

Chapter 21

FOOD SECURITY AND AGRICULTURAL DEVELOPMENT

The agricultural development strategy for the Plan aims to substantially improve productivity and to bridge the yield gap by the systematic application of better inputs and technology. This will enhance profitability of the farming, improve competitiveness and ensure the environmental sustainability of agriculture. The overall objective is to achieve an agriculture growth rate of four to five per cent per annum during the Plan period in order to support the overall GDP growth trajectory, ensure food security and reduce rural poverty. This chapter is divided into two portions, that is, Agriculture and Food Security, and Livestock, Dairy and Fisheries.

The agriculture sector continues to be an important component of Pakistan's economy despite its decreasing share in the GDP. In 2012-13, it contributed 21.4 per cent to the GDP, about 60 per cent to exports and provided productive employment to 44 per cent of the labour force. More than two-thirds of the rural population depends on agriculture for its livelihood. Hence, an accelerated growth of agriculture is a prerequisite for the economic and rural developments. During four decades from 1960 to 2000, the agriculture sector grew at an average rate of about four per cent annually, higher than the population growth rate of 1.9 per cent. Unfortunately, the momentum of growth could not be sustained after 2000, and its performance fluctuated hugely from 2001 to 2010, seeing a decline of 2.2 per cent in 2000-01 which rose to 6.5 per cent in 2005-06, averaging about 2.6 per cent every year.

In 2007-08, the growth rate fell to 1.8 per cent amidst the global food crisis, which resulted in widespread food shortages, high prices of staple food items, and large imports of wheat from 2007 to 2009 (4.4 million tonnes). The average growth of agriculture between 2008-09 and 2012-13 was just 2.4 per cent, with the crop sector growing only by 1.3 per cent in this period. If the declining trend in agriculture growth was not reversed, it could jeopardise food security, increase malnutrition, cause significant increase in rural unemployment and poverty, leading to increase in the rural-to-urban migration, and slow agro-based industrial growth.

The World Development Report 2008 pointed out that the GDP growth originating in agriculture is at least twice as effective in reducing poverty as that originating in other sectors of the economy. The experience of rapid agricultural growth in Brazil, China and Vietnam demonstrates its impact on overall economic growth, poverty reduction and move towards industrialisation. In Pakistan, there has been under-investment in the agriculture sector and neglect of agriculture infrastructure and institutions over the past two decades.

Situational analysis

Growth

The agriculture sector, including livestock, grew at a disappointing rate of about 2.4 per cent during the last five years. The performance of the crop sector was even worse, averaging just over one per cent in this period. The rate of growth fluctuated widely in the crop sector ranging

from 5.2 in 2008-09 to -4.2 in 2009-10. Livestock performed consistently and supported the overall growth of the sector. The growth in fisheries was negative and other smaller sectors, such as forestry, also performed below par (Table 1). The low growth rates in agriculture are attributed to underinvestment, particularly in agricultural research and marketing infrastructure, absence of an effective strategy for improved seed, water management and credit disbursement.

Table 1: Agricultural growth (per cent)

Year	Crop	Livestock	Fisheries	Forestry	Agriculture
2008-09	5.2	2.2	2.6	2.6	3.5
2009-10	-4.2	3.8	1.4	-0.1	0.2
2010-11	1	3.4	-15.2	4.8	2
2011-12	3.2	4	3.8	1.8	3.6
2012-13	1.5	3.5	0.7	6.6	2.7
Average	1.3	3.4	-1.3	3.1	2.4

Source: Pakistan Economic Survey, 2012-13

Physical

The production of major crops showed a mixed trend during 2008-13.

- Wheat production remained below 25 million tonnes except in 2010-11, when about 25.2 million tonnes of wheat were produced. The country was thus self-sufficient in its staple diet, and also generated surplus for export.
- Rice production increased initially, but failed to sustain the momentum.
- Cotton production never exceeded 14 million bales, mainly because of pest attacks caused by the resurgence of the Cotton Leaf Curl Virus (CLCV), whitefly, and mealy bug. Resultantly, the annual cotton production remained below the domestic demand, necessitating the import of raw cotton to the extent of 1.5 to 2.0 million bales each year to meet the requirement of the local textile industry.
- The production of sugarcane, after a double dip in the initial two years, was able to surpass 55 million tonnes.
- Maize, along with potato, has emerged as a crop yielding consistently well.

The performance of minor crops was never up to the mark. The underinvestment in agriculture (water, seed, and technology) and deterioration of agriculture terms of trade coupled with markets failures were the major reasons for less than historical production trend (Table 2).

Table 2: Production achievements (2008-13)

Crop	(Million tonnes)				
	2008-09	2009-10	2010-11	2011-12	2012-13
Wheat	24	23.3	25.2	23.5	24.2
Rice	7	6.9	4.8	6.2	5.5
Maize	3.6	3.3	3.7	4.3	4.2
Cotton*	11.8	12.9	11.5	13.6	13
Sugarcane	50	49.4	55.3	58.4	63.7
Gram	0.7	0.6	0.5	0.3	0.8
Sunflower	0.4	0.3	0.4	0.3	0.2
Potato	2.9	3.1	3.5	3.4	3.8
Onion	1.7	1.7	1.9	1.7	1.7

Source: Pakistan Bureau of Statistics * Million Bales

Agriculture and food security

Issues and challenges

The major challenge to the agriculture sector is to create an environment for achieving an average growth rate of four to five per cent annually with a focus on small and resource poor farmers. This would require a strategy, which addresses main causes of: (i) stagnant productivity of major crops, (ii) declining investments in agriculture (both public and private), (iii) increasing food insecurity and poverty; (iv) inefficient use of agricultural inputs such as water, fertilizer and agro-chemicals, (v) slow development and dissemination of technologies, (vi) poor delivery of public services, (vii) market failures, (viii) weak institutions, (ix) inadequate agriculture credit, and (x) lack of appropriate policies and incentives to make agriculture more productive and competitive. These issues will be addressed by the agriculture development strategy outlined below for the Plan.

Strategy for agriculture development

Objectives

The main objectives of the strategy are to: (i) accelerate agriculture growth and reduce rural poverty, (ii) achieve self-reliance in essential food commodities, (iii) expand exports and galvanise agro business potential, (iv) achieve an average growth rate of four to five per cent per annum to support overall growth strategy of the government, and (v) improve quality of growth by adopting a strategy which is pro-poor, pro-small farmer and pro-environment.

Strategy

Achieving these objectives will require success in the following strategic areas based on energy and water efficient high-yielding production technologies and market-oriented public policy interventions:

- Ensuring food security and safety for all (that is, availability and access to quality food at affordable prices) and setting up institutional framework within the Ministry of National Food Security and Research (MoNFS&R) to implement the strategy
- Improving total factor productivity and competitiveness of the agriculture production systems through technology-based interventions with emphasis on small and medium size farmers and landless tenants
- Improving export of agri products in compliance to the international food standards for accessing regional and high-end markets
- Policy and institutional reforms for moving towards market economy and involving private sector in the agricultural business
- Paradigm shift from resource-intensive to resource-conservation technologies for more productive, competitive and sustainable farming systems (grow more with less and increased use of bio energy, etc.)
- Managing natural resources in a sustainable manner by adopting good agricultural production practices (Global GAP) with emphasis on sustainable use of land and water resources (aquifer recharge in arid and semi-arid regions)

- Strengthening and integration by improved coordination of the National Agricultural Research System to enhance the process of innovation and commercialisation.
- Market-led approach to diversification of agriculture into high-value crops, value addition and supply chain infrastructure development
- Improving post-harvest management, marketing infrastructure and policies based on the public-private partnership
- Improving sector governance, particularly the delivery and quality of agriculture support services (research, extension, agriculture credit, marketing, inputs supply) and computer-based land record management system
- Ensuring fair price to producers and consumers by improving the procurement and distribution system for essential food items through developing adaptation and mitigation strategies for climate change in different agro climatic zones of the country and reclamation of lands

A balanced approach to the agriculture development will be persuaded for achieving equitable productivity growth both at small and large farms. Pre-requisites to success will be macroeconomic stability and sustained efforts to consolidate and deepen the agriculture policy reforms to achieve improved productivity, food security and better living conditions of the rural people.

The following paragraphs translate the aforementioned strategy into various plans and programmes for implementation during the Plan period.

Plans and programmes

As a long-term development plan, the Vision seeks a country with ensured food security for its inhabitants in the entire supply-chain. Food security has been included as a component of Pillar-IV along with Energy and Water in the Vision with an aim to provide sufficient, reliable, safe and cost-effective food for present and the future needs. The Plan aims to achieve food security for all by developing the agriculture sector into a modern, efficient and diversified entity.

Improving agriculture productivity

There exist huge gaps between current yields and what can be economically achieved with better support services, especially in high-potential areas. This provides an opportunity to achieve the growth targets envisaged in the Plan. Improved productivity and competitiveness of the crop sector will require accelerated adoption of resource conservation technologies to grow more with less investment in agricultural research and extension systems, improved access to agriculture credit, targeted subsidies to stimulate the use of new technologies, better mechanisms for risk mitigation, and improved post-harvest management and marketing facilities.

Bridging the yield gap of smallholders requires greater emphasis on enhancing coverage of certified seed of improved varieties, efficient use of available water and fertilizer by adopting resource conservation technologies (that is, laser levelling, furrow irrigation, drill seeding, band placement of fertilizer, minimum tillage, integrated pest management, etc.), recycling rather than burning of crop residues and increased use of organic matter.

The investments in agricultural research system will be enhanced to upgrade capacity for development and adaptation of appropriate resource conservation technologies. Immediate

attention is needed for strengthening the Provincial Agricultural Research System through significant increase in the financial allocations for rehabilitation and up-gradation of research infrastructure (including scientific equipment, laboratories and green houses), and improvement of the service structure of scientists in line with the PARC and the agriculture universities. For high priority research issues, the ongoing competitive grant system of the PARC, HEC and PARB will be strengthened. In addition, national and international cooperation in agricultural research will be promoted. The private sector-led inputs delivery and other agricultural services will be encouraged in linking farmers with markets and processing industry to ensure fair returns to farmers by enhancing their capacity to invest in the modernisation of agriculture production systems.

Diversification into high-value agriculture

Given the diversity of the agriculture sector and export competitiveness in high-value crops, the strategy needs to balance food crops and higher-value horticultural crops. Fundamentally, the growth must come from farmers' enhanced capacity to modernise their production systems based on optimal utilisation of land and water resources and commercial approach to agriculture production and value chain. This will require economies of scale at the farm individual, corporate or cooperative level, adoption of modern production and post-harvest technologies, and investment in the supply chain infrastructure.

Accelerated growth in high-value agriculture will be achieved on sustained basis, only if the markets work better, ensure fair price to farmers, and mop up marketable surpluses for processing and packaging into value-added products for local and export markets. This will require necessary market reforms and establishment of supply and cold chain infrastructure through innovative public-private partnerships to realise full market potential. Experiences of other developing countries indicate that given the large size and technical complexity, these investments can best come through the private sector-led joint ventures with the government providing an enabling environment in terms of incentive policies. In addition, better functioning of markets requires addressing the public sector infrastructure – deficit in farm to market roads – to facilitate small farmers' entry to market, especially in areas of good agricultural potential.

Treating production and marketing operations holistically, using the policy support tools for precision agriculture, offer substantially higher financial and economic returns by minimising expenditures on capital inputs, such as fertilizers, pesticides, energy and by reducing risks of crop failure. The corporate or cooperative approach is the best suited for diversification into high-value agriculture on commercial scale where production, processing and marketing operations are integrated and managed as an agro-industry. The Plan will encourage these initiatives in the private sector through appropriate public policy interventions and provision of incentives.

Improving sector governance

The poor state of governance is common in the management of agriculture, both by the public and private sectors. It has adverse impact on the agriculture productivity resulting from litigations over land and water disputes, rent-seeking by the revenue functionaries, tempering of water course outlets (mogaaz) by influential farmers upstream of distributaries, and market failures, etc.

To improve governance in agriculture, it is imperative to revisit the role of public institutions and modify control-oriented and supply-driven system to the decentralised and demand-driven. At the same time, appropriate regulatory mechanism must be put in place to prevent exploitation of the small producers. Devolution at the local level is important, including improvement in their administrative capacity and accountability, and strengthening of the participatory process. An independent third party evaluation of the devolution system implemented in 2002 versus the previous system would provide guidelines for needed reforms. Likewise, the post-18th Constitutional amendment devolution needs a review. In addition, measures that improve governance and accountability – stricter enforcement of laws, legal reforms and wider dissemination of information on spending and effectiveness of public sector projects and programmes – can help spur both greater efficiency of government, as well as growth and investment in the rural areas.

Improving governance is also crucial for reducing poverty through improved growth in the rural sector. Governance issues, including litigation over land, water disputes, and corrupt practices in land transactions involving transfer, sale or purchase are a major bar to investments and growth in agriculture.

To address these issues, the strategy will emphasise: (i) improving financial management and accountability at the project and institutional levels, (ii) transparent and authentic land records and water entitlements by modern IT-based system, (iii) increased transparency and information of the government activities to facilitate public oversight, (iv) capacity-building of the local government institutions, and (v) safeguards against market failures.

Improving water-use efficiency

Inefficient use of water is one of the serious issues of the agri sector. The irrigated area in Pakistan has increased from 16.8 million hectare in 1990-91 to 18.9 million ha in 2012-13, and is expected to expand further. This happened because of increase in water availability from 119.6 MAF to 137.5 MAF during the same period. Yet the water resources available for agriculture continue to shrink due to increased demand from the urban and industrial sectors.

To overcome these problems, the Plan recommends a strategy of ‘More Crop per Drop’ by increasing crop productivity per unit of water through promotion of water saving technologies. These will include the lining of watercourses, drip and sprinkler irrigation system, land levelling, permanent raised-beds, and substitution of high delta water crops (sugarcane, rice) with low delta crops (maize, oil seeds, pulses, etc.). A multi-pronged strategy will be adopted for improved water use efficiency to sustain food and water security. The main components of this strategy will be:

- Reducing water losses (both at system and farm level) and improving conservation of available resource to enhance water productivity
- Minimising system losses by improving operational management of canal system for wet, average, and dry season scenarios and by monitoring of water discharges at mogaz
- Increasing the water storage capacity through development of on-farm storage tanks, small dams, check dams, and spate irrigation (rod kahi) in rain fed, sailaba and mountainous areas

- Strengthening on-farm water management research on crop water requirements, water pricing, water losses and use efficiency, water productivity, cost recovery, and equity issues under the demand-driven versus supply-driven irrigation management
- Build consensus among provinces, like the 1991 Water Accord, to initiate new water projects and extension of the existing irrigation facilities to additional areas
- Increase irrigation intensity through fuller utilisation of available water resources by expanding the on-farm water management programmes
- Launching of major programme of aquifer recharge in arid and semi-arid areas of Cholistan, Thar and Balochistan to ensure that water flows from tube-wells can be sustained

Improving land resources

Pakistan faces serious issues of land degradation from water-logging, salinity, nutrient mining and soil erosion. Inefficient irrigation and drainage systems, secondary salinisation, sea water intrusion, and lack of awareness are the major causes of land degradation. Rapid urbanisation is eroding arable land. About 3.2 million ha of canal command area are severely affected by water-logging (water table less than 150 cm) and salinity. In spite of the huge investment for reclaiming land fertility, the menace of water logging and salinity still persists. In addition, soil fertility has badly affected by water and wind erosion and inefficient application of fertilizers. For this purpose, strategies encompassing mitigation, rehabilitation and better land-use planning will be adopted in order to protect land resources.

The strategy includes actions such as: establishment of groundwater regulation system to monitor and regulate water and salt balance of aquifers, reduction in drainage surplus through precision irrigation, strengthening and expansion of soil testing labs for issuance of soil health cards to farmers to provide updated information on nutrients balance, improved watershed and rangelands management, soil conservation programme through technical, biological, chemical, and social measures, promotion of Remote Sensing and Geographic Information System tools for identification, assessment and monitoring of degraded lands, and improved coordination and capacity-building of the stakeholders concerned. Legislation will be introduced against unchecked spread of housing schemes on fertile lands. Under the land reform programme, additional land will be reclaimed and irrigated for allotment to landless, agri graduates, women haris and tenants. A land consolidation programme, where necessary, will be undertaken to create viable units for modern agriculture.

Agricultural biodiversity

Pakistan is rich in indigenous crop diversity with an estimated 3000 taxa of the cultivated plants. There are around 500 wild relatives of the cultivated crops, mostly found in the Northern Areas. Introduction of high-yielding varieties, expansion of land, deforestation and dam constructions have threatened wild landraces of the crops, as agro ecological diversity of the region is in danger due to modern agriculture. Pakistan has preserved 15,600 germplasm accessions from more than 40 crops at the Pakistan Genetic Research Institute. Around 50 per cent of the germplasm has been evaluated and catalogued. During the Plan period, preservation of plant genetic resources will further be improved.

Mitigating impact of climate change

Manifestations of the climate change are already evident by changes in rainfall patterns, occurrence of droughts and floods, extreme temperature, etc. It is predicted to have significant negative impacts on agriculture production systems in different parts of the country, particularly in the arid and semi-arid regions.

Although the impact of climate change is not yet fully understood and may not always be negative, there is a need to initiate research on adaptation and mitigation strategies. The research agenda will focus on measures to minimise the impact of climate change on crop production and water resources, including: (i) development of crop varieties resistant to pests, diseases and drought and also tolerant to extreme variations in temperature, (ii) changes in cropping patterns and sowing dates based on more accurate weather forecast for the cropping season, (iii) changes in planting methods and water management practices for high delta crops such as rice, sugarcane and maize (for example, from flat to bed planting and from flood irrigation to furrow or drip or sprinkler irrigation, etc.), (iv) water resource conservation and demand management through expansion of small scale water storage capacity and rain water harvesting at the farm level, (v) equitable water pricing based on delta of water for different crops, (vi) development of water markets at the farm level where the farmers could buy and sell water through mutual agreements as is presently done in case of the tube-well water.

To address climate change issues and their impact on agriculture on a systematic and long-term basis, a National Climate Change Policy will be formulated. The Global Change Impact Study Center (GCISC) is well-placed to undertake this task in close collaboration with key stakeholders under the overall guidance of the Prime Minister's Committee on Climate Change. As per recommendation of the Task Force, the Ministry of Climate Change will take steps on priority basis to formulate the National Climate Change Policy, along with the action plan, and the GCISC will take necessary initiatives for high-quality research and modelling studies on the climate change.

Agricultural inputs and support services

Seed

Quality seed is a prerequisite to realising the full benefit of good crop husbandry practices. Any weakness in terms of genetic purity or physical health may damage all investments and efforts made during the course of crop life. The seed sector is grossly underdeveloped due to extended delay in legislations though number of private domestic seed companies is around 700, which are dealing in all field and horticultural crops. Several initiatives such as establishment of facilitation units and testing labs were taken.

Along with insistent legislation issues, wide spread spurious seed, especially GMOs, non-availability of certified seed and planting material, no system of seed commercialisation in the National Agricultural Research System and lagging seed registration process have been identified as potential obstacles to the seed sector. Enactment of laws regarding seeds has been considered a fundamental step to resolve this major issue. Certified nurseries of planting material in production areas with mother plant banks are needed to meet the fruit orchard needs along with backup support. High-tech seeds, such as Hybrid and GM, should be given high priority and must be developed indigenously by technology acquisition, strengthening of the public sector R&D and enhancing role of the private sector for seed development and

commercialisation. A comprehensive but convenient registration procedure for new entrants is also deemed necessary. Projected seed requirements for major crops, along with fruit nursery plants, are given in Table 3.

Table 3: Requirements and targets of improved seed and fruit nursery plants distribution

Crop	Total Req.	('000' Tonnes)									
		2013-14		2014-15		2015-16		2016-17		2017-18	
		Target	%	Target	%	Target	%	Target	%	Target	%
Wheat	1,085	217.1	20	227.9	21	233.4	21.50	238.8	22	244.2	22.5
Cotton	40	40	100	40	100	40	100	40	100	40	100
Paddy	42.5	12.7	30	13.6	32	14.4	34	15.3	36	16.1	38
Maize	31.9	9.6	30	10.2	32	10.8	34	11.3	36	12.1	38
Fodders	40.1	12.0	30	12.4	31	12.8	32	13.3	33	13.7	34
Oil seeds	10.6	2.1	20	2.2	21	2.2	21	2.3	22	2.3	22
Pulses	47.5	9.5	20	9.9	21	10.5	22	10.3	23	11.4	24
Vegetables	5.1	5.1	100	5.1	100	5.1	100	5.1	100	5.1	100
Potato	372.7	37.3	10	41	11	48.5	13	52.2	14	55.9	15
Fruit Nursery (000 No.)	1,000	40	4	60	6	65	6.5	70	7	85	8.5

Source: Federal Seed Certification & Registration Department (FSC&RD)

Fertilizer

Since the advent of the Green Revolution, the use of fertilizers in Pakistan has been growing at a fairly good pace. However, the imbalance application of nitrogen and phosphate has been a recurring issue to affect fertilizer use efficiency, and subsequently the crop productivity in the prevailing intensive cultivation systems. Consequently, essential plant nutrients are depleting, lowering the average productivity of crops. The imbalanced nutrient application during 2012-13 recorded in terms of the NP ratio was at 4.15:1 against desirable 2:1. The decrease in use of P and K is attributed to their high prices and less overall farm profitability due to deteriorating terms of trade.

The use of fertilizers up to 2017-18 is targeted to grow by three per cent per annum (Table 4). The growth rate for the nitrogen is estimated to be 2.5 per cent, while phosphate and potash at five per cent each. In quantitative terms, by 2017-18, nitrogen, phosphate and potash use is projected to increase by 3,499.9, 9,45.3 and 29.5 thousand tonnes respectively. The overall fertilizers consumption is estimated at 4,474.7 thousand nutrient tonnes. Other fertilizer products to meet micronutrient deficiencies such as Zinc, Boron, Iron and Copper will also be needed for specific crops in order to enhance productivity and improve quality. Pakistan has the potential to fulfil its entire urea fertilizer requirements through indigenous production, but has to rely on imports due to prevailing energy crisis, particularly reduction of natural gas to the fertilizer sector. The use of fertilizers up to 2017-18 is targeted to grow by three per cent per annum.

Table 4: Fertilizer off-take projections

Nutrient	Benchmark	('000' Nutrient tonnes)					
		2013-14	2014-15	2015-16	2016-17	2017-18	Growth (%)
Nitrogen	3,170.7	3,184.4	3,222	3,331.2	3,414.5	3,499.9	2.5
Phosphate	777.7	880.9	912	857.4	900.3	945.3	5
Potash	24.3	23.6	28	26.8	28.1	29.5	5
Total	3,972.7	4,088.9	4,162	4,215.4	4,342.9	4,474.7	3

Note: Benchmark is average of the last five years.

Source: National Fertilizer Development Centre (NFDC)

In terms of fertilizer marketing, Pakistan has been experiencing problems of timely availability of fertilizer to farmers due to heavy dependence on imports, delays in imports, and weak regulatory mechanisms. The public sector control over urea imports, owing to subsidy element, also sometimes poses problem of supply. Fertilizer use development has now been strongly established by the governmental support during the previous years. It is a right time to loosen the governmental control over this business and let the market forces prevail. Urea imports must be deregulated completely and do away with direct and indirect subsidies in a phased manner. The Fertilizer policy 2001 needs review to undertake such decision. To guarantee continuous supply, strategic reserves of major fertilizers, such as DAP and urea, need to be maintained by the private sector under a predefined mechanism, to assure fertilizer availability during peak seasons.

Plant protection

To sustain higher yields, it is imperative to protect crops from insects and pests and keep fields clear from weeds by judicious use of pesticides and herbicides. Indiscriminate use of pesticides and other chemicals is harmful as residual levels in the food chain can exceed permissible limits. In 2004-05, pesticide use was 129,000 tonnes which is now around 40 thousand tonnes. Pesticide consumption has been declining in Pakistan largely because of more cultivation of Bt cotton requiring comparatively less sprays. Previously, schemes involving IPM, biological control, pesticide quality control labs, and plant quarantine services were taken up. To provide healthy food, the Integrated Pest Management along with monitoring of pesticide residues in agriculture produce need to be promoted. This strategy will be continued during the Plan period.

Farm mechanisation

Accelerated farm mechanisation is an important ingredient of the strategy to step up agriculture growth. Range of current power and implements are insufficient to support the need of the sector. Before de-functioning of the MINFA, developmental schemes were initiated for high efficiency irrigation system, provision of the subsidised tractors and farm implements such as laser land leveller, zero or minimum tillage machine, seed-fertilizer drill, raised bed technology, combine harvesters, threshers, etc. Most of such schemes could not get high success, except the tractor scheme, which remained continued by the federal as well as provincial governments. Due to this, the level of farm mechanisation is basically confined to tractor cultivation. To improve the situation, availability of tractors along with modern farm implements for zero and deep tillage, fertilizer band placement and laser land levelling will be provided on credit. This will enhance integrated use of inputs and farm machinery to improve productivity. Better enabling environment for agriculture machinery manufacturers may

improve their production capacity to help reduce the lag period. The role of service providers will be enhanced for rental of farm machinery and adoption of corporate or cooperative farming. Strengthening of the R&D involved in farm mechanisation will help accelerate the pace of farm mechanisation through acquisition or development of appropriate farm machinery. Around 0.95 million tractors with improved implements usage at the farm level, have been envisaged at the end of this Plan as against 0.72 million units in 2013.

Agricultural research

Traditionally, the National Agricultural Research System (NARS) has contributed well to the agri development. However, since the 1990s, Pakistan has grossly underinvested in the agri research. According to the IFPRI study (2008), the level of investment in research declined by 23 per cent between 1991 to 2002, while in India and China it increased by 81 and 118 per cent respectively. This adversely affected the national capacity for research. Many of the research programmes, pursued by the agri research institutions, have not kept pace with the needs of the farmers and economy. There was more emphasis on knowledge generation than on moving from research to innovations and technology development. The Provincial Agriculture Research System, which is the backbone of the Pakistan's National Agricultural Research System (NARS), suffered from budgetary constraint, brain-drain, outdated research infrastructure and a service structure providing little incentive for creative research and innovations.

To address these issues, revamping and strengthening of the whole research system along with improvement in the incentive structure, enhanced budget allocations will be taken up on priority basis in the Plan period. At the same time, an effective monitoring and evaluation system will be put in place to measure the impact of research and technology generation on sustainable agriculture development. The role of the PARC as an apex research organisation will be enhanced in resource mobilisation, acquisition, adaptation, and generation of cutting edge technologies, and sustainable management of natural resources. Research will be intensified to reduce the energy intensity of the agri sector to bring down the cost of production, which has gone up due to high energy prices.

Agricultural extension and training

Extension is a vital link between a researcher and farmer. The yield difference between small farmer and progressive farmers shows gaps in resource and knowledge. An effective extension service can play an important role in adding to the resource and knowledge to increase productivity by adopting cost-effective production technologies. However, the quality of agriculture extension service has deteriorated overtime since the extension methodologies and tools are outdated, while the crop production systems have become more complex and diversified. The extension strategy envisaged in the Plan will promote the use of more modern and effective extension service based on electronic and extension technologies and on provision of specialised extension service staffed by subject matter specialists for precision agriculture and high value crops, such as horticulture and floriculture. The service may also include information dissemination on weather forecasts for agriculture, Global GAP or good agriculture practices, latest innovations in conservation agriculture, post-harvest management, and market information on crop prices, etc. It will also upgrade the training programmes, along the lines of technical and vocational training needed for commercial farming. Greater involvement of the private sector (fertilizer, pesticides and seed industry) in specialised extension services to address specific production problems at the field level and provide services such as soil testing, integrated nutrient and pest management, drip and sprinkler

irrigation system, and production of hybrid and GM (Genetically Modified) crops will be encouraged.

Agricultural credit

Inadequate financial resources and lack of access to financial institutions are major constraints on the adoption of modern agricultural practices by small farmers. One-window operation, revolving credit scheme, microcredit scheme, inclusion of more banks and institutions in agricultural credit and issuance of smart card for small farmers were some of the major interventions to increase credit out-reach. By such actions and active monitoring by the State Bank of Pakistan, the target of agricultural credit disbursement was achieved most of the time. Total credit disbursement was Rs232 billion in 2008-09, which has added up Rs100 billion in five years by 2012-13. Generally agricultural credit accounts for only four to five per cent of banks credit portfolio. Banks are not enthusiastic about agri credit due to the significant number of widely dispersed clients they are supposed to cover, while farmers shy away from banks because of the cumbersome procedure involved.

Table 5: Agriculture credit disbursement targets (2013-18)

(Rs billion)	
Year	Total
2013-14	380
2014-15	500
2015-16	600
2016-17	680
2017-18	770
Total	2,930

Source: *Planning Commission*

In view of the potential role of agriculture in the poverty alleviation and promoting rural employment, the commercial banks will be encouraged to be more innovative and promote group loaning, inducting agricultural graduates as their Mobile Credit Officers, and increasing branch network in rural areas. To enhance outreach, number of branches in rural areas will be significantly increased. The smart card facility, supported by a system of due diligence, can also be introduced.

It has been argued that the agricultural credit system should be reformed so as to ensure that at least 50 per cent of the total is provided to small farmers, and that landowners are able to obtain credit on the basis of the market-value of the land rather than on the outdated produce index units. Measures will be sought to substantially increase the amounts being provided to small farmers. A high priority to women borrowers in microcredit programmes will also be given.

In view of the recent enhancement of indicative credit ceiling and greater emphasis on technology-based agriculture in the future, the agricultural credit disbursement target for the Plan period has been set at Rs2,930 billion (Table 5). Almost equal share is expected to be allocated for production and development purposes.

Agriculture marketing infrastructure and trade

The present marketing policies and infrastructure facilities constitute major constraints on the agri production. The market failures are common in years of surplus production resulting in low farm gate prices and poor return to farmers on their investments. This results in low production of these crops in the ensuing cropping season; hence leading to a cycle of food surplus and deficit years. These market failures entail high cost for the producers, consumers and for the national economy.

The Plan will start the movement towards converting Pakistan into a large net exporter of food and high-value agriculture products, including halal food to regional markets, by modernising marketing and post-harvest handling systems. To access any international food market, the foremost requirement is food safety and health compliance as per the international standards. An accredited food safety inspection system will be established to enhance the Pakistani share in the international trade.

At present, Pakistan is annually producing about 35 million tonnes of grain (wheat, rice, maize) and 13 million tonnes of horticulture products. The existing grain storage capacity is about 4.5 million tonnes. Its marketing and storage infrastructure to handle these diverse agricultural products is grossly inadequate and inefficient, resulting in high transaction cost to farmers and significant losses during handling and storage. Losses are estimated at three to six per cent for grains, and 25 to 40 per cent for perishable commodities, entailing a financial loss of Rs12 billion to Rs25 billion for grains and Rs24 billion to Rs38 billion for perishables. In contrast, the developed countries manage their storage losses within zero to two per cent by using the modern storage technologies, including silos storage for grains and cold chain systems for perishables. The latter includes: pack houses (for washing, grading, waxing and packing, etc) cold storages, controlled atmosphere chambers, and refrigerated transport containers (for flowers, fruits and vegetables).

The issues relating to the post-harvest handling of agriculture produce, such as marketing and storage, have been discussed at various levels in the government for some years, and a number of proposals for development of grain storages and cold chain infrastructure were in consideration. Storage and cold chain is a high investment area and does not appear feasible for the public sector to invest. There is an urgent need to amend the Agriculture Produce Market Act 1939 to attract the private sector in the business.

Special crops: Tea, olive, palm

Import bill of tea and the edible oil is very high and is a burden on the economy of Pakistan. As import substitution measures, efforts are being made to promote tea, olive and palm cultivation. Parts of the Khyber Pakhtunkhwa and Azad Jammu and Kashmir have been potentially identified to have potential for tea cultivation. Accordingly, a research station was established at Shinkhari (District Mansehra), which was subsequently upgraded to the National Tea Research Institute (NTRI). The NTRI developed varieties, production and processing technologies. It also established a tea processing unit and started promotion of tea cultivation in these areas. An area of about 500 acres has been brought under tea and cooperating farmers have been trained. Commercialisation of tea production, with the involvement of the private sector, is planned on 3,000 acres each in the KPK and AJ&K. Effective monitoring and independent evaluation is needed to assess the potential of tea cultivation on a commercial scale.

Pakistan is dependent on imported edible oil to meet its needs. Wild olive is indigenous in Pakistan, but cultivated species have been introduced only recently. About seven million wild olive plants, with cultivated species through grafting small plantations of cultivated species, have been established by the PODB on about 600 acres. No scientific data has been produced so far to determine the success of the grafted plants and the varieties with production potential. As such the project did not attract the growers for its commercial cultivation.

A recent GIS study has identified the tribal areas of the KPK and Balochistan, and the adjoining areas of North and South Waziristan, Mohmand and Kurram agencies, Bajaur, Malakand, Loralai, Barkhan and Zohb, better suited for olive cultivation than the areas with wild olive. An independent evaluation of the projects undertaken so far is needed to determine their economic and commercial viability.

Agro-forestry

Agro-forestry represents the integration of agriculture and forestry to improve the productivity and sustainability of farming system and increase farm income. The perennial woody plants provide direct and indirect benefits, and assure livelihood security to the farming community. The role of trees in soil conservation, erosion control and environment amelioration is widely acknowledged and serve as compelling reasons for including trees as part of the farming system. The present challenges of food security and diversification, issues of energy requirement and clean fuel can be met through different agro-forestry systems. In addition, harnessing large areas of arable land for plantation of suitable multi-purpose plants will promote sustainable development of agriculture. As per a survey (2008) of the Ministry of Environment, the total area under agro-forestry is estimated to be 773,000 ha with provincial breakup showing: Punjab 435,000, KPK 190,000, Balochistan 80,000, Sindh 50,000, AJ&K 12,000 and Gilgit-Baltistan 6,000.

The main issues in agro-forestry development relate to lack of systematic and sustainable development of agro-forestry due to lack of institutional ownership either by the Ministry of Agriculture or Ministry of Environment. As a result, there is neither a development plan nor specific fund allocation for this activity. The research, extension and development programmes are non-existent. Given the stronger linkages of agro-forestry with sustainability of agriculture and natural resources, the Planning Commission will set up a 'Committee on Agro-forestry comprising all major stakeholders to prepare strategic plan for systematic development of agro-forestry. The committee will address the following issues with specific recommendations: (i) institutional home of agro-forestry at the federal and provincial levels, (ii) past performance and future outlook in terms of impact on sustainability of natural resource base, (iii) research and development needs, (iv) current state of legislation and regulations for agro-forestry and need for improvement, if any, (v) selection of suitable plant species with economic value and development of nurseries for different agro-climatic zones, (vi) training and technology transfer, adoption of social forestry on commercial scale, and (vii) need for a dedicated knowledge acquisition and dissemination centre on agro-forestry.

Policies and institutions

Despite closing down of the Ministry of Food and Agriculture, several policy interventions are still under adoption and implementation though there exists no centralised and documented

policy at the federal level. However, the MoNFS&R is actively working to formulate a national Agriculture and Food Security Policy.

Restructuring of the Agricultural Policy Institute: Historically, Pakistan has substantial experience and expertise of the agricultural pricing policy analysis and the Agricultural Prices Commission (APCOM), now renamed as the Agriculture Policy Institute (API), headed by experts of international repute. The situation has unfortunately deteriorated. Many of the recent policy initiatives and interventions in the wake of the food crisis lacked the requisite analytical and prescriptive underpinnings. As the country is increasingly grappling with complex policy issues, there is an urgent need to have a first rate autonomous agriculture policy institute to critically examine the emerging challenges and provide various policy options. The proposed institute will build on the existing capacity at the Agricultural Policy Institutes in the MoNFS&R and will be made fully functional during the Plan. Most of the groundwork has already been done on its mandate, governance and financial structure, and detailed terms of reference.

The API, as an autonomous institution, will have an independent professional Board of Governors having representation of eminent experts (economists, agri economists and experts), private sector (farmers, agro-industry, financial institutions, exporters) and relevant representatives of different ministries concerned.

Agricultural statistics and database management: Timely availability of reliable agricultural statistics and the capacity to use them in support of effective planning and policy formation are essential requirements for improved agri performance. Although Pakistan has a long history of agricultural data collection as well as policy analysis, its capacity has weakened overtime as evidenced by the recent interventions introduced in the wake of the food crisis. This is primarily due to lack of real time quality data and weak analytical capacity to use the data in policy formulation. The size of harvests, demand and supply, balance of food crops and products have become contested issues necessitating improvements in agricultural statistics to address the current challenges and provide policy options for sustainable agriculture development in the longer run.

There are a variety of sources of agricultural statistics in Pakistan. The agricultural census, livestock census, and farm machinery census are conducted at periodic intervals. The data generated by these censuses are of reasonably good quality. The major issue with this data is its availability in real time, that is, within a period of no more than one year. With the availability of new software programmes and the modernisation of data entry systems, this is feasible for quick implementation. The data with respect to complete enumeration of land use, cropping pattern and sources of irrigation have improved considerably, as has been that of crop-cutting experiments. However, recently doubts have been expressed regarding data quality in wake of the controversy over the size of crops. Recently, there have been some pilot efforts to collect and to revalidate crop reporting data through satellite imaging and remote sensing.

The above review underpins the need for improvement, both in the quality of data and analytical capacity to use it for policy formulation and planning purposes. Recently, the SUPARCO has emerged as an organisation providing data of five important crops with state of the art satellite technology in a timely manner having much more authenticity and reliability. It is proposed to examine these issues and make recommendations for modernising the data collection, analysis and reporting system should be constituted. To ensure effective use of these data, analytical capacity will be developed to prepare and publish reports on changes in

agriculture productivity, profitability and competitiveness, domestic resource cost of producing major agriculture products, consumption and utilisation of agro products, food security and terms of trade indices, agriculture prices and parity, etc. This will contribute to informed decision-making by the government.

Agricultural terms of trade: The agricultural terms of trade are an important parameter to determine changes in the profitability of the sector. The trends in terms of trade shape the economic condition faced by farmers and constitute an important component of the prevailing investment climate. According to the Task Force Report on Food Security, the decline in the agricultural terms of trade since 1990 has been a major constraint for depressing investment. It is important to arrest the historical resources transfer from the agri sector to other sectors of the economy.

Agriculture can only be transformed into a fully-viable economic industry by changing the policy framework and terms of trade, which must be favourable to agriculture. Thus, there is a need to monitor the agricultural terms of trade by an official agency on a regular basis. As recommended by the Task Force on Food Security, the API will be mandated to estimate the agricultural terms of trade on an annual basis. There is also an urgent policy need to strengthen the capacity in the Ministry of Agriculture for judicious formulation of the agricultural price policies.

Policy on biotechnology: Biotechnology application in agriculture has emerged as a major technical innovation of the 21st century to increase the productivity and quality of agriculture and livestock products. It is a powerful scientific tool for improved food security and reduced environmental hazards of the current production system.

Biotechnology offers opportunities to develop pest resistant transgenic crop varieties (Bt cotton, Bt maize, Bt canola etc.) as well as crop varieties tolerant to drought, salinity and resistance to herbicides. In addition, it covers other technologies, which are crucial for sustainable agriculture development such as bacterial based bio-fertilizers to meet the crop nutrient requirements, bio-pesticides, and bacterial polysaccharides. In addition, the tissue culture technology is commonly used in floriculture, forestry and micro propagation of disease free planting material. Bio-energy is another area where biotechnology has the potential to make a significant contribution. With the help of genetic engineering, the production of enzymes used for converting lignin to cellulose, sugars and then to bio-fuel can be initiated. In addition energy crops are being genetically engineered to have lower content of lignin and higher cellulose, making the process of converting biomass to energy economically feasible.

Considering the current state of biotechnology research and its potential benefits, this policy roadmap is proposed to accelerate R&D activities: (i) immediate legislation of the Amended Seed Act and Plant Breeder Right Bill, (ii) upgrading the research on biotechnology to a level at par with other major agricultural economies through international collaboration with the Consortium Group for International Agriculture Research (CGIAR) institutions and multinationals (e.g. Monsanto, Sygenta, Bayer's, Biocentury, Du Pont, etc.), (iii) third-party evaluation of existing biotechnology institutions, (iv) implementation of the National Biosafety Guidelines and Rules, and (v) establishing a National Biosafety Committee (NBC), which must gradually evolve into a National Biotechnology Regulatory Authority as an autonomous body to take care of all the IPR, bio-safety, bio-security and related bioethical issues.

Coordination: Agriculture development activities primarily fall in the domain of provincial governments, except for national policy and regulatory matters. The Plan addresses new development initiatives, programmes and projects relating to national food and fibre security, international trade and trans-boundary research and development issues, such as introduction of new varieties, flow of agricultural goods and services, pests and diseases, and research and development. During the Plan implementation period, the provincial governments will take up most of the development initiatives. For better planning and implementation of development initiatives, the coordination between the federal ministries and provincial departments of agriculture will be strengthened through more frequent interaction. The number of vertically driven projects will be limited only to innovative high-tech projects or those involving trans-boundary issues, such as pest and diseases, quarantine, sanitary and phyto-sanitary measures and compliance with the WTO regulations.

Corporate agriculture: In Pakistan about 90 per cent farmers are small. They cannot use high technology for crop production being uneconomical in farm operations due to their farm size. To solve this problem there is need to revitalize corporate agriculture to overcome the limitation of the small land owners by setting up land development corporations with majority equity of the poor and managed by professional managers.

Ensuring food security

Notwithstanding the recent increases in food production, the challenge of food security remains a real one. Food availability, its safety and affordability are three essential ingredients of food security. Long-term food security requires not only producing sufficient food to meet market demand, but also ensuring its timely availability in adequate amounts at affordable prices to the common man. It is estimated that nearly one-third of the population still suffers from varying degrees of hunger, poverty and malnutrition.

According to the UN study of 2008, the number of food insecure people across Pakistan has reached about 45 million following the food price hikes during 2007-08. Persistence inflation of commodity prices in conjunction with declining economic activity is likely to have further increased the incidence of food insecurity (potentially impacting one-third of the population). The government is strengthening social protection framework, and coordination mechanism is being evolved to protect the poor. Despite some problems of targeting and efficiency of delivery systems, these programmes were affective in meeting the urgent food security needs of the poor. However, it is recognised that income and food support programmes, by their very nature, are emergency measures and their fiscal sustainability in the long run is a major issue in a resource constrained economy, like Pakistan. There is, therefore, need to evaluate these programmes and make them more cost-effective and sustainable by linking them with (i) Acquisition of productive assets such as land, technical skills, credit for micro enterprises, etc. (ii) Food for work, (iii) NGO-led Dal Roti Kitchens, and (iv) School Nutrition Programmes as proposed under the WFP initiatives.

Food security can not be only ensured by increasing availability of food through higher agricultural production rather it also requires better access to food. It means that the objective of food security cannot be achieved until the issue of poverty is also addressed. A significant reduction in poverty levels is the most important development challenge.

A new article 'Right to Food' will be added to the Constitution for making it the fundamental right of every citizen. To implement the 'Right to Food' policy, a national food security policy

will be formulated. There is a need to evolve an equitable system of food procurement and distribution, improve the access of poor households to food at affordable prices and evolve a transparent system of safety nets for very poor households. The procurement programme will be strengthened to ensure all farmers receive the guaranteed support price for grains and improve arrangements for storage and subsidised distribution to ensure relative price stability throughout the year.

In addition to food security, food safety needs urgent attention due to poor compliance with the Sanitary and Phyto-Sanitary (SPS) measures during food production, marketing, storage, and processing, given the poor hygienic and sanitary conditions prevailing at work place as well as due to lack of enactment and enforcement of food laws. The presence of pesticide residues, bacteria, viruses, parasites, adulterants including hazardous physical and chemical agents are largely responsible for food contaminants and consequent illness, hospitalisation and death, accounting for large financial losses to individual families as well as to the public exchequer. Similar to food security, ensuring food safety is central to human development and poverty reduction. To improve food safety, quality and compliance of the SPS, a project the NAPHIS is under implementation for the last many years. It is going to establish food safety authority at the federal and provincial levels. It will integrate the scattered institutions under one umbrella having complementary nature of work.

In view of the multi-sectoral nature of food security and food safety issues, it is proposed to set up an 'Institutional Framework' at the Ministry of National Food Security and Research (NFS&R) for a holistic and multi-faceted approach to food security and food safety issues to cover the entire supply chain of food, that is, from plough to plate. More specifically, the Framework must cover:

- Monitoring of the Food Security Index as a composite indicator of food security status at any point in time. The variables covered by the Index include availability, price, access or affordability, absorption and ability to withstand shocks. The task of preparing specific indices may be carried out jointly by the API and PIDE in collaboration with the IFPRI.
- Determination of optimal size of strategic and operational stocks, and their locations
- Support and release prices
- Size of procurement and release prices
- Market information on national, regional and global production, prices, stocks, and future prices
- Food demand and supply balance, and projections for imports, exports, and stocks
- Food supplementation and fortification
- Revision of the existing Pure Food Law to harmonise with the international food safety standards and sanitary and phyto-sanitary measures set by the Codex Alimentarius Commission and WTO
- Upgrade food analysis labs to the international level under the international accreditation

The Ministry of NFS&R, being the lead Ministry on grain food-related issues, is well-placed to implement this institutional framework through appropriate strengthening of the analytical capacity of its Food Wing and the API. At the same time, the capacity of the provincial

governments will require strengthening in the area of food production, forecasting, pricing, procurement, storage and distribution. The analytical capacity of the Planning Commission (F&A Section) will also be enhanced to provide intelligent inputs and views in policy-making based on policy analyses work. As a matter of policy, market-based approaches will be followed for production, marketing, and trade of food commodities with appropriate safeguards to ensure availability of adequate, nutritious and safe food at affordable prices on sustainable basis.

Crop growth targets

Keeping in view the pace of growth in the crop sector, investment and policy framework the physical production targets of various crops, including horticulture, has been fixed and presented in the Table 6.

Table 6: Physical production targets of crop and horticulture products and projected growth rates for the Plan

Crop	Bench mark*	(000 Tonnes)				
		2013-14	2014-15	2015-16	2016-17	2017-18
Wheat	24,306	25,979	25,478	26,000	27,357	28,178
Rice	5,508	6,798	7,005	6,902	6,954	7,371
Maize	4,225	4,944	4,695	5,323	5,749	6,208
Cotton (mil bales)	12.7	12.8	13.9	15.44	16.1	17
Sugarcane	58,737	67,460	62,652	68,035	71,395	74,964
Gram	484	399	484	715	709	780
Rapeseed, Mustard & Canola	184	203	183	213	223	234
Sunflower	328	193	186	566	679	815
Potato	3,551	2,901	3,084	4,110	4,316	4,532
Onion	1,723	1,740	1,763	1,967	2,016	2,096
Vegetables	2,080	2,184	2,294	2,408	2,529	2,655
Fruits	7,109	7,465	7,838	8,230	8,641	9,073
Fodder	46,802	48,206	49,652	51,142	52,676	54,256

**Average 2010-13. Projections have been made keeping in view the historical trends, growth potential and likely impact of exogenous and indigenous factors including policy interventions and investment in the plan period.*

Financing the Plan

To realise the agriculture growth targets envisaged in the Plan (Table 6), it will be necessary to significantly increase the level of investments in the sector, focusing on strategic areas including marketing and storage infrastructure, farm mechanisation, cost of agricultural inputs, adequate and timely availability of inputs, water harvesting and conservation technologies, post-harvest management and supply chain infrastructure, etc. Most of these investments are of a commercial nature, and thus fall under the purview of the private sector. However, certain investments comprise the nature of public-goods and would require continuing and increasing amounts of the PSDP-funding for accelerated growth of the agriculture sector.

Investment requirements of the sector are enormous. The potential contributor can be the federal and provincial governments, private sector and to some extent donor and international agencies. Planned expenditure from the public sector has been estimated to be around Rs294.8

billion. Keeping in view the nature of agricultural and food activities about Rs245.9 billion will be invested by the provincial governments, while that of Rs48.8 billion is the plan investment in the federal PSDP for this sector. This also includes investment of Rs90 billion on livestock development (the programmes and projects are discussed in the subsequent sections). The breakup for the crop sector includes agricultural research (Rs30 billion); water conservation technologies (Rs110 billion), farm mechanisation (Rs25 billion), capacity-building in agricultural planning, policy analysis, monitoring and evaluation, human resource development (Rs16 billion), post-harvest management, agriculture marketing, and storage infrastructure including cold chain (under public-private partnership modality (Rs45 billion). The year-wise break up is given in table 7. Nearly half of the total investments needs for marketing and storage infrastructure are expected to come from the private sector.

Table 7: Estimated expenditures planned for the Plan

	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Federal	950	1,257	1,706	2,000	3,000	8,913
Provincial	17,200	19,600	32,170	35,362	40,300	144,632
National	18,150	20,857	33,876	37,362	43,300	153,545

Priority investment areas for the Plan

Based on the foregoing strategic thrusts, the following priority investment areas are identified for funding by the federal and provincial governments along with the involvement of the private sector:

Agriculture intensification and diversification

- Development of a modern seed industry including local production of hybrid and genetically modified plant varieties (Hybrid Rice, Maize, Bt. Cotton, Bt. Maize, and Hybrid Vegetables, and disease free certified planting material for horticulture)
- Promotion of resource conservation technologies
- Establishment of farm-level water storages for rainwater harvesting
- Diversification into high-value agriculture and value-added products
- Farm mechanisation with emphasis on farm machinery designed to improve efficient use of agricultural inputs, particularly fertilizer, water and energy and resource conservation technologies
- Sustainable management of natural resource base
- Crop maximisation programmes for import substitution crops
- Floriculture and agro-forestry development
- Value-addition through cluster development
- Olive promotion

Policy and institutional reforms

- Establishing an autonomous Agricultural Policy Institute, and Centre for rural economy

- Setting institutional framework for food security and safety issues at the MoNFS&R
- Strengthening of the provincial agricultural research system
- Establishment of the Federal Committee on Food and Agriculture to provide platform for consultations with stakeholders on major issues for participatory planning and development
- Promoting corporate agriculture, cooperative and contract farming
- Crop production forecasting and market information

Marketing infrastructure and trade

- Animal and plant health inspection system
- Post-harvest management, marketing, storage and supply chain infrastructure
- Cold chain infrastructure for high-value perishable commodities (Horticulture, Floriculture and Livestock Products)
- Farm to market roads and rural markets

Capacity-building

- Capacity-building in agriculture policy analysis, resource management, monitoring of food security and terms of trade indices, monitoring and evaluation, etc.
- Natural resource planning and management
- Agri business, marketing and international trade (infrastructure and institutions)
- Moving from research and knowledge-based technologies to innovations

Agro-forestry

- National survey and assessment of agro-forestry
- Community-based interventions in promoting agro-forestry development
- Conservation, development and commercial exploitation of medicinal plants
- Bamboo research and development programme, and establishment of the Bamboo Research Institute

Livestock, poultry and fisheries

The livestock (including poultry and fisheries) sub-sector plays an important role in the economy of the country and the livelihood of its people. It accounts for 55 per cent of the agricultural GDP. It is a net source of foreign exchange earnings and provides raw materials, particularly for the leather products, carpets, and woollen textile industries. The livestock is mainly raised by more than 8.5 million small farmers and landless families in the rural areas, and is their main source of livelihood. It serves as a safety net for the poor and provides opportunity for self-employment of women. The livestock rearing is the only agricultural activity, which generates daily cash income. The farm-yard manure produced by livestock is a significant source of organic fertilizer for crop production as well as domestic fuel. Thus the sub-

sector plays an important role in poverty alleviation, gender employment, and stimulation of agricultural growth given its enormous potential for value addition and export.

During the last five years, value-added in the livestock subsector grew at an annual rate of 3.8 per cent. Pakistan is endowed with a large livestock population, well-adapted to the local conditions. The growth in livestock population is presented in Table 8, which shows a steady upward trend. Pakistan is the fourth largest producer of milk in the world. In addition, there is a vibrant poultry sector with more than 560 million birds produced annually.

Table 8: Comparative status of livestock population during 2008-13

Animal	(Million numbers)					
	2008-09	2009-10	2010-11	2011-12	2012-13	% Change
Buffaloes	29,883	30,790	31,726	32,689	33,681	2.54
Cattle	33,029	34,274	35,567	36,907	38,301	3.19
Sheep	27,432	27,757	28,086	28,418	28,755	0.96
Goats	58,279	59,858	61,480	63,147	64,858	2.25
Camels	958	970	983	996	1,008	1.04
Horses	350	352	354	356	358	0.45
Mules	165	167	170	173	176	1.33
Asses	4,510	4,593	4,678	4,765	4,853	1.52
Total	154,606	158,761	163,044	167,451	171,990	2.24

Source: Pakistan Bureau of Statistics, Estimated figures based on inter census growth rate of Livestock Census 2006

Situational analysis

Growth: The Livestock sector achieved a satisfactory growth rate of about 3.4 per cent per annum, which is attributed to the new interventions launched during the period addressing the issues of cold chain development, marketing and livestock management and health. The growth in the fisheries sector was negative (Table 9). The poor growth rate is attributed to insufficiencies in fisheries research, value-chain and marketing infrastructure, non-compliance of the SPS standards inadequate implementation of envisaged strategy, and shortfall in credit disbursement targets.

Table 9: Livestock and fisheries growth rate (per cent)

Year	Livestock	Fisheries
2008-09	2.25	2.57
2009-10	3.80	1.40
2010-11	3.39	-15.20
2011-12	3.95	3.77
2012-13	3.68	0.65
Average (2008-13)	3.41	-1.36

Source: Pakistan Bureau of Statistics

Financial

The livestock sector's contribution to the GDP remained around 11 per cent. As a result of the establishment of an independent Ministry of Livestock and Dairy Development, the emphasis on this sector increased substantially. In terms of the Public Sector Development Programmes, an allocation of Rs2.6 billion was earmarked for the development projects of livestock, poultry and fisheries during 2009-10. This was the ever highest allocation for the sector. In the next year (2010-11), the allocation was reduced to Rs900 million and in the same year the Ministry was closed down because of the 18th Amendment. All major investments, thereafter, were abandoned considering the sector as provincial subject. Historically, the government has underinvested in livestock sub-sector as it accounted for only 0.5 per cent of the federal PSDP spending and 10 per cent of the agriculture sector spending.

Physical

With regard to physical achievements, a mixed trend was observed during the last five years. Meat production grew by 3.77 per cent with major contributions from poultry. Other poultry product, eggs also showed an impressive achievement of over 4.53 per cent. Value-addition in fisheries increased at a rate of 0.97 per cent, with not much expansion in the marine catch. Growth in milk production was 2.73 per cent. Increased private sector involvements in the sub-sectors (livestock, poultry and fisheries) and attention of the public sector were the major reasons for better production, which is shown in the Table 10 below.

Table 10: Livestock, poultry and fisheries achievements during 2008-13

Product	2008-09	2009-10	2010-11	2011-12	2012-13	Growth (per cent)
Meat	2,843	2,965	3,094	3,232	3,379	3.77
Beef	1,601	1,655	1,711	1,769	1,829	2.84
Mutton	591	603	616	629	643	1.75
Poultry	651	707	767	834	907	7.86
Milk	43,563	44,977	45,622	47,951	49,512	2.73
Egg (Millions)	11,258	11,839	12,857	13,114	13,813	4.53
Fish	695	704	712	725	729	0.97
Inland	215	219	225	260	262	4.37
Marine	480	485	487	465	467	-0.54

Source: Pakistan Bureau of Statistics and Agricultural Statistics 2011-12, MoNFS&R

The principal initiatives undertaken were: Strengthening of Livestock Services for Livestock Diseases Control in Pakistan, Eradication of Rinderpest, Prime Minister's Special Initiative for Livestock, Milk Collection /Processing and Dairy Production & Development Programme, Livestock Production and Development of Meat, Improving Reproductive Efficiency of Cattle and Buffaloes in Smallholders Production System, The White Revolution 'Doodh Darya' Horizon – II, National Programme for Control and Prevention of Avian Influenza, Fisheries Training Centre, Monitoring of Deep Sea Fishing Vessels, and Aquaculture and Shrimp Farming. The major accomplishments include: eradication of Rinderpest, effective control of avian influenza, improvement in farm-gate milk prices with community organisations and provision of chillers, and establishment of the Centre of Excellence in Bovine Genetics.

Livestock

The livestock has an enormous potential to become an engine of economic growth given the large potential for productivity increase and value-addition. With the increase in population, urbanisation and income levels the national demand for a nutritious and more diverse diet with more meat and milk products is increasing. There is a need to accelerate the development of this sector given its role in poverty reduction, national food security and export. To achieve this, appropriate policy framework should be put in place that enables improved marketing, efficient technologies, and food safety standards through the food chain. Promotion of these practices will provide profitable business opportunities and help in reducing the incidence of poverty amongst livestock holders.

Issues and challenges

Major issues and problems of the sub-sectors includes: (i) low productivity per animal, (ii) poor genetic stock, artificial insemination of only about 10 per cent, yield gap of 61 per cent between national milk average yield and that of progressive livestock holders, (iii) inadequate animal health coverage (25 per cent) (iv) inadequate feed resources, (v) shortage of needed skills, (vi) primitive marketing infrastructure and unfair marketing practices, (vii) weak research system and ineffective extension services, (viii) inadequate development funds allocation, (ix) limited credit availability, and (x) outdated regulatory framework, and inadequate database and analytical capacity.

Strategy

The overall objective of livestock development during the Plan is to achieve broad-based economic growth, poverty reduction, and improved livelihood of the rural people. The specific strategies to achieve these objectives include:

- Improved productivity of meat and milk per animal through genetic improvement of the indigenous livestock, and improved animal nutrition and health
- Improved marketing facilities and infrastructure for livestock and its products to enhance share of producer in consumer rupee
- Reduced morbidity and mortality by effective preventive and curative control measures
- Development of highly trained and qualified human resources for livestock, dairy, poultry, fisheries development and value chain for animal products
- Effective food safety regulatory measures
- Improvement of database and analytical capacity
- Promotion of private sector-led livestock and dairy development

Plans and programmes

Special attention has been paid to developing the sector by launching some mega development projects at the federal level during 2005-2011. The goal was to improve marketing facilities, breed improvement and to extend proper health coverage throughout the country. The investment priorities for livestock development during the Plan period can include:

- Focusing on small, landless farmers and women households

- Breed improvement including (i) genetic improvement of indigenous livestock through pedigree record keeping, production of progeny tested bulls, and (ii) artificial insemination and embryo transfer technology
- Nutrition through (i) production, import and distribution of certified fodder seed, (ii) balanced feed for large and small ruminants, (iii) rangeland management and development, and (iv) imposing ban on burning of wheat straw after harvesting of the crop as it is a very important roughage available for livestock feeding.
- Improve animal health by (i) enhancing effective veterinary coverage to livestock, (ii) encouraging the private sector role in veterinary cover, and (iii) controlling infectious and contagious diseases by production of quality vaccines and mass vaccination programmes, and (iv) encouraging the pharmaceutical sector for production of quality veterinary medicine
- Quality control, marketing and value-addition by (i) establishing effective testing and regulatory mechanism for ensuring quality of feed, milk and other livestock products, (ii) organising livestock holders into milk marketing groups and promoting vertical integration, (iii) value-addition in dairy and meat industry for better gains, (iv) deregulation of milk and meat prices, and (v) public-private partnership in setting up of livestock markets and state of art slaughterhouses
- Capacity building by (i) strengthening of planning, policy making, analytical, monitoring and regulatory capacity, and (ii) imparting training in livestock management, artificial insemination, embryo transfer, dairy technology, and silage/hay making.
- Mechanisation by (i) mechanisation of livestock rearing operations, (ii) development of machinery for making straw bundles simultaneously while wheat crop is being harvested by the combined harvester.
- Credit by ensuring increase in institutional credit for accelerated growth in livestock sub-sector by increasing its outreach and reasonable mark-up

Feed and forage

Fodder is the cheapest source of food for livestock, but its shortage limits the livestock production in the country. The livestock is generally underfed and under-nourished, which results in their poor health and productivity. There is a shortage of 44 per cent in total digestible nutrients and 51 per cent in digestible protein. It is established that simply by meeting nutritional requirements of animals, production can be increased by 50 per cent.

It is estimated that the livestock population in Pakistan would increase by 50 per cent by 2025. But the main issue that remains to be addressed is whether the supply of forage from rangelands and residues from crop fields would be sufficient to sustain such a huge number of livestock? This concern is magnified given that there had been a 12 per cent decrease in the area under fodder cultivation during the previous decade because of competing demand of land for crops. It is evident that present forage resources would not be sufficient to meet the future livestock population. Effective measures will be required to meet the future forage demand through both introducing new high yielding forage crops (irrigated and rained) and efficiently utilising existing forage resources from the vast rangelands by their effective and sustainable management.

Pakistan is an arid country, with 80 per cent of its geographical area classified as arid and semi-arid, with an average annual rainfall of 278 mm. A dominant part of these dry lands is rangelands (65 per cent of geographical area), which despite being overgrazed and highly neglected has sustained more than 60-70 per cent of the total sheep and accounts for 28 per cent of the Total Digestible Nutrients (TDN) intake by the livestock. The present production capacity of rangelands is only 10-15 per cent, which can be increased up to 50 per cent if proper attention is paid. Rangelands are managed by the provincial Forest Departments, but unfortunately have received low priority. In the context of growing demand for feed and forage, the rangeland has assumed greater significance in the context of policy interventions in the 11th Plan.

Issues and challenges:

The major issues in feed and forage are:

- Inadequate attention to research and development of high yielding, multi-cut fodder varieties and hybrids by public and private sectors and its multiplication and resultant inadequate availability of quality seed and the widening gap between its demand and supply
- Lack of awareness of fodder and seed production technology by the growers
- Decrease in the fodder cultivation area
- Non-availability of quality balanced ruminant feeds
- Neglect of rangelands development
- Burning of wheat and paddy straws resulting in wastage of an important potential livestock feed source

Strategy

The strategy for enhancing feed and forage production includes:

- Increasing availability of quality fodder seed through strengthening fodder research and seed multiplication arrangements and imports
- Promoting multi-cut fodder crops; training farmers in silage and hay making; creating awareness for planting of cereal crops and legumes in rotation such as Lucerne to enhance both fodder production and soil productivity
- Promotion of the balanced ruminant feed
- Use of waste and reclaimed land for fodder cultivation
- Establishment of the Rangeland Development / Management Authority to encourage introduction of drought-tolerant and high-yielding grasses and fodder plant; rainwater harvesting; establishment of nurseries; production of rotational grazing through community involvement
- Imposing ban on burning of wheat straw, and appropriate mechanisation to enable wheat and rice straw bale-making

Poultry

A viable poultry sector is essential to national food security as the effective domestic demand for meat continues to grow in step with increasing population and per capita income. Poultry is growing as a major job provider in the rural areas. In addition, informal rural poultry can be started with low investment. It is an important means of improving nutrition, self-employment of women and can help in poverty alleviation. The poultry sector is currently a competitive business that is relatively free from government price and marketing restrictions and barriers to entry or exit. In this unrestrained environment, the private sector has made substantial investment in commercial poultry production. As a result, production in the early 1970s grew in the range of 20 to 30 per cent per annum, and from '80s to mid-90s, the annual growth rate was between 10 to 15 per cent annually. This increased poultry production released the pressure on the demand for beef and mutton. The real price of both chicken and eggs over the years have not increased at the same rate as the prices of mutton and beef, and today chicken meat is priced lower than beef.

A new class of entrepreneurs has come into broiler production with modern technology, adopting controlled environment houses, with automatic feeding and drinking systems. The trend to apply modern technology is spreading gradually in all segments of the poultry production.

Poultry is by far the largest consumer of agro and livestock residue and by-products, such as, oilseed meals, wheat bran, rice polishing, broken rice, corn gluten meal, guar meal, fish meal, animals' by-product meal. Poultry sub-sector is emerging as one of major consumers of agriculture residues and by-products (2-3 million tonnes) along with consuming near three million tonnes coarse grains like maize, sorghum, broken rice, rice tips, etc.

The main objective of the poultry development for the Plan is to have a vibrant private poultry sector, which can flourish without much involvement of the government.

Issues and challenges

Issues and problems currently constraining the development of poultry include:

- Supply and quality of poultry feed ingredients (lack of local soybean production)
- Disease prevalence, and lack of trained supportive human resource
- Import of chicken meat without duty – the greatest threat
- Rationalisation of levy of local government fees and taxes; sales tax on poultry farms electricity bills
- Sales tax on poultry feed, which results in higher prices of poultry meat and contribute to food inflation
- Non-exploiting full potential of rural poultry

Strategy

The strategy to be adopted covers:

- Incentives for enhancing poultry production in the form of relief in taxes, and import duties on the modern poultry equipment

- Creating conducive environment for the industry by provision of level-playing field for local poultry industry, that is, protecting it from unfair competition from poultry imports
- Setting up of well-equipped laboratories for conducting detailed pathological tests, monitoring of diseases and control methods at the district level in intensive poultry-producing areas
- Provision of the adequate credit to accept poultry farm as collateral, equity debt ratio of 30: 70, repayment period 5 to 10 years depending on cash flow with a two-year grace period
- Launching programmes for research, extension and increased production of soybean in the country to meet the needs of poultry feed
- Training programmes to create skilled human resources
- Develop and improve markets for poultry industry

Fisheries

Fish is considered to be one of the best sources of animal protein and it can contribute to balancing the diet of the protein-deficient people. Pakistan produced about 0.73 million tonnes of fish in 2012-13. About 50 per cent of the total fish production is consumed locally, 20 per cent is exported, and about 30 per cent is converted into fish-meal for the poultry industry. Fish and fishery products from Pakistan are exported to 75 countries of the world. A major fraction of seafood is exported in frozen form whereas dried, chilled, fresh and live seafood are also exported. There are 65 fish processing plants in Pakistan with the capacity to process 800 metric tonnes of fish and shrimp daily. Previously a ban imposed on export of fish to the European Union has been lifted recently, which will boost local production as well as increase exports.

Issues and challenges

The main issues and impediments currently constraining the development of fisheries are:

- High post-harvest losses due to inadequate infrastructure and lack of awareness
- Non-compliance of the SPS standards
- Lower-level of investment in the fisheries and aquaculture by public and private sector
- Competition of local fish production with low-price imported fish
- Lack of trained manpower, infrastructure and modern technologies for fisheries and aquaculture sector
- Inadequacy in supplementary fish feeds in various aquaculture systems
- Dependence on low yielding fish species with unreliable genetic potential in inland fisheries
- Over fishing and destruction of habitat in coastal and inland fish resources
- Monitoring of marine fishery to control unauthorised catch

Strategy

The objectives of the fishery development are to increase the national fish supply based on sustainable production and improved marketing of aquatic products. The strategies to be adopted for achieving the Plan targets of the inland fishery development include:

- Providing enabling environment for the private sector investment and infrastructure development
- Detailed evaluation of freshwater resources by use of the GIS, sustainable exploitation of natural fisheries resources, control of aquatic pollution and enforcements of laws and regulations
- Conservation of biodiversity and propagation of indigenous fish species for commercial production and allocation of water for promoting aquaculture; sustainable release of freshwater downstream Kotri for conservation of biodiversity of the Indus River
- Sustainable development of inland aquaculture production to increase fish production by modern aquaculture technologies and introduction of high-value fish species in culture system with emphasis on intensification and conservation of Trout or Mahaseer aquaculture
- Reducing post-harvest losses by developing proper cold chain from production to consumption
- Development of skilled human resource by establishing the National Fisheries Research and Training Institute
- Provision of soft loans for fish farming, and replenishing the existing water bodies
- Improvement of fishing vessels with modern equipment and nets to control over exploitation
- Promoting private sector investment in coastal aquaculture production (including seed and fingerlings, feed and grow-out)
- Modernising the capturing, handling, preservation and value addition of fish and aquatic products; cool chain development for aquatic products
- Initiation and development of intensive coastal aquaculture and introduction of high value fish species in culture system
- Exploring possibilities for saline and brackish water aquaculture
- Controlling over-exploitation of marine fisheries resources by establishing sustainable harvesting and utilisation of untapped marine resources
- Improving fishing facilities for local communities and fishermen in coastal areas and establishment of modern fish markets
- Promoting export of high-value aquatic products to international markets

Marketing, value-addition and cold chain development

Inadequate and poor marketing system and infrastructure with weak food safety measures are major constraints to improved production and marketing. It undermines both the quality and value of the product with low return for the producer and high cost for the consumers. The

existing marketing system is exploitive of both the producer and consumer by the chain of middlemen.

Previously many valuable suggestions have been made to address the issues of marketing, but no discernible improvement could be made. At the institutional level, there is disconnect between different organisations at the federal, provincial and district levels to address marketing issues. Owing to the perishable nature of the livestock products (milk and meat), its timely disposal is critical to the profitability of the producer and quality and price of the product to the consumer. It is reported that spoilage losses of milk alone are approximately 15 per cent causing an annual loss of Rs169 billion. Lack of infrastructure such as cooling facilities at farm or collection points as well as transportation of milk is major causes. If properly handled, channelised and processed, it has the potential to increase the availability of milk and dairy products in the country worth at least Rs300 billion. The milk, which is already reaching the urban market, if chilled at source and processed, has an additional potential of value-addition worth up to Rs200 billion.

Issues and challenges

The issues and problems constraining the development of proper marketing, cold chain development and value-addition in livestock, poultry and fisheries sub-sectors include:

- Outdated marketing infrastructure, that is, markets, slaughter houses and retail outlets)
- Weak market information and research system
- High wastage of milk and fish due to non-availability of proper cold chain
- Exploitation of producers and consumers by the middleman
- Lack of incentives for private investment, and inadequate analytical capacity

Strategy

To safeguard the interest of the producers and consumers following strategy will be adopted:

- Policies will be formulated with the participation of stakeholders regarding incentives for quality production, processing, marketing and value-addition.
- Development of cold chain for milk, meat and fish, and encouraging processing and packing industry through dairy farmers associations
- Ensuring quality of processed and improved livestock products, vet medicines and vaccines, and animal feed by establishing testing labs to avoid adulteration and enforcing punishments for defaulters
- Strengthening research on market issue and related aspects by producing trained cadre of livestock business managers, technicians and farmers
- Providing necessary relief in taxes and import duties on the processing equipment and slaughter houses equipment
- Protection of consumer rights, and promotion of the private sector investment and joint ventures

The major investment priorities for improving marketing, value-addition and cool chain development include: improving marketing infrastructures, promoting livestock holders

organisations at village level for collective marketing of milk as well as its processing, establishing regulatory mechanism for ensuring quality of feed, medicines, livestock products; improving market information system; enforcing quality standards and grades for local and export markets with a proper certification and inspection system-establishment of testing labs, and developing analytical capacity for studying of marketing issues.

Livestock, poultry and fisheries research and extension system

Research and extension cannot be overlooked for the development of any sector. In Pakistan, the research system of the sub-sector is very weak and needs complete overhaul along with the establishment of new research institutes in the missing areas and disciplines. We do not have a proper livestock, poultry and fisheries extension system. The Livestock system is primarily confined to disease control, while livestock nutrition, management, productivity enhancement, and marketing are neglected.

Physical targets

The sub-sectors of agriculture — livestock, poultry, dairy and fisheries — are expected to grow well since they are highly resilient against climatic changes and normal shocks. The growth targets of 13.89 per cent for meat, 9.24 per cent for milk, 17.14 per cent for eggs and 3.71 per cent for fisheries have been fixed for the Plan (Table 11).

Table 11: Livestock, poultry and fisheries production targets for the Plan

('000 tonnes)

Product	Benchmark	2013-14	2014-15	2015-16	2016-17	2017-18	Growth(%)
Meat	2,515	3,531	3,697	3,873	4,061	4,262	13.89
Beef	1,449	1,887	1,951	2,017	2,085	2,155	9.74
Mutton	554	657	671	686	701	717	5.88
Poultry	512	987	1,074	1,170	1,276	1,391	34.33
Milk	39,596	50,989	52,632	54,328	56,080	57,890	9.24
Egg (Millions)	9,712	14,556	15,346	16,188	17,083	18,037	17.14
Fish	754	780	806	788	863	894	3.71
Inland	262	278	294	295	331	351	6.79
Marine	492	502	512	493	533	543	2.07

Source: Ministry of National Food Security and Research

Financial outlay and investment priorities

The importance of the livestock sector — dairy, poultry and fisheries — will become more important when the agriculture sector is worked out to significantly increase its contribution to the overall growth of the GDP because, in the short-run at least, the manufacturing sector in particular is liable to be hobbled by the ongoing financial and energy crises.

During the Plan, an investment of Rs60 billion will be made. Major areas of investment include: productivity increase through genetic improvement (Rs8 billion), supporting feed lot fattening of large and small ruminants and development of meat processing and marketing infrastructure (Rs7 billion) establishing livestock and fisheries extension and strengthening research (Rs6 billion), increasing certified fodder seed availability and ensuring balanced feed (Rs5 billion), effective disease monitoring and control (Rs12 billion), marketing reforms and cold chain development (Rs12 billion), quality testing and certification (Rs2 billion), compilation of vital

statistics and developing analytical capacity (Rs2 billion), and capacity-building Human Resource development (Rs6 billion). Proposed major development initiatives include:

Livestock

- Enhancing productivity of large and small ruminants through selective breeding, establishing livestock breeding societies and production of proven sires and artificial insemination and embryo transfer technology
- Supporting feed lot fattening of large and small ruminants and development of meat processing and marketing infrastructure
- Improving certified fodder seed coverage and creating farmer awareness for fodder conservation technologies
- Rangeland development and management
- Establishing community organisations of livestock holders for milk collection, processing and marketing
- Effective prevention and progressive control of livestock diseases through effective immunisation programmes by producing and distributing quality vaccines
- Encouraging pharmaceutical sub-sector for production of quality veterinary medicines
- Establishing quality testing and certification labs for vet medicines, animal feed and livestock products
- Establishing modern slaughterhouses and markets through public-private partnership
- Capacity-building of livestock, dairy, poultry and fisheries technicians, farmers and professionals

Poultry

- Promoting rural poultry and supporting commercial poultry by providing policy support
- Promoting soybean cultivation and identifying alternate sources for feed

Fisheries

- Establishing the National Fisheries Research and Training Centre
- Promoting inland fisheries
- Intensification of trade of aqua culture and introduction of high-value fish

Common interventions

- Developing database and analytical capabilities
- Strengthening of planning, policy-making, monitoring and regulatory capacity
- Establishing new and improved livestock, poultry and fish markets
- Setting up livestock and fisheries extension services
- Strengthening capacity research on livestock, poultry and fisheries