

AGRICULTURE SECTOR STUDY: CRITICAL ISSUES AND STRATEGIC OPTIONS

I. Overview

Agriculture continues to be a fundamental instrument for sustainable development and poverty reduction in India. India resides in its villages and according to the 2001 census 72.2 per cent of the people are in rural areas. The agriculture sector contributes only about 18 per cent of the total Gross Domestic Product (GDP). Indian agriculture has made rapid strides from food shortages and imports to self-sufficiency and exports. It has moved from subsistence farming to intensive and technology led cultivation. Agriculture is at the core of socio economic development of the country. Growth of other sectors and overall economy depends on performance of agriculture to a considerable extent. Not only it is a source of livelihood and food security for a large population of India but also has a special significance for low income, poor and vulnerable sections. However, several constraints such as preponderance of small and marginal holdings accounting for about 82 per cent of total holdings, imperfect market conditions and lack of backward and forward linkages have contributed to the stagnation of the sector.

II. Lessons of the X Five Year Plan

The Xth Plan strategy was not very different from what is proposed for the 11th plan – better management of land and water resources, crop diversification and the development of marketing infrastructure, modernising the extension system (along with encouraging entry of private sector), and the development of agriculture in the North-East. The mid-term appraisal showed that plan spending on agriculture was slow to take off and many of the plan schemes did not take shape until the third year.

As is evident from Table 1, the growth in all segments of the agriculture sector declined in the period from 1996/97 to 2003/04. Overall the sector grew at 1.85% per annum in the period 1995/96 to 2004/05. The growth rate in the period 1984/85 to 1995/96 was 3.6%. The stagnation is most evident in foodgrains – their per capita availability in 2004/07 was 186 kgs as against 207 kgs in 1991/95.

It is quite certain that the 10th plan target growth of 4% per annum will not be achieved. The failure is a reflection of the structural factors that ail the agricultural sector: the stagnant to declining public investments, the failure of plan programs to make a dent on the erosion of land resources, a sluggish agricultural research system, and an extension system on the verge of collapse. The 10th plan programs did not witness a turn-around in any of these areas.

Lack of resources and the absence of adequate incentive structures have led to the break-down of extension services in most states. The central government responded to the malaise in extension by creating a new institution – the Agricultural Technology Management Agency (ATMA). This was done on a pilot basis in 4 districts of each state. ATMA was set up as an autonomous institution and has all the stakeholders as its members. The ATMA model has two advantages over traditional extension – in structure it is decentralised and it can accept funds and resources from a variety of agencies including user fees. However, it is not yet clear whether it can overcome the other problems of traditional extension – chronic underfunding and non-accountability to users. However, the Central government has found the results sufficiently impressive to extend the ATMA to 252 districts during the X plan.

In **livestock**, the principal plan programs are as follows:

(a) Fodder development programmes: During the 9th plan, the government set up a Central Fodder Development Organization to research fodder crops, to test their field performance and to organize and distribute foundation seed. This venture has not performed well – for many of the usual reasons. State level initiatives are more likely to succeed – the focus has to be on R&D, production of foundation seed and related extension. Distribution will rarely be an issue because that will happen through farmers. Although there are centrally sponsored state level fodder programmes, they involve insignificant resources.

(b) The national project for cattle and buffalo breeding is a major scheme for genetic upgradation. However, there are huge gaps in breeding programs for cattle such as incomplete identification of genetically superior indigenous breeds, the shortage of breeding bulls, insufficient knowledge among farmers about the importance of quality breeds and poor delivery of artificial insemination services (because of insufficiency of mobile centres).

(c) Slaughter houses are in poor shape and need to be modernized especially in view of the prospects of exports. The centrally sponsored schemes for modernization failed because states failed to allocate resources to match the central grant.

(d) Disease control is another public sector activity with high returns. Currently, the problems are poor vaccination coverage of animals and the absence of a system for quick monitoring of epidemics (such as avian flu). Although many centrally sponsored schemes exist, the problem is again with the share from the states.

(e) In the dairy sector, the major plan scheme is the Intensive Dairy Development Programme which is meant to cover the districts which did not benefit from Operation Flood. The scheme has been poorly implemented. Although Operation Flood and IDDP enabled the establishment of district level milk unions, many of them are not financially viable illustrating the dangers of a subsidy driven approach.

In **agricultural marketing**, there are as many as 39 plan schemes spanning 9 Ministries and several autonomous bodies. These schemes promote private investment in domestic trading, post harvest management, exports, quality management and support initiatives for capacity building, food safety and improving market information. These schemes involve providing an investment grant to private entrepreneurs for a range of projects. The investment grants under various schemes range from 10 percent to 50 percent of the total project cost, although the majority of schemes provide support through the subsidy in the range of 25 to 33 percent. The multiplicity of schemes, the cumbersome process of financial disbursement and the lack of a database that documents the infrastructure created are some of the handicaps of these schemes. The major schemes with the Agriculture Ministry promote the creation of agricultural market infrastructure, and the construction of rural godowns.

In addition, the **National Horticultural Mission** (NHM) was launched in 2005. The mission mandate is comprehensive – from R&D to production strategies to post-harvest management. Institutionally, it is open to collaborations with a variety of partners – including the private sector and cooperatives. The mission adopts a cluster approach and promotes specific commodities in specific regions. Subsidy is extended to farmers for adopting the crop and for greenhouses, organic certification and training. Subsidies are also offered to other private agents for creating nurseries, seed production, seed infrastructure, and post-harvest infrastructure. Financial assistance is also given to research institutions for horticulture related research.

