Agriculture and Food-security

5.1 The Tenth Five-Year Plan had targeted gross domestic product (GDP) growth in agriculture and allied sectors at 4 per cent per annum, aiming to reverse a sharp deceleration in the second half of the 1990s - from 3.2 per cent per annum in the period 1980-81 to 1995-96 to 1.9 per cent per annum during 1996-97 to 2001-02.[1] This has not been achieved. Drought conditions caused agricultural GDP to fall by 7 per cent in the first year of the Tenth Plan (2002-03) and, despite a smart rebound by 9.6 per cent in the second year (2003-04), growth in the first two years of the Plan averaged only 0.9 per cent per annum. With the monsoon weak in 2004, agricultural growth in 2004-05 will be modest at best, being placed at 1.1 per cent according to advance GDP estimates. On this basis, GDP growth in agriculture and allied sectors during the first three years of the Tenth Plan averages only 1 per cent per annum. The Tenth Plan target of 4 per cent growth is, therefore, far from being realised. In fact, per capita agricultural GDP shows no significant upward trend after 1996-97, only fluctuations. The erratic monsoon in recent years has once again underlined concerns that led the Tenth Plan to lay emphasis on irrigation, water conservation and land management, but actual growth outcomes during the Ninth Plan and in the Tenth Plan so far suggest deeper problems as well. This requires a comprehensive re-examination of the agricultural strategy.

PROGRESS IN THE TENTH PLAN

5.2 Although the Tenth Plan had aimed to reverse deceleration in agricultural growth, its allocation for agriculture and allied sectors was relatively modest. The proposed Plan outlay on these sectors, at Rs 58,933 crore for Centre, states and Union Territories combined, was 39 per cent higher than the Ninth Plan outlay in nominal terms, compared to corresponding increase of 89 per cent between the Eighth and Ninth Plans. The share of agriculture and allied sectors was only 3.9 per cent of total Tenth Plan outlay as against 4.9 per cent in the Ninth. And, despite increase in the share of irrigation, the total share of agriculture, irrigation and rural development stood reduced from 20.1 per cent in the Ninth Plan to 18.7 per cent in the Tenth Plan.

5.3 This was because the Tenth Plan had assumed that the incremental capital-output ratio (ICOR) for agriculture and allied activities, which had more than doubled in the Ninth Plan from the Eighth Plan, could be halved. Implicit in this was the view that sufficient capacity had been built up for agricultural production to respond quickly to policy reform and to well-directed Plan spending. Moreover, Ninth Plan actual expenditures had fallen well short of planned outlay. The Tenth Plan combined Centre, states and Union Territories outlay on agriculture and allied sectors was, therefore, considered adequate, being 60 per cent higher than the corresponding Ninth Plan actual expenditure. In particular, at Rs 21,068 crore, the Tenth Plan outlay of the Union Ministry of Agriculture represented a 93 per cent increase over its Ninth Plan actual expenditure.

5.4 The thrust areas identified in the Tenth Plan are summarised in Box 5.1. As far as the Central Plan was concerned, these priorities were to be implemented through a number of schemes, many of which were ongoing. However, following a detailed exercise of zero-based budgeting, it was decided to reduce the

1 These figures are based on estimated growth rates from fitted semi-log trends. The extent of deceleration varies depending on the end points used.

number of schemes of the Department of Agriculture and Cooperation (DAC) from 147 at the start of the Ninth Plan to 30 at the start of the Tenth. Similarly, in the case of the Department of Animal Husbandry and Dairying (DAHD), 10 Ninth Plan schemes were to be weeded out, four were to be merged into a single scheme and one was transferred from DAC to DAHD. The 235 ongoing Ninth Plan schemes of the Department of Agricultural Research and Education (DARE) and the Indian Council of Agricultural Research (ICAR) were to be merged into 72.

5.5 Zero-based budgeting was expected to bring about convergence between various Central sector and Centrally sponsored schemes. However, actual progress on convergence/integration has been slow and many schemes continue to maintain a separate identity. Along with the new schemes added, the DAC currently has about 60 schemes with over 100 distinct components and DAHD 19 schemes with 30 components. The DARE/ ICAR schemes/projects currently number over 200, since most erstwhile projects continue as per original approval.

5.6 Progress in implementing Plan programmes in the first two years of the Tenth Plan was also slow. There was delay in starting new schemes meant to impart specific thrust to the Tenth Plan strategy. So far, the DAC has started nine new Tenth Plan schemes, the DAHD three and DARE/ICAR five. These do cover Tenth Plan priorities: micro-irrigation, missions on horticulture and bamboo technology, development of market infrastructure, small farmer agri-business consortia, extension support to states and through mass media, breed conservation, clean milk production, venture capital fund for dairying/poultry, organic farming, transgenic and genetically modified crops, veterinary type culture and assessment of vulnerability to climate change. But none of these really took

Box 5.1
Thrust areas for the Tenth Plan

The following areas were identified for giving special attention during the Tenth Plan:

- Utilisation of wastelands and un-utilised/under-utilised lands.
- Reclamation/ development of problem soils/ lands.
- Rainwater harvesting and conservation for the development of rainfed areas.
- Development of irrigation, especially minor irrigation.
- Conservation and utilisation of biological resources.
- Diversification to high value crops/activities.
- Increasing cropping intensity.
- Timely and adequate availability of inputs.
- Strengthening of marketing, processing/ value addition infrastructure.
- Revamping and modernising the extension systems and encouraging private sector to take up extension services.
- Bridging the gap between research and farmer's yields.
- Cost-effectiveness while increasing productivity.
- Promotion of farming systems approach.
- Promotion of organic farming and utilisation of organic waste.
- Development of eastern and north eastern regions, hill and coastal areas.
- Reforms to introduce proactive policies for the farm sector

off and total expenditure on all these during the first two years of the Tenth Plan was negligible. More generally, actual Plan expenditure of the Ministry of Agriculture during 2002-03 and 2003-04 was only 27 per cent of total Tenth Plan outlay, much less than the norm for the first two years. Only 31 per cent of Plan outlay was budgeted during 2002-03 and 2003-04, and actual expenditure was 86 per cent of the budgeted amount.

5.7 Recognising the tardy progress in the first two years, a very substantial correction was made in 2004-05 when the Union Budget in July 2004 increased allocations for DAC, DAHD and DARE/ICAR by 22, 67 and 29 per cent respectively over corresponding provisions of the previous year. These allocations were further enhanced by 13 per cent by the Planning Commission using its additional budgetary support, to a level 45 per cent higher than in 2003-04 BE. This took actual Plan expenditures in the first three years of the Tenth Plan to 48 per cent of total Plan outlay. Since this was still less than the norm, further increase in allocations over 2004-05 RE of 42 per cent for DAC, 16 per cent for DAHD and 28 per cent for DARE have been made in the Union Budget for 2005-06. These increases have brought the nominal Tenth Plan outlay within target, although expenditure in real terms is likely to remain short of norm at the end of 2005-06 because of back-loading. Nonetheless, with almost two-thirds of the increased expenditure this year on new schemes identified in the Tenth Plan and with sizeable increases also in Plan allocation for the Ministries of Water Resources and Rural Development, it can be said that the Plan has finally taken off as far as agriculture is concerned. Detailed outlay and expenditure are given in Annexure 5.1.

5.8 However, it should be emphasised that the decision to increase Plan allocations in 2004-05 was taken after kharif sowing had begun and any impact should be visible only from rabi at the very earliest. Since the latest data available are second advance estimates for 2004-05, which give tentative projection of rabi output, the only mid-term assessment possible at this stage is of the first two and a half years of the Tenth Plan, which effectively continued with the Ninth Plan. The Ministry of Agriculture has indicated the need for higher expenditure step up from this base to achieve the Tenth Plan outlay. In the absence of actual experience of specifically Tenth Plan schemes, this requires to be assessed against trends observed since the beginning of the Ninth Plan.

PERFORMANCE REVIEW

National Accounts

5.9 National Accounts Statistics (NAS) are not available after 2003-04 and many details are available only till 2002-03. The data available show the following:

- There was deceleration in both livestock and crop sectors, but more markedly for crops. Growth rates of livestock and crop output have averaged about 3.6 and 1.1 per cent per annum respectively after 1996-97, down from 4.5 and 3.1 per cent during 1980-97.
- Within the crop sector, only fruits and vegetables, condiments and spices and drugs and narcotics continued to grow at over 2.5 per cent per annum. Excluding these, growth rate of output of remaining crops fell below 0.5 per cent per annum after 1996-97 as compared to over 3 per cent earlier.
- Growth of input use in agriculture also decelerated after 1996-97, to about 2 per cent per annum from over 2.5 per cent during 1980-97. This occurred mainly after 1997-98 when, reversing an earlier trend, output prices began to fall relative to input prices.
- Part of the deceleration in agricultural growth can, therefore, be attributed to lower profitability leading to slower increase in input use. But, in addition, growth of input productivity (defined as difference between output and input growth) fell from about 1 per cent per annum prior to 1996-97 to negligible thereafter.

- During 1997-2002, agricultural prices declined relative to prices not only of inputs but also non-food consumer goods. As a result, purchasing power of agricultural incomes (current price GDP divided by consumer expenditure deflator) decelerated more than GDP at constant prices. Real farm incomes defined in this way not only show no per capita growth after 1996-97, but also exhibit increased variability.
- The deceleration in output growth after mid-1990s thus coincided with a fall in the relative price of agricultural produce. This suggests a demand problem that also increased market risks.
- National Accounts data on private consumption confirms this. Real per capita food consumption declined after 1998-99 despite fall in relative food prices. Per capita consumption declined absolutely in case of cereals, pulses and edible oils and its growth decelerated for all types of food, including fruits, vegetables and milk

Thus, National Accounts show serious setback to agriculture from the Ninth Plan onwards. Input use and productivity growth decelerated on the supply side. This was accompanied by low demand growth and higher farm income variability.

Production

5.10 The Tenth Plan foodgrains target was modest. It aimed to meet a requirement of 230 million tonnes in 2006-07, estimated on the basis of nutritional norms and about the same in per capita terms as actual production of 212.9 million tonnes in 2001-02. Nonetheless, actual performance is well below this. Drought caused **foodgrains** output to fall to 174.2 million tonnes in 2002-03, and the subsequent recovery to 212.1 million tonnes in 2003-04 remained below the level of 2001-02. The second advance estimate for 2004-05 places kharif production at only 102.9 million tonnes, about 9 per cent lower than in 2003-04. Although rabi is expected to be much better, overall foodgrains production in 2004-05 is unlikely to cross the 2001-02 level.

5.11 This poor performance is more worrying in view of the fact that the underlying trend of **rice** and **wheat** production was already less than population growth by the end of the Ninth Plan. Yield growth decelerated throughout the 1990s to only about 1 per cent per annum from 3 per cent during the 1980s, indicating a potentially serious exhaustion of technological progress. The huge stocks that emerged at end of the 1990s have so far masked this. But, since large exports at below domestic prices and subsequent poor monsoons have now reduced stocks to almost normal, a significant production effort is necessary to meet requirement. For this, it will be essential to tap potential of the Eastern region, in part by ensuring adequate price support and removing distortions that have recently depressed prices in this region because of sale from stocks built up from traditional surplus areas through high Minimum Support Prices (MSP).

5.12 Unlike rice and wheat, yield growth of **coarse cereals** was maintained at about 2 per cent per annum through the 1990s, mainly because of good performance in maize. However, except maize, area shifted from coarse cereals to other crops and, as a result, there was no growth in total coarse cereals output. **Pulses** yields continued to stagnate although these crops have been under a Technology Mission since early 1990s, and the area under cultivation has also shrunk. Despite some promising new varieties and proven benefits from micronutrients and sprinkler irrigation, there is as yet no break-through at the farm level. Although the MSP of pulses have been increased recently to encourage technology adoption, it is the view of the Commission for Agricultural Costs and Prices (CACP) that a sharp increase in imports has blunted this effort.

5.13 **Oilseeds** have been under a Technology Mission since 1986 and there was substantial expansion of area, yield and production till the mid-1990s. But in the absence of technological

breakthrough and because of pressure from cheaper imports, the Ninth Plan period saw stagnation in yield and decline in area, taking production down from 24.4 million tonnes in 1996-97 to 20.7 million tonnes in 2001-02. In 2002-03, the first year of the Tenth Plan, monsoon failure caused production to decline further to 15.1 million tonnes. There was a rebound to a record 25.1 million tonnes in 2003-04, but growth continues to be negligible. In the current year, 2004-05, there has again been a marginal fall in output.

