 1981-97 to 2% during 1997-2005. Further scope for increase in net sown area is limited. Land degradation in the form of depletion of soil fertility, erosion and, water logging has increased. There has been decline in the surface irrigation expansion rate and reduction in ground water table. Risk and vulnerability increased. Disparities in productivity across regions and crops persisted. Long term factors like steeper decline in per capita land availability and shrinking of farm size are also responsible for the slow performance of agriculture.

The Steering Committee report on agriculture for 11th Plan (GOI, 2007) has identified the possible reasons for deceleration in agriculture since mid-1990s. According to the report, the major sources of agricultural growth are: public and private investment in agriculture and rural infrastructure including irrigation, technological change, diversification of agriculture and fertilizers. The progress on all these sources slowed down in the 1990s particularly since mid-1990s (Table 3). Expansion was noticed in the case of agricultural credit.

There has been some revival in agriculture in recent years. Agricultural growth was more than 4% during 2003-04 to 2007-08. The total foodgrains production for the year 2008-09 was 233.88 million tonnes and stands out as record production. There were significant exports in cotton, rice and sugar. Cotton crop experienced a revolution due to adoption of BT cotton. Production of cotton increased from 99.97 lakh bales in 2000-01 to 258.84 lakh bales in 2007-08. There has been some increase in high value agriculture. Some of the lagging regions like Bihar showed relatively high growth in recent years. Similarly, Gujarat recorded high growth of 9% per annum during 2001-02 to 2007-08 (Gulati, 2009).

There has been demand problem in the economy due to financial crisis since 2008. However, rural demand and purchasing power were higher due to several factors: increase in minimum support prices, National Rural Employment Guarantee Scheme (NREGS), loan waiver scheme and higher agricultural growth in recent years. In the year 2008-09, however, agricultural growth was only 1.6%. There is a concern in 2009-10 due to drought conditions in several parts of the country.

There are three goals of agricultural development. These are: (a) achieve 4% growth in agriculture and raise incomes by increasing productivity (land, labor), diversification to high value agriculture and rural non-farm by maintaining food security; (b) sharing growth (equity) by focusing on small and marginal farmers, lagging regions, women etc.; (c) third is to maintain sustainability of agriculture by focusing on environmental concerns.

What are the policy reforms needed to achieve the above goals? There are basically seven factors which need focused reforms in the short and medium terms. These are: (a) price policy; (b) subsidies and investments; (c) land issues; (d) irrigation and water management (e) research and extension; (f) credit; (g) domestic market reforms and diversification. Institutions have to be

developed in all these aspects. *The reforms needed in supply factors are well known. But, it is important to keep repeating for better policies and implementation.*

(a) Price Policy

The major underlying objective of the Indian government's price policy is to protect both producers and consumers⁵. Currently, food security system and price policy basically consists of three instruments: procurement prices/minimum support prices, buffer stocks and public distribution system (PDS). There is a need to provide remunerative prices for farmers in order to maintain food security and increase incomes of farmers. There has been a debate on price vs. non-price factors in the literature. In our view both price and non-price factors are important in raising agricultural production.

One criticism of procurement policy is that it is limited to few crops and few states. Our field visits to different states reveal the following farmers' perceptions about agricultural prices. The cost of cultivation is increasing due to increase in input prices. Particularly agricultural wages have increased due to National Rural Employment Guarantee Scheme (NREGS) in several states. They want to resort to mechanization due to labour shortages in peak season. Farmers respond to prices as shown by increase in yields of wheat in Punjab and other states with significant increase in MSP. Farmers have to undergo distress sales due to lack of procurement in states like Bihar, parts of UP, M.P. and Orissa. If rice production is to be shifted to Eastern region, rural infrastructure including procurement centres has to be improved. Pulses production can be enhanced in several states with higher MSP and procurement. Provision of electricity has to be raised in order to exploit ground water in Eastern region.

In the context of globalization, tariff policy becomes important for agricultural commodities. In other words, it is important to monitor exports, imports, global supply and demand and fix tariffs accordingly. There is a need to balance between producer prices and consumer prices by careful calibration of minimum support prices and tariff policy (import duties).

There is a need for reforms in buffer stock operations and targeted public distribution system (TPDS). Buffer stock operations are becoming expensive. As FCI gets full reimbursement for its procurement, handling and storage costs, the scope for its efficiency improvement through reduction in operating costs need to be examined. Similarly, there are significant leakages in PDS. There can be better ways of more efficient food management practices in procurement, buffer stock and PDS. Policy reforms are needed here. Private sector can be involved in storage and some other activities with regulations.

(b) Subsidies and Investments in Agriculture: One major reform needed in agriculture sector relates to reduction in subsidies and increase in investments. Agricultural subsidies are fiscally unsustainable and encourage misuse of resources, leading to environmentally malignant developments. There is trade-off between subsidies and investments. Public investment declined from 3.4% of agri.GDP in the early 1980s to 1.9% in 2001-03. At the same time subsidies increased from 2.9% to 7.4% of agri.GDP (GOI, 2007). Rise in public and private investment is crucial for enhancing agricultural growth. Fortunately, gross capital formation in agriculture has

⁵ On price policy, see Acharya (1997), Sen (1999), Bhattacharya (2003)

increased from 12% of agricultural GDP in 2004-05 to 14.2% of GDP in 2007-08 (Table 4). Public sector investment has increased significantly during this period. However, we need 16% agricultural GDP as investment in order to get 4% growth in agriculture. In this context, the announcement of *Bharat Nirman* programme in 2005 by the Government of India in order to improve agriculture and rural infrastructure is in the right direction. However, the pace of this programme has to be improved.

(c) Land Issues: Some argue that small size of farm is responsible for low profitability of agriculture. Chinese and the experience of other East Asian countries show that it is not a constraint. On land market, the Report of the Steering Committee recommended the following. “Small farmers should be assisted to buy land through the provision of institutional credit, on a long term basis, at a low rate of interest and by reducing stamp duty. At the same time, they should be enabled to enlarge their operational holdings by liberalizing the land lease market. The two major elements of such a reform are: security of tenure for tenants during the period of contract; and the right of the land owner to resume land after the period of contract is over” (GOI, 2007). Basically, we have to ensure land leasing, create conditions including credit, whereby the poor can access land from those who wish to leave agriculture. There are some emerging land issues such as increase in demand for land for non-agricultural purposes including special economic zones, displacement of farmers, tribals and others due to development projects. There is a need for careful land acquisition. Land alienation is a serious problem in tribal areas.

(d) Irrigation and Water Management: Water is the leading input in agriculture. Development of irrigation and water management are crucial for raising levels of living in rural areas⁶. Major areas of concern in irrigation are: decline in real investment, thin spread of investment, low recovery of costs, decline in water table, wastages and inefficiencies in water use and, non-involvement of users Both investment and efficiency in use of water are needed. Major areas of reforms needed in irrigation are: stepping up and prioritizing public investment, raising profitability of groundwater exploitation and augmenting ground water resources, rational pricing of irrigation water and electricity, involvement of user farmers in the management of irrigation systems and, making groundwater markets equitable (Rao, 2005). In a recent study, Shah et al (2009) indicate that the impact of the drought of 2009 is expected be less severe than the drought of 2002 due to ground water recharge in the last few years. Ground water can be exploited in a big way in Eastern region. Watershed development and, water conservation by the community are needed under water management. New watershed guidelines based on Parthasarathy Committee’s recommendations were accepted by the Central Cabinet in March 2009. The implementation has to be stepped up in order to obtain benefits in rainfed areas. National Rainfed Area Authority has big responsibility in matters relating to water conservation and watershed development. Assets created under NREGS can help in improving land and water management.

(e) Research, Extension and Technology Fatigue: The yield growth for many crops has declined in the 1990s. Technology plays an important role in improving the yields. The National Commission on Farmers indicates that there is a large knowledge gap between the yields in

⁶ On land and water management, see Vaidyanathan (2006)

research stations and actual yields in farmers' fields. The yield gaps given by the Planning Commission (GOI, 2007 a) range from 5% to 300% depending on the crop and State.

National Food Security Mission (NFSM) has been launched in 2007 to increase 20 million tonnes of foodgrains (10 m.t. for rice, 8 m.t. for wheat and 2 m.t. for pulses) during the 11th plan period. It has already shown some results by increasing yields in different regions. There is a need to strengthen this mission to increase productivity.

The issue of technology fatigue in agriculture is well known now. There is a need to shift away from individual crop-oriented research focused essentially on irrigated areas towards research on crops and cropping systems in the dry lands, hills, tribal and other marginal areas (Swaminathan, 2007). In view of high variability in agro-climatic conditions in such unfavourable areas, research has to become increasingly location-specific with greater participation or interaction with farmers. Private sector participation in agricultural research, extension and marketing is becoming increasingly important especially with the advent of biotechnology and protection being given to intellectual property. However, private sector participation tends to be limited to profitable crops and enterprises undertaken by resource rich farmers in well endowed regions. Therefore, the public sector research has to increasingly address the problems facing the resource-poor farmers in the less endowed regions. The new agricultural technologies in the horizon are largely biotechnologies. There has been a revolution in cotton production due to success of BT cotton in this decade⁷. Similarly, there is a need to strengthen extension. The ATMA (Agricultural Technology Management Agency) scheme was launched in 2005 to support state governments' efforts to revitalize the extension. This scheme gives an opportunity to improve extension system. The returns to investment on research and extension will be much higher on agricultural growth as compared to other investments.

(f) Credit: According to the expert group on Financial Inclusion (GOI, 2008) only 27% of farmers have access to institutional credit. It is true that there have been some improvements in flow of farm credit in recent years (Table 5). However, the Government has to be sensitive to the four distributional aspects of agricultural credit. These are: (a) not much improvement in the share of small and marginal farmers⁸; (b) decline in credit-deposit (CD) ratios of rural and semi-urban branches; (c) increase in the share of indirect credit in total agricultural credit and; (d) significant regional inequalities in credit.

(g) Diversification to Hi-value Agriculture and Marketing: There has been diversification of Indian diets away from foodgrains to high value products like milk and meat products and vegetables and fruits. Since risk is high for diversification, necessary support in infrastructure and marketing are needed. Price policy should also encourage diversification. The Government wants to have second 'green revolution' by diversifying agriculture in crop sector and allied activities. To promote holistic growth of the horticulture sector through area based regionally differentiated strategies, the National Horticulture Mission (NHM) was launched in the country during 10th Plan. The impact has to be strengthened further to improve productivity in horticulture sector.

⁷ On biotechnology in Indian agriculture, see Rao and Dev (forthcoming)

⁸See Rangarajan, 2005

The true benefit of diversification will come if more emphasis is given to allied activities like animal husbandry and fisheries. The livestock sector contributes 5.4% to GDP and 22.7% to total output from agriculture sector. Ownership of livestock is more equitable than that of land and women play significant role in animal husbandry.

For small and marginal farmers, marketing of their products is main problem apart from credit and extension. In recent years, there has been some form of contract arrangements in several agricultural crops such as tomatoes, potatoes, chillies, gherkin, baby corn, rose, onions, cotton, wheat, basmati rice, groundnut, flowers, and medicinal plants. There is a silent revolution in institutions regarding non-cereal foods. New production –market linkages in the food supply chain are: spot or open market transactions, agricultural co-operatives and contract farming (Joshi and Gulati, 2003). Contract farming in India is neither backed up by law nor by an efficient legal system. This has to be strengthened as legal system is the single most constraint to widespread use of contract farming in India.

There is a need to revamp some of the legal hurdles for agro processing and APMC Act⁹. Several State Governments have already amended their APMC Acts allowing varying degrees of flexibility. However several States are yet to notify the relevant rules that would make the amendment fully operational. These steps should be speedily completed to provide a boost to promotion of direct marketing, contract farming, and setting up of markets in private and co-operative sectors.

Most important problem for the farmers is output price fluctuations. There is a big gap between producer prices and consumer prices. There are different models for marketing collectively by the small and marginal farmers. These are: self help group model, co-operative model, small producer co-operatives and contract farming. *Apni Mandi* in Punjab, *Rytu Bazars* in Andhra Pradesh, dairy co-operatives are some of the successful cases in marketing. The real challenge lies in organising the small and marginal farmers for marketing and linking them to high value agriculture. Thus, group approach is needed for getting benefits from marketing.

4. Few Other Issues

Emerging Challenge: Climate Change

Climate change is a reality. India has reasons to be concerned about climate change. Vast majority of population depends on climatic sensitive sectors like agriculture, forestry and fishery for livelihood in the country. The adverse impact of climate change in the form of declining rainfall and rising temperatures and thus the increased severity of drought and flooding, would threaten food security and livelihood in the economy. For example, rise in temperature would affect wheat yields.

India has prepared a document namely the National Action Plan on Climate Change. It provides a direction for changes at the national level in policy, planning and public-private partnerships and lays out a global vision for modifying longer time trends for sustainable development. Successful adaptation coupled with mitigation holds the key to food security and livelihoods for the 21st century and beyond in India.

⁹ See Chadha (2009) on agro processing and rural industrialization

Equity in Agriculture

Regional Disparities: Growth rates in agriculture SDP were high for many states during the period 1984/85 to 1995/96. However, growth decelerated in all the states except Bihar during the period 1995/96 to 2004/05 (GOI, 2007)¹⁰. The deceleration is the highest in the states with greater proportion of rain-fed areas (Gujarat, Rajasthan, M.P., Karnataka and Maharashtra). Recent experience, however, shows that Gujarat recorded the highest growth of around 9 per cent during 2000/01 to 2007/08 (Gulati, 2009). During this period, six states viz., Gujarat, Rajasthan, Himachal Pradesh, Andhra Pradesh, Chattisgarh and Bihar recoded more than 4% growth per annum. Public investment in infrastructure like irrigation, power, roads, watersheds, check dams, technology like BT cotton and diversification in agriculture played crucial roles in raising agricultural growth in Gujarat. Other states can learn from the experience of Gujarat. There is a need to shift rice cultivation to Eastern region from Punjab and Haryana for growth, equity and environment reasons. In order to encourage the States to invest more towards agriculture and allied sectors and to achieve 4% growth in agriculture, the government launched the Rashtriya Krishi Vikas Yojana (RKVY) in 2007-08 with an outlay of Rs.25,000 crores for the 11th Five Year Plan. The scheme requires the States to prepare District agriculture plans and provides adequate flexibility and autonomy to State governments. The States should make use of this scheme to improve the agriculture sector.

Small and Marginal Farmers: It is known that more than 80% of India's farmers belong to the categories of small and marginal farmers with an area share of more than 40%. The support systems and policy changes have to support in raising productivity and incomes of the small and marginal farmers. National Commission on Enterprises for Unorganized Sector (NCEUS, 2008) suggests special programmes for small and marginal farmers. Principal activities proposed under this include promotion of marginal-small farmers' groups, enabling greater access to institutional credit, training and capacity building, support for strengthening and non-farm activities, gender-focussed activities and planning for development of marginal and small farmers.

5. Conclusion

This paper provides an overview of the issues and policies on (a) the impact of structural macro policy reforms on agriculture and (b) reforms relating to supply side factors in agriculture sectors. There are two major conclusions as given below.

(1) Structural reforms on agriculture have positive and negative effects. Agriculture benefited indirectly due to disprotection given to industry in the post-reform period. The terms of trade, private investment, opportunities for technology and specialization have increased for agriculture. On the negative side, trade reforms might have affected some crops and increased dependence on global prices which are volatile. Fiscal and financial liberalization also had some adverse impact on investments and credit. It has been concluded by some that the slow down in agriculture growth is linked directly to structural macro reforms in the country and globalization including joining of WTO. It may be noted that the slow down is more to do with domestic policies. Some of the adverse effects due to structural reforms can be reversed if macro pro-agricultural policies are followed as happened since 2004-05. Higher GDP growth due to

¹⁰ Also see Bhalla (2006)

domestic reform policies and global boom helped in having higher tax/GDP ratio and better allocations to agriculture in the form of public investment and credit.

(2) It may be noted that the slowing in agriculture growth could be attributed to the structural factors on the supply side such as public investment, credit, technology, land and water management etc. rather than globalization and trade reforms per se. There are six deficits in Indian agriculture. These are: (a) investment, credit and Infrastructure deficit; (b) land and water management deficit; (c) research and extension (technology) deficit; (d) market deficit; (e) diversification deficit; (f) institutions deficit. Reforms are needed to reduce these deficits in order to achieve the goals of agriculture: (i) Achieving 4% growth in agriculture; (ii) equity in terms of higher growth in lagging regions, small and marginal farmers and women and ; (iii) sustainability.

Apart from high growth, efficiency (cost reduction) is also needed in globalized world. Group approach among farmers should be encouraged in order to get inputs at cheaper rates and marketing of output at higher prices.

The four central government's special programmes viz., National Food Security Mission (NFSM), Rastriya Krishi Vikas Yojana (RKVY), National Horticulture Mission (NHM) and Agricultural Technology Management Agency (ATMA) would be useful, if implemented properly, in improving growth and equity in agriculture.

The medium and long term measures relating to supply side can also improve drought-proofing and de-risking agriculture. Similarly, rural non-farm sector has to be developed. In spite of these measures, agriculture would always be subjected to shocks in the form of volatility in global agricultural prices and natural calamities like droughts, floods and temperature changes. Therefore, there is a need to put in place social protection programmes and drought or flood management practices including crop insurance to take care of risks or shocks in agriculture. For example, social protection programmes like PDS and rural public works programmes helped in a big way the drought effects in Gujarat and Rajasthan in 1987-88.

'Business as usual approach' may not help revival of agriculture. The government is thinking of big push to education in 11th Five Year Plan. Such a big push is needed for reforms in supply side for agriculture. Similarly demand factors also have to be addressed. Given the short run and structural long term problems in agriculture, the government should give large push to core issues to make cultivation viable and profitable. There is a need to concentrate on delivery systems also. India's large numbers of farmers can benefit if there are right policies and effective implementation.

References

- Acharya, S.S. (1997), "Agricultural Price Policy and Development : Some Facts and Emerging Issues" *Indian Journal of Agricultural Economics*, Vol.52, No.1
- Ahluwalia, M.S. (1996), "New Economic Policy and Agriculture: Some Reflections", *Indian Journal of Agricultural Economics*, Volume 51, No.3
- Alagh, Y.K. (2006), "Indian Economic Strategies After Doha" in Radhakrishna, R, S.K. Rao, S.Mahendra Dev and K.Subbarao (2006 eds.), *India in a Globalising World: Some Aspects of Macroeconomy, Agriculture and Poverty*, Essays in honour of C.H. Hanumantha Rao, Academic Foundation
- Balakrishnan, P. (2000), "Agriculture and Economic Reforms: Growth and Welfare", *Economic and Political Weekly*, March 4-10
- Bhalla, G.S. (1995), "Globalization and Agricultural Policy in India", *Indian Journal of Agricultural Economics*, Vol.50, No.1
- Bhalla, G.S. (2006), "Agricultural Growth and Regional Variations", in R.Radhakrishna, S.K. Rao, S.Mahendra Dev and K.Subbarao (eds.), *India in a Globalising World: Some aspects of Macroeconomy, Agriculture and Poverty*, Essays in honour of Prof. C.H. Hanumantha Rao, Academic Foundation, New Delhi
- Bhattacharya, B.B. (2003), "Trade Liberalization and Agricultural Price Policy in India Since Reforms", *Indian Journal of Agricultural Economics*, Vol.58, No.3
- Chadha, G.K. (2009), "Agriculture and Rural Industrialization in India, Recent Developments and Future Concerns" in Rao, N.C. and S.Mahendra Dev (eds.,2009) *India: Perspectives on Equitable Development*, Academic Foundation
- Chand, Ramesh and Dayanath Jha (2001), "Trade Liberalization: Agricultural Prices and Net Social Welfare", in SS Acharya and D.P.Chaudhari (eds.), *Indian Agricultural Policy at the Cross Roads*, Rawat Publishers, New Delhi
- Deshpande, R.S. (2004), "Liberalization, Domestic Price Policy and Agricultural Growth", Summaries of Group Discussion, *Indian Journal of Agricultural Economics*, Vol.89, No.1
- Dev, S. Mahendra (2008), *Inclusive Growth in India, Agriculture, Poverty and Human Development*, Oxford University Press, New Delhi
- GOI (2007), *Report of the Steering Committee on Agriculture for 11th Five Year Plan*, Yojana Bhavan, New Delhi
- GOI (2007a), *Agricultural Strategy for the Eleventh Plan: Concerns and Way ahead*, Yojana Bhavan, New Delhi
- GOI (2008), *Expert Group on Financial Inclusion*, Chaired by Dr. C.Rangarajan, Government of India
- Gulati, Ashok (2009), "Emerging Trends in Indian Agriculture: What can we learn from these?" 2nd Prof. Dayanath Jha Memorial Lecture, National Centre for Agricultural Economics and Policy Research, New Delhi
- Joshi P K and A. Gulati (2003), 'From Plate to Plough: Agricultural Diversification in India', Paper presented at the Dragon and Elephant: A Comparative Study of Economic and Agricultural Reforms in China and India', New Delhi, India, March 25-26
- Mishra, V.N. and Govinda Rao (2003), Trade Policy, Agricultural Growth and Rural Poor: Indian Experience, 1978-79 to 1999-00, *Economic and Political Weekly*, October 25, 2003
- Nayyar, Deepak and Abhijit Sen, (1994), "International Trade and Agricultural Sector in India", in G.S.Bhalla (ed.), *Economic Liberalization and Indian Agriculture*, Indian Studies for Industrial Development, New Delhi
- Rangarajan, C (2005), "Agricultural Credit: Reaching the Marginalised Farmers", Lecture delivered at the Bankers' conference (BANCON) 2005, Kolkata, November 12, 2005
- Rao, C.H.Hanumantha (2003), "Reform Agenda for Agriculture", *Economic and Political Weekly*, Feb 15

- Rao, C.H. Hanumantha (2005), *Agriculture, Food security, Poverty and Environmen*, Oxford University Press, New Delhi.
- Rao, N.C., and S.Mahendra Dev (forthcoming), *Biotechnology in Indian Agriculture-Potential, Performance and Concerns*, Academic Foundation, New Delhi
- Sekhar, CSC (2004), "Agricultural Price Volatility in International and Indian Markets", *Economic and Political Weekly*, October 23, 2004
- Sen, Abhijit (1999), "Agricultural Price Policy: Achievements and the Emerging Problems", in Krishna Rao, Y.V. (ed., 1999), *New Challenges Facing Indian Agriculture*, Vishalandra Publishing House
- Shah, Tushar, Avinash Kishore, P.Hemant, (2009), Will the Impact of the 2009 Drought be Different from 2002, *Economic and Political Weekly*, Vol.44, No.37
- Singh, Manmohan (1995), "Inaugural Address", *Indian Journal of Agricultural Economics*, Vol.50, No.1.
- Swaminathan, M.S. (2007), *Agriculture Can not Wait: New Horizons in Indian Agriculture*, Academic Foundation, National Academy of Agricultural Sciences
- Vaidyanathan, A. (2006), *India's Water Resources: Contemporary Issues on Irrigation*, Oxford University Press, New Delhi
- Vyas, V.S. (2007), "Market Reforms in Indian Agriculture: One Step Forward, Two Steps Back", in Gulati, A. and S.Fan (eds.,2007), *The Dragon and the Elephant: Agriculture and Rural Reforms in India and China*, Oxford University Press, New Delhi

Table 1 Index of Terms of Trade between Agriculture and Non-agricultural Sector

Year	Combined Index of Prices paid	Index of Prices Received	agriculture's terms of trade
1981-82	61.9	54.9	88.7
1982-83	66.0	60.3	91.4
1983-84	70.1	64.2	91.6
1984-85	72.4	68.0	93.9
1985-86	75.2	70.4	93.6
1986-87	80.2	76.7	95.7
1987-88	88.3	86.0	97.4
1988-89	91.8	90.3	98.3
1989-90	98.1	97.5	99.4
1990-91	110.2	112.3	101.9
1991-92	123.8	130.8	105.6
1992-93	133.5	138.7	103.9
1993-94	146.1	151.4	103.6
1994-95	160.5	171.1	106.6
1995-96	173.7	182.9	105.3
1996-97	184.8	190.6	103.1
1997-98	194.9	205.9	105.6
1998-99	209.9	220.8	105.2
1999-00	214.0	219.8	102.7
2000-01	223.0	225.0	100.9
2001-02	229.0	235.3	102.8
2002-03	239.3	247.9	103.6
2003-04	248.7	251.2	101.0
2004-05	257.5	258.2	100.3
2005-06	270.6	275.8	101.9
2006-07*	285.4	291.1	102.0

*provisional

Note: Index of terms of trade are based on the triennium ending 1990-91

Source: Directorate of Economics and Statistics, Ministry of Agriculture

Table 2 Agriculture Terms of Trade based GDP Implicit Price Deflators (1999-00 =100)

Year	Term of Trade for Agriculture
1989-90	88.9
1990-91	89.8
1991-92	96.4
1992-93	93.3
1993-94	93.9
1994-95	95.8
1995-96	96.2
1996-97	97.6
1997-98	101.1
1998-99	101.0
1999-00	100.0
2000-01	97.1
2001-02	96.3
2002-03	97.3
2003-04	95.7
2004-05	93.4
2005-06	96.8
2006-07	97.7
2007-08	101.4
2008-09	103.4

Note: GDP implicit price deflators for agriculture and non-agriculture are used to derive agricultural terms of trade

Source: Estimated based on National Accounts Statistics, CSO.

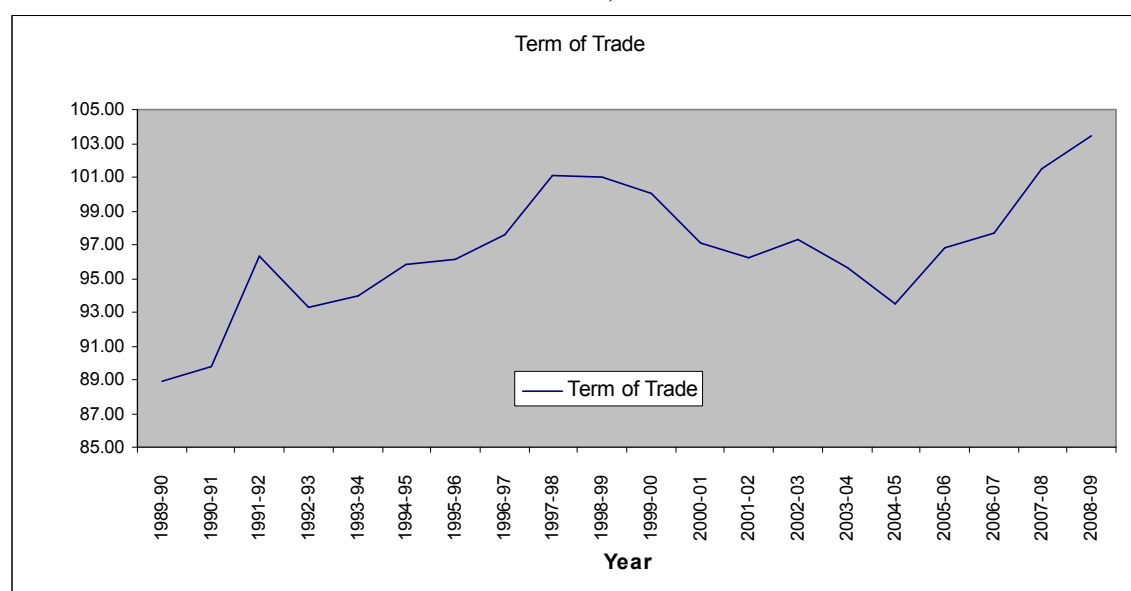


Fig 1. Terms of trade for agriculture based on GDP implicit price deflators

Source: Estimated from National Accounts Statistics, CSO.

Table 3. Trend growth rate in area, input use, credit and capital stock in agriculture during 1980-81 to 2005-06

	1980-81 to 1990-91	1990-91 to 1996-97	1996-97 to 2005-06
Technology	3.3	2.8	0.0
Public Invest.	3.9	1.9	1.4
Private Invest.	0.6	2.2	1.2
Irrigated Area	2.3	2.6	0.6
Area under Fruits and veg.	5.6	5.6	2.7
NPK Use	8.2	2.5	2.3
Credit	3.7	7.5	14.4

Source: GOI, 2007

Table 4. Gross Capital Formation in Agriculture&Allied as percentage of GDP in Agriculture&Allied

Year	Public Investment (%)	Private Investment (%)	Total Investment (%)
1999-2000	1.94	9.29	11.23
2000-01	1.81	8.40	10.21
2001-02	2.05	9.99	12.04
2002-03	1.99	10.69	12.68
2003-04	2.24	8.85	11.09
2004-05	2.70	9.28	11.98
2005-06	3.12	9.81	12.93
2006-07	3.53	10.26	13.79
2007-08	3.97	10.27	14.24

Source: Ministry of Agriculture, Government of India

Table 5. Credit flow to Agriculture (Rs.in crores)

Year	Target	Achievement	%Achievement	%Growth
2004-05	105000	125309	119.34	44.06
2005-06	141000	180486	128.00	44.03
2006-07	175000	229400	131.09	27.10
2007-08	225000	243569	108.25	6.17
2008-09	280000	287149	102.55	4.87
2009-10	325000	92070(upto July, 2009)	28.33	---

Source: NABARD, 2009 quoted by Ministry of agriculture, Government of India, 2009