The NHM is the single largest program within the Ministry of Agriculture and all horticultural programs account for about 30% of the total outlay of Department of Agriculture and Cooperation. With just about 2 years since the launch of the NHM, it is a little premature to evaluate the effectiveness of the program. A Planning Commission report found weaknesses in the organizational structure of the NHM. A strategy document of the National Development Council admits to an even more basic problem – the weak horticulture data base means that it is difficult to evaluate the choice of commodity clusters and also to assess the impact of the programme. As a subsidy driven program, it will have to be seen whether the financial disbursement and monitoring within NHM is any better with what has been the experience with the other programmes of the Agriculture Ministry. A fourth difficulty is that economic decisions driven by subsidies would inevitably be distortionary. A public goods vision is absent in NHM as also in the schemes that promote private investment in godowns, cold storage and refrigerated trucks.

III. Key strategies and priority programs of the XI Five Year Plan

The vision for the 11th five year plan (FYP) envisages (a) a faster growth for the economy (b) broad-based growth in terms of sectoral coverage and (c) inclusive growth in the sense of sizeable income gains for the population in the lower income deciles. For agriculture, the approach paper targets a growth rate of 4% per annum. This will be a challenge as agriculture over the last decade (1995/96 to 2005/6) has grown only at about 2% per annum.

Arguably, agriculture does not have a dominant role in achieving the first objective mentioned above. With the share of the sector in GDP dipping below 20%, the 11th plan target of 4% growth in this sector would contribute not more than 0.8% to growth rate of GDP. The second goal is a response to the recent patterns in economic growth where non-agricultural sectors have grown at much higher rates than agriculture. On the other hand, agriculture is the largest employer as the bulk of labour force (about 50% for males and about 68% for females) is still in agriculture.¹ This has obvious implications for inter-sectoral disparities.

This in turn leads to the third component of the plan vision. Without substantive growth in agriculture, which is not just the largest employer but is also the largest employer of poorly educated workers, it is hard to imagine inclusive growth. However, even with a 4% growth in agriculture, growth here will lag other sectors.² Hence the approach to the 11th FYP also emphasizes the importance of providing enough non-farm employment opportunities for the rural population in order for the growth process to be inclusive.

The approach paper argues that a 4% agricultural growth is constrained not just by supply bottlenecks but also by sluggish demand growth. The per capita consumption of basic food staples – cereals in particular – has been seen to be stagnant. Therefore, demand for this segment is unlikely to exceed the growth rate of population. It should be noted, however, that by various estimates, substantial sections of the Indian population are still malnourished and their caloric intake is less than the medical norms. The growth in demand therefore, is also determined by the nature of the growth process – more inclusive it is, greater will be the demand for basic food staples. For this reason, the approach paper emphasizes agricultural exports and social programs such as the National Rural Employment Guarantee Scheme that can boost demand.

¹ These estimates are based on daily status employment data from the NSS employment survey of 2004/5.

² Over the decade 1995/96 to 2004/2005, the nonagriculture sector grew on average at 7% per annum.

On the supply side, the approach paper offers a detailed plan to remove the constraints to agricultural growth. The paper notes that in the absence of a technological breakthrough and given the long gestation lags in R&D, the development strategy in the immediate must rely on exploiting existing opportunities and technologies.

The major constraints identified by the XI plan are:

- (i) 'Knowledge deficit', which has been identified by the National Commission on Farmers as one of major constraints to agricultural productivity. Collapse of the extension service, fertilizer subsidies leading to excessive and harmful use of fertilizers, sub-optimal farming practices are some of the results of the poor access to knowledge.
- (ii) Lack of credit at reasonable rates which places an excessive dependence of the farmers on informal sources obtained at exorbitant rates.
- (iii) Lack of modern agricultural markets and marketing infrastructure such as godowns, cold-chains etc. and restrictive marketing legislation, has hampered diversification into horticulture and floriculture. The latter is a necessary component of accelerated agricultural growth.
- (iv) Barriers to participation of small farmers. Aggregation by the small and marginal farmers can give them the advantage of scale in dealing with the markets. The absence of such group formation leads to transaction costs for each farmer being too high to make it profitable for him/her to participate in the value chain.
- (v) Lack of risk management instruments that are reasonably priced and efficient. Adoption of new technologies, of new seeds and new farming practices and taking on market-related activities raises the risks for the farmer.
- (vi) Need for a revamped and restructured agricultural research system that can support increases in productivities, conservation of resources, deal with climate change issues and promote appropriate technologies and management practices.
- (vii) Access to irrigation water is a major constraint. In spite of substantial irrigation infrastructure the access is constrained because of poor performance. Management regimes that involve the users needs to be promoted in an effective manner. In rain-fed areas effective harvesting of rainfall and equitable, sustainable and efficient use of groundwater needs to be promoted.

The strategy proposed by the XI Plan:

- (a) Bringing more area under irrigation
- (b) Better management of water resources including rainwater harvesting and watershed development
- (c) Better management of land resources by reclaiming degraded land
- (d) Reviving agricultural extension and dissemination of best practices
- (e) Diversification into high value crop agriculture
- (f) Diversification into animal husbandry and fishery

- (g) Schemes to increase the flow of credit and insurance to the sector
- (h) Improving markets and incentives
- (i) Land reforms

The approach paper also calls for a prioritised strategy for agricultural research that could enhance the long-term growth trajectory of the sector.

From Table 1, it can be seen that within agriculture, the crop sector has historically been the slowest growing sector. Livestock, Fisheries, and Horticulture have been the faster growing sectors throughout although all the subsectors show a deceleration of growth in the period since 1996/97.

Table 2 shows that the faster growing sectors now contribute about 50% of agricultural GDP. If the crop sector (which includes cereals, pulses, oilseeds and other field crops) growth rate can be boosted to 2% per annum to match the growth in population, the livestock, fisheries and horticulture sectors would have to grow at 6% per annum to achieve the target growth of 4% per annum.

To examine the demand constraints on agricultural growth, Table 3 lists projected growth rates for different agricultural commodities. In this projection, foodgrains are projected to grow at around the rate of population growth. This is consistent with the findings that the income elasticity of demand for this item is close to zero. Milk, Meat, Eggs, Fruits and Vegetables will grow at higher growth rates between 2.5 to 4% per annum. So according to these projections of the planning commission, even the non-crop sector will face serious demand constraints if it grows beyond 3-4% per annum. This means that if this sector is to achieve a 6% growth rate, it will be imperative to access international markets. Agricultural exports will therefore have to play a big role if the plan strategy is to be successful.

Table 1: Growth rate of Output of Different Sub-sectors of Agriculture: 1993/94 prices

Period	Crop sector	Livestock	Fisheries	Horticulture
1980/81 to 1989-90	2.71	4.84	5.93	2.42
1990/91 to 1996/97	3.22	4.12	7.41	5.92
1996/97 to 2003/04	0.61	3.76	4.28	3.66

Source: Report of the Steering Committee on Agriculture and Allied Sectors for Formulation of the 11th Five Year Plan, April 15, 2007, Planning Commission, New Delhi

Table 2: Output share of different sub-sectors in Agriculture GDP

Sub sector	Output share %
Crops	46
Horticulture	21
Livestock	25
Fisheries	4
Forestry/logging	4

Source: Report of the Steering Committee on Agriculture and Allied Sectors for Formulation of the 11th Five Year Plan, April 15, 2007, Planning Commission, New Delhi

Table 3: Projected growth rate and demand for various food commodities towards 2011-12

Commodity	Growth Rate
Foodgrains	2.21
Milk and Milk products	3.18
Meat	4.65
Eggs	4.62
Fish	4.58
Oilseeds	2.94
Vegetables	2.51
Fresh fruits	3.46
Sugar and Gur	1.88

Source: Report of the Steering Committee on Agriculture and Allied Sectors for Formulation of the 11th Five Year Plan, Planning Commission

IV. Recent initiatives by Government of India

Several significant initiatives have already been taken in recent years by the government to reverse the downward trend in agricultural production and to find sustainable solutions. Some of these important initiatives include:

(i) Bharat Nirman; (ii) National Rural Employment Guarantee Programme; (iii) National Horticulture Mission; (iv) Expansion of Institutional Credit to Farmers; (v) Establishment of the National Rainfed Area Authority; (vi) Establishment of the National Fisheries Development Board; (vii) Watershed Development and Micro Irrigation Programmes; (viii) Reforms in Agricultural Marketing and Development of Market Infrastructure; (ix) Revitalisation of Cooperative Sector; (x) Agri-business Development through Venture Capital Participation by the Small Farmer Agri-business Consortium; (xi) Reform and Support for Agriculture Extension Services; (xii) National Food Security Mission; (xiii) *Rashtriya Krishi Vikas Yojana* to incentivise the states to invest more in agriculture; (xiv) Integrated Food Law; (xv) Legislative Framework for Warehousing

Development and Regulation; (xvi) Protection of Plant Varieties and Farmers' Rights Act, 2001; and (xvii) Knowledge Connectivity through Common Service Centres and IT initiatives.

V. National Policy for farmers 2007

This was based on the Report of the National Commission on Farmers submitted in October 2006. The policy, among other things, aims to improve the economic viability of farming by substantially improving the net income of farmers in addition to improving productivity, profitability, land, water and support services and provide appropriate price policy, risk management measures.

Main provisions of the Policy:

Important provisions and features incorporated in the National Policy for Farmers, 2007 include the following:

(a) Human Dimension: Focus to be on the economic well-being of the farmers than just on production and productivity and this is to be the principal determinant of Farmers policy.

(b) Definition of Farmers: Expanded to include all categories of persons engaged in the sector so that they can be extended the benefits of the Policy.

(c) Asset Reforms: To ensure that every man and woman, particularly the poor, in villages either possesses or have access to a productive asset.

(d) Income Per Unit of Water: The concept of maximizing yield and income per unit of water would be adopted in all crop production programmes, stress on awareness and efficiency of water use.

(e) Drought Code, Flood Code and Good Weather Code: To be introduced in drought prone areas, flood prone areas and in arid areas respectively so as to maximize the benefits of monsoon and to be prepared for likely contingencies.

(f) Use of Technology: New technologies which can help enhance productivity per unit of land and water are needed. Biotechnology, information and communication technology (ICT), renewable energy technology, space applications and nano-technology to provide opportunities for launching sustainable productivity increases.

(g) National Agricultural Bio-security System: To be set up to organize a coordinated agricultural bio-security programme.

(h) Inputs and services-Soil Health: Good quality seeds, disease free planting material, including in-vitro cultured propagules and Soil health enhancement hold the key to raising small farm productivity.

(i) Credit & Insurance: Credit counseling centers to be established where severely indebted farmers can be provided a debt rescue package to help them out of debt trap. Need for both credit and insurance literacy in villages,

(j) Setting up of Farm Schools in the fields of outstanding farmers to promote farmer to farmer learning and to strengthen extension services.

(k) Community Foodgrain Banks: To be promoted to help in the marketing of unutilized crops.

(l) Single National Market: To develop a Single National Market by relaxing internal restrictions and controls.

VI. Strategic options and key issues

To make agriculture economically, socially and ecologically viable and enabling it to reducing poverty and inequality, a paradigm shift is required. Increasing agricultural productivity should be at the center of this new approach. It is crucial that the sector's productivity is improved through increased investment in research and development, human capital, extension services, irrigation and rural infrastructure. The rural poor need to be better connected to cities and markets. Macroeconomic policies, credit instruments and crop insurance need to be made farmer-friendly. A market orientation with a focus on quality and standards would be part of this strategy. In short, agriculture should be treated as a high-value added, diversified, marketable sector - not a charity case.

Key issues

Given its natural limitations, agriculture alone cannot take the country's poor people out of poverty. Therefore, a gradual transition from agriculture should complement productivity improvements - by empowering the poor, particularly women, with the skills to tap labor market opportunities and by promoting rural non-farm activities and regional growth centers.

Some of the key issues that need to be addressed are dealt with in detail below.

A. Agricultural value chains in integrating small and poor farmers and in facilitating agro-processing

The value chain begins from the grower and ends with the consumer. Transport, storage, handling, marketing and processing and retailing are the services that add value to the product at different points in the chain. The traditional value chain in India has about 4 to 6 intermediaries between the grower and the consumer. Fruits and vegetables tend to have more intermediaries than field crops. These links are connected by several forms of transport including air, rail, road, bullock carts, push carts and even head loads.

A typical value chain includes the following:

Grower (producer)
trader (pucca arthiya)
commission agent (kutchra arthiya)
wholesaler (processor)
retailer
consumer

There are more intermediaries in the Indian marketing chain than in the supply chain in developed countries. A CII-McKinsey report shows that while it is common to have up to 6 intermediaries in the fruit and vegetables chain in India, there is just the wholesaler and retailer in the US chain. Similarly, there are at least 2 intermediaries between the wheat farmer and the flour mill in India compared to just one in the U.S. The length of the marketing chain stems partly from the need to consolidate supplies. Such assembly happens at the village and district level as the supplies find their way to the wholesale markets.

The Directorate of Marketing and Inspection has estimated how the price gets built up along the value chain. Gross marketing margins are much higher for the horticultural products than for the field crops. Horticultural products are also more perishable and hence handling and wastage costs are correspondingly greater. For field crops, the price increase is of the order of 50% while

it is more than 100% for the horticultural crops. As a consequence, the farmer's share in the rupee paid by the consumer is higher for foodgrains than for perishable horticultural products. For foodgrains, the farmer's share is between 60-65% while for horticultural products, it is typically less than 50%.

In summary, agricultural marketing in India mostly occurs through the mediation of the wholesale market. What the marketing chain does is to first aggregate produce from many small growers and when the produce changes hands in the wholesale markets, the chain works in the reverse process – to disassemble the wholesaled amounts into marketing lots suitable for retail. As a result, the marketing chain for perishables, in particular, tends to be long. Some characteristics of the traditional marketing chain have been the waste (in terms of the degradation in quality and quantity especially of fresh produce) and the low share of the producer in consumer rupee. The wastage is an indication of the low value of the crop at harvest time.

Integrated marketing chains with fewer intermediaries could offer farmers a higher share of the consumer rupee. Other countries (including those in South East Asia) have achieved it because of processing units that are integrated backwards. However, Indian agribusinesses are small. Over 75% of units in food processing are small scale. Even the large scale companies are small by international standards. The average size of top 20 Indian food companies was \$125 million as against average revenues of \$400-500 million of the top food firms in Malaysia and Indonesia (CII, 1997).

The exceptions to the above are (a) milk and (b) poultry. The value chain in both these sectors is integrated with cooperatives playing a big role in milk and private hatcheries playing a similar role in poultry. An obstacle to the growth of integrated chains in other segments is the "smallness" of farmers that comes in their way of access to markets, technology and inputs. Small farmers account for most of the production of livestock and over half of the production of horticultural crops. Market reforms and investments which can reduce the transactions costs of small farmers in the supply chain will be beneficial not only for equity but also for agricultural growth because of the domination of small farmers in these activities.

Key development issues and constraints for high-value commodities

First, large-scale investment is necessary to overcome these inefficiencies – in handling, grading, transport and storage .

Second, the policy environment must be facilitating so that the emerging agribusiness sector invests in the supply chain. This is a sector that has been the object of active government regulation that has historically discouraged private companies from investing in the supply chain.

Thirdly, policies must seek to encourage and foster institutional innovations that would allow small growers to participate in the supply chain.

Fourthly, public investments would be needed for several kinds of marketing infrastructure and also basic supporting infrastructure such as roads and electricity.

Impact of infrastructure constraint on limiting the development of agricultural value chains and agro-processing:

As most growers offer small quantities for sale, the principal service offered by the intermediaries in first half of the marketing chain is aggregation of these quantities. After they are wholesaled, the process is reversed. The CII-McKinsey study estimated that in India only half of the total price increase (that occurs as the commodity moves through the supply chain) is due to costs

incurred by intermediaries compared to 80% or more in the U.S. This happens because U.S. intermediaries offer services more than just assembly such as grading, storage and temperature control. These services are not offered in India because of a lack of investment.

The marketing chain does not offer grading facilities in most locations. Even in regulated markets less than 20% of them offer any sort of grading facility. As a result, farmers lose out on the value addition that they could get from grading. The facilities at the regulated markets are woefully inadequate to permit efficient handling. There is limited capacity for auction platforms and the number of shops and godowns within the regulated market. At harvest time, markets are severely congested. Although the produce arrives in bulk, there is no bulk handling facilities at the mandis. Delays in sales are common and covered space to store unsold grain is limited. This leads to spillage, waste and quality deterioration.

Private investment in bulk storage facilities is minimal. Private facilities are small scale and are usually covered and plinth (CAP) storage or covered godowns. CAP storage involves losses upto 20%. The existing cold storage capacity in the country is sufficient for less than 15% of total production of fruits and vegetables. Cold chains are available only for a few select high-value commodities and in some regions such as grapes in Maharashtra.

The absence of basic infrastructure such as roads and electricity is an aggravating factor. The lack of good roads discourages private sector companies from extending their procurement operations into the hinterland. The absence of cheap grid electricity pushes up the costs of cold storage.

B. Policy, legal and institutional framework, the role of public and private sector and progress on institutional reforms

Historically, the marketing sector has been subject to various government regulations. In the last decade, however, as the understanding gained in government and elsewhere about the adverse impact of regulations, there have been several key reforms.

1. The wholesaling of agricultural produce is governed by the Agricultural Produce Marketing Acts of various State governments. These acts empower state governments to notify the commodities, markets and market areas that are regulated. Once a commodity is notified, the APMA made it mandatory that it be transacted in the regulated market in effect granting monopoly of marketing to the regulated markets. The monopoly led to arbitrary market fees, barriers to entry and prevented direct grower to company contact essential for contract farming and market integration. Following the recommendations of high level government committees, the Central government prepared a Model Act for agricultural produce marketing which the state governments could use as a model for their individual acts. Under the Model Act, private agents can be licensed to set up a market or buy produce directly from farmers. The license will be given by an authority of the government such as the State Agricultural Marketing Board.

The reforms in the model Act have been adopted in Madhya Pradesh, Himachal Pradesh, Punjab, Sikkim, Nagaland, Andhra Pradesh, Chattisgarh, Rajasthan, Orissa, Arunachal Pradesh, and Maharashtra. Tamil Nadu already had a APMA that was consistent with the model Act and the states of Kerala and Manipur never passed such an act. Bihar has repealed the act. The state governments that have not completed this reform are Haryana, Karnataka, Gujarat, Uttar Pradesh, Assam, Mizoram, Tripura, Meghalaya, J&K, Uttarakhand, Goa, West Bengal and Jharkhand.

2. While historically futures markets were severely restricted, these prohibitions are no longer in place and futures trading is now permitted in all commodities including foodgrains. Recently, because of the run-up in wheat prices, futures trading in wheat contracts were suspended. While this is a setback, the policy has generally been supportive of commodity exchanges.

3. The Essential Commodities Act is a legislation of the Central Government that controls the storage, movement and trade in a large number of agricultural commodities including foodgrains, edible oils, pulses and sugar. The State Governments have the powers to issue Control Orders under this Act. These have been used to license traders, impose stock limits, restrict movement of commodities, compulsorily purchase of the commodity at the levy price and prescribe trading practices.

While this Act is damaging to private trade and investment in efficient supply chains, government's stand has been that although the Act would not be operative at most times, it should be in the books so that the government can deal with shortages in essential commodities. Therefore, reforms have been partial. In 2001, the Central Government issued an order removing the licensing requirement and all restrictions on purchase, stocking, transport of specified commodities including wheat, rice, oilseeds and sugar. However, Control Orders are still in place in many states and the government retains the power to notify commodities under the Act as and when needed.

4. The warehousing system operates under the legal framework of the Warehousing Corporations Act 1962 as well as the State Warehouses Act applicable in particular states. Government committees have noted that government warehouses are poorly integrated with private supply chains and are not well managed. Till recently, India did not have a legal framework for a system of negotiable warehouse receipts. This has now been rectified with the passing of Warehousing (Development and Regulation) Bill 2005. Under this law, a Central Warehousing Authority will be set up to regulate the system of negotiable receipts. When implemented, this law will help improve the efficiency of spot and futures markets.

5. Cooperatives have an important presence in agricultural marketing by marketing produce, providing inputs and storage. Cooperative marketing in India is usually not self sustaining, are usually managed (especially at the higher level) by government appointees, and their business decisions are subject to approval by the Registrar of Cooperatives. It is widely believed that political interference and bureaucratic oversight have severely hampered the effectiveness of cooperatives. A government committee (Expert Committee on Strengthening and Developing of Agricultural Marketing, (2001)) noted that unless cooperatives are freed from the shackles of politicians and bureaucracy they may not become effective alternatives to the private sector.

These views led to new Central laws facilitating cooperatives. First, the Companies Act was amended in 2002 to allow a cooperative enterprise to register under the rubric of the Companies Act as a Producer Company. Second, a new version of Multi-state Cooperative Societies Act (2002) grants cooperatives more much desired autonomy and limits the power of the Registrar of Societies. In this amended legislation, the cooperatives will get full freedom to augment their resources and raise funds through various legal means. Finally, some of the State Governments (most notably Andhra Pradesh) have also taken steps to remove various restrictive provisions from the State Cooperative Acts by enacting the Mutually Aided Cooperative Societies Act. Under this law, cooperatives that do not receive financial support from the government have full functional autonomy. The impact of this law has been most in the credit sector as many micro-finance organizations have begun to use the organizational form defined under this Act.

6. There are many as sixteen laws relating to foods emanating from various ministries. The two main laws are the Prevention of Food Adulteration (PFA) act and the Fruit Products Control Order. PFA covers a wide range of food products and details compliance requirements expected for food safety and for retail labelling. PFA also lists conditions for processed foods and permitted food additives. The fruit products order regulates sanitary and hygiene conditions in the manufacture of fruit and vegetable products. Recently, a law has been enacted that would replace all the different food laws. The laws will be governed by a new body called the "Food Safety and Standards Authority of India".

VII. Potential areas for external assistance

Limited Funding:

Generally speaking, financial resources are more stretched at the state level than at the Centre. Often Centrally sponsored programmes are not fully exploited because states are not able to commit their portion of funds. This problem is especially acute for agricultural extension, state agricultural universities, and livestock programmes (especially in disease control

Limited institutional capacities:

In order to optimize land and water resources for agricultural activities, the XI plan approach paper and the strategy paper emphasize the need to develop strategies appropriate for different agro-climatic zones. District level agricultural plans with competent technical input are also needed to fully optimize resources available from the state and the centre in a way consistent with its resource endowments. This is made difficult by the lack of a usable data base for agricultural planning.

External best practices:

The following activities could benefit from external best practices

- (a) the provision of extension services for crop agriculture and animal husbandry – the problems with the current set-up have already been discussed and alternative delivery channels are being experimented.
- (b) Delivery of artificial semination services to livestock owners – the programme needs to be strengthened with best practices and standards for identifying bulls with known genetic worth, preservation and mobile delivery of quality semen.
- (c) Instituting systems of disease control, diagnostics and animal quarantines at major ports. Diseases can spread through controlled and uncontrolled movements across borders. Diseases also impact agricultural exports. Because of these global implications, there are large payoffs from adopting international best practices.
- (d) Modernizing abattoirs – this would be essential to geographically diversify livestock exports and will also be required by the domestic retail revolution. Once again, because of exports, international best practices would be valuable.

(e) Contract farming is critical for horticulture. Because of perishability, the demands from processing and high quality standards demanded by consumers, large scale retail suppliers will procure by contract farming. Yet, contract farming is controversial and can be politically sensitive. For the industry to grow, it is important to promote international best practices including transparency about price, delivery schedules and quality specifications.

Innovativeness:

(a) The government has historically played a large role in the creation of infrastructure and the delivery of services. However, this role has often been played out inefficiently – mostly because incentives have been weak for tenured government officials. This (sometimes coupled with a lack of resources) has weakened the delivery of services and increased the cost of government created infrastructure. It is in the context that the government is now experimenting with public private partnerships (PPP). The idea here is that while the government continues with the responsibility of providing the service, the service delivery is handled by private organizations whether for profit or non-profit NGOs. In some PPP models, the government only provides part funding (say for capital assets), while the private player recovers the rest from user charges or other sources. In other PPP models like in roads, the private player provides the bulk of resources and in returns receives an exclusive license to collect tolls for a specified period of time. Thus, the advantages of PPP could be two-fold: in better service delivery and in supplementing government resources.

Many of the schemes of the Department of Agriculture and Cooperation have embraced PPP – for example, in extension (with NGOs) and in production of seeds by the National and State seed corporations. The PPP in both these schemes involves public funding and private delivery. The PPP model with part government funding involves capital subsidy grants for the construction of rural godowns and for the creation of market infrastructure. The NHM is also following this model. It is questionable, however, whether the marketing and NHM activities are true to the spirit of PPP. In particular, the latter activities do not seem to involve public goods at all. The other issue with PPP is that there needs to be monitoring arrangements and performance incentives in the agreement.

(b) So far the private agent in PPP has been a NGO or a for-profit private agent. A third possibility is a grower's association. For delivery of various kinds of services, whether they are public goods (such as extension, disease control) or private goods (seeds, artificial insemination services, quality testing or certification), it is cost-effective to deal with producer groups rather than individual growers. Innovative institutions such as producer companies can therefore make a big difference. There are experiments of this sort going on in southern and western India and also in Madhya Pradesh. However, the experiences have not been distilled into a set of guidelines or practices for optimal forms of such organization. This would help in disseminating this innovation.

VIII. Key options for ADB's assistance

Agricultural growth is critical for achieving the sector balance and the inclusive growth that is integral to the vision of the 11th FYP. The question is what will be the best opportunities for ADB within the agricultural strategy of the plan.

(a) Land Reforms

The land reforms agenda in the approach paper is incompletely spelt out. The paper argues that tenants must have well defined rights in order to provide them incentives and so that they could be credit worthy. At the same time, the paper also argues about promoting land leasing so that land is not fallow when owners do not wish to cultivate land.

For most growers the land holdings are too small to support reasonable living standards for the majority of rural households. As the approach paper points out, the pressing need is to create enough non-farm opportunities that can substitute or supplement the meager incomes from agriculture. The key land reform initiatives that can pay dividends are land consolidation (a program that has barely covered two-fifths of India's cultivable area including most notably Punjab and Haryana) and providing a legal framework for leasing that respects the property rights of owners. With the migration of marginal and small farmers to the nonfarm sector, there is an opportunity for middle and large farmers to lease in land from these growers. However, ill-defined property rights are barriers to this transaction.

Progress in land reforms has been slow and uneven as most states are not strongly committed to it. So there are not many opportunities here for ADB except for advocacy of liberal leasing laws. One initiative that ADB could back with state governments is the program to computerise land records. This was first introduced in 1997/98 with a 100% financing from the central government and technical support from the National Informatics Centre. However, progress has been tardy because of the usual reasons of poor coordination among the different agencies. The results could be impressive if there was greater ownership of this program.

(b) Reclaiming Degraded Land

A planning commission report quotes the Ministry of Rural Development to say that nearly two-thirds of agricultural land is degraded to some extent. Only about one-third is in good health. Soil erosion due to rain, streams and floods is the main form of land degradation affecting 94 million hectares. 22 million hectares suffer from acidity or salinization while another 14 million hectares are water logged. Besides these forms of degradation, soil health has also been compromised by loss of macro and micro-nutrients and organic matter that occurs due to crop cultivation. The distortionary fertilizer policy has contributed to the nutrient imbalance in the soil.

The policy response has been to stress watershed programs which among other things would combat soil erosion. Similarly, land reclamation involving drainage and better management of surface irrigation would be needed in the command areas of the canal-irrigated areas. The activities here could afford the opportunity to also invest in building capacity for monitoring land degradation – an important component of which is the information base such as detailed maps of various kinds of land degradation at the local and state level.

To address nutrient deficiencies, farmers would first have to be aware of this issue and have access to soil testing labs that could offer them inexpensive analysis of their soils. Public good characteristics for soil testing services flow from the sustainability goal that such services can support. In addition, most farmers are too poor to pay for the cost of providing these services. If the ADB were to be involved here, it should back PPP programs where the labs are operated as franchises whether by private entrepreneurs, NGOs or by KVKs. Service delivery is the consideration here. Resources would be required for capital costs, publicity, demonstrations and training. Some KVKs are already doing this – they also obtain synergy through related programmes such as sale of biofertilizers, compost, organic manure and soil micronutrients.

(c) Agricultural Extension

There is a large gap between yields in research trials and those which are realized on farmer's fields. It is widely accepted even by the government that extension services have collapsed in most states. The services are underfunded, does not promote the latest developments in new cropping practices, in pisciculture or in livestock management and are poorly delivered. Not only does extension need more funds and a more ambitious mandate, it also needs to be restructured so that it is accountable to its users. The central government is open to PPP models – its ATMA model is a hybrid one – however, the responsibilities between various stakeholders would have to be clearly delineated for it to become a PPP.

Some form of extension is now happening outside the conventional channels – by NGOs, private companies and by farmer groups. This usually happens for a specific mandate. Some successful programs here have been with respect to insect resistance management, organic produce certification and dissemination of information relating to SPS standards. However, they have been limited and have not been scaled up because of shortage of funds. Such projects – situated outside traditional extension and with a specific mandate – can be attractive for ADB. The other issue for ADB when it supports extension is regarding sustainability - what happens when the project ends. If resource flow dries up, then the gains are temporary. The ADB should therefore consider investments in materials, courses, techniques (including ICT) that have a multiplier effect through capacity building and which can be useful in PPP.

(d) Agricultural Research

Despite the achievements of the past, the problems with the Indian agricultural research are well known. Two endemic problems are over-bureaucratization and the lack of prioritization in allocating research resources. While there is immense scope for applied research in addressing the pest and disease problems in rainfed areas, and in improving livestock productivity, this area is not ripe for ADB funding in the absence of structural reform of the national agricultural research system. An exception would be international collaborative research between CGIAR institutions and the Indian research system – especially for disease problems of rainfed crops and for livestock. Such international collaborations have well defined goals with time deadlines.

(e) Animal Husbandry

Although livestock and fisheries have been growing faster than the crop sector and together account for nearly 30% of agricultural GDP, this sector has not been given its due in terms of both policy attention as well as public investment. This sector is also important from an equity point of view. Livestock ownership is widely distributed among the poor and is a valuable income supplement in mixed farming systems. Further, in arid and semi-arid environments which are not friendly to crop agriculture, there is a greater dependence on livestock agriculture. There is a strong complementarity between crop and livestock; a large portion of livestock is used as draught animals and their feed consists largely of crop residues and agricultural byproducts. In addition, the manure from livestock is a source of fertilizers and is also used as fuel.

Although India has the largest livestock population in the world, productivity is very low. The principal reasons are absence of good breeding stock, low quality feed and fodder and inadequate control of animal disease. Within the livestock sector, poultry and milk production have been the fastest growing segments. Milk has gained from a successful cooperative movement which brought in millions of small producers into the organized dairy segment while poultry sector growth has been led by the private sector which successfully integrated breeding, the provision of feed and poultry production. The meat sector has not seen a comparable development and is still largely unorganised. This sector is teeming with opportunities for ADB –

it is relatively underfunded and the returns are high. However, the institutional framework is also weak and reforms here will have to be part of the package.

There is need to promote state level initiatives on R&D for fodder crops, production of foundation seed and related extension. All of these initiatives can be in PPP mode.

(i) The infrastructure for cattle and buffalo breeding needs considerable strengthening in terms of back-up research, data base on elite breeds, absence of extension, network of artificial insemination centres and training of personnel. So this will be a good opportunity for ADB. While service delivery activities (such as artificial insemination) can be in PPP mode, research and documentation efforts would have to be in the public sector.

(ii) Modernization of slaughter houses is hampered by the resource constraints of the States. Hence there is an opportunity for ADB to be involved at the state-level to take advantage of the centrally sponsored schemes. This is ideal for PPP.

(iii) As noted earlier, the system of disease control is inadequate and will be a constraint to future livestock development. Although many centrally sponsored schemes exist, the problem is again with the share from the states. A related issue is the animal quarantine and certification services available at the 4 major metros. More such stations will be needed as exports grow – this will be under the Central government. This activity will have to be in the public sector.

(iv) The milk sector has benefited from a strong cooperative movement and favourable policy attention from successive governments. The main issue now is the absence of quality systems at many dairy plants as a result of which they have not been able to acquire ISO certification. There is a central scheme that provides assistance for the creation of bulk cooling capacity at the village level to improve the quality of milk at the farm level. The resource requirements are too modest to be the centre-piece of ADB investments but can be part of a bigger package for the livestock sector.

(v) The delivery of services for the livestock sector is even poorer than in the crop sector. The state extension services, even in their existing condition, deal mainly with crop agriculture. Crop agriculture also gains from a well developed private sector for the supply of inputs like seeds, fertilizers, pesticides and machinery. Although states have invested in infrastructure to provide free livestock services, this is inefficiently utilized and because it is not sustainable, it has not been scaled up. The solution lies in institutional reforms. First, producer organizations whether in the form of cooperatives, farmer companies or societies have to play a big role. Most producers have few animals and they are also burdened by social and economic disadvantages. Producer groups are the only way to address the disadvantage. The group can access marketing services (and be part of the retail revolution that will sweep the country), livestock services (breeding, preventive health and veterinary services) and credit. Second, the delivery of services at the farmer level should be in the hands of the private sector. A PPP model should be followed where the public sector invests in knowledge capital – for breeding, disease control and veterinary services – and the private sector delivers the services based on this knowledge.

(f) Marketing including that of horticulture

The marketing sector suffers from long and fragmented supply chains resulting in high waste and low efficiency. Within this sector, horticulture and floriculture is especially sensitive to handling and transport infrastructure and evidence shows that these costs are particularly high in India. A recent study found that the farm gate price of horticultural products is less than 15% of the price at the importing destination. This means improvement in production conditions and decreases in production cost will have minor impacts on prices and shares in world markets. The major

impact will come from addressing the cost build-up from the farm gate to the world markets. Its f.o.b. prices are in most cases, well below, international prices. Therefore, if export opportunities are tapped, domestic demand will not be a constraint to the growth of this sector.

The major public investments in marketing have to do with modernisation of existing markets, creation of new markets, supply chain infrastructure at airports and ports, and the development and implementation of standards relating to agricultural practices and food safety.

In the last 7-8 years, there is considerable private investment that has occurred in handling systems and to a lesser extent in storage systems. With the legislative reforms allowing direct marketing and entry of private sector in setting up agricultural markets, investment plans are also being made in this direction. The NCDEX and the MCX have ambitious plans for setting up spot markets. The ITC e-choupal is evolving in the direction of providing an alternative market.

There must be a strategic focus to ADB's support of public investments in this sector. It should be with respect to market infrastructure that is complimentary to private investments. Most of such opportunities will happen in the lower layer of markets.

The bottom most layers of agricultural markets are primary markets that are periodic in nature. These are the first point of sale for small producers. They tend to be highly congested and lack supporting services. Moreover, they are at the stage that wholesale markets were before they were regulated by the APMC act, i.e., market practices are not uniform especially with respect to weights and measures. The primary markets can be also be used as collection centres by agribusinesses whether cooperatives or private players. Therefore, there would have to be facilities for cleaning, sorting and grading. These investments can operate on PPP basis. Cooperatives and producer groups can be encouraged to operate these centres. Although not widespread, such models do exist and deserve to be replicated. The added advantage is that these organizations, once formed, can also be leveraged into contract farming partnerships. Therefore, the start-up costs of such ventures can be part of the investments for primary markets and collection centres.

The regulated wholesale markets also require public investments to upgrade existing facilities and to create new ones. Wholesale markets lack a wide range of facilities – covered market area, covered shops, road inside market yards, truck parking, cold storage, warehouses and drying area. ADB can encourage such investments as long as (a) the APMC act has been amended to allow competition in wholesaling and (b) the APMC also shares in the investment as APMC's as a whole, have collected market fees well in excess of what has been reinvested in the market. The absence of connecting roads and reliable grid electricity are basic constraints that reduce the return to market infrastructure investments.

As regions begin to specialize in the crops of comparative advantage, we are seeing the emergence of commodity clusters – whether in fruits and vegetables, flowers, medicinal and aromatic plants, livestock, spices, poultry and meat. Each of them has different infrastructure requirements in terms of market yards, grading facilities, storage and cold chains. The development of these specialized markets can also be on PPP basis and will require considerable public investments. Related to these, is the development of supply chain infrastructure, especially at airports and ports for export crops. This is especially critical for perishables and commodities that are sensitive to spoil from storage at uncontrolled temperatures. APEDA has already set up several kinds of export infrastructure, including cargo complexes and it has proposals for many more for the 11th Plan. So this is also a viable channel for ADB investments.

Finally, terminal markets for traders are a new development and there is scope for many such markets at all the large cities. However, a cautionary tale here is of SAFAL, the terminal market set up in Bangalore by NDDDB. After several years, the utilization of this facility is still low.

Horticultural exports need to conform to prescribed quality standards. Accredited quality testing labs are in short supply, for instance, for spices where routine tests need to be undertaken to meet EU limits for certain “toxic” substances. This again is an excellent candidate for a PPP model.

Despite all the policy attention to horticulture, the data base for this sector is surprisingly weak and even the production statistics (not to talk of market arrivals and prices) are not on firm footing. Detailed district level data is not available – which constrains the idea of the National Horticultural Mission of promoting commodity clusters. The preparation of a detailed horticultural data base (in collaboration with the Dept of Statistics) would be a very useful investment.