5.14 Imports of edible oils were less than 10 per cent of domestic production till 1994-95, but have since increased sharply so that import volumes are now at par with domestic production. Rising domestic demand, trade liberalisation and a sharp fall in world edible oils prices in the late 1990s contributed to this rise in imports. Domestic prices of edible oils/ oilseeds remained low and were disincentives to domestic producers. India is already among the largest markets for global edible oils trade, and productivity improvements are required for domestic oilseeds production to remain competitive. This calls for a fresh look at the working of the Technology Mission on Oilseeds and Pulses (TMOP), which appears to be failing in its objectives.

5.15 **Cotton** production had also fared poorly during the Ninth Plan. Yields declined due to a combination of lower prices and increased pest incidence following rapid price-induced area expansion in the previous decade. Output fell from 14.2 million bales in 1996-97 to 10 million bales in 2001-02. Drought caused production to fall further in 2002-03, to 8.7 million bales, the lowest since 1987-88. Although this recovered to 13.8 million bales in 2003-04, production remained lower than reached in 1996-97. The second advance estimate for 2004-05 however shows substantial increase to 17.1million bales. Nonetheless, India's cotton economy continues to suffer from well-known problems causing low yield and poor quality. It is also well known that, if these problems are addressed, very large gains are possible with end of the Multi-Fibre Agreement. In view of this, a Technology Mission on Cotton (TMC) was launched in February 2000 and approval given for cultivation of Bt varieties. With limited results from these efforts thus far, mills are importing larger quantities of quality cotton. There is an urgent need to re-look the TMC and, in particular, to involve the textile industry more closely on cotton technology.

5.16 **Sugarcane** production increased at about 1.5 per cent per annum during the Ninth Plan, from 278 million tonnes in 1996-97 to 297 million tonnes in 2001-02. But this was entirely on account of area expansion, with yield growth decelerating to almost nil from about 2 per cent per annum in the previous decade. In the Tenth Plan period, production fell to 282 million tonnes in 2002-03 and again, more sharply, to 236 million tonnes in 2003-04. The second advance estimates for 2004-05 indicate further marginal decline. Recovery of sugar from sugarcane has also not increased much during the last decade. This twin failures on yield and recovery points to weakness on the part of industry to leverage research and extension, make available good planting material, propagate better agronomic practices and improve crushing efficiency. Although Indian cane yields are relatively high and cost of cane production relatively low by world standards, Indian sugar was unable to compete in the world market when world prices crashed in 1998. This is despite the fact that levy obligations on mills were reduced sharply and licensing eased. Very large sugar stocks built up as production expanded much more than domestic demand in response to liberalisation of industry and excessive State Advised Prices. The main concern now is whether the large subsequent downturn indicates a return to the high amplitude cane cycles that were moderated during the 1980s and 1990s or whether industry will emerge more efficient out of the downturn. Issues such as use of ethanol in automobile fuel and of profitable cogeneration of electricity are important in this context.

5.17 **Plantations** have also performed poorly in recent years, particularly since 1998 when world prices turned downwards. **Tea** production increased 2.5 per cent per annum between 1990-91 and 1998-99 but has, if anything, declined since then. **Coffee** production decelerated from

5.5 per cent per annum to nil. And, although less steep, there was deceleration also of **rubber** production, from over 6 per cent per annum to 3 per cent. Moreover, given product inflexibility, these sectors suffered even more on the income side. Poor realisations turned a number of tea gardens sick and many closed down or were abandoned, while small holders (who dominate coffee and rubber production and are increasingly important in tea) suffered severe financial crisis. In response, the government has provided funds for relief, stabilisation and rehabilitation. But, quite apart from the limited longer-run utility of some of these short-run responses, the really necessary tasks are of replanting old and less productive plantations, improving cost and quality through better processing and, most importantly, to devise better longer-run protection against market risk. It is now evident that, with imports liberalised, India's large domestic market is no longer an adequate buffer against consequences of high world price volatility.

5.18 In contrast to poor performance of all the above crop sectors, data from NAS show high growth in the Ninth Plan of **fruits and vegetables**, at 4 per cent per annum, about the same as during 1980-97. However, not only does this data show deceleration after 2001-02, unlike for the other crop groups, but there are serious differences between these and official estimates from the DAC. For example, the NAS shows value of output (at constant 1993-94 prices) of fruits and vegetables up 12 per cent from Rs 54,138 crore in 1999-00 to Rs 60,634 crore in 2002-03, while for the same years DAC reports fruits output down marginally from 45.5 to 45.2 million tonnes and vegetables output down quite substantially from 90.8 to 84.8 million tonnes. Fruits and vegetables are undoubtedly among the fastest growing sectors within agriculture (DAC data imply annual growth at 4.2 per cent between 1991-92 and 2001-02 and at 2.2 per cent between 2001-02 and 2003-04), but the database is unreliable. The system of horticulture statistics needs urgent improvement to make it reliable for planning and analysis.

5.19 The Tenth Plan had projected that fruits and vegetables production would grow at 6-8 per cent per annum, and contribute very significantly to an upturn in overall agricultural growth. This has not been achieved even on the most optimistic interpretation of data and raises doubts on the feasibility of Tenth Plan assumptions. Any attempt to increase growth of fruits and vegetables output through area diversification will reduce land under other crops and put downward pressure on fruits and vegetables prices. The extent to which it is feasible to plan production increase beyond normal demand growth depends on the extent to which costs of production can be reduced by increasing productivity. Not only do all available data show much lower actual demand growth than Tenth Plan projections, DAC data show no increase in fruits yields per hectare since 1991-92 (output grew entirely through area expansion) and vegetables yields actually declined from 1999-00, reversing an increase earlier.

5.20 Given climatic diversity, India has long-run comparative advantage in horticulture. But despite appreciable production growth through area expansion, yields and produce quality remain unsatisfactory on international comparison. The National Horticulture Board and the Technology Mission for the North East run a number of schemes but major constraints remain, namely, senility of many existing orchards, non-availability of quality planting material, lack of strong extension machinery, and inadequate marketing, cold storage and processing infrastructure. The Tenth Plan had proposed to focus on these to double horticulture production by 2011-12 through a National Horticulture Mission (NHM) linking ICAR, DAC, Ministry of Food Processing Industries (MFPI) and the private sector. This mission, which is overdue, will be launched in 2005-06 with clearly focused initiatives for different crops and regions and needs to be expedited on a scale consistent with growth of demand. With area under horticulture already growing and responding to demand, no special effort (e.g. subsidy) is necessary to shift areas from existing crops. Rather, the priority must be on technology to improve yield and quality and on post-harvest management, infrastructure and processing.

5.21 The proposed NHM extends beyond fruits and vegetables, to **medicinal plants** and **spices**. These are also crops where recent growth has been relatively high and export prospects are good. India already exports about 8 per cent of its spices production and has significant share in world markets. However, like other export crops, producers have recently suffered from uncertainty and low prices, e.g. for pepper, cardamom and vanilla. In addition to competition from lower cost producers, other issues are the growing food safety concerns in major buying countries, absence of comprehensive food safety standards in India, promotion of Indian brands abroad and encouraging organic production and certification.

5.22 **Livestock** is another sector where data is less reliable than for forecast crops but where it is generally accepted that growth has been higher than in other sectors of agriculture and allied activities. According to NAS, total livestock output increased at 3.8 per cent per annum during the Ninth Plan, slower than the 4.5 per cent growth rate achieved during 1980-97. The Tenth Plan target for milk production was set at 108.4 million tonnes envisaging 5 per cent annual growth over the 84.4 million tonnes reached in 2001-02. Egg and wool production targets were set at 43.4 billion numbers and 63.7 million kg, implying annual growth of about 2.5 per cent and 5 per cent over 2001-02 levels. However, performance in the first two years of the Tenth Plan has not been satisfactory, falling not only behind targeted growth but also Ninth Plan achievement. In comparison to the Ninth Plan, growth rates in the first two years of the Tenth Plan have declined quite significantly – milk (2.2 per cent from 4.3 per cent), egg (2.14 from 7.3 per cent) and wool (-0.6 per cent from 2.1 per cent). Thus, as in case of most crops, the deceleration in livestock sector during the Ninth Plan continued into the Tenth. A matter of concern is that milk and egg production has decelerated despite the latest Livestock Census showing large increase in the number and proportion of crossbred cattle and also of poultry since 1997. Besides drought conditions, feed availability and marketing problems of livestock products appear important.

5.23 The target for **fish** production during the Tenth Plan was fixed at 8.2 million tonnes implying growth of 5.4 per cent per annum. This too sought to reverse deceleration during the Ninth Plan, from about 6 per cent per annum during 1980-97 to only 3 per cent in the Ninth Plan, mainly due to stagnation in the marine catch. Fish production has increased from 5.9 million tonnes during 2001-02 to 6.2 million tonnes during 2002-03 and is provisionally placed at 6.4 million tonnes in 2003-04. This implies a growth rate of 4 per cent during the Tenth Plan so far, higher than in Ninth Plan but less than target.

5.24 To summarise, almost every sector experienced lower growth after 1996-97 than in the previous decade and a half. The magnitude of deceleration was such that although 2003-04 was a year of excellent monsoon and record production, per capita output in that year was less than 1996-97 in every crop sector except horticulture. Underlying this was productivity deceleration across all sectors, implying lower cost reduction through technological progress than earlier. The deceleration coincided with a downturn in world prices, and this impacted domestic farm prices more than in earlier decades because of greater openness. The consequence was that farm incomes became more variable and decelerated more than output in many cases.

5.25 The available data on growth of State Domestic Product (SDP) from agriculture and allied sectors shows that the deceleration observed at the all-India level occurred also for almost every state individually. However, some distinct regional patterns do emerge from district-wise data on production of individual crops:

- In the relatively rich irrigated rice-wheat and wheat-sugarcane regions, although yields decelerated and almost stagnated, income growth did not slow down significantly. This is because of effective implementation of MSP and generous MSP awards throughout the Ninth Plan. There was no crop diversification and area increased further under wheat, rice and sugarcane.

- In high rainfall unirrigated regions mainly growing rice, growth decelerated but yields continued to grow faster than the national average However, since MSP policy was ineffective, farm incomes declined in these regions when it was decided in 2001 to reduce stocks by lowering sales prices and increasing food for work. Nearly a third of crop growth in these regions since mid-1990s has been on account of diversification, mainly towards vegetables.
- The dry and arid regions growing unirrigated coarse cereals, cotton and oilseeds were the most dynamic during 1992-98 when world prices were high. Yield growth was moderate but area increased rapidly and there was very significant diversification from coarse cereals, pulses and lower valued oilseeds towards cotton, higher value oilseeds and horticulture. However, lower world prices since then have combined with successive droughts to reduce incomes very significantly. These regions, already most vulnerable to monsoon risk, bore the brunt of transmitted world price volatility.
- The other regions affected significantly by world price movements were the plantations and the already diversified coastal regions in the South.

CONSUMPTION DEMAND AND FOOD SECURITY

5.26 A consequence of the marked deceleration of agricultural growth has been that food consumption has stagnated since the beginning of the Ninth Plan. This conclusion follows not only from the NAS, which shows per capita real consumption expenditure on all food and beverages lower in 2002-03 and 2003-04 than in 1996-97, (but also from the National Sample Survey which suggests an even larger decline. These data-sets show larger decline in cereals consumption than of other food, so there is some evidence of diversification of the food basket). But the matter of concern is that the decline in cereals consumption is not being made up by increased consumption of other foods. In fact, the National Accounts data shows real per capita consumption lower in 2003-04 than in 1998-99 of cereals, pulses, edible oils, sugar, milk, fruits and vegetables, with consumption higher only of meat, fish and eggs. Moreover, this data shows that prices of all food items, except fruits and vegetables, increased less than the overall price level.

5.27 Since per capita GDP grew at about 3.5 per cent per annum during this period, the above is evidence of a major structural weakening of demand impulses that the agricultural sector can expect from the growth of other sectors of the economy. In addition to changes in patterns of consumption due to variations in life-style, this outcome is almost certainly linked to the fact that overall employment growth has been very slow and real agricultural incomes (which still provide a large source of food demand) have been stagnant or declining. From the point of view of planning future agricultural growth, this means that the demand side can no longer be ignored. This implies that it might be difficult to increase agricultural growth while maintaining profitability unless either costs are reduced by enhanced technological progress or definite steps taken to increase demand, for example, through greater exploitation of export prospects and, even more importantly, through policies which aim directly at increasing rural employment and incomes. Furthermore, these outcomes require that the performance of agriculture be viewed in conjunction with the continuing need for food security since recent trends appear to have set back progress in tackling the problem of under-nutrition, where India still lags behind other developing countries.

5.28 India's food security system is one of the largest in the world but is confined almost entirely to provisioning cereals. This system comprises the Food Corporation of India (FCI) which implements the MSP for cereals, holds buffer stocks, and delivers grain to a public distribution system (PDS) with a network of about 400,000 fair price shops (FPS). Since its inception after the food shortages of the mid-1960s, this system has managed to help the

country avoid famine, contain food price variability to much less than in world markets and offered enough price support for farmers to nearly triple cereals production. Quite apart from PDS entitlement, this delivered an almost steady decline in real market prices of cereals over the 1970s and 1980s and rising per capita availability. Till 1997, the annual cost of the entire system was less than 0.5 per cent of GDP.

5.29 However, the yield deceleration from early 1990s had cost implications that made it more difficult to reconcile producer, consumer and fiscal interests, especially with MSP being used in the early 1990s as an instrument to compensate farmers for cuts in fertilizer subsidy. The system ran into crisis during the Ninth Plan when large MSP increases were continued despite falling world prices and, simultaneously, the PDS was converted from universal to a targeted benefit.

5.30 The targeted Public Distribution System (TPDS) was introduced in 1997 in response to the 1990s reversal of the earlier decline in real cereals prices and to meet criticism that PDS did not deliver adequately to the poor. The TPDS replaced the earlier universal PDS entitlements with differential prices for the below poverty line (BPL) population and those above the poverty line (APL). BPL prices were set much lower than earlier uniform prices and, in order to reduce subsidy outgo, APL prices were increased in phases to reach full cost by 2000.

5.31 But since MSPs were above market prices, full cost pricing caused the APL to exit PDS, rendering many FPS unviable, while FCI bought almost the entire market arrivals in traditional surplus areas. PDS sales declined from over 19 million tonnes in 1996-97 to less than 12 million tonnes in 2000-01 even as procurement went up from 21 million tonnes to over 37 million tonnes. With exports restrained by low world prices, stocks increased from 18 million tonnes at end of 1997 to 58 million tonnes at end of 2001. The increased cost of stock holding doubled the food subsidy to nearly 1 per cent of GDP. And, most importantly, per capita cereals availability fell 20 per cent between 1997 and 2001, to its lowest level since 1980.

5.32 This perverse operation of the system not only reduced consumption, but, at the same time, prices and supplies became less stable and farm incentives were disturbed. As stocks built up, the wholesale price index for cereals increased 31 per cent between 1996-97 and 1999-00, distorting inter-crop parities and inflating money wages at a time when prices of other agricultural commodities were weak. Subsequently, in order to reduce stocks, BPL prices were cut further and quotas increased sharply in 2001-02. But such cheap supplies depressed farm prices of cereals wherever MSP was ineffective and, in particular, paddy prices in eastern India fell below full cost of production

5.33 Large exports at BPL prices and the drought of 2002-03 finally brought stocks down to near normal levels at the end of 2003. MSP policy has since been more restrained and procurement has stabilised at about 40 million tonnes. PDS sales have climbed back from 13 million tonnes in 2001 to about 25 million tonnes and total off-take, including for the Food for Work and Mid-Day Meals programmes, is now also about 40 million tonnes. However, this return to balance has been reached with much larger proportion of cereals production being procured and distributed by public agencies than before 1997. Moreover, per unit subsidy is much higher because about 60 per cent of PDS supply is now at BPL prices that are well below MSP and another 20 per cent at even lower prices for the Antyodaya Anna Yojana (AAY). The food distribution system has, therefore, been converted from its price stabilisation role to primarily one of transfer to the poor.

5.34 The failure during 1997-2003 of the till then quite effective food security system is a matter of grave concern. Not only were huge costs incurred (exceeding Central Plan outlays on agriculture, irrigation and rural development put together) without delivering food security, but its perverse operation also distorted producer incentives and added to the already increasing uncertainties. The problem arose

because the stabilisation objective of the system was overridden by other objectives such as income support to farmers, compensating for input subsidy reduction and targeting consumer subsidies to the poor. An important question, since BPL prices are below costs of production of wheat and rice, is whether differential PDS pricing is the best way of serving the equity objective? With a decision already taken to introduce Employment Guarantee and expand Mid-Day Meals and the Integrated Child Development Services (ICDS), an alternative may be to move rapidly to full all-India coverage of these welfare initiatives and revert simultaneously to uniform PDS pricing (linked to but no less than MSP) and to the original clear-cut and much less expensive objective of stabilising prices at above costs of production. This would of course still leave the question of reaching the urban poor for whom no expansion of employment schemes is yet on the anvil and the old and infirm currently covered by AAY. But these relatively smaller parts of total PDS could either continue or be replaced by an expanded old age and disability pension. The important objective should be to redesign the system so that the food security and poverty alleviation objectives are strengthened and purchasing power of the poor increased so that agricultural demand growth is restored without distorting price incentives for agricultural growth.

AGRICULTURAL EXPORTS AND IMPORTS

5.35 Since the mid-1970s, India has been a net exporter of agricultural products. Although the World Trade Organisation (WTO) Agreement on Agriculture in 1995 was expected to improve India's agricultural trade, this has not happened. In fact, the gap between agricultural exports and imports has been narrowing in recent years. The ratio of dollar value of exports and imports of agricultural products, which was close to 5 in 1996-97 has steadily come down to 2.2 in 2003-04. This is explained by the relatively faster growth of agricultural imports than of agricultural exports.

5.36 India's agricultural exports had performed extremely well in the first half of the 1990s. But since 1995-96, this has shown extreme fluctuations. Exports growth accelerated 45 per cent in 1995-96 over the low base of the previous year, to US $ 6,320 million, decelerated to less than 12 per cent in 1996-97 and then registered negative growth for three years in succession. This recovered somewhat in 2000-01 but suffered another setback in 2001-02. However, there has again been a turnaround during 2002-03 and 2003-04 and indications are that this favourable trend will continue in 2004-05.

5.37 Nonetheless, it needs to be noted that not only has the share of agri-exports in total merchandise exports come down steadily from 21 per cent in 1996-97 to 12 per cent in 2003-04, but the share of agricultural exports (including processed foods) in agricultural GDP also declined from 7.6 per cent in 1995-96 to 6.3 per cent in 2001-02 and recovered to only 6.9 per cent in 2003-04. Although the declining share of agri-exports in total exports is explained in terms of the relatively faster growth in the volume of merchandise exports, it appears that there are other and more fundamental reasons such as loss of competitiveness that many an Indian agri-export items had to suffer in a depressed world prices situation which underlie the sluggishness of agri-export. This is quite evident in the case of coffee, tea, spices and even fruits and vegetables whose market share has displayed declining trends in recent years.

5.38 In the context of the inadequate domestic demand growth that has been discussed earlier, the slow and uncertain export growth of agri-products is a cause for worry. Although the Foreign Trade Policy 2004-09 has emphasised the importance of agricultural exports and announced a number of measures to boost them, namely, the Special Agricultural Produce Scheme (Vishesh Krishi Upaj Yojana), Funds for Development of Agri Export Zones (AEZ) and relaxation of Export Promotion Capital Goods (EPCG) scheme for AEZ, etc., these do not really address the fundamental problem of competitiveness which essentially depends on higher productivity, better quality and lower cost of exportable agri-products. Apart from agronomic measures for raising productivity, interventions are required for

educating farmers to enable them to upgrade their skills to improve the quality of products so that they conform to the strictest sanitary and phyto-sanitary standards.

5.39 As in the case of agri-exports, India's agri-imports have also displayed extreme fluctuations, having varied in the range of 58 per cent to (-)29 per cent in the post 1995-96 period. The percentage share of agri-imports in total imports also has shown very high volatility, having moved in the range of 28 per cent to less than 2 per cent during the same period. There was, in fact, a negative growth of 29 per cent in 2000-01 but since then, agri-imports have grown at a relatively high rate of about 23, 22 and 27 per cent in 2001-02, 2002-03 and 2003-04 respectively. In recent years, imports of only two items, namely, pulses and edible oils have recorded consistently high volumes. Import of pulses, which used to vary in the range of 3-6 lakh tonnes in recent years – except in 1997-98 when over 1 million tonnes were imported – surged to over 2 million tonnes in 2001-02 and has been close to that level since then, essentially reflecting shortage of domestic production. Similarly, import of edible oils surged from 1 million tonnes in 1995-96 to over 4 million tonnes in 1999-2000 and has since been moving in the range of 4.2 to 5.3 million tonnes per year, accounting for about half of domestic consumption. As in the case of agri-export items, concerted efforts are required to raise the productivity and production of both pulses and oilseeds in the country.

MAJOR SUPPLY-SIDE ISSUES

5.40 Although poor performance of agriculture in the Tenth Plan is partly due to poor monsoon and to sluggish implementation outlined earlier, this is largely attributable to longer-term trends. Besides the demand problems, the supply side problems are: declining public investment; failure to carry out essential reforms to conserve water and soil; unabated degradation of natural resources, and weakened support systems due to financial problems of state governments, i.e. unresponsive agricultural research, nearly broken down extension, inadequate seeds production, distribution and regulation etc. There is consensus among experts that steps are needed in several areas to reverse this trend, and that there are also some inherent problems.

AGRICULTURAL INVESTMENT

5.41 The deceleration in the growth of agriculture in the 1990s is generally attributed to inadequate investment. This is supported by the fact that the share of agriculture in total gross capital formation (GCF) had progressively come down from 15.4 per cent in 1980-81 to about 8 per cent by the end of the Ninth Plan (2001-02), and that as a percentage of GDP it has declined from 3.5 in 1980-81 to 1.6 in 2001-02. More importantly, real public sector GCF in agriculture and allied sectors has actually declined in the last two decades. This reduced steadily from over Rs. 7,300 crore in 1980-81 to less than Rs. 5,000 crore 1990-91, registered a slight turnaround to around Rs. 5,300 crore in the mid-1990s before declining to Rs. 4,658 crore in 2001-02. Based on this, and the fact that huge amounts are being spent on various subsidies, namely, food, fertilizers, power and irrigation, a view is generally expressed that the latter have crowded out the resources for public investment in agriculture-related infrastructure.

5.42 However, although it is true that public sector investment in agriculture was squeezed, it is not clear that low investment alone explains the deceleration in the growth of agriculture. It needs to be noted in this context that real private sector investment was able to make up much of the slack in public sector investment, resulting in acceleration of overall growth in GCF from about 1.6 per cent per annum in the period 1980-81 to 1996-97 to over 2.6 per cent during 1996-97 to 2003-04, i.e. precisely during corresponding periods when GDP growth in agriculture decelerated sharply. In fact, there was a large increase in the capital intensity of agricultural production during the 1990s, doubling the incremental capital-output ratio from about 2 to 4, implying higher cost of production and lower profitability in a situation of depressed domestic and global commodity prices.

5.43 The primary task now is to find ways to make the fixed capital more productive. The bulk of the investment that has taken place in both the public and the private sectors is accounted for by investment in augmenting irrigation resources: canal irrigation in the case of public investment and groundwater exploitation in the case of private investment. In order to make the fixed capital more productive, it is necessary to invest more for completion of incomplete irrigation projects, better water management in the running projects and augmenting land and ground water resources in the non-command areas through the watershed development approach.

5.44 The question of funding public investment still remains. Subsidy reduction is one way to find resources. But it needs to be noted that much of what is Plan capital expenditure in agriculture is also subsidy. Therefore, instead of viewing subsidy reduction as a means to mobilise resources for agriculture related investment, it may be more beneficial to focus on those aspects of all subsidies, current and capital, that lead to distortions and deleterious effects on natural resources and cropping pattern. In fact, there is scope for significant reduction in the cost of subsidy through better designing of the programmes and delivery mechanism.

5.45 For example, the magnitude of food subsidy could be significantly reduced by fine-tuning the MSP of rice and wheat to the level of costs/market prices so that procurement remains close to the requirement of buffer stock as well as of PDS, thereby eliminating subsidy attributable to excessive carrying costs of stocks, export incentives and wastage. Restraint in fixing MSP is absolutely essential since the volume of procurement cannot be delinked from price-support operation under the concept of MSP, which is a commitment on the part of the Government to purchase whatever quantity is offered at that price. Making MSP of rice and wheat to conform to costs/market prices is also necessary to remove distortions in cropping pattern in favour of rice-wheat and rice-rice rotation, which have known adverse environmental impacts. In order to reduce costs and make price support more widely available, it is also necessary to expand coverage of decentralised procurement that has so far received only limited response from the states.

5.46 As for subsidies on inputs such as water and fertilizers, these should also be viewed in terms of the possible distortions and deleterious effects that they may be causing. For example, over-exploitation of ground water and ecological degradation from water-logging, salinity, etc., due to subsidised or free power or wasteful use of canal water leading to tail-ender problems on the one hand and inadequate funds for the maintenance of delivery systems due to negligible user-charges on the other. Similarly, subsidy-induced overuse of nitrogenous fertilizers, vis-à-vis, potassium and phosphoric fertilizers leading to degradation of soil needs to be prevented. While full recovery of costs of material inputs and services may not be feasible, systems can be developed to reduce the subsidy bill with consequential benefits on the conservation/ environmental protection side.

5.47 It also needs to be mentioned that merely rolling back subsidies and diverting these to agricultural investment cannot solve the problems of agriculture. In order to make investment in agricultural infrastructure yield the desired results in terms of higher productivity and production, it would be imperative to pursue reforms vigorously in many areas such as agricultural research, extension, credit, marketing, etc., since these reforms collectively would determine the profitability of agriculture. It is profitability that would ultimately drive the engine of innovation, entrepreneurship and growth.

IRRIGATION AND WATER RESOURCE MANAGEMENT

5.48 From the point of agricultural production, the single most effective supply-side constraint is that irrigation coverage still extends to only about 40 per cent of net sown area. In particular, slow expansion of surface irrigation through investment in major and medium projects has been the main reason why public investment in agriculture has

declined since the early 1980s. While there are genuine problems that make it difficult to initiate new irrigation projects quickly, a concentrated effort is required to expedite ongoing but unfinished projects that involve 13.4 million hectares of potential, and bring under irrigation about 14 million hectares in command areas of completed projects that lie unirrigated due to lack of field channels, silting of reservoirs and similar problems.

5.49 The Accelerated Irrigation Benefits Programme (AIBP) has this objective, and allocation for this has been stepped up in 2004-05. But there is need also to address factors that have so far caused AIBP to be sluggish on benefit delivery. Currently, projects are prioritised on the basis of likely completion time and continue, with no further projects financed till selected projects are completed. This allows selected projects to drag and pre-empts resources from other projects. A better priority may be to allocate across projects according to likely additional irrigation possible from a given investment within given time, without insisting on project completion but with actual benefits monitored directly through remote sensing or otherwise. Also, to expedite projects involving more than one state, it may be necessary to define these as national projects and route Central funding through a single executive authority.

5.50 It is equally important to take measures to improve water use efficiency at both farm and community levels. The Tenth Plan had visualised large investments in micro-irrigation as a technology-driven method to conserve water at the farm level and also to improve yields. The Planning Commission has now given in-principle clearance to the proposed scheme but details are yet to be finalised. Since technologies such as drip irrigation are expensive and relatively novel in most parts of the country, subsidies are necessary to encourage their use, particularly in the initial stages. But how much subsidy is justified beyond technology demonstration and how to distribute it best requires further analysis. For example, a high subsidy would be required to encourage adoption if irrigation water is free. But if resources are limited, it makes more sense to keep subsidy low to ensure that it goes to those who value water saving most.

5.51 Similarly, participatory irrigation management (PIM), through water user groups or panchayats, can lead to more efficient water use at the command area level. But this works best if the community group is able to charge for water and retain the proceeds. Synergy with private investment may be possible if subsidies are kept low for individual purchases of devices such as drip but larger subsidies are made available through panchayats, empowering them to decide on both how much to charge for water and how much subsidy to pass on to members. Moreover, this can make it possible to direct more resources to villages with greater water shortage.

5.52 Some innovative mix of proper utility pricing, community control and provision of subsidies on water conservation techniques is urgently necessary in regions displaying acute water stress, i.e. over-exploited and dark blocks, particularly in low rainfall regions. The problem is growing due to over-exploitation of groundwater facilitated by cheap (in some states, free) supply of power. There can be no solution to this without proper pricing of water and electricity. However, it must also be recognised that what is required is an acceptable framework since simply increasing electricity tariffs may neither be politically feasible nor sufficient. For example, even high tariffs without proper metering will not reduce waste while it is possible to design metered pricing that is both effective in conservation and allows a fixed quantum of free electricity. In addition, there is a need for definite non-price initiatives.

5.53 The Tenth Plan had envisaged community-level investment on artificial recharge of ground water and on rainwater harvesting, and had also mooted legislation to regulate groundwater use. If the latter is to extend beyond imposing bans on sinking new wells to regulation at the aquifer level, panchayats will need the power to regulate allocation and pricing of ground water. For this to be acceptable, panchayats must be able to deliver visible gains over what is possible through individual ownership. Besides capacity

building, this requires that community control receives more government support and subsidy than can be accessed individually.

WATERSHED DEVELOPMENT AND RECLAMATION OF WASTELAND/ DEGRADED LAND

5.54 Rain-fed areas constitute about 60 per cent of net sown area and are characterised by low levels of productivity and low input use. The bulk of India's rural poor lives in rain-fed regions and face high variability of rainfall, resulting in wide variation and instability in yields. For sustainable development of these areas, the watershed development approach has been adopted and given high priority for several years. Evaluation studies show several benefits:

- increase in water level and recharge of ground water aquifers;
- reduction in soil erosion;
- increase in cropping intensity;
- change in cropping pattern leading to higher value crops;
- increase in crop productivity;
- rise in overall bio-mass in the watershed;
- increase in employment; and
- reduction in rural and urban migration.

5.55 Expenditure on the several schemes for watershed development has been stepped up in 2004-05. This is also a major focus of productive works under the new National Food for Work Programme, already launched in the poorest 150 districts and to be converted into an Employment Guarantee scheme.

5.56 However, while expanding the pace and scope of watershed development, much greater attention needs to be paid on why past efforts have delivered less than promised. Some watersheds are poorly designed. Most do not reach full potential in terms of agricultural production except under initiative and supervision of a few non-government organisations (NGOs). In many cases, watersheds have not been properly maintained because community involvement waned after the initial development stage. In any case, community involvement in watershed planning and design has typically been low; and distributional problems are persistent, arising from existing inequalities in land distribution or because of ill-defined rights and encroachment.

5.57 Some of these problems arise because watershed development is capacity-intensive and inherently slow. In addition, there are too many agencies of the Central and state governments implementing watershed schemes. This makes a coordinated approach towards prioritised planning and implementation rather difficult. A more structured and monitorable system with much greater community participation needs to be put in place. Lack of community participation is widely regarded as the principal reason why efforts towards watershed development do not yield better and desired results. It is important for the planned distributional outcomes to be equitable and widely acceptable in order to ensure that there is a sense of ownership and participation on the part of the community at large both in implementation and maintenance of the water retention structures. It is necessary, in this context, to collect and collate information on successful experiences in designing and implementing watershed projects so that these can be replicated elsewhere in the country.

5.58 The National Common Minimum Programme (NCMP) has envisaged that the government will introduce a special programme for dryland farming in the arid and semi-arid regions of the country. Since this is eminently amenable to watershed development approach, it should be conceptualised in a manner so that it can be integrated with the activities and coverage of on-going watershed development programmes of the DAC and the Department of Land Resources in the Ministry of Rural Development.

5.59 Out of an estimated area of 107 million hectares of degraded land, 64 million hectares is categorised as wastelands. These wastelands and degraded lands are either unutilised or under-utilised. Being a common property resource, individuals do not have the right to utilise these lands for any productive purpose.

Land under the control of government or panchayats or other para-statal bodies could be parcelled out in viable units and allotted to landless and others, especially the deprived social groups, not only for homestead and kitchen gardening but also for specific purposes such as tree plantation or agro forestry. Distribution of such lands to the landless is actually being planned under two major recent initiatives, namely, the National Mission on Bamboo Technology and Trade Development and the National Mission on Bio-Diesel. The problem, however, is that the landless do not have capital and finance. Organising these people under cooperative structure and leveraging the employment guarantee programme could be a viable solution to the problem. Without resolving this issue, it would be difficult to involve local communities, which is a pre-condition for implementing these programmes successfully.

5.60 Despite a plethora of schemes and many years of implementation, the physical progress of treatment of degraded land has been rather slow. This should, however, be seen in the light of the overall magnitude of the task and the complexities of the issues involved, apart from the huge amount of funds that is required for the purpose. According to the Working Group on Watershed Development, Rainfed Farming and Natural Resource Management for the Tenth Plan, the total cost of treatment of 88.5 m.ha. of degraded land that would require treatment by the Thirteenth Plan would come to around Rs. 72,750 crore to be shared by the Centre, states and the community. The Centre's share works out to about Rs. 23,600 crore at 1994-95 prices. A detailed plan of action has yet to be chalked out. For this, the different ministries viz. Ministry of Agriculture, Ministry of Rural Development and Ministry of Environment and Forest will have to take up a comprehensive exercise to determine the acreage that can be treated and the financial resources required, under each scheme/ programme, in order to meet the above target.

EXTENSION SERVICES

5.61 Revival of agricultural dynamism calls for corrective steps to deal with the near collapse of the extension system in most states. One of the key reasons for the breakdown of the system is the financial stringency experienced by the states as well as the Centre. As a result, farmers are becoming increasingly dependent on the private sector for extension services. While this can be an effective alternative if private services are supplied efficiently and competitively, in the absence of assured public provision of such services at a certain standard, the resource poor and gullible farmers can become victims of exploitation by unscrupulous traders and money-lenders interested in selling spurious inputs such as seeds, fertilizers and pesticides or simply interested in pushing excessive dependence on inputs, whether spurious or not. There is, therefore, an immediate need for reforming and revitalising the existing agricultural extension system in the country. Obviously, adequate financial support from the Centre to the states would be required. The main ingredients of this reform should be:

- active involvement of farmers through user groups/ associations;
- increasing the use of media and information technology including cyber kiosks to disseminate knowledge of new agricultural practices and information on output and input prices;
- building gender concerns into the system, for example, by having the extension services managed predominantly by women; and
- inducting agricultural graduates and NGOs to offer extension advice.

5.62 DAC has moved in the direction of extension reforms by embracing the elements indicated above. It has formulated a scheme for replicating the Agriculture Technology Management Agency (ATMA) model of extension services, which was successfully pilot-tested under the National Agricultural Technology Project (NATP). The scheme aims at converging resources at the grass-root level (district, blocks and villages) through involvement of farmers, subject matter specialists, NGOs, Krishi Vigyan Kendras (KVKs), etc.

5.63 Under the theme of Mass Media Support to Agriculture Extension, DAC has taken three new initiatives – launching of the Kisan Channel on Doordarshan, Narrow-casting and the use of the All-India FM Transmitter Network. The Kisan Channel telecasts agriculture-related programmes by utilising the national and regional centres of Doordarshan. In addition, through Narrow casting, area-specific telecast of agricultural programmes is being done through 43 stations of Doordarshan. Under the FM radio network, presently 96 FM Stations of All-India Radio are broadcasting half-hour agriculture programmes.

5.64 DAC has also established Kisan Call Centres, which have started functioning from January 2004. Farmers can call a common toll free number and access expert advice. At present, 13 such centres located at Delhi, Mumbai, Chennai, Kolkata, Hyderabad, Bangalore, Chandigarh, Lucknow, Ahmedabad, Kanpur, Indore, Jaipur and Kochi are engaged in agricultural technology dissemination. Though this is still at an early stage, these call centres have so far received over 600,000 calls and the number of calls averages about 100,000 per month at present.

5.65. A Central sector scheme viz. Establishment of Agri-clinics and Agri-business by Agriculture Graduates is being implemented with the aim of supporting agriculture extension and development. The scheme is being jointly implemented by Small Farmers' Agri-business Consortium (SFAC), National Institute of Agricultural Extension Management (MANAGE) and National Bank for Agricultural and Rural Development (NABARD) in association with 66 training institutes.

5.66 Although all these Central sector schemes are important to revive the extension system, it should be emphasised that this is primarily a responsibility of the states. While national level inputs, such as through basic research and advice on comparative advantages, is a long-term necessity, Central help to revitalise state extension systems should ideally be time-bound, helping to create capacity for eventual ownership by the states and their ability to meet their specific problems.

AGRICULTURAL CREDIT

5.67 According to preliminary results from the 59th round of the National Sample Survey, 58 per cent of the credit requirement of farmers was met by institutional sources in 2003 and the remaining 42 per cent by informal sources like money lenders and traders who charge very high interest rates. This suggests worsening of the debt and credit situation since a similar survey a decade ago. Small and marginal farmers depend far more heavily on informal sources and, in the process, get exploited.

5.68 The reasons for the inability of the institutional services to meet fully the credit needs of the farm sector are fairly well known, namely, the commercial banks' inclination, given financial sector liberalisation, to avoid high cost of intermediation in retailing rural credit and to prefer collateral based lending due to fear of high level non-performing assets (NPAs), poor recovery rate and generally perceived high risk associated with agricultural lending. Despite reports and recommendations of numerous high level committees over the years, the country has not been able to make a dent in the problem. There is obviously a need to turn the focus on to farm credit in order to improve the situation in the shortest possible time.

5.69 However, there are some welcome developments also. Self-help groups (SHGs) especially of women, for providing micro credit have been a success story. Their experience points to the promise that groups comprising of small and marginal farmers hold in managing credit for land saving activities like animal husbandry, dairy, horticulture, agro-forestry, etc., provided there are contractual arrangements with dealers and processors for the provision of inputs and services of the marketing. The apparent success of SHGs should not distract attention from the host of problems that SHGs, in general, and those of women, in particular, face. In fact, under the SHG–Bank Linkage Programme of NABARD, the outreach

achieved in many states is inadequate. Even in those states where a sizable number of SHGs are financed, the quality of linkage continues to be low. Common problems SHGs face are: delays/refusal of banks to open savings bank accounts of SHGs; large number of visits required to be paid to branches for accessing credit access; inadequate credit support being extended by banks; delays in renewal of credit limits and impounding of savings of SHGs as collateral of loans. NABARD/ banks need to address these problems urgently. Moreover, SHGs have only a limited role in overall farm credit.

5.70 There are signs of improvement in the disbursement of ground-level credit, which increased from Rs. 62,000 crore in 2001-02 to about Rs. 70,000 crore in 2002-03 and to Rs. 87,000 crore in 2003-04. In fact, realising the need for enhancing credit to agriculture, the government had, in June 2004, announced its intention to double the flow in three years and accordingly, set a target of Rs. 1,05,000 crore for 2004-05. Based on data on credit flow up to December 2004, it appears that, notwithstanding unsatisfactory performance by cooperative banks, all three segments together will disburse Rs. 1,08,500 crore in 2004-05. In his Budget 2005-06 Speech, the Finance Minister has further proposed asking commercial banks, Regional Rural Banks (RRBs) and cooperative banks to increase the flow of credit by another 30 per cent in 2005-06. Thus, it appears that the target of doubling the credit in three years beginning 2004-05 would be realised. However, sustaining such a high growth rate would require steps to address the deep-seated problems indicated earlier.

5.71 Moreover, increased credit alone does not address the problem of existing farm debt. One of the reasons for credit-related distress of the farmers is that share of cooperative banks in the institutional credit for agriculture and allied activities has declined. There is a need to revitalise the cooperative structure, which still constitutes the largest network of rural credit outlets, through infusion of capital and increased quantum of refinance. More importantly, there is a need to amend the cooperative laws of the states with a view to inject professionalism, autonomy and transparency in the functioning of cooperative societies. The Task Force on Revival of Cooperative Credit Institutions under the chairmanship of Prof. A. Vaidyanathan to examine the reforms required in the cooperative banking system has recently submitted its report recommending, among other things, special financial assistance to wipe out accumulated losses and strengthen the capital base of cooperative credit institutions, institutional restructuring to ensure democratic institutions and changes in the legal framework to empower Reserve Bank of India (RBI) to enforce prudent financial management. These recommendations should be implemented in order to bring banking cooperatives under the full regulatory control of the RBI.

AGRICULTURAL INPUTS

Seeds

5.72 Despite a huge institutional framework for seed production both in the public and private sector, availability of good quality seeds continues to be a problem for the farmers. As a result, they prefer to rely on farm saved seeds; seed replacement rate continues to remain in the range of 2-10 per cent in certain states for certain crops, which is much below the desired level of 20 per cent for most crops. As is well known, seed replacement rate has a strong positive correlation with the productivity and production of crops. There is a need to rejuvenate the seeds sector through revamping the public sector seed companies, including the State Seed Corporations. The private sector currently supplies around 40 per cent of the total seeds distributed, but this success has been largely on account of hybrids with little impact on open-pollinated varieties. There is a need to strengthen the regulatory machinery to prevent proliferation of sub-standard/ spurious seeds.

5.73 A Central sector scheme, Development and Strengthening of Infrastructure, Facilities for Production, and Distribution of Quality Seeds, is being implemented during the Tenth Plan in order to develop and strengthen the

seeds infrastructure facility (i.e. production, processing, storage, and distribution of certified/ quality seeds), upgrade the quality of farmer's saved seeds, disseminate seed production technology and ensure the availability of seeds during natural calamities. This scheme, which comprises of assistance to improve infrastructure at the level of State Seed Corporations as well as the private sector and also has a component for providing subsidised foundation seeds to individual farmers, is expected to boost the availability of quality seeds which will translate into higher seed replacement rate / productivity.

5.74. The Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act, 2003 has been enacted to protect the Intellectual Property Rights of plant breeders and to stimulate investment in research and development in new varieties. Necessary rules and regulations under the Act have been notified. The Act will enable the research organisations to reorient their research for commercial returns. Breeders, researchers and farmers will also be able to protect their rights globally, which would facilitate enhanced import and export of seeds.

5.75 In order to replace the existing Seed Act, 1966, a draft Seed Bill was formulated. After necessary formalities, the Bill has now been cleared by the Cabinet and is likely to be enacted shortly as Seed Act, 2005. This new Act provides for regulation of all activities relating to seeds and planting material for agricultural, horticultural and plantation crops. It is expected to ensure availability of true-to-the-type seeds to the farmers, increase in seed replacement rate (SRR), increase private participation in seed production, distribution, certification and seed testing. The Act also provides for regulation of import and sale of transgenic seeds and planting material and stringent penalties to check the sale of spurious seeds.

Integrated Nutrient Management

5.76 One of the proven and well-documented reasons for stagnation in the productivity and production growth rate since the early 1990s is the unbalanced use of fertilizers. Although matters have improved considerably since the mid-1990s, the current fertilizer ($N:P_2O_5:K_2O$) consumption ratio in the country is 6.5 : 2.5 : 1 as against the conventionally accepted ratio of 4:2:1. The consumption ratio in several agriculturally advanced states is still wider.

5.77 Although the DAC emphasises on increasing fertilizer use, especially in the states where their consumption is low, by providing adequate infrastructure and quality control measures, it has been unable to develop or implement schemes/strategies for promotion of balanced fertilizer use. In fact, with the increasing incidences of multiple nutrient deficiencies in the soils, the meaning of balanced fertilizer use is entirely changed. It is not only confined to the use of NPK but also need-based application of nutrients like sulphur, zinc, iron and boron which have become essential for exploiting the potential of high yielding varieties. Experimental evidences indicate that the productivity of existing varieties can be enhanced appreciably provided rational crop nutrition schedules are followed. The major bottlenecks are:

- inadequate availability of straight fertilizers of nutrients other than NPK and zinc;
- less exposure of extension agencies towards advances in crop nutrition;
- lack of strong policy support on balanced fertilizer use; and
- lack of awareness among farmers.

5.78 Continuation of the subsidy on urea while decontrolling P&K fertilizers further adds to the inadvertent promotion of imbalance in fertilizer use on the one hand and excessive use of fertilizer-N on the other, leading to environmental pollution and lowering of profits to the farmer.

Integrated Pest Management

5.79 Use of bio control agents in controlling crop pests have emerged as an important eco-safe alternative for the management of pests and diseases in agriculture.

However, farmers are still to adopt it in a major way. A restructured scheme for Strengthening and Modernisation of Pest Management Approach in India has been launched for the promotion of an eco-friendly approach for pest management encompassing cultural, mechanical, biological and need-based use of chemical pesticides with preference to the use of bio-pesticides, bio-control agents. The ICAR/State Agricultural University (SAU) system is being strengthened for developing modules of Integrated Pest Management (IPM). Apart from promotion of IPM, the scheme covers implementation of the Insecticides Act, 1968, locust survey, surveillance and control and training of extension functionaries in plant protection.

5.80 In view of the heightened food safety and environment security concerns, people need to be educated about IPM at all levels right from the school stage. A multi-disciplinary course on IPM at the undergraduate level needs to be introduced in the curriculum. IPM could be popularised with the farmers only if the availability of critical inputs is ensured at the critical time. Therefore, efforts should be made to increase the growth of bio pesticides production from 2.5 to 5 per cent over the next five years. The KVKs and directorates of extension must work together in a network mode to popularise the IPM programme. Video material on IPM should be prepared and shown to farmers. Farmers adopting IPM and getting higher yields need to be encouraged and suitably rewarded.

Organic Farming

5.81 Promotion of organic farming through utilisation of organic waste is one of the thrust areas of the Tenth Plan. Organic farming is a holistic approach involving the use of inputs of organic or biological origin for crop production, processing and packaging of the produce. This approach largely excludes the use of synthetic agro-chemicals and fertilizers. The purpose of organic farming is not to go back to primitive forms of agriculture, but to blend modern scientific technologies with the indigenous knowledge and skills using the vast potential of various kinds of residues and wastes, so as to achieve sustainability of natural resources on the one hand and to exploit growing global market of organic food on the other.

5.82 In order to promote organic farming, a new Central sector scheme, National Project on Organic Farming, has been approved with an outlay of Rs.57.05 crore by re-structuring the on-going scheme of National Project on Development and Use of Bio-fertilizers. The scheme is being implemented at a pilot scale during the Tenth Plan in the areas where use of agro-chemicals is very low, those which fall in agri-export zones, and in urban hinterland (peri urban) areas. The main components of the scheme are: putting in place a system of certification of organic produce; capacity building through service providers; financial support for commercial production units of fruit and vegetable-waste compost, bio-fertilizers, hatcheries for vermiculture, and promotion and extension of organic farming.

Farm Machinery/ Implements

5.83 One of the thrust areas of the Tenth Plan is the development of energy and time-saving machines/implements and their adequate production/supply. A restructured scheme for Promotion and Strengthening of Agricultural Mechanisation through Training, Testing and Demonstration has been launched. New equipments like zero-till seed-cum-fertilizer drill, raised bed planter, rotavator, multi-crop thresher, sugarcane cutter planter, vertical conveyer reaper, paddy transplanter, etc. have been demonstrated.

AGRICULTURAL INSURANCE

5.84 In India, crop insurance is one of the instruments for protecting farmers from agricultural variability, mainly weather-induced. The initial Comprehensive Crop Insurance Scheme (CCIS) was implemented during the 1985-1999 period. For improving the scope and content of CCIS, a broad based Central sector scheme, National Agriculture Insurance Scheme (NAIS) was introduced from the rabi season of 1999-2000. The scheme is available to

Box 5.2
Organic Farming

Concept, Scope and Initiatives

- Organic farming is a way of farming which excludes the use of chemical fertilizers, insecticides, etc. and is primarily based on the principles of use of natural organic inputs and biological plant protection measures.
- Properly managed organic farming reduces or eliminates water pollution and helps conserve water and soil on the farm and thereby enhances sustainability and agro-biodiversity.
- Organic farming has become popular in many western countries. There are two major driving forces behind this phenomenon: growing global market for organic agricultural produce due to increased health consciousness; and premium price on organic produce fetched by the producers.
- India has comparative advantage over many other countries because of the vast cultivated area, which has remained free of contamination from chemicals, spread over distinctly varying agro-climatic conditions. For example, large areas in north-east region, northern hills and rainfed regions with very low or nil use of agro-chemicals can be instantly converted to organic farming.
- In India, a National Programme for Organic Production is being implemented by the Agricultural and Processed Food Products Export Development Authority (APEDA), Ministry of Commerce, with major responsibility for developing standards for organic farming and regulatory mechanism for export purposes.

Organic Uttaranchal : A success story

- The Uttaranchal Organic Commodity Board (UOCB), a nodal agency of the Government of Uttaranchal for promotion of organic farming, was registered under the Societies Act in May 2003. A project called Centre for Organic Farming (COF), "Himotthan Pariyojna", funded by the Sir Ratan Tata Trust was anchored within the Board for providing technical and marketing expertise for product development, supply chain management, market linkages, certification, etc.
- Crop certification is being facilitated under the internal control system supported by COF. Regular training is being provided by the field staff available with different programmes. The certification is done by a team of field staff, internal inspectors and Quality Managers in coordination with an External Certification Agency.
- Initially, a pilot programme of demonstration of certain technologies was taken up in 16 villages of Uttaranchal. Later, it was expanded to 212 villages. The term bio-village has evolved along with the development of demonstration villages to 100 per cent saturation villages where commodity production, certification and market linkage has been established. Presently, 1200 bio-villages are covered under the organic programme and 20,000 farmers have been sensitised.
- The tangible results are: export of 100 tonnes of organic rice to Germany and a product expansion plan for 400 tonnes of commodities like kidney beans, lentils, buckwheat and millets. An increase of 35-40 per cent in unit price has been realised for the farmers. The groups logged domestic market sales to the tune of Rs. 35 lakh in 2004. Organic producer groups have been trained to semi-process and package the products at the village level itself. A total of 40 organic commodities have been developed, including organic detergents.
- A number of farmer groups are actively engaged in exploring organic opportunities and some NGOs are also active in linking farmers with health food activists.

all farmers (both loanee and non-loanee) irrespective of the size of their land holdings. It covers a wide range of crops including annual commercial/ horticultural crops. At present, 23 states and two Union Territories are implementing the scheme. The NAIS provides for 50 per cent premium subsidy to small (1 hectare) and marginal (1-2 hectare) farmers. The subsidy burden is shared equally by the states and Central governments. The basic limitation of the scheme is that it covers only a small fraction of the eligible cropped area or the number of farmers and has a very high claims to premium ratio. Since its inception in rabi 1999-00 till rabi 2003-04, NAIS has registered a very high claims ratio of over 3.8 on an all-India basis; although the penetration in terms of both the number of farmers and acreage was about 11 per cent. The low coverage and high claims to premium ratio has made the scheme unviable. It can be improved by transition to actuarial rates, increasing the accuracy and timeliness of crop estimation methods and making the implementing agency, namely, Agriculture Insurance Company, share some risk. However, since actuarial premia are likely to be high for regions with low and erratic rainfall, a special budgetary subsidy might be necessary for these regions.

AGRICULTURAL DIVERSIFICATION

5.85 Agricultural diversification has to be a major element in the strategy for accelerating agricultural growth and this calls for action on several fronts. Ideally, there should be a shift of land from cereals to non-cereals (in the process increasing both farm income and employment) combined with an increase in productivity in cereals to ensure that the per capita availability of cereals does not decline. Diversification also means a shift from crop agriculture to animal husbandry/dairy and fisheries. Diversification is unlikely to be a feasible strategy all over the country, but it does hold great promise in many areas, particularly in the case of the shift away from crops. The shift from cereals to horticulture crops requires a supportive policy framework, notably, a much greater focus on marketing arrangements, including encouragement to private sector involvement in marketing; and encouragement of downstream food processing and research linked to market requirements for diversifying into horticulture. The shift from crop agriculture to animal husbandry, dairy and fisheries is constrained by the lack of availability of green fodder and grazing land and a host of problems in marketing dairy products of the kind that horticulture faces. This calls for policy changes, particularly in the area of the management of the common property resources in the villages and a much greater thrust on revitalising milk and other such cooperatives at the grass root level.

5.86 Since fruits, vegetables, milk, etc., are perishable, success in diversifying into production of these depends critically on the existence of a complete supply chain, with cooling facilities and final market avenues. This calls for a strong contract farming system. Agricultural research would also need to be tailored to developing varieties/ products suitable to the different requirements of particular markets such as for domestic consumption/ exports/food processing. Extension services and supply of inputs would need to be tailored to the requirements of the specific varieties. The country needs a credible strategy for tying up all the missing links so that the National Common Minimum Programme's (NCMP) objectives of augmentation and modernisation of rural infrastructure consisting of cold chain and marketing outlets are realised quickly.

5.87 Development of marketing links also requires changes in the agricultural marketing laws of the states and facilitation of contract farming, whereby crop buyers can organise farmers to produce under contract, using inputs which meet buyers' specifications. The changes needed are at the state level and there is enormous resistance to (as well as lethargy in) bringing about these changes because of entrenched vested interests who control existing mandis and the associated activities. Clearly, a strategy which identifies the package of changes needed and provides for incentives for making changes in the Agricultural Produce Marketing Committee (APMC) Acts and penalties for not doing so, would be necessary.

AGRICULTURAL PRODUCE MARKETING COMMITTEE ACTS

5.88 The Agricultural Produce Marketing Committees Acts do not allow the setting up of parallel competitive markets. The markets set up under the Acts also do not provide direct and free marketing, organised retailing, smooth raw material supplies to agro processing industries, competitive trading, information exchange and adoption of innovative marketing system and technologies. The supporting services like grading, standardisation, and storage with pledge finance facilities have become secondary activities. These deficiencies are going against marketing and processing efficiencies as well as acting as disincentives to farmers, traders and industries. The DAC has drafted a model Agricultural Produce Marketing Act and circulated it among the states. The Model Act provides for legal persons, growers and local authorities to establish new markets, growers to sell their produce in markets other than the regulated markets, establishment of direct purchase centres, consumers'/farmers' markets for direct sale, promotion of public-private partnership in the management and development of agricultural markets, regulation and promotion of contract farming, etc. Although most states agreed to consider amending their respective APMC Acts, there has been little progress on this.

INNOVATIVE MARKETING AND CONTRACT FARMING

5.89 Some states have been working on various innovative marketing strategies to get a better share of the consumer price for the farmers. Some experiences with direct marketing have been quite successful such as direct sale of fruits and vegetables to consumers in Hadapsar market in Pune (since 1976), Horticultural Producers Co-operative Marketing and Processing Society Ltd or HOPCOMS in Karnataka (since 1965). Some more recent experiments on the peripherals of cities are Uzhavar Santhail (since 1999) in Tamil Nadu, Ryathu Bazars (since 1999) in Andhra Pradesh and Apni Mandi in Punjab and Rajasthan. Further improvement in direct marketing is possible if provision is made for better marketing infrastructure and information. Some private initiatives such as ITC's e-choupal, Tata's Kisan Centres, ICICI Bank's convergence of agri services, etc., have given encouraging signals for the future of the agriculture. One variant of direct marketing is contract farming. Contract farming can reduce risks of deficient market demand and adverse price fluctuation while the corporate bodies/ buyers reduce their supply risks i.e. risk of non-availability of desired quality raw material. These arrangements are on the increase and can be further enhanced by providing appropriate legal and regulatory framework. However, it should also be emphasised that small farmers can be at disadvantage in contract farming because of contract enforcement and other transactions costs and it is necessary to enable farmers groups, co-operatives and panchayats to assist in contract design and implementation.

ESSENTIAL COMMODITIES ACT

5.90 The NCMP has stated that controls that depress the incomes of farmers will be systematically removed. The Tenth Plan had identified the Essential Commodities Act, 1955

Box 5.3
Contract farming

Contract farming is a system for the production and supply of agricultural/ horticultural produce under forward contracts between growers and buyers. The terms and nature of the contracts differ according to variations in the nature of crops to be grown, the technologies and the context in which they are practiced. Contract farming can help the farmers access credit, quality inputs, technical guidance and reduces risks of deficient market demand and adverse price fluctuation. The corporate bodies/buyers of the agricultural produce benefit from contract farming through the assured supply of quality raw material. The experience with contract farming shows that it has been beneficial in many ways.

- Due to Pepsico's involvement in contract farming with the farmers of Punjab, tomato cultivation has stabilised in the state on 25,000 hectares with a crop size of about 5,00,000 tonnes. The average yield of the contract farmers' is 25-50 per cent higher than the state average, while their per hectare income is reported to be 40 per cent higher than that of the other farmers. The Pepsico project has introduced new seed varieties, new technology of deep chiselling, new methods of transplantation like shovel technique and bed head planting etc. to Punjab.
- Agricultural seed production and distribution, which are the business of over 150 companies, survive on contracts. A case study by the Maharashtra Economic Development Council of seed multiplication by JK Agri-genetics, ProAgro and Nath Seeds in Andhra Pradesh, Maharashtra and Gujarat respectively have found that these companies attribute their healthy volumes and profits to the contracts;
- Hindustan Lever Limited (HLL) entered into a joint venture with the Madhya Pradesh government to grow wheat. The project, which started about three years ago on 250 acres, has expanded to cover to 15,000 acres.
- Rallis' Kisan Kendras have set-up contract farming pilot projects for fruits, vegetables and basmati rice in Hoshangabad (Madhya Pradesh), at Bangalore (Karnataka), Nashik (Maharashtra) and Panipat (Haryana). The company has come together with credit providers ICICI Bank and buyers of agricultural produce like HLL and FoodWorld.
- ITC's e-choupal, an information technology based intervention, has created a direct marketing channel, eliminating wasteful intermediation and reducing transaction costs. E-choupals have been set up in around 29,500 villages, benefiting more than 3million farmers.
- Mahindra Shubh Labh Services (MSSL) offers extension services to farmers for a fee, with assured level of yield. As a result of the company's experiment in Madurai, Tamil Nadu, the average yields of the farmers who availed the services of the company were reported to have been improved.

Farmers' perception

The Maharashtra Economic Development Council's study has found that contracts are not always well understood, with prices, quality stipulations, and respective responsibilities being the main areas of confusion. Overall, however, farmers were distinctly satisfied with contracts and were ready to repeat them, in general, and with the same parties, in particular, if offered. Farmers reported higher incomes and prestige due to association with a large organisation as the main benefits of contracts. Nevertheless, they firmly believed that buyers were responsible for disputes, underlining the antagonistic nature of contracts in general.

Move forward

To further strengthen the contract farming, it is important to establish:

- an appropriate legal framework,
- a credible contract enforcement mechanism, and
- an inexpensive and simple arbitration arrangement.

Further, the involvement of the farmers' associations, NGOs and the State is important to ensure that the contracts are not biased against the farmers.

(ECA) as one such impediment and, in May 2002, an Inter-Ministerial Task Force on agricultural marketing reforms had enumerated more than 200 control orders by various states. Although a number of agricultural commodities have been taken off the ECA, the rigid rules framed under the Act continue, for the most part. However, the NCMP also states that the ECA will not be diluted. It has been suggested that the ECA be so amended that rules framed under it apply in specified situations without hampering normal market activity.

INFRASTRUCTURE

5.91 Inadequacies of rural infrastructure like roads, transport, electricity, marketing infrastructure, storage facilities (both warehouse and cold storages), and other post harvest facilities continue to impede the generation of market surplus and value addition in Indian agriculture. Market infrastructure is important for the performance of various marketing functions, expansion of the size of the market and transfer of appropriate price signals for marketing efficiency etc. A new Central sector scheme for Development/Strengthening of Agriculture Marketing Infrastructure, Grading and Standardisation, has been formulated which would be implemented as a reform-linked scheme. To attract private investment under the scheme, credit-linked back-ended subsidy for capital investment would be provided for setting up general or commodity-specific marketing infrastructure for agricultural commodities. Subsidy would also be provided for strengthening and modernisation of existing agricultural markets, wholesale markets and rural haats in tribal areas.

5.92 The DAC is implementing the on-going Central sector scheme, Capital Investment Subsidy for Construction/Renovation of Rural Godowns, during the Tenth Plan for the creation and renovation of storage capacity. It is expected that 140 lakh tonnes of storage capacity will be created/renovated under this scheme during the Tenth Plan. It is necessary to introduce a negotiable warehouse receipt system for the farmers to harness the full benefit of the storage capacity.

ANIMAL HUSBANDRY AND DAIRYING

Cattle and Buffalo Development

5.93 The National Project on Cattle and Buffalo Breeding (NPCBB) Phase-I is one of the major schemes of the DAHD for genetic upgradation, as well as conservation of indigenous cattle and buffalo breeds. It appears that the emphasis has been shifted to the improvement of cattle through crossbreeding, using frozen semen technology, whereas the conservation of the indigenous well-adapted cattle and buffalo breeds has been neglected, thus leading to their progressive elimination from the production system. It is advisable that before starting on Phase-II of NPCBB, the DAHD undertakes an independent evaluation study with special reference to the extent of conservation works on indigenous cattle and buffalo breeds that had been undertaken under Phase-I, financial viability of all the state implementation agencies and their sustainability without assistance from Plan funds during Phase-II, and achievement of state-wise financial and physical targets, which had been fixed during the district level planning in consultation with the local authorities.

5.94 The Department is spending about Rs. 8 crore per year in the Central Cattle Development Organisation for production of about 300 bull calves. There are few takers for these very expensive bull calves produced by the seven Central Cattle Breeding Farms, as they are not progeny tested. Only 36 per cent of the total bull calves produced since inception have been distributed to different states for meeting their requirement. The Central Cattle Breeding Farms may be closed or they may be used exclusively for the conservation of indigenous breeds particularly draught breeds of cattle, which are facing threat of extinction.

Dairy Development

5.95 The sharp deceleration in the growth rate of total milk production is worrying, as this could drag down the total output from the agriculture and allied sectors. Many district level milk cooperative unions established under Operation Flood are

running in losses and the effort to rehabilitate them through the Central sector scheme Assistance to Cooperatives has also not been effective in most cases. The Operation Flood programme covered 265 districts while the remaining 250 districts are covered by the ongoing scheme, Integrated Dairy Development Project (IDDP). The DAHD has so far approved 53 projects in 23 states and one Union Territory (covering a total of 149 districts) with an outlay of Rs. 292.19 crore. The major problem is poor planning, with unrealistic physical targets and slow pace of implementation.

5.96 There is little meaning in enhancing milk productivity without providing marketing facilities. A good year of milk production would bring cheer to the dairy farmers of Gujarat (which has an effective marketing network under AMUL for milk collection), but not in states like Orissa, Bihar, Kerala and Karnataka because the excess supply would lead to prices falling or the Milk Unions in these states suffering losses. Milk Unions created under both the Operation Flood and IDDP are unable to bear the additional expenditure required to purchase surplus milk in the flush season and are often compelled to declare 'milk holidays' (refusing to collect milk from the producers). The National Dairy Development Board (NDDB) could initiate a programme for creating a buffer stock for milk powder during the flush season, with assistance from the Government of India. The total cost would not be more than Rs. 100 crore per year, which is a modest amount in comparison with the expenses on buffer stock operations on food grains (wheat and rice).

Poultry Development

5.97 In the past decade, egg production has grown around 4.5 per cent per annum, but the growth rate has decelerated to 2.14 per cent in the first two years of the Tenth Plan. The present poultry production model (high input-high output) is becoming ineffective due to high feed cost, non-availability of credit at reasonable interest and lack of adequate marketing support. The high cost of maize is the major roadblock in the future development of poultry farming. Further, there are no organised arrangement or agencies with enough incentive to buy up the local surplus of egg or broiler birds. The local trader may or may not have sufficient capital to take advantage of low prices to buy up the excess produce but the paucity of storage facilities deters even an attempt at this. If the farmer has some sense of certainty about a remunerative price of his produce, things will change dramatically. Demand management should be the major focus of the DAHD in the remaining period of the Tenth Plan.

5.98 During the Tenth Plan, 13 Central poultry farms under the Central Poultry Development Organisation have been reorganised to form four Regional Directorates. These farms have produced about 3 lakh chicks and 8.5 lakh hatching eggs in two years at a cost of more than Rs. 8 crore. It would be more cost effective if the private sector and ICAR institutions are actively encouraged to produce and distribute parent stock to the state farms (both public and private). Under the Centrally sponsored scheme, Assistance to State Poultry Farms, the DAHD had released Rs. 11 crore to 27 state poultry farms in the Ninth Plan and close to Rs. 16 crore in the first two years of the Tenth Plan for promoting backyard poultry. There is need to restructure all the poultry schemes with the aim of creating the necessary infrastructure for managing demand side problems.

Meat Production and Surplus Male Animal

5.99 In India, meat production is largely a by-product of the system of livestock production, which utilises spent animals at the end of their productive life. The sector is presently neglected primarily due to lack of a clear policy on the utilisation of surplus male animals. Rearing of bullock is also becoming uneconomic. The share of mechanical power, consisting of tractors, power tillers, electric motors and diesel engines in agriculture has risen from 40 per cent in 1971-72 to 84 per cent in 2001-02. On the other hand, the share

Box 5.4
Indian Poultry Sector: A Profile

- The Indian poultry industry has evolved from a backyard activity to an organised, scientific and vibrant industry. Among the livestock products, the most notable growth has been recorded by eggs, the production of which has grown at 8.5 per cent per annum between 1980-81 and 1989-90. However, the growth rate declined to 4.3 per cent per annum in the 1990s and further to 3.3 per cent between 2000-01 and 2003-04.
- The high growth rate in egg production in the last two decades was the result of investments by the private sector and its efforts in balancing the demand and supply in the market. Although India is the world's fourth largest egg producer (3.13 million tonnes), as of 2003, it is far behind the highest producer China (43.26 million tonnes) as well as the United States (8.47 million tonnes).
- Karnataka, Kerala, Tamil Nadu, Andhra Pradesh and the western region of Maharashtra accounted for more than 62 per cent of total national egg production in 2003-04 and 60 per cent of total broiler production.
- The poultry sector includes both commercial as well as backyard operations. However, more than two-thirds of total egg production and almost the entire commercial broiler production are from improved poultry birds in the organised sector.
- The Venkateshwara Hatcheries Group, the flag-bearer in this sector, has more than 80 per cent share in the layer day old chick market and more than 50 per cent of the broiler market and is the largest exporter of poultry products.
- The broiler sector is currently dominated by Venkateshwara Hatcheries, Sugunal Hatcheries, Arambagh Hatcheries and Pioneer Hatcheries. Broiler production has now stabilised to fulfil the entire demand of the country.
- Rural poultry continues to be a significant socio-economic activity primarily with BPL and tribal households. The backyard sector is dominated by Keggfarms, which is operating in West Bengal, Uttar Pradesh, Orissa, Bihar, Jharkhand, Chhattisgarh, Karnataka, Andhra Pradesh, Kerala and Uttaranchal. This farm and its agencies are presently distributing about 1.5 crore improved birds per year to the rural people.

of draught animals has gone down from 45 per cent in 1971-72 to less than 10 per cent in 2001-02. During 1992 to 1997, there was a decline in the male cattle (–6.8 per cent) and buffalo (–7.5 per cent) population used for work purposes. The issue of surplus animals, particularly surplus male animals, has been discussed in earlier Plans. The Second Plan Document had noted that 'a complete ban on the slaughter of all cattle would tend to increase their number further and to jeopardise the well-being of the limited number of good cattle, which the country possesses'. The Third Plan Document also recognised the seriousness of the problem of surplus and uneconomic cattle. The issue of effective utilisation of surplus and culled animal needs to be resolved through dialogue involving all concerned, as it has wide socio-political ramifications.

Feed and Fodder Development

5.100 The area under fodder crop and permanent pasture is about 80 lakh ha and 110 lakh ha (1996-97) respectively. Indian agriculture is characterised by mixed crop-livestock farming. But the delicate balance between crops and livestock is on the verge of breaking down. The reasons are:

- **India has seen rapid increase in the number of animals.** Total livestock population has increased from 369

million in 1977 to 482 million in 2003. The poultry population has increased from 160 million (1977) to 444 million (2003).

- **Human population growth is leading to farm sizes fragmenting to the point where mixed farming systems are collapsing**. Bullocks can no longer be maintained on the farm, thus depriving farming households of draught power and denying soils recycled nutrients.
- **The policy bias towards crop production actually prevents integration of crops and livestock**. The restriction on the import of food grains in order to protect domestic cereal production, in turn, encourages farmers to grow crops on marginal land previously used for livestock grazing. Cheap, subsidised mineral/ chemical fertilizer and fuel are replacing farm manure and animal traction.
- **Livestock on grazing lands.** Livestock farmers do not own the land they use for grazing and this is causing damage to pasture lands because farmers are not willing to improve land unless they are sure that they will reap the benefits.

5.101 The DAHD is required to evaluate the present status of pasturelands and evolve a work plan for convergence of all relevant schemes/programmes implemented by other ministries/departments. Plans/programmes are needed for cultivation of fodder crops and fodder trees to improve the availability of green fodder. The Department is yet to formulate a new scheme on feed and fodder development in the Tenth Plan.

Livestock Health

5.102 The country lacks the necessary infrastructure for rapid diagnosis of animal diseases and reporting these to all the concerned agencies. There is a lack of coordination (particularly in the case of exotic diseases) between the animal disease diagnostic and forecasting system of ICAR and the policy makers in the DAHD. Further, the quality control mechanism in respect of veterinary biological products like vaccines, diagnostics, embryo, semen etc. is not adequate. Establishment of a Veterinary Biological Products Quality Control, which had been sanctioned in the Ninth Plan, has not yet been completed. The Department should gradually withdraw from the areas like direct participation in the Foot and Mouth Disease (FMD) Control Programme because some states like Haryana, Kerala are doing reasonably well on their own. Large amounts of unspent balance (Rs. 20.26 crore against release of Rs. 51.41 crore in the first two years of the Tenth Plan) in the programme, Assistance to States for Control of Animal Diseases, is a matter of concern and needs to be addressed immediately and, if required, the scheme may be restructured.

Fisheries

5.103 Fisheries not only provide an important alternative source of protein rich food, but also contribute to socio-economic development by generating employment as well as stimulating subsidiary industries. About 6.7 million fishermen/fish farmers depend on fisheries and aquaculture for their livelihood. Fisheries contribute 1.2 per cent to overall GDP and account for 21 per cent of the total agricultural exports. Fish production has increased from 4.36 million tonnes in 1992-93 to 6.2 million tonnes in 2002-03. Foreign exchange earning through exports also increased to Rs.6,800 crore in 2002-03 from Rs.1,767 crore in 1992-93. The present production from marine sources is about 3 million tonnes against a potential of 3.93 million tonnes whereas the production from inland sources is 3.2 million tonnes against a potential of 4.5 million tonnes.

5.104 A holistic approach for the sustainable development of fisheries and aquaculture has been adopted during the Tenth Plan, with the objective of optimising production and productivity, augmenting the export of marine products, generating additional employment opportunities and improving the socio-economic conditions of the fisher community, including removing gender bias in the fisheries sector. Emphasis was also laid on conserving aquatic resources and genetic diversity and

increasing the per capita availability and consumption of fish besides the development of non-food fisheries and aquaculture such as pearl-oyster culture, development of ornamental fisheries etc. which would provide a source of additional income to the fishermen and fish farmers.

5.105 A major constraint to the development of the fishery sector is inadequate infrastructure facilities, namely, fishing harbours and fish landing centres with the modern amenities which are necessary to maintain the quality of fishery products in line with international standards of Hazard Analysis and Critical Control Point (HACCP), European Union (EU) norms etc. The present level of infrastructure facilities is reported to be adequate to meet only about 25-30 per cent of the actual requirement. The absence of an institutional mechanism for easy flow of finance for deep-sea fishing and for fish seed hatcheries in the private sector is another issue that needs to be addressed on a priority basis.

5.106 Currently, about 70-75 per cent of inland fish production is obtained through aquaculture. The production and productivity from inland water bodies in states like Gujarat, Jharkhand, Maharashtra, Tamil Nadu, and those in the North-East (except Assam) should be increased to the level of national productivity of 2.2 tonnes per hectare per annum at present. Apart from this, flood plain wetlands or beels are other potential fishery resources in the Assam, West Bengal, and Bihar, which offer tremendous scope for both culture and capture fisheries. Reservoirs, which form the largest inland fisheries resources, also remain largely under-exploited. Steps to increase production of quality fish seed including seeds for fresh water prawn farming and other species of fin/ shell fish which are not cultured on a large scale at present are also required, along with measures for seed certification, disease diagnosis and other health management.

5.107 The fish farmers are not getting the same concessions in income tax, water and power tariffs, etc. as the agriculture sector does, although aquaculture is recognised as a part of agriculture, even by NABARD. Therefore, policy intervention is required to treat aquaculture at par with agriculture. Necessary policy guidelines on uniform long-term leasing of all suitable water bodies need to be circulated to states/Union Territories for streamlining the efforts to enhance production and productivity through aquaculture. Policy intervention is also required for the effective management of in-shore fisheries and rational exploitation of deep sea, offshore and oceanic fishery resources for the overall development of marine fisheries. Subsidiary industries relating to fisheries like culture of pearls, development of global trade of ornamental fish to provide high-margin business opportunities for fishers, setting up of adequate fish marketing network etc. are some of the other areas which need adequate attention.

AGRICULTURAL RESEARCH

5.108 A review of the research and development activities of the ICAR system during first two years of the Tenth Plan highlighted several weaknesses. These include: proliferation of programmes resulting in resources being spread thinly, and lack of focus in areas of relevance and opportunity; crop bias with major focus on rice and wheat; and inadequate priority to emerging challenges, particularly post-harvest, marketing and environmental conservation. There is inadequate emphasis on the needs of rainfed areas, which account for over 60 per cent of cultivated area, and the role of women in agriculture. The multiplicity of institutes with overlapping mandates has led to duplication of research work. Lack of accountability, less emphasis on multidisciplinary research; weak interaction among researchers, extension workers, farmers and the private sector and excessive centralisation of planning and monitoring are other important weaknesses that need to be addressed through appropriate policy initiatives.

5.109 The following areas deserve particular attention in order to address the weaknesses of the National Agricultural Research System (NARS):

- **Refining the mandate of the System's operating units and rationalising their**

number. There are considerable overlaps in the mandates of the newly established units with that of other units in the system, primarily because the institution from where the new establishment was hived off continues to work in the areas which it should have shed. For the immediate, there is need to redefine the mandate of the institutions to remove the overlaps and, in the long run, to pay attention to reducing the number of institutions by consolidation and rationalisation.

- **A better definition of research responsibilities among the components of NARS.** The SAUs should handle the research, education and extension needs of the regions of their jurisdiction and the ICAR institutes should concentrate on basic, anticipatory and strategic research. There should also be greater synergy between the two sets of institutions; in fact, ICAR should assume the responsibility of mentoring and grooming regional institutions and SAUs.
- **Improving the financial situation of the SAUs.** The financial situation of most SAUs are precarious. Historically, ICAR has been contributing about 10-15 per cent of the SAU budgets; the rest coming from the respective state governments, which are themselves starved of funds. On the other hand, ICAR and its constituent institutes are flush with funds. There is a need to strengthen the finances of the SAUs commensurate with their responsibilities. A part of the annual allocation to ICAR should be earmarked for transfer to SAUs for carrying out specific, problem-oriented research. In order to encourage the SAUs to undertake problem-oriented research and application of technologies in the field, a system of recognition for good work by way of certificates, awards, prizes, etc., for individual scientists, group of scientists and/or for a SAU as a collective entity should be operated. Although ICAR hands out awards to SAUs for extraordinary research/innovation, this is only a token gesture. The monetary component of awards, etc., should be enhanced substantially to, say, Rs. 10 crore, in order to generate competition amongst SAUs.
- **Strengthen anticipatory and strategic research.** The system's capacities for anticipatory and strategic research have waned over the years and this is one of the major reasons for its inability to halt the stagnation in the growth of agriculture in the recent decades. The rapid pace of developments in science globally also requires consistent scouting of leads from basic research, from which materials and technologies can be derived for developmental activities. Based on the recommendation of the Task Force on Revamping and Refocussing of National Agricultural Research headed by Dr. M.S. Swaminathan, the Government has already announced a National Fund for Strategic Agricultural Research with an initial provision of Rs. 50 crore in the 2005-06 budget of ICAR. The Fund should be operationalised expeditiously.
- **Improving research/performance and monitoring.** Block grant to the Department and, in turn to the institutes, has led to a deterioration in the performance profile of the institutions and the overall inability to effectively monitor and assess their performance. It is important that project based-funding is introduced and implemented immediately. This will require that a limited number of 'system priorities' are identified on the basis of objective criteria in consonance with national needs. The projects should clearly enunciate a work plan, expected outputs with milestones, time lines and criteria for validating the claimed achievements, etc.
- **Decentralised management and functioning.** An essential requirement

for the success of project-based operations is financial and administrative autonomy of the project leaders, i.e. decentralisation and delegation of power down the line from the headquarters to the institute and right up to project leader.

- **Emphasis on development of technologies for remunerative agriculture.** A major area of concern is that agriculture is becoming increasingly uneconomic as a profession. There is, therefore, a need for developing technologies that can enhance farmer's income. It should be stressed that while developing technologies for the resource poor farmer, the researcher must take into account the cost-return-risk factors. If the cost and risk factors are low and returns are high, the technology will be easily adopted by the farmer even with minimal extension effort. There is also a need to make agricultural research/ technology gender-sensitive by devising agricultural equipments which are women friendly and generally reduce drudgery.
- **Developing and implementing progressive personnel policies.** Any successful operation needs to be manned by competent people, backed by progressive policies. For this to happen, the recruitment system needs to be fair and transparent and the career advancement should be based on rational and objective criteria for assessment and promotion. Processes must be put in place that provide incentives to the performer through recognition and award. At the same time, there should also be provision to identify and weed out of the ineffective persons.
- **Human resource development, manpower planning and grooming leadership.** Inadequate attention to human resource development has weakened the system progressively. There is increasing attrition due to retirements and recruitments are not being done. There are also no conscious efforts towards grooming leadership. Remedial steps are required.

THE WAY FORWARD

- Increase investment and input use and improve use efficiency of the latter. This should address the issue of low investment and low growth of input use, and of higher capital output ratios and low factor productivity growth experienced since the mid-1990s.
- Step up public investment, particularly in irrigation and water resources management; watershed development and reclamation of waste/degraded land; and provision of essential infrastructure such as roads, markets and electricity.
- Focus on reducing those subsidies that lead to distortions and have deleterious effects on natural resources and cropping patterns, instead of viewing subsidy reduction as a means of mobilising resources for agriculture-related investment.
- Work out some innovative mix of proper utility pricing, community control and provision of subsidies on water conservation techniques in the regions displaying acute water stress, i.e., over-exploited and dark blocks, particularly in low rainfall regions. Proper pricing of water and electricity are essential elements of any solution to the problem of over-exploitation of groundwater. But this must be done within an acceptable framework, such as metered supply, a part of which is subsidised.
- Re-examine fertilizer subsidies in order to improve the nutrient balance and also to target this more to smaller holdings, for example, through higher subsidy on fixed quantity per farmer.
- Reform and rejuvenate support systems such as agricultural research, extension and credit and delivery systems of inputs

such as seeds, fertilizers, pesticides, veterinary services etc. Identify specific problems arising at the state level in these areas and link Central assistance to corrective action so that state government efforts become sustainable. In particular, this will involve re-balancing the roles of ICAR vis-à-vis the SAUs, of scheduled commercial banks vis-à-vis, cooperatives, and enabling states to induct practices and personnel with the capacity to deal with new challenges.

- Focus on the demand side problems, because the experience since the mid 1990s has been that growth of agricultural products exports has slowed down and per capita domestic consumption of most agricultural products have either remained stagnant or declined despite declining relative prices. Undertake some demand side initiatives and, in order to increase rural incomes, diversify cropping patterns. Simultaneously, provide adequate insurance to those carrying out diversification either within agriculture or from agriculture to non-agriculture.
- Restore the growth rate of yields per acre of cereals to levels actually attained during the 1980s from the current negligible levels. This is an essential pre-requisite for sustainable diversification. Although diversification from cereals to other crops is necessary both in view of changing demand patterns and of sustainability of natural resources, per capita production of cereals has actually been declining over the last decade.
- Move rapidly to full all-India coverage of welfare schemes like employment guarantee, Mid-Day Meals and the ICDS. Simultaneously, revert to uniform PDS pricing and to the clear-cut and much less expensive objective of stabilising prices at above costs of production. For this, the MSPs should be reasonable and extended to cover the entire country. Differential PDS pricing is not the best way of serving the equity objective since this distorts incentives and leads to heavy leakages.
- Improve the National Agriculture Insurance Scheme by transition to actuarial rates, increasing accuracy and timeliness of crop estimation methods and making the implementing agency, namely, Agriculture Insurance Company, share some risk. However, since actuarial premia are likely to be high for regions with low and erratic rainfall, a special budgetary subsidy might be necessary for these regions.
- Undertake policy changes in the area of management of common property resources in the villages to address the problem of the lack of green fodder and grazing land. Place greater thrust on revitalising milk and other cooperatives at the grass root level to solve the problems in marketing dairy products. Policy roadblocks are discouraging the shift from crop agriculture to animal husbandry, dairy and fisheries.
- Change agricultural marketing laws of the states and facilitate contract farming to help develop the marketing links that are necessary for raising the efficiency of agriculture. Link Central assistance to the initiation of market reforms in order to bring about changes in the Agricultural Produce Marketing Committee (APMC) Acts. However, since transactions costs and contract enforcement can work against small farmers, this must be accompanied by steps to empower cooperatives/ panchayats to negotiate on behalf of such farmers.
- Make demand management of milk and milk products one of the major priorities. Create a buffer stock of milk powder during flush season and use it to introduce a 'school milk programme' along with the ongoing Mid-Day Meal scheme. Similar programmes are in vogue in countries like Bangladesh, Indonesia, China, Germany, Sweden and the United Kingdom.

Annexure 5.1

Financial performance of the Ministry of Agriculture during Ninth and Tenth Plans

(Rs crore)

		DAC	DAHD	DARE	TOTAL	DAC	DAHD	DARE	TOTAL
		(At Current Prices)				(At 2001-02 prices)			
I	Ninth Plan Outlay@	9153.82	2345.64	3376.95	14876.41	11812.90	3027.02	4357.92	19197.84
II	Ninth Plan Expenditure*	7512.55	1038.82	2388.91	10940.22	8115.91	1128.41	2570.92	11815.24
III	Tenth Plan Outlay (2002- 07)**	13200.00	2500.00	5368.00	21068.00	13200.00	2500.00	5368.00	21068.00
IV	2002-03(BE)#	2167.00	300.00	775.00	3242.00	2089.68	289.30	747.35	3126.33
V	2002-03 (Expenditure)#	1655.94	230.26	650.75	2536.95	1596.86	222.04	627.53	2446.43
VI	2003-04(BE) #	2167.00	300.00	775.00	3242.00	2025.61	280.43	724.43	3030.47
VII	2003-04 (Expenditure)#	2050.34	269.35	748.98	3068.67	1916.56	251.78	700.11	2868.45
VIII	2004-05(BE)#	2650.00	500.00	1000.00	4150.00	2336.86	440.92	881.83	3659.61
XI	Additional GBS during 2004-05	440.00	100.00	-	540.00	388.01	88.18	-	476.19
X	2004-05 (RE)#	2945.00	575.00	900.00	4420.00	2597.00	507.05	793.65	3897.71
XI	2005-06 (BE)#	4179.32	669.08	1150.00	5998.40	3509.97	561.92	965.81	5037.71
XII	**Total of first 3 years' expenditure in Tenth Plan (V+VII+X)**	**6651.28**	**1074.61**	**2299.73**	**10025.62**	**6110.42**	**980.88**	**2121.29**	**9212.59**
XIII	3 years' expenditure as per cent to Tenth Plan outlay	50.4	43.0	42.8	47.6	46.3	39.2	39.5	43.7
XIV	**Total of 4 Years' expenditure in Tenth Plan (V+VII+X+XI)**	**10830.60**	**1743.69**	**3449.73**	**16024.02**	**9620.39**	**1542.80**	**3087.11**	**14250.30**
XV	4 years' expenditure as per cent to Tenth Plan outlay	82.05	69.75	64.26	76.06	72.88	61.71	57.51	67.64

BE= Budget Estimate; RE= Revised Estimate; GBS= Gross Budgetary Support.

DAC= Department of Agriculture & Cooperation. DARE= Department of Agricultural Research and Education. DAHD= Department of Animal Husbandry and Dairying.

Sources:

@ Ninth Five-Year Plan (1997-2002), Vol I, Planning Commission, Government of India

* For Ninth Plan Expenditure figures: Agricultural Statistics at a Glance, 2004 of the Department of Agriculture and Cooperation for DAC, Annual Report 2001-02 of the Department of Animal Husbandry and Dairying and Union Expenditure Budget Vol. I 2003-04 for DAHD and Union Expenditure Budgets Vol. I from 1999-2000 to 2003-04 for DARE

** Tenth Plan Five-Year Plan (2002-07), Planning Commission, Government of India

Union Expenditure Budget Vol. I, Ministry of Finance, Government of India, from 2002-03 to 2005-06.