18. Agriculture Development

18.1. Introduction

Agriculture plays an important role in Pakistan's economy. It is the single largest sector and dominant driving force for growth and development of the national economy. Agriculture and Livestock accounted for 23.1 per cent of the GDP in 2004-05. It employs 43.1 per cent of the labour force, provides livelihood to 68 per cent of the country's population living in rural areas, and contributes 60 per cent share in export earnings from processed and un-processed agricultural products. Major industries like textile and sugar are based on the agriculture sector. Agriculture sector has grown at an average rate of 4 per cent per annum in the past two decades, contributing significantly to overall economic growth, food supplies and exports. Although the share of agriculture in the GDP has declined over the years, in line with development of other sectors such as industry, infrastructure, services, etc., it still remains the leading sector of the economy. The future policies in agriculture have been focused on attaining high growth rates by providing the right policies and institutional support, so that the sector can move forward and enhance its contribution to the economy.

18.2. Review of Agriculture Sector (2001-05)

The agriculture sector grew at an average annual growth rate of 4.5 per cent in the last decade, i.e. 1990's. However in 2000-01 and 2001-02, its performance was badly affected due to persistent drought conditions. It registered a growth rate of (-) 2.2 and (-) 0.1 per cent in 2000-01 and 2001-02, respectively. With subsequent improvement in the availability of water, it grew by 4.1 per cent and 2.6 per cent in 2002-03 and 2003-04, respectively. In 2003-04, the major crops which account for 34.2 per cent of the agriculture value added grew by 2.8 per cent and minor crops which contribute 12.4 per cent to the agriculture value added, grew by 1.7 per cent. In 2004-05, the agriculture sector registered an all time high growth of 7.5 per cent due to farmer's friendly government policies, favourale weather conditions and improvement in the availability of water. There was a record production of 14.6 million bales of cotton and 21.1 million tonnes of wheat. The contribution of major and minor crops was 17.3 and 3.1 per cent, respectively. The details are presented in Table 1.

Table 1
Agriculture Growth

(%)

Year	Agriculture	Major Crops	Minor Crops
2000-01	(-) 2.2	(-) 9.9	(-) 3.2
2001-02	(-) 0.1	(-) 2.5	(-) 3.7
2002-03	4.1	6.9	0.4
2003-04	2.6	2.8	1.7
2004-05	7.5	17.3	3.1

Although the shortage of water affected the performance of crops in 2000-01 and 2001-02, its impact was reduced due to various measures by the farmers on the recommendation of the Agriculture Departments such as efficient use of canal water, exploitation of underground water through tubewells, sowing on ridges and better

agronomic and management practices. The production of major crops is given in Table 2. The crop production data is given at Annex I.

Table 2
Production of Major Crops

'000' Tonnes

Crops	Year				
	2000-01	2001-02	2002-03	2003-04	2004-05
Wheat	19,024	18,227	19,183	19,500	21,109
Rice	4,803	3,882	4,478	4,848	4,992
Cotton (000 Bales)	10,732	10,613	10,211	10,048	14,600
Sugarcane	43,606	48,042	52,056	53,491	45,316

The country achieved self-sufficiency in wheat. Around 1.036, 1.704 and 0.553 million tonnes were exported due to build up of wheat stocks, in 2001-02, 2002-03 and 2003-04, respectively. However, due to subsequent decline in wheat production, around 1.37 million tonnes of wheat was imported in 2004-05 to build up reserve stocks and meet domestic requirement.

Although availability of water has been a serious constraint, there are other factors also, which are hampering the growth and development of the sector. Some of the factors are: low productivity of crops, inefficient use of water, degradation of land resources (waterlogging and salinity), imbalance application of fertilizer, inefficient use of agricultural inputs, ineffective transfer of technology to the farmers, lack of coordination between research and extension, post-harvest losses, marketing infrastructure, etc. These issues will be addressed during the Medium Term Development Framework (MTDF) in order to improve agricultural productivity.

18.3. Objectives and Targets

The main objectives of agricultural development will be to achieve self-reliance in agricultural commodities, ensure food security and improve productivity of crops. An average annual growth rate of 5.2 per cent is projected during the MTDF. The following measures will be taken to achieve these objectives :-

i) Enhance productivity of crops through development of new technologies, high yielding disease resistant varieties, scientific methods of farming and improved management practices.

ii) Efficient use of water through precision land leveling and high efficiency irrigation systems.

iii) Promote production and export of high-value crops.

iv) Promote import substitution by enhancing the production of oilseeds and tea.

v) Ensure availability of agricultural credit especially for small and medium farmers.

vi) Improve income of the farmers by providing incentives through the support price mechanism, reduce post-harvest losses and promote processing/value addition.

vii) Improve marketing infrastructure.

viii) Improve efficiency of agricultural inputs and ensure their timely availability to the farmers.

ix) Strengthen agricultural institutions for research and extension and improve their linkages and coordination.

18.4. Strategies

The following strategies will be adopted to achieve the above objectives :

i) The agricultural research and extension institutions will be strengthened and streamlined to meet the challenges being faced by the sector. Major investment will be made for research and technology development. Practical training will be provided to farmers in order to improve their technical knowledge and skills to adopt latest technologies. A mechanism will be evolved to improve and strengthen the linkages between these institutions to make them more effective.

ii) Crop productivity will be enhanced through development of high yielding varieties, use of improved and hybrid seed, balanced use of fertilizers and micro-nutrients, integrated pest management, and judicious application of other plant protection measures.

iii) The production of high value crops, fruits, vegetables and flowers will be increased and their export will be promoted by improving their quality. The private sector will be encouraged to establish processing, grading, packaging and cold storage facilities through provision of liberal credit and other facilities to promote exports.

iv) Programme will be undertaken to enhance the production of oilseeds, horticulture and tea.

v) Additional water storage capacity will be developed in order to bring additional area under cultivation, increase cropping intensity and productivity. Water use efficiency will be improved through precision land levelling, lining of water courses and promoting drip, sprinkler and trickle irrigation system particularly in water scarce areas and for high value crops.

vi) Emphasis will be given to conjunctive water use and management (rainfall, canal and ground water) in order to have sustainable productivity of land and water and maintain healthy salt balance in soil.

vii) Emphasis will be given to crops which require less water. Thus area under Irri-rice will be reduced and substituted with cotton, oilseeds and pulses. Area under sugarcane will be reduced and substituted with sugarbeet, sunflower and high value crops.

viii) The farmers will be advised to use improved seed, balanced fertilizers and herbicides/pesticides as per recommendations of the scientists. Their quality and timely availability will be ensured. Adulteration of fertilizers and pesticides will be controlled through legislation and imposing stiff penalties. The electronic media will be extensively utilized to provide information on new productivity enhancing technologies to the farmers.

ix) Appropriate and timely availability of institutional agricultural credit specially for small and medium farmers will be ensured to enable them to purchase essential agricultural inputs. The focus of institutional credit support will also be shifted towards landless, tenants, women and other disadvantaged groups through organizing the rural communities.

x) Farm to market roads will be improved to provide easy access to the farmers to market their produce. The existing markets will be improved and new markets will be established by the District Governments/Market Committees. Market information system will be improved.

xi) The support price programme will be continued for wheat and indication price will be announced for cotton, rice and sugarcane to protect farmers against market volatility.

xii) Programmes will be undertaken for the development of cultivable wastelands. The Government will encourage corporate agriculture farming by leasing out big chunks of state-owned un-cultivated land to potential investors.

xiii) Programmes to control waterlogging and salinity through preventive and curative measures will be continued. The use of gypsum will be promoted for amelioration of sodic soils. Research will be undertaken on bio-saline agriculture.

xiv) The requirements of WTO will be met to maintain competitiveness of agricultural products.

18.5. Intersectoral Linkages

The development of agriculture has linkages with other sectors such as rural development, water resources, industries, poverty alleviation, gender development and environment. High growth rates in the agriculture sector will help in poverty alleviation by providing opportunities for employment and development of the rural economy. It will also help in diversification of the rural economy toward agro-based industries and non-farm activities such as livestock, fisheries and poultry. The development of farm to market roads and other rural infrastructure will help the farmers in marketing their products. The key element in future agricultural development will be conservation and augmentation of water resources. A high priority is already being given to lining of water courses and construction of small and medium dams. Proper linkage and coordination will be established between the agriculture and irrigation departments in order to promote efficient use of water. The management of land and water resources in a sustainable manner will help in improving the overall environment of the country.

18.6. Agriculture and World Trade Organization (WTO)

The WTO has opened up new opportunities and challenges for the agriculture sector. The major areas of reform are waiving of domestic support, removal of export subsidies and market access by removal of non-tariff barriers. In case of Pakistan, domestic support, i.e. subsidies have already been phased out. The aggregate measures of support (AMS) is negative. The reduction in export subsidies and liberal market access by developed countries are important for our exports. In order to take advantage of this, the quality of agricultural products should meet international specifications and sanitary and phyto-sanitary standards.

The MTDF envisages improvement in agriculture research, extension services, plant protection, irrigation, drainage and reclamation, on-farm water management and

agricultural marketing, which will cope with challenges of WTO. The knowledge of farmers about WTO will be enhanced through appropriate training of extension officials and creating awareness. Pakistan's comparative advantage in crops like cotton and rice will be consolidated. Necessary measures will be taken on sanitary and phyto-sanitary issues in line with the requirements of WTO. Quality testing laboratories will be established and strengthened to meet the WTO requirements. Capacity building in knowledge of international trade will be undertaken.

The Agreement on Trade Related Intellectual Property Rights (TRIPs) will be used for plant variety protection and seed industry. A gene bank will be established to prepare inventory of all genetic resources of the country and take steps to get proprietary rights on them. The Pakistan Intellectual Property Rights Organization will look after the interests.

18.7. Physical Targets

The production targets have been fixed for the next five years keeping in view the domestic demand, population growth and national requirement. Their past performance and technical feasibility of achieving them alongwith the availability of essential inputs such as water, seed, fertilizer, machinery etc. were also kept in view while fixing these production targets. The efficient use of available water, application of balance fertilizer along with micro-nutrients, distribution of improved seed, adoption of integrated pest management (IPM) techniques and improved agronomic practices will help to achieve the targets. The production targets of crops for the next five years are presented at Annex II. The Ministry of Food, Agriculture and Livestock will coordinate with the Provincial Governments, farmers and other stakeholders to ensure the availability of inputs and achieve the production targets.

18.8. Availability of Inputs

The inputs required to achieve the crop production targets are given in Table 3. Necessary measures will be taken to improve and ensure timely availability of these inputs.

Table 3
Crop Production Inputs: Benchmark and Targets

Inputs	Unit	2004-05 Benchmark	2009-10 Targets	Annual Growth Rate 2005-10
Water Availability	MAF	135.7	150.3	2.1
Fertilizer Off-take	(000) 'N' Tonnes	3,280	3,981	4.0
Seed Distribution	(000) Tonnes	207.8	336	10.0
Tractors	(000) Nos.	342	466	6.3
Agricultural Credit	Billion Rs	85	250	24.1

The production of the crops is almost stagnant. In order to improve productivity, application of optimum level of fertilizers, maximum use of quality seeds and effective control of insects, pests and diseases will be required. This will require a high level of investment for which agricultural credit will be expanded at 24.1 percent per annum from Rs 85.0 billion in 2004-05 to Rs 250.0 billion in 2009-10.

18.9. Water

The achievement of the crop production targets envisaged in the MTDF will depend on availability and efficient use of water. The availability of water is projected to increase from 135.7 million acre feet (MAF) in 2004-05 to 150.3 MAF in 2009-10. Programmes are being undertaken to increase the availability of water through construction of medium and small dams and canals for utilization of flood water. Lining of water courses is being undertaken to prevent losses of water. The On-Farm Water Management Programme (OFWM) will help in reducing field and conveyance losses by improving water courses, precision land leveling, organizing water user's association and establishing demonstration plots. High efficiency irrigation system will also be promoted for efficient use of water. The details are given in the Chapter on Water Resources.

18.10. Improved Seed

The use of quality seed increases yield from 20 to 40 per cent over the traditional seeds used by the farmers. The current status of seed availability and the proposed targets are given in Table 4. In order to achieve the targets, the seed production, multiplication and distribution systems will be strengthened. The research institutes will give high priority to the development of new crop varieties and hybrid seeds. The Foundation Seed Cells will be established/activated in each commodity research institute to produce sufficient quantity of pre-basic seed to meet the requirement of public/private seed companies. For this purpose, the required infrastructure such as equipments, mini-seed processing units and training of plant breeders will be provided. The Seed Act 1976 will be amended to allow production of basic seed by private seed companies through their own arrangement and legislation will be carried out to protect plant breeders' rights. It will provide a mechanism for supply of pre-basic seed from research institutes to the private sector and measures for effective monitoring by the Federal Seed Certification and Registration Department to curb the sale of sub-standard seed in the market through regulatory measures. The seed production and distribution programme in the provinces will be improved by involving public and private seed companies. A fruit tree nursery "registration and certification" scheme will be launched in order to make available true to type quality fruit plants free from diseases and virus tested. The Federal Seed Certification and Registration Department will be strengthened in order to enable it to carry out its functions in an effective manner. Eleven new seed testing laboratories will be established in addition to 17 already in operation. A data variety bank will be established to document all commercial varieties, their characteristics and breeding history, in order to enable the department to issue "variety passport" to facilitate agriculture trade in future.

Table 4
Seed Distribution Targets of Major Crops (2005-10)

'000' (Tonnes)

Crops	2004-05 Benchmark	Seed Distribution Targets					Growth Rate (%)
		2005-06	2006-07	2007-08	2008-09	2009-10	
Wheat	171.2	184.0	198.0	212.5	228.4	245.5	7.5
Cotton	24.5	29.3	35.1	41.9	50.1	60.0	19.6
Rice	6.8	7.6	8.5	9.7	11.0	12.5	12.9
Basmati	5.2	5.6	6.0	6.5	7.0	7.5	7.5
IRRI	1.6	2.0	2.5	3.2	4.0	5.0	25.6
Maize	5.3	6.8	8.6	11.0	14.0	18.0	27.7
Total	207.8	227.7	250.2	275.1	303.5	336.0	10.0

18.11. Fertilizer

The use of fertilizer during the MTDF is expected to grow by 4.0 per cent per annum in order to meet the crop production targets. The growth rate for the nitrogen is estimated at 3 per cent, phosphate 7 per cent and potash 12 per cent. In quantitative terms, nitrogen will increase to 3,049 thousand tonnes, phosphate 1,058 thousand tonnes and potash 45 thousand tonnes by 2009-10. The overall fertilizer consumption is estimated at 4,152 thousand tonnes. The details are given in Table 5. The average application rate at national level will be about 180 Kg nutrients per hectare. The other fertilizer products as source of micronutrients such as Zinc, Boron and Iron would also be targeted for specific crops (rice, cotton, maize, sugarcane, vegetables and horticultural crops) for productivity and quality.

Table 5
Fertilizer Offtake Targets (2005-10)

	'000' (Nutrient Tonnes)			
Year	**Nitrogen**	**Phosphate**	**Potash**	**Total**
2004-05 (Benchmark)	2,630	754	25	3,409
2005-06	2,709	807	28	3,544
2006-07	2,790	863	31	3,684
2007-08	2,874	924	35	3,833
2008-09	2,960	988	40	3,988
2009-10	3,049	1,058	45	4,152
Growth %	3	7	12	4

The emphasis will be on efficient and balanced use of fertilizers in order to increase productivity per unit of applied nutrients. The use of potash and micronutrients will be promoted wherever needed. An Integrated Plant Nutrition (IPN) management approach including use of organic, bio-sources with mineral fertilizers to improve efficiency, protect environment and improve productivity will be hallmark of the plan. The existing soil testing laboratories in the provinces will be strengthened both in terms of resources and trained manpower, to cater the needs of farming community. Fertilizer recommendations will be developed for different cropping zones and cropping systems. The private sector will be induced to install blending/compound fertilizer plants in different crop production regions to provide soil and crop specific fertilizers. Fertigation techniques (use of fertilizer with irrigation water) will be refined and promoted to improve efficiency.

Organic farming will also be initiated to evaluate its comparative yields and acceptance. Degraded lands will be rehabilitated through use of soil amendments, soil conservation and cultural practices. An inventory of soil resources with reference to their capability, production potential and constraints will be mapped for crop ecological zones in the country. This will help to address the soil problems and efficient use of inputs. The agriculture extension departments will promote the use of gypsum for reclamation of sodic soils and sub-standard water.

18.12. Plant Protection

The control of pests and diseases is an important factor in increasing the productivity of crops. Around 20-25 per cent of crop outputs are lost due to attack of insects and pests. The use of pesticides has increased from 665 tonnes in 1980 to 69,897 tonnes in 2002. It has been estimated that its consumption may touch 78,000 metric tonnes by 2010. Around 54 per cent of the pesticides are applied on cotton crop, 23 per cent on rice, 9 per cent on fruits and vegetables, and 5 per cent on sugarcane. The increasing and indiscriminate use of pesticides

must be avoided as it also kills useful insects and predators and causes environmental degradation. Emphasis will be given on promotion of Integrated Pest Management (IPM) in order to reduce the application of pesticides. The participation of women will be encouraged in IPM activities. The following measures will be taken in the next five years:

i) The existing quality control laboratories will be strengthened and new laboratories will be established to enforce quality control.

ii) The pest scouting services in the provinces will be made more effective in order to provide information to the farmers regarding the economic threshold level of pests and diseases for application of chemicals and pesticides.

iii) Strict quarantine measures will be followed at all entry points in the country in order to prevent import of disease/pest infected seeds and plants.

iv) Private companies will be encouraged to manufacture pesticides locally in order to reduce the cost through fiscal incentives.

v) Specifications for import and marketing of pesticides will be published by the Plant Protection Department.

vi) Necessary infrastructure will be established to guide the provincial and district level institutes on the international trends in pesticide application to ensure that Pakistan conforms to the international minimum pesticide use standards.

vii) Monitoring will be carried out by the Plant Protection Department to check the effectiveness of different pesticides. Awareness will be created about maximum residue limit and other parameters among the farmers.

viii) IPM and biological control of pests will be promoted to reduce the application of pesticides and minimize pesticide residues in agricultural products.

18.13. Mechanization

Mechanization of farm operation has become necessary due to shortage of labour and animal power at planting and harvesting stages of crops. It helps in timely sowing, cultural practices and harvesting of crops and reduction in post harvest losses. The most popular forms of mechanization are tractors with cultivators, drills, wheat threshers, sprayers, power rigs, tube-wells and bulldozers.

The total number of operational tractors in the country is estimated to be 342,000 by June 2005. Thus available horsepower (hp) at farm level will be 0.82 hp per hectare as compared with 1.4 hp per hectare recommended by FAO for developing countries. It is projected that 45,000 tractors per annum will be added to the existing fleet. Thus, the total number of operational tractors will be increased to 466 thousand in 2009-10, increasing the horsepower at farm level to 1.1 hp per hectare. The fleet of bulldozers in the provinces will be strengthened for the development of wastelands and construction of slow action dams.

During the MTDF, the availability of institutional credit for the purchase of tractors and other agricultural machinery will be ensured through earmarking the actual credit requirement to Zarai Taraqiati Bank Limited (ZTBL) and other commercial banks. The farmers will be facilitated to procure small seed processing units and establish primary grading facilities at farm level to fetch good price of their produce. The sugarcane harvesters, maize and cotton pickers, paddy transplanters and laser land leveling equipments will be introduced. Custom hire farm service centers will be established at suitable places for costly

agricultural machinery/implements for small and medium farmers under public-private partnership. The public sector will provide seed money and technical assistance for the establishment of these centers. The farmers' organizations will be responsible for the operation and maintenance of these centers on sustainable basis.

18.14. Agricultural Credit

Credit plays an important role in increasing agricultural productivity. Timely and adequate availability of credit enables the farmers to purchase the required inputs and machinery for carrying out farm operations. The farmers will be facilitated through the one window operation and revolving credit scheme. The one window operation was initiated in 1997 by the ZTBL which has been found quite useful in meeting the farmers' credit requirements. Under the scheme, the representatives of postal, revenue and agriculture departments and ZTBL are present at one place on the fixed days. All the required formalities are completed and loan is processed on the spot. It is disbursed by the bank on the next day. The revolving credit scheme is of three years duration with automatic renewal, one time documentation, partial repayments and annual clearing of accounts at the convenience of the borrower. Micro-credit will be provided to small farmers through the Khushali Bank and Rural Support Programme.

The agricultural credit requirement for the MTDF has been estimated at Rs 1,665 billion. The details are given in Table 6. It is expected that the banks will disburse Rs 250 billion in the terminal year of the MTDF against requirement of Rs 400 billion.

Table 6
Agricultural Credit Requirement

(Billion Rs)

Year	Production	Development	Total
2005-06	205	70	275
2006-07	220	80	300
2007-08	240	90	330
2008-09	260	100	360
2009-10	290	110	400
Total	1,215	450	1,665

The following measures will be taken to ensure timely availability and efficient utilization of agriculture credit:

i) In addition to the Zarai Taraqiati Bank Limited and Provincial Cooperative Banks, the major commercial and private banks will also provide agriculture credit

ii) The mark-up rates on agricultural credit will be reviewed by the banks and reduced reasonably on the basis of market mechanism.

iii) One window operation facility will be further improved to make it more effective in meeting the farmers' needs.

iv) Special trainings on agricultural credit for farmers will be organized by the banks to create awareness and share of knowledge and experience with them.

v) Institutional credit will also be extended to rural non-farm sector including rural poor, tenants, agricultural artisans, women and other disadvantaged groups by organizing rural communities.

18.15. Price Policy

Price plays an important role in giving the right signal to the farmers for deciding about relevant crop size and increasing agricultural productivity through price intervention/stabilization. The prices of crops will be reviewed annually, keeping in view the cost of production and other factors. The Government will continue to fix support price for wheat and make its timely announcement. Indicative price for rice (paddy), seed cotton and sugarcane will also be fixed. The support price for wheat will be implemented by the Provincial Food Departments and PASSCO. Through the support price mechanism, minimum guaranteed price will be assured to the farming community in case the market price falls below the support price.

18.16. Horticulture

The country is endowed with a wide range of agro-ecological zones and diverse climatic conditions that make it possible to grow a large variety of tropical, sub-tropical and temperate fruits, vegetables, flowers, medicinal herbs and spices. The horticulture sector contributes about 12% of agriculture value addition. The production of fruits and vegetables will be enhanced from 6.0 million tonnes and 7.0 million tonnes in 2004-05 to 9.4 million tonnes and 10.0 million tonnes, respectively in 2009-10. A Pakistan Horticultural Development and Export Board (PHDEB) has already been established with a view to promote technological upgradation and human resource development, facilitate and set-up necessary infrastructure for horticulture development including cold chains, promote public-private partnership, design/implement quality standard, diversify overseas markets, enhance horticultural exports and help in formulation and implementation of national horticultural policy. An Agribusiness Development Project will be implemented to facilitate the private sector in marketing and export of horticulture products.

The constraints of the horticulture sector are : poor farming practices, shortage of improved planting/seed materials, low yields, pests/diseases especially fruitfly/viruses, post-harvest losses, sub-standard quality, inadequate facilities for grading, packing, marketing, lack of reefer containers, cold storages and cool chain, limited space/transit time through air/sea ways and poor linkages with potential importing countries. The following measures will be taken to promote horticulture:

i) An important policy goal will be to encourage fruits and vegetable farmers to grow specifically for the export market through contract growing by the private exporters.

ii) Multiplication of good quality, disease/virus free fruit trees will be undertaken by research institutes for distribution to the farmers.

iii) The Pakistan Horticulture Development and Export Board will formulate policies and strategies to promote the export of horticulture crops. It will establish export-processing zones in the provinces.

iv) Research and development activities will be undertaken by research institutes to improve yield, productivity and quality of horticulture crops, reduce post-harvest losses and improve cultural and agronomic practices.

v) Improved production technologies will be transferred to farmers for

increasing the production of fruits, vegetables and flowers through aggressive extension campaign by the print and electronic media.

vi) Tissue culture techniques will be promoted for production of disease/virus free, true-to-type quality plants by federal and provincial research organizations.

vii) Training will be imparted to farmers and exporters on pre and post-harvest operations in order to improve the quality of fruits and vegetables.

viii) Private sector will be encouraged to establish processing, grading, packing, cold storage, cool chain and transport facilities through provision of credit facilities.

ix) Local packaging industries for manufacturing of packaging material for fruits and vegetables will be promoted.

18.17. Floriculture

There is large scope for commercial cultivation of flowers and ornamental plants. The demand for flowers is increasing and flower shops are expanding in all the major cities. The constraints of floriculture include: un-organized production and marketing system, low productivity, inconsistent quality, lack of facilities for export and absence of cool chain facilities for post-harvest handling and air-conditioned pack houses at the airports, lack of trained manpower having experience and technological knowledge of flower industry, specialized inputs for production (agri-chemicals, growth regulators, etc.) and post-harvest handling/treatments to enhance shelf-life.

During the MTDF, the commercial production of flowers and ornamental plants will be promoted. Research and development activities will be strengthened to improve quality and shelf-life of flowers through evolution of improved seed/plant materials and transfer of production technologies to the growers. Training will be imparted to growers in quality production, marketing and processing for export. Quality standards for flowers and ornamental plants will be developed by the PHDEB to enhance exports and acceptability in overseas markets. The formation of flower producers and traders organizations will be encouraged for promotion of floriculture and its marketing. Private sector investment in expansion of floriculture, its marketing and establishment of cool chain facilities for post-harvest handling, transportation and air-conditioned pack houses for their exports will be encouraged through provision of credit facilities.

18.18. Oilseed Crops

The annual edible oil consumption is around 1.9 million tonnes. About one-third of the requirement is met through domestic production of oilseeds (rapeseed, mustard, sunflower, cottonseed, etc) and two-third are imported. In 2003-04, 1.36 million tonnes edible oils costing Rs 37.9 billion were imported. The total oilseeds production during 2004-05 is estimated at 5.8 million tonnes, which will increase to 7.5 million tonnes in 2009-10. A two-pronged strategy will be followed, i.e. vertical increase in oilseeds productivity and horizontal increase in area under oilseed crops, coupled with favourable policy environment. Vertical increase will involve enhancement in per acre yield of oilseeds particularly sunflower and canola through development of high yielding varieties, improving production technology and research/extension activities, while horizontal increase will be achieved through utilization of rice and cotton fallow areas and barani areas, inter-cropping and exploring new areas. The developmental activities will be undertaken by the Pakistan Oilseed Development Board

(PODB). The following measures will be taken during the MTDF:

i) The PODB will prepare annual production plans, undertake development activities, ensure availability of inputs and procurement of the produce and liaise with the edible oil industry for oil extraction and marketing of oil and meal.

ii) Efforts will be concentrated on promotion of canola and sunflower. Their yield will be increased through better management practices such as the use of quality (hybrid) seed, application of fertilizer and plant protection measures.

iii) Research institutes will develop new high yielding, disease resistance varieties of oilseed crops.

iv) Inter-cropping of canola with wheat, sugarcane, maize and cotton will be encouraged through farmers' education and training.

v) Inbred lines of suitable hybrid varieties of sunflower developed by the research institutes will be provided to the Provincial Seed Corporations and Private Seed Companies for further multiplication and distribution among the growers.

vi) Large-scale plantation of oil palm in coastal areas of Sindh and Balochistan and olive plantation in NWFP, Potohar in Punjab, Balochistan and AJK will be promoted and industrial links for extraction of edible oils will be arranged by the PODB in the private sector.

18.19. Tea Cultivation

A National Tea Research Institute (NTRI) has been established at Shinkiari, Mansehra for research and development activities on tea cultivation. An area of 150,000 acres in Mansehra and Swat has been identified as suitable for tea cultivation. A National Tea Research and Development Programme was initiated during 1998-99, with the objective to survey/identify specific plantation sites, demonstrate tea cultivation and impart training to tea growers. A pilot black tea processing plant has also been established at NTRI, Mansehra with processing capacity of 500-1000 kg per day. During the MTDF, tea cultivation will be promoted. The ZTBL and other commercial banks will provide long-term credit until maturity of the tea bush to the farmers. The National Tea Research Institute will train the farmers in nursery raising, provide planting material and guidance in tea cultivation. The agricultural extension department of NWFP and private companies will also be involved in further promotion of tea cultivation in the area.

18.20. Agricultural Research

The primary objective of agricultural research will be to generate new knowledge and techniques for the enhancement of agricultural productivity. The research institute will aim at evolving high yielding, disease/virus resistant varieties of crops and improved breed of livestock through conventional breeding and biotechnology. The Pakistan Agricultural Research Council will be responsible for coordination of research throughout the country in order to avoid duplication. The following measures will be taken during the MTDF period:

i) Emphasis will be laid on accelerating the development of high yielding, disease/virus resistant verities of crops specially cotton, sugarcane, wheat, rice, oilseeds, pulses, fruits and vegetables, developing agronomic packages necessary for realizing the full yield potential of crops.

ii) Programmes on genetic engineering, biotechnology and tissue culture will be established and strengthened in selected institutes.

iii) Coordination and linkages between the research and extension system will be strengthened for effective transfer of technology to the farmers.

iv) Human resource and capacity building for agriculture research system will be improved through earmarking adequate share for agricultural scientists in Ph.D. programmes of the Higher Education Commission.

v) In order to provide autonomy to agricultural research institutes, similar legal framework as adopted for R&D organizations of the Ministry of Science and Technology will be followed.

vi) An Inter-Ministerial Agricultural Research Coordination Board chaired by the Federal Minister for Agriculture will be established in the MINFAL to coordinate agricultural research activities.

vii) The funding of agricultural research institutes will be enhanced from the present level of 70:30 between salaries and operational cost to internationally recognized ratio of 60:40.

18.21. Agricultural Extension

The basic function of agricultural extension is to transfer the latest production technologies generated at research institutes and universities to the farmers. During the MTDF, the Provincial Governments will improve and strengthen the agriculture extension services. The electronic media will be extensively used for broadcasting/telecasting special production packages of different farm operations. A section on transfer of technology will be established as an integral part of all research institutes to ensure that the latest research findings and packages are communicated to the farmers. Extension services in each district will establish an adaptive research farm having its own team of mobile extension experts, which will undertake crop maximization/adaptive research programmes. Trainings/refresher courses will be organized for the extension staff to enhance their knowledge and latest technologies. The Punjab Province is implementing a new approach of farmers group participation in four districts which will be extended to the whole province in phases. This may be adopted by other provinces. The new system involves a "Group Participatory Approach" aiming at integrated crop management through Training of Trainers (TOT), Training of Facilitators (TOF) and Farmers' Field Schools (FFS) where the farmers will be trained. The success of the new approach lies in its focus on the farmers as decision makers in soil, crops and pest management techniques and the use of non-formal methods using the farmers' fields for training and learning process. Women will be involved in agriculture extension activities.

18.22. Agricultural Marketing

An efficient marketing system is essential for increasing agricultural production, ensuring better returns for the growers and meeting requirement of the consumers. Food grain as well as fruit and vegetable markets though exist at tehsil/district levels which are regulated and operated by the market committees through local fees and taxes. The existing marketing system has many imperfections/inefficiencies, which reduce farmers' profitability. Some of the important pre-requisite for efficient market are: provision of physical marketing facilities, network of farm to market roads, market information, proper grading, packaging, processing facilities. The following measures will be taken to improve the marketing system:

i) The functioning of regulated markets will be reviewed and necessary measures will be taken for their improvement by the Provincial Governments.

ii) The existing federal and provincial marketing institutions will be strengthened in order to enable them to collect, analyse, forecast and disseminate accurate, reliable, consistent and timely information/data on prices and demand for various commodities.

iii) Grading and quality control will be enforced by the Agriculture and Livestock Marketing Adviser (ALMA) specially for commodities which are being exported.

iv) The formation of growers' association and marketing cooperatives will be encouraged for collective handling of marketing operations, processing and storage.

v) Product related specifications and standards will be developed for agricultural commodities to meet the requirement for export as well as local markets so as to enhance acceptability of farmers produce and add value to it.

vi) Agricultural Marketing Companies will be provided regulatory support under prudential and civil law to enhance their role in setting-up marketing and storage infrastructure, engage in commodity trade, undertake contract/corporate farming and provide institutional credit to the farmers.

vii) Private sector will be inducted in the establishment of cool chain, distribution and modern storage (silos and warehouses) system for perishable and non-perishable commodities for local/external markets and to provide the farmers with options of marketing their produce as and when profitable. Cool chain for perishables will be established at major airports and exit points. Setting up of agro-processing zones at strategic locations and cluster production areas across the country will be encouraged in order to facilitate the agriculture processing industry.

viii) Markets will be linked with producing areas by constructing farm to market roads.

18.23. Role of Provincial and District Governments

The development of agriculture is primarily the responsibility of the Provincial Governments and the MTDF has been prepared in consultation with them. The policies and strategies given in the MTDF will be implemented by the Federal and Provincial Governments. The provinces may prepare new projects for enhancing agricultural productivity, conservation of water and promotion of drip and trickle irrigation. The Provincial Governments may improve and strengthen the agricultural research and extension systems in order to develop new technologies and varieties of crops and transfer it effectively to the farmers. A high priority may be given to promote high value crops e.g. fruits, vegetable, flowers etc. The marketing infrastructure may be improved to facilitate the farmers in marketing their produce.

Agriculture extension, water management, soil fertility and soil conservation have already been devolved to the District Governments. They may prepare suitable projects for implementation in their respective areas.

18.24. Private Sector Investment

Agriculture is mostly a private sector activity. It benefits from public investment in supporting infrastructure and services. The growth of private investment will depend on knowledge base of the farmers about new technologies and equipments and institutional mechanism to support such investment. The most important things for the farmers to understand is how investment in particular input and technology will enable them to raise their productivity and incomes. The knowledge of the farmers will be improved through training and demonstration plots. The latest production technologies will be transferred to the farmers through the agricultural extension system, electronic and print media. The farmers will invest in land improvement, water courses, tubewells, high efficiency irrigation system, tractors, farm implements, orchards, livestock, dairy, fisheries, etc. The availability of agriculture credit is being enhanced to enable farmers to make the required investment. The agriculture credit requirement during the MTDF has been estimated at Rs 1,665 billion, out of which Rs 1,215 billion will be for production and Rs 450 billion for development purposes. The total private fixed investment including farmers' self-financing is estimated at Rs 868.3 billion for the next five years. An Agribusiness Development Project will be undertaken to promote private sector agro-enterprises development throughout the whole value chain. It will include creation of enabling policy/institutional environment, restructuring and strengthening of institutions to facilitate development of agribusiness, provision of appropriate support for agribusiness, capacity building and enhanced coordination.

18.25. Financial Allocation

An allocation of Rs 50.5 billion has been made in the Public Sector Development Programme during the MTDF to promote the development of the agriculture and livestock sector. The details are given at Annex III.