

**Seventh Five Year Plan (7FYP)
FY2016-2020**

**Focused Write-up, Ministry of Agriculture
(Agriculture Sub-sector: Crops and Horticulture)**

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Introduction

Agriculture is the main economic activity and lifeline of the Bangladesh economy; and it is firmly integrated with the life and livelihoods of the people of Bangladesh. Agriculture sector makes an important contribution to GDP of the country, provides employment of about half of the labor force, remains a major supplier of raw materials for agro-based industries, and contributes significantly to export earnings of Bangladesh. Agriculture sector comprises crops, fisheries, livestock, and forestry sub-sectors with crop sub-sector being the predominant. In spite of the gradual decline of the relative importance of crop sector in agriculture and in national economy, it still remains the most important sub-sector of agriculture contributing about 12% of national GDP in the financial year 2013-14 where agriculture sector's total contribution to GDP was around 18.5%. More importantly, the crop sub-sector provides staple food and other food items, raises rural income and creates jobs for rural poor people.

Though the share of agriculture in GDP has declined from over 50% at the time of independence to around 18.5% currently, but the total contribution of agriculture to GDP has increased, and still it remains the predominant sector in terms of employment and livelihood. Agriculture is the principal source of food and nutrition. So, its role is important in improving the wellbeing of the vast population through enhancing productivity, profitability and employment generation in the rural areas. Agriculture sector is a special field of social activities that are directly involved in food and nutritional security, income generating opportunities and poverty reduction. Besides, it is the largest source of market for a variety of consumer goods, particularly in the rural areas. Hence, improvement of agriculture and acceleration of its growth is essential to reduce the rural poverty and enrich the national economy.

Agriculture provides food, feed, fiber and fuel and plays a key role in economic development of Bangladesh. However, it faces great challenges today as it has to confront climate change, loss of biological diversity, loss of soil fertility, water shortage, etc. In Bangladesh, agricultural land and water resources for irrigation are shrinking. Land is declining by 1% per annum and the land quality is deteriorating due to degradation of soil fertility (e.g. nutrient imbalance), soil erosion, soil and water pollution and increased soil salinity. There is non-regulated and excessive use of groundwater and very little effort to augment surface water. In order to produce more food for an ever increasing population, raw materials for agro-industries and higher income for farming communities from a decreasing land and water resources, it is necessary to develop existing agricultural production system into a more dynamic, market oriented and sustainable commercial sector by higher productivity and profitability through irrigation expansion, agricultural intensification, diversification, mechanization and value addition.

For achieving the set goal of MDG and turning Bangladesh into a middle income country by the 2021, the GDP has to grow by 7% per year. To attain the rate and to keep pace with the population growth, agriculture must grow at a constant rate of minimum 4-4.5% per year, which is not at all too optimistic to attain. There will be serious gap between demand and supply if the current rate of productivity and production continues. Thus, the production rate and productivity in all the subsectors of agriculture has to be elevated to meet the future

demand. This can only be possible through an increase in agricultural productivity from a shrinking land resource base by adequate and effective development, dissemination and adoption of demand meeting agricultural technologies along with a viable supply chain linking farmers with the buyers/consumers both at the domestic and overseas.

Sustainable intensification, diversification and commercialization of agriculture through desired technological and management changes require an efficient and productive agricultural technology system (particularly green growth, water/time economy and climate-smart technologies e.g. IPM, INM, AWD, renewable/solar energy, salt/drought/stress tolerant and low-water requiring crop varieties, etc.), good agricultural practices, and stronger research-extension-farmer linkages. This needs to be supported by appropriate value addition and market linkages. Enhancing productivity, resource use efficiency, using cutting age science, experimental facilities and above all maintaining a reservoir of skilled and first-rate human resources has become critically important to sustain knowledge-intensive and highly productive agriculture. Bangladesh agriculture requires more scientific and technological cooperation; and demands considerable increase in the effectiveness of the public expenditure in research and extension systems.

Major challenges for Bangladesh agriculture are to raise productivity and profitability, reduce instability and production costs, increase resource-use efficiency, loss of arable land, hazards of climate change, providing consumers safe food, yield gap minimization, expansion of irrigation facilities & farm mechanization, quality seed production & distribution, quality horticultural crop production, popularization of good agricultural & IPM practices, linking farm-produces with market, and low price of products, low investment in agriculture and inadequate credit support to farmers. Encouraging agricultural growth requires various policies ranging from applying new technology and extension services to providing credit to small farmers. The past growth in agriculture was helped by the new HYV (high yielding variety) technology, particularly in rice, in which both the state and the market played important roles. All out support to achieve the stipulated objectives in the field of crop production, yield gap minimization, expansion of irrigation facilities, quality seed production & distribution, farm mechanization, quality horticultural crop production and popularization of IPM practices.

The Government would continue its pro-active role in delivering key public goods, technology and technical know-how in agriculture, particularly in improving the ability of farmers to adopt new technology and providing appropriate mix of incentives to pursue profitable and market oriented operations. Particular attention would be given to develop and adopt technologies and improved agricultural practices and make available quality inputs (seed, fertilizer, chemicals and implements) in ecologically vulnerable areas such as saline, flood and drought prone locations. In recognition to women's various contributions in agricultural productivity (homestead fruits and vegetables, fisheries, livestock, poultry, etc.) and growth, special measures would be taken to increase women's participation in these sub-sectors.

1. Review of past development policies, strategies, programs/ projects of the sectors/ sub-sector:

Poverty Reduction Strategy Paper (PRSP) has provided continuity to most of the efforts initiated in accelerating the aims & objectives have taken for agricultural development and poverty reduction. Among the declared 8 MDGs eradication of extreme poverty and hunger ensuring

environmental sustainability are the two important goals related to agriculture sector specially crop sub-sector. Since 2009, poverty has been showing a declining trend due to the government supportive policy to agriculture. It now stands at 24% in place of 40% during 2008-09. In the National Agriculture Policy 2013, emphasis has been given on ensuring food safety, innovative improvement for e- agriculture, promoting urban agriculture & homestead gardening, yield gap minimization, expansion of irrigation facilities & farm mechanization, quality seed production & distribution, supply of quality inputs, quality horticultural crop production and popularization of good agricultural & IPM practices. The National Sustainable Development Strategy (NSDS) has been suggested to face and meet the environmental challenges in the way to development. NSDS fulfils Bangladesh's commitment to the international community to formulate and implement a sustainable development strategy addressing environmental issues. Adoption of IPM technology in agricultural production by mass people is also a good example regarding environmental sustainability. National Sustainable Development Strategy (NSDS), approved in February 2013 emphasized on:

- i) Arresting conversion of good agricultural land into non- agricultural purposes. It is to be noted that about 1.0% of agricultural lands is being diverted to non- agricultural use every year.
- ii) Reversing trend of nutrient mining and depletion of soil organic matter due to monoculture in intensive crop agriculture.
- iii) Utilization of agricultural land that remains fallow or seasonal fallow in drought prone, flood prone and coastal area due to environmental stress factors which will be aggravated further due to climate change.
- iv) Location specific production packages and agricultural technologies to facilitate growth of agriculture sector.
- v) Reduction of yield gap and large scale adoption of proven agro-technologies at farm level which need adequate training at farmer level.
- vi) Availability of adequate quality seeds.
- vii) Development of marketing & storage facilities and mobilizing farmers groups.

2.0 Lessons learned from past development interventions and key constraints. These should include adopted policies, appropriateness of institutional framework, and human resource needs and capabilities.

While implementing agricultural programs in the past some useful lessons were learned, and also some constraints or drawbacks were identified. Those are as follows:

2.1 Lessons Learned

- 1) Under present practices, both organizational and program development is headquarters based. Agricultural research and extension, both need to be decentralized to address location specific problems and issues, and also for quicker decision making. To this effect, outreach facilities (research, training, communication, etc facilities for RARS & ARS) to be developed/improved and used effectively.
- 2) Policy documents mainly focus on food production, especially rice production, giving lesser attention to other crops i.e. pulses, oilseeds, wheat, vegetables, fruits, flowers, etc.

Accordingly policy prescriptions for input distribution and input levels, extension services, credit delivery and output marketing are directed to major cereal food crop, rice, not much to other. Crop diversification to be strictly considered for human nutrition and soil health besides agricultural intensification and commercialization.

- 3) Technology transfer is more effective and quicker through farmer-groups than individuals; so farmers' mobilization into effective farmer-organizations (club, group, school, etc) may be considered for effective technology transfer.
- 4) Knowledge-based skilled first-rate human resources in both research and extension have become critically important to sustain knowledge-intensive and highly productive agriculture.
- 5) Knowledge and skill gap of farmers, traders, and entrepreneurs is identified as the main reason for yield/trading gap; so capacity building and skill developing trainings to be imparted to farmers, traders and entrepreneurs.
- 6) Low input use efficiency and use of low quality inputs causing low productivity and higher production cost in agriculture; supply of quality inputs to be ensured and input use efficiency to be increased.
- 7) Poor development of market chain and unstable market price of agricultural products discourages farmers to produce more; agricultural market management system needs to be strengthened; transport, storage and processing facilities for agricultural commodities to be created/improved; Producers Organizations (POs) and Rural Business Center (RBC) as developed under NATP-1 may be considered as the model.
- 8) Unplanned and unwise development of infrastructures (dams, roads, industries, houses, etc.) causing water-logged and loss of cultivable lands; this requires regulation.
- 9) Overlapping of tube wells with less command area, causing over pumping and wastage of groundwater resulting in high depletion of groundwater table; this is to be regulated strictly.
- 10) Indiscriminate use of agro-chemicals threatening the soil and human health, inland fisheries and other forms of bio-life, and degrading of agricultural environment; use of environment friendly green technologies (e.g. IPM, INM, AWD, etc.) to be emphasized.
- 11) Agricultural commercialization needs intensification, diversification and promoting mechanization.
- 12) Bangladesh is the most climate vulnerable country with its agriculture as the most affected sector. Thus, climate-smart technologies to be developed and practiced to alleviate the effects climate change.
- 13) Mainstreaming women in agriculture, strengthening urban agriculture and the use of ICT in agriculture to be ensured.
- 14) Low investment in Agricultural Research and Development hinders agricultural development and growth; both public and private sector investment in agriculture should be increased to a standard level.

2.2 Key Constraints or Drawbacks

- 1) Inadequate production and supply of quality agricultural inputs (e.g. seed, fertilizer, irrigation, pesticides, etc.), low input use efficiency, and weak management in quality control of agricultural inputs;
- 2) Shrinking cultivable land and degrading soil health/soil fertility;
- 3) Declining water resource for irrigation, overlapping of irrigation units with less command area, causing huge loss of groundwater and resulting in unusual depletion of groundwater table due to over pumping;
- 4) Excessive and injudicious use of agro-chemicals/fertilizers by the farmer, threatening soil and human health and degrading of agricultural environment;
- 5) Unplanned and unwise development of infrastructures (dams, roads, industries, etc.) causing water-logged and loss of agricultural lands;
- 6) Weak agricultural market management system, lack of development of market chain, and unstable market price of agricultural products;
- 7) Post-harvest management is weak and loss is high;
- 8) Inadequate public sector budget allocation for agriculture, especially for research; private sector investment is insignificant; inadequate capital of farmers' own, and limited institutional credit;
- 9) Insufficient technologies to cope with unfavorable environment (e.g. drought/saline prone areas, climate change, etc);
- 10) Insufficient trained scientists/professionals and infrastructural facilities for emerging advanced agricultural science;
- 11) Poor diversification and mechanization in agriculture;
- 12) Lack of effective coordination among the agricultural organizations; and weak research-extension-farmer linkages;
- 13) Insufficient use of ICT in agriculture sector;
- 14) Inadequate training for farmers and agri-business communities;
- 15) Insufficient storage, transport and processing facilities for agricultural commodities; and

3. Development vision, goals, objectives and targets for 7FYP of the sector/sub-sector drawn from the Constitutional Obligation, Election Manifesto of the government, Perspective Plan, National Sustainable Development Strategies (NSDS), MDGs, SDGs and other commitments and/or national and sectoral concerned reviews and papers.

Agriculture is the single largest producing sector of the economy of Bangladesh. Food security and poverty alleviation is mostly lies with these macroeconomic based activities. As stated in the vision 2021 in line with the election manifesto of the present government that Bangladesh has to reduce the import dependency, and again become self sufficient in food production by the year 2013. By the year 2021, malnourishment would be reduced by 85%, and Bangladesh will become food exporting country. The major focus of the Seventh Five Year Plan (7FYP) in the sector will center on consolidating and expanding the productivity gains already achieved in food grain production as well as designing policies, strategies and actions to accelerate the crop diversification and commercialization process by increasing local and export market opportunities by the farmers and other stakeholders. Further attention will have to be given to reduce knowledge gaps as a means to sustain production and dealing with emerging issues arising out of globalization and trade. The development vision of agricultural research would be

to generate demand-led green and climate-smart technologies/information suitable for highly productive high value intensive agriculture. The development vision of agricultural extension should be to continue improved technological support, technical know-how, where possible input support and updated information to the farmers, in order to contribute in national economic growth. The goal is to ensure national and household food security, increasing farmer's income and creation of employment opportunities at farm and home level.

Constitutionally it is the obligation of the government to protect the fundamental rights of the people enabling access to safe and nutritious food adequately and sufficiently corresponding to the tradition and food habit of the people. However, legislative protection is needed to ensure the implementation of the access and right to food. Constitution of Bangladesh has reflected the right and focuses agricultural policy in such a way to make it applicable. Election Manifesto of the present government highlighted various initiatives for poverty alleviation that committed to freeing the nation from its current crisis of hunger. Ensure "Food for all" policy is the main aim of the government. To that effect, government has introduced various forms of development initiatives: i) subsidy for agricultural inputs, ii) increase easy agricultural loan for all categories of farmers, iii) development of rural warehouses, iv) ensure fair price for all crops & agricultural produces, etc. In this regard, the government took several significant steps like, loan for share cropper; face the challenges of globalization, development of commercial agriculture, rural infrastructure development, etc. Agricultural Perspective Plan endorsed potential merits of the national views on food production and availability having consensus from the stakeholders. Plan incorporated the vision and strategic thrust on priority and role of agricultural sector development. Poverty Reduction Strategy Paper (PRSP) has provided continuity to most of the efforts initiated in accelerating the aims & objectives that have been taken for agricultural development and poverty reduction. The National Sustainable Development Strategy (NSDS) has been suggested to face and meet the environmental challenges in the way to development. The challenges are: degradation of agro-ecosystem, rivers and wetlands, coastal environment and urban environment; degradation and depletion of ground water; deforestation and desertification in different parts of the country etc. NSDS fulfils Bangladesh's commitment to the international community to formulate and implement a sustainable development strategy addressing environmental issues. Millennium Development Goals (MDGs), made over a decade ago highlighted three important issues on poverty, slums and water; have been targeted to achieve by 2015. Significant and substantial progress has been made in meeting many of the targets—including halving the number of people living in extreme poverty and the proportion of people without sustainable access to improved sources of drinking water. There have been visible improvements in all health areas as well as primary education. According to the SAARC Charter, SAARC Development Goals (SDGs) is to strengthen and push forward bi-lateral cooperation among the member countries enhancing technology generation & transfer and promote trade, etc for improving the quality of life. SDGs consolidated four broad categories: livelihood, health, education and environment. The goals include: i) eradicate extreme poverty & hunger, ii) achieve universal primary health, iii) promote gender equality & empower women, iv) reduce child mortality, v) improve maternal health, vi) combat HIV/AIDs, malaria and other diseases, and vii) ensure environmental sustainability.

3.1 Vision

Ensure food and nutritional security, enhancement of sustainable agricultural production and commercialization, and livelihood improvement through technological innovations and use, decentralization of research and extension system, value addition to agricultural produces, and linking farming community with markets.

3.2 Goals

- To generate demand driven innovative agricultural technologies, particularly for agro-ecologically constrained locations;
- To develop low input requiring water/time economy production systems;
- To establish decentralized extension approach for technology, knowledge and information transfer and diversified and market oriented production;
- To strengthen research-extension-farmers linkages for sustainable commercial agriculture.

3.3 Objectives

Sustainability of high yield and environmental protection remain the principal concern in recent years. Loss of soil fertility followed by unbalanced use of chemical fertilizers, lack of adequate quantity of water in some areas as well as their appropriate conservation and management are the major factors causing divergence between potential and actual output of major agricultural commodities. Thus, the major objectives of the 7FYP are to:

- establish need-based decentralized research and extension system to cater the national as well as regional needs and address the emerging issues;
- attain self-sufficiency in food grain production along with increased production of other nutritional and high value crops;
- increase productivity and real income of farm families in rural areas on a sustainable basis;
- encourage export of agricultural commodities, particularly vegetables and fruits keeping in view domestic production and need;
- promote adoption of modern agricultural practices in dry land, wetland, hills and coastal areas;
- promote commercialization of agriculture and ensure market price of the produces for sustainable and profitable agriculture;
- encourage research and adoption of modern agricultural practices for development of drought, submergence and saline prone agriculture considering water and time economy, adaptation to climate change, proper use of genetically modified technology in agriculture;
- ensure sustained agricultural growth through more efficient and balanced utilisation of land, water and other resources;
- promote use of environment friendly green technologies (e.g. IPM, INM, AWD, etc.) and climate-smart/resilient technologies; introduce salinity, submergence and other stress tolerant varieties specially in the Southern regions;
- encourage more use of surface water for irrigation and reduce pressure on groundwater;
- encourage comparatively large farm to graduate into commercial farming;
- encourage wider women participation in homestead based agricultural production, post harvest management, agro/food processing, marketing and decision making for ensuring women empowerment ;
- create opportunity for agricultural product processing and establishing agro-based industry ensure easy marketing and fair price of agricultural commodities by strengthening agricultural market management system and creating/improving transport, storage and processing facilities; and
- promote the effective use of ICT in agriculture.

3.4 Targets

Crops production and achievement of targets is mostly depends on favourable weather conditions as the major cereal crops production is susceptible to climate change and variability. However, quality seeds, fertilizers, timely rainfall, sunny weather, effectiveness of extension services also contribute to record production. Furthermore, adaptation strategies namely- higher levels of irrigation, cultivation of short-duration rice varieties, changing planting dates, use of different crop varieties and cultivation of non rice crops, etc support the targeted yields. Therefore, target of crop production is determined boosting farmers' adaptation diminishing the adverse effects of climate change. In Bangladesh the major cereal crops are rice and wheat although main focus is on rice production, with 79.4 percent of the total cultivatable land area under rice crop. Three separate rice crops are recognized: the rainfed Aus crop with 10 percent of area, the rainfed Aman crop with about 51 percent area and the increasingly important irrigated Boro crop with about 39 percent of the cropped area. Bangladesh's rice yields range from 1.25 tons per hectare for local varieties (Aus crops) to 4.5 tons for hybrid varieties (Boro crops). Yields are increasing as more farmers adopt hybrid seed varieties; invest in small-scale mechanization, and use fertilizer and agrochemicals more efficiently. However, Bangladesh has got the lowest productivity among the world's rice producing countries. It is possible to produce a maximum of 0.7 metric tons of paddy (not rice) per acre, against the global average of two tons per acre. In this situation, there is no other alternative but to increase the yield of food grains to ensure food security for the nation. In the preceding plans, rice production was projected as 33.2 mmt in 2010-2011; 34.0 mmt in 2011-2012; and 34.2 mmt in 2012-2013. Based on the previous projection and adding some 5.23 percent to that, rice production required may be projected to be 53.06 mmt in the year 2019-2020 (Table below).

Table: Rice production projection

	Production projection				
	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Rice (mmt)	43.27	45.54	47.92	50.42	53.06

4.0 Current and Future Challenges for Crop Agriculture

Crop sector deals with research, extension, input supply and marketing of crops grown in the country. Rice is the dominant staple food crop occupies over three fourths of cropped area; and other major crops are jute, wheat, potato, pulses, oilseeds, spices, vegetables, sugarcane, tobacco and tea. In recent years, the cropped area under Boro rice, maize, potato and vegetables has increased.

Since independence, rice production has tripled from 11 million tones (milled rice) in 1972 to about 34 million tons in 2012. Growth in rice production was 2.8% per year in the 1980s, and 3.5% per year since 1990/91. Since late 1980s, most of this growth has occurred through development and adoption of improved rice varieties (lately with stress tolerant: salt, water logging/submergence tolerance varieties and hybrid rice varieties) supported by irrigation in Boro rice in the dry season; supplementary irrigation in Aman rice; and introducing Boro rice in low lying areas by replacing rain fed Aus rice of local varieties with high yielding varieties.

Since the start of the millennium, maize production has been gaining momentum due to favorable environment for higher productivity and a stable and expanding market as feed for the poultry and livestock sub-sectors and has now overtaken that of wheat. Since maize is used as poultry feed, the substitution of wheat by maize has had a negative impact on the supply of staple food for people and has put more pressure on rice to meet the growing food grain demand.

Over the last two decades significant progress has also been made in the production of potato and vegetables. The major problem faced by potato and vegetable production is the volatility in prices leading to increasing production and large post harvest loss, occasionally over 40%. It will be difficult to sustain the growth of production of these high-value and labor-intensive crops unless investment is made in the post harvest management (a 10% reduction of post harvest loss would add 10% additional food for the nation), processing and storage to stagger marketing of the crops throughout the year to match the demand that remains stable across the season. In addition, it is also important to exploit international markets with investment in packaging, Sanitary and Phyto-sanitary Standards (SPS), and Good Agricultural Practices (GAP). Protocols for Bangla GAP should be developed and practiced for safe food production.

The production of other crops including pulses, oilseeds, jute and sugarcane has either remained stagnant or declined over time. The production of oilseeds and jute has picked up in recent years due to favorable markets, availability of higher yielding varieties, and identification of favorable agro-ecological niche for these crops. Major drivers of crop production have been the development and diffusion of improved crop varieties, and more effective on-farm water management, crop management particularly expansion of irrigation infrastructure (mostly shallow tube well based groundwater irrigation). In addition to the modern varieties of different crops, production technologies have been developed in the national agricultural research systems. Use of non urea fertilizer has been increased because of government subsidy that brings more efficient fertilizer management in the field. However, yield gap between potential and actual yield of a crop variety realized by farmers, still remains high. New technology generation for vulnerable areas e.g. stress tolerant varieties and management practices, quality improvement of major crop varieties, pest and disease management, resource conservation, value addition and post harvest management, and climate smart technology, continue to be the major challenges.

In recent years, some private sector farms have started producing seeds of hybrid rice and maize within the country through contract farming. Gradual adoption of these improved varieties by replacing low-yielding traditional varieties have contributed to increasing yield, reducing production cost, and increased profitability in farming. The technological progress has been supported by public and private farmers investment for irrigation, flood control and drainage, and farm mechanization especially expansion of power tiller for land tilling, power threshing and processing as well as milling. The optimum exploitation of the yield potential of improved varieties depends on good irrigation-water management, farm mechanization, transportation and marketing. The irrigated area has expanded rapidly since 1989 with the liberalization in the import of diesel engines and reduction in import duties and withdrawal of restrictions on standardization of irrigation equipment and power tiller replacing draft power and facilitating farm operations.

The recent crop sector development has contributed to transform from subsistence agriculture into semi commercial agriculture. Now emphasis will be given to transform agriculture into commercial venture for which more investment is needed. Application of GAP for safe food production, farm mechanization, post harvest management, agro-processing, market development will get priority.

Major Challenges

Future growth and raising productivity in crop agriculture could come from five main sources: i) judicious use of agricultural inputs; ii) dissemination of improved technology; iii) use of good quality seed; iv) shift to higher-value crops for commercialization and v) removing market distortions. In this context the challenges are as follows:

Sustained Growth through the Use of Additional Inputs: Additional land could be brought under crops through increases in actual area cropped (conversion of non-crop or non-agricultural land and restoration of degraded land) and increases in cropping intensity. But, rather than bringing more land under crops in the future some contraction is an active possibility.

Productivity Enhancement: Productivity gain can come from two sources – technical change and correction of market distortions. Technical progress resulting in improved seeds (HYV) was responsible for doubling yields per acre during the 1970s. Whereas 50% of cropped area today is under HYV, with current rates of conversion, almost all suitable land is expected to come under HYV within the next decade or so.

Effective Research: Agricultural research has been a neglected area with low budgetary allocation and comparatively lower research and financial facilities for scientists. This largely resulted in the “brain drain” of trained professionals who migrated to research centers overseas. This trend needs to be reversed by increasing research and extension allocation of budget at least 5% of Agricultural GDP as against 1.5% of current allocation, including in-situ promotion with good governance and accountability.

Commercialization of Agriculture: Crop agriculture is mainly subsistence which needs to be commercialized with high value crops such as aromatic rice, vegetables and fruit production and processing. Good agricultural practices need to be employed for production and post harvest management.

Diversification with High Value Crops: Bangladesh given a receptive market and the right policy environment could have a comparative advantage in certain high-value crops, including traditional fruits and vegetables. The future of non-rice crops will depend on the removal of a number of constraints that currently inhibit their expansion, including comparatively less attention given to development of appropriate technology for non-rice crops and inadequacies of market infrastructure and services, which need proper attention.

Agro-Processing: Food processing e.g. pineapple canning, mushroom growing and dried food production also has considerable potential, provided quality control can be imposed. To ensure that their production and export potential are fully realized, the government needs to continue its current commitment to investing in manufacturing and infrastructure. Cotton is an important cash crop in Bangladesh. About 75065 farmers are engaged in cotton cultivation. During 2013-14 season, a program was taken to produce 2, 05,000 bales in 52,000 ha of land. Out of which an area of 41, 498 ha of land were brought under cultivation. A total of 1, 44, 616 bales of cotton were produced in the country in 2013-14 Fiscal Year. But we need atleast 42 lac bales cotton to meet our national demand. We need to spend 21000 crore taka annually to import rest of the portion of cotton to meet our national demand. So cotton production is required to be raised immediately. Jute is the major fiber crop of the country. Potential exists for the fiber to increase its contribution to the economy through productivity increases and diversification. The share of raw jute and jute goods in the total exports of the country has been increasing with increased world demand for natural fiber. In this situation, special measures will be taken during the 7FYP period to encourage farmers to further intensify jute production in order to satisfy domestic and increased export demand. To enable jute to compete with synthetics, emphasis will be given to related agricultural and technological research efforts.

Farm Mechanization: Rapid expansion of mechanization is needed due to the dearth of animal draft power, farm labors and declining interest of young people in traditional agriculture. The available animal draft power is insufficient and unreliable. As against this farm mechanization can help in improving productivity, reducing cost of production, increasing input use efficiency (water, seed, fertilizer, land and labor) and achieving timeliness of crop production operations. Agricultural mechanization is also required to reduce the turn-over time. There is a need for development of more efficient and less costly equipment so that farmers can benefit. In BARI, research on the use of solar panel to generate power for irrigation is in progress. Since agriculture is the mainstay of the economy, promotion and development of agro-related metal working industries to provide support to agricultural production is a major concern. Selective mechanization based on traditional devices conducive to productivity will be adopted. In the context of market economy, emphasis will be given to the collaborative role of public and private sectors in technology development and its diffusion.

Other Challenges: There exists several other challenges in crop subsector: a) low quality and adulterated agricultural inputs (seeds, feeds, fingerlings, breeds, broods, fertilizers and pesticides) marketed by unscrupulous traders, b) abrupt depletion of soil organic matter, c) insufficient discharge of irrigation water at the peak demand hours of Boro crop due to depletion of groundwater table, d) intrusions of saline water into the groundwater table, e) flash flood and drainage problem, f) degradation of land (salinity, erosion, water logging etc.), g) combating climate change effects on agriculture, and h) farm gate price support for the producers, etc.

5.0 Strategies of Crop Sub-Sector for 7FYP

Creating Opportunities for Sustainable Agriculture and Green Growth: Integrated pest management (IPM) program will be intensified and expanded in order to safeguard crops from pest and combat environmental degradation due to pesticide uses. Pheromone technology is used for combating selected pests in fruits and vegetables. Organic farming along with use of crop residues, compost, and animal waste has been popularized but need more effort. Actual plant protection activities are in the private hands. However, the public sector programs are confined to qualitative and quantitative aspects of plant protection: pest's surveillance, monitoring and early warning against pest attacks, advisory service to farmers, traders and others dealing with pesticides and quality control of pesticides marketed by the private sector. Sustainable agriculture will be built on current agricultural achievement adopting sophisticated approach that can maintain high yields and farm profits without undermining the resource conservation on which agricultural system depends. The system will be built on approach that will explore connection between farming and other aspects of social, economic and ecological environment. Sustainable agriculture will be planned and implemented in such a way that it will be resource conserving, socially supportive, commercially competitive and environmentally sound. The following activities will be promoted:

1. Partnership among the public-private and international organizations will be promoted to make sustainable agriculture to work;
2. Protecting and conserving environment by promoting ICM, INM, IDM, IPM (Sex pheromone, botanical pesticides, biological control, etc.), surface and rainwater utilization, utilization of solar energy in farm activities;

3. Capacity building will be targeted at all segments of agriculture: farmers, extension providers, dealers, distributors, entrepreneurs, agribusiness people, trainers and researchers (man, woman, youth will be the target groups) through knowledge and skill development;
4. Improving rain-fed agriculture;
5. Technology transfer through farmer group approach;
6. Protect biodiversity (plant, animal, fisheries, pollinator, etc.);
7. Food safety, nutrition and dietary diversification;
8. Natural resource management (land, water and biodiversity);
9. Sustain economic viability of farming practices; and
10. Creating enabling environment for the institutions.

Crop Zoning and Land Use Planning: Considering the increasing demand for food production, it is an essential task to promote optimum land use and its conservation. Historically, land use planning has largely been an economic concern. Focus will be given on comprehensive land use planning through integration of economic, ecological, social and cultural values in production program in order to develop options so that informed choices can be made. In the seventh five year plan, emphasis will be broadened to include soil and water conservation, land development, drainage and flood control, and reclamation program. The integrated and dynamic nature of people's livelihood strategies and how these affect their decision making and capacity to use and manage the natural resource base will be an important consideration for land use planning. Production program will be organized based on crop zoning.

Agricultural Inputs- Seeds and Fertilizers: At present, BADC, as per seed policy 1993, concentrates its efforts on the production of HYV seeds of paddy, wheat, potato and jute in the seed farms and also uses farmers to multiply seed on contract basis. Production program of all other crops beyond foundation seed will be done by contract growers. With the introduction of seed policy, emphasis has been given to private sector involvement in research and development of hybrid and HYV seed. The concerned agencies under the MOA will be further strengthened in order to ensure quality of seed at all stages of its production- breeder, foundation and certified seed and encouraged farmer to produce quality seed and farmer to farmer seed exchange. Emphasis will be given on creating facilities and infrastructure support for hybrid seed production and marketing. Farmers will be given training and technical assistance to extend improved methods of seed production, testing and storage. Private sector will be encouraged to invest in research and development in seed system, production, processing, storage and marketing.

Fertilizer is one of the critical inputs required for increasing crop production. The expansion of modern agricultural practices together with intensified cultivation has led to an increasing demand for fertilizers. It is, therefore, necessary to ensure timely supply of fertilizers to meet the increasing demand. Imbalanced use of chemical fertilizers is causing land degradation and excessive mining of plant nutrients resulting in the decline of soil fertility on the one hand and reduction in the potential yield on the other. It is, therefore, important to adopt pragmatic measure to encourage farmers using balanced fertilizers to maintain soil fertility. Fertilizer marketing will be monitored to maintain its quality and availability at farm level.

Promotion of Precision Agriculture: For resource conservation and judicious use of inputs, the Seventh FYP will give more focus on the Precision Agriculture (PA). Precision agriculture will ensure optimization of inputs use and maximization of returns while preserving resources and reducing environmental risks. Precision agriculture will be adopted wherever possible. Land leveling with laser equipment, buried pipe irrigation, drip & sprinkler irrigation, hydroponic

culture of vegetables, bed planting, and use of USG & IPM are some of the examples of precision agriculture. This will save inputs, increase yield and profitability, and improve environmental management.

Use of Water Resources and Water Economy: Water is a very essential input for increasing crop production and sustainable agriculture. Due to climate change and lifting ground water in an unplanned way, a significant portion of the country is not getting irrigation water during dry season. Therefore, a well-planned irrigation management system is essential for gradual increase of cropping intensity as well as yield. Irrigation efficiency will be ascertained and modern water management technology will be promoted to enhance irrigation efficacy and water productivity through optimal use of available water resources. The government has laid special emphasis on the increased use of surface water and reduced use of groundwater in irrigation to protect the ecological balance and reduce irrigation expenses. Thus, conjunctive use of surface and groundwater would be stressed. About 3000 liters of water is needed to produce one kilogram (1kg) paddy; so water-economy and availability should be considered while planning crops and cropping patterns for different regions.

Introduction and Popularization of Good Agricultural Practices (GAP): Standard setting, certification and accreditation will continue to be the main focus for safe food production and marketing at local and export markets. Protocol development for Good Agricultural Practices (GAP) suitable for Bangladesh agro-ecological and socio-economic conditions should be the major priority. New Agriculture Policy of GOB also calls for development and implementation of such protocols, i.e. codes, standards and regulations for fulfillment of trade and food safety and quality requirements. There are four pillars of GAP: economic viability, environmental sustainability, social acceptability and food safety and quality. Research and extension will put effort jointly to promote the process. Establishment of GAP will ensure:

- Safety and quality of food and other agri-products;
- Capturing new market opportunities for farmers and exporters; and
- Better natural resources use, workers health and working conditions.

Farm Mechanization: Use of farm tools and machinery improves work efficiency and resource use efficiency; helps intensify crop production and transform to commercial agriculture; enhances productivity and profitability of land, labor and inputs. Use of machinery reduces harvest and post-harvest losses, production costs, and drudgery of farm workers; ensures timely operation, faster speed, higher precision and quality produce. Mechanization creates employment opportunities; provide dignity to agriculture profession and better livelihood, and increases gross income. Moreover, animal draft power is drastically reduced on the farm due to high maintenance cost, shortage of feeds/fodders, and lack of grazing fields. Rural people migrated to urban areas for employment and better amenities; this caused a shortage of agricultural labor on the farm.

The Government would play its pro-active and catalyst role in popularizing the use of selected demand-led agricultural tools and machinery through field demonstration, trade leveraging and providing subsidy on key machinery, and imparting training to operators and mechanics for improving their technical know-how and skills in machinery operation, repair and maintenance. Particular attention would be given to develop custom hiring and/or cooperative ownership

system in mechanization. Mechanization will generate interest among young educated people to take up farming.

Post Harvest Management: Bangladesh experiences seasonal surpluses in several agricultural commodities of perishable nature. Development of agro-processing facilities can prevent postharvest losses and enhance farmers' income. The agro-processing industries are at present in their nascent stage of development. Most of the technologies and facilities for handling, storage, processing and packaging of farm products and by-products are substandard and outdated as they cater primarily to the domestic market. There exists considerable underutilization of capacity as well. Agricultural research institutes like BARI and BRRI will carry out research on technology development for post harvest management e.g. packaging and agro-processing. Meanwhile, some technologies are already available with these institutes for the development and growth of agro-processing industries in the country. Nevertheless, some specialized extension activities could be delegated to the private sector such as those related to fruits and vegetables enterprises. The process of supporting agro-business will be continued and strengthened during the Seventh Plan period.

Value Chain Development: Value chain development for identifying constraints to marketing supply channel is a new tool for rationalizing prices of agricultural produce between farm gate and consumer. MOA has been supporting value chain development of selected vegetables and fruits through its development projects. In the seventh five year plan the approach will be applied to other crops such as aromatic rice. The main effort will be to improve the efficiency of agricultural marketing to reduce market distortions and the cost of marketing, and to ensure that farmers get proper price for their produce and consumer gets quality products. The seventh plan will improve marketing services with a view to ensuring fair returns to the growers for their produces and adequate supply to the consumers at reasonable prices. In this regard, the establishment of HORTEX, a private board for value chain promotion for high value commodities, is an important institutional development. In addition, the Seventh Plan emphasizes the importance of capacity building of government extension agencies and will take necessary steps in this regard.

Agricultural Credit: Lack of access to credit has plagued poor farmers and rural dwellers for many years. Inadequate capital of farmers' own and limited institutional credit hinders the production of rural poor seriously. Rural people need credit to allow investment in their farms and small agro-business practically agricultural inputs to smooth consumption and to reduce their vulnerability to weather and economic shocks. Because they have little access to formal financing institution, they mostly rely on costly informal credit source. Recognizing this, government has made lower interest rate for agricultural credit especially for pulse, oilseed and spice crops. This will be continued further during the seventh five year plan to ease investment in agriculture.

Agricultural Research: The main objective of research organizations is to generate demand-led technology (varieties and management practices) and information; and also scaling-up the developed technologies including validation trials. Priority will be given to address the problem areas (like hills, coastal, haor and barind areas) that are more prone to weather vagaries and that have proportionately higher populations of poor and vulnerable people. The research will develop and refine technologies that will bridge yield gaps and promote diversification, sustainable natural resources management: rain water & river water harvesting for agricultural production, disease and pest management, development of varieties/species with post harvest

technology of high value agricultural commodities, mechanization, etc. It will also address climate change effects by breeding and introducing saline and drought tolerant, short duration varieties, introduction of high value commodities and low-cost, high-impact post-harvest technologies as well as research on packaging, harvesting, maturity index, food processing and market intelligence. Research on IPM, on-farm water management, food technology, bio technology, bio-security and socio economic condition will have special emphasis along with other contemporary issues. Research thrust would include, but not limited to, yield and quality improvement program of rice, wheat, maize, pulses, oilseeds vegetables, fruits and stress tolerant and climate change resilient variety development; improved management practices for field crops, vegetables, fruits, flowers with thrust on marginal and unfavorable eco-system; post harvest management, processing and value addition of agricultural commodities; pest and disease management for crop, natural resource management (NRM): land, water and bio-diversity; energy management in agriculture; equipment development for farm mechanization; socio-economic, policy and extension research, etc.

Farming system research will be undertaken on a pilot basis to extrapolate advanced technology and identify adoption constraints and their solution and establish strong linkages among research-extension and local communities. Other programs/activities to be undertaken by and/or for research are:

- i) Packaging of developed technologies for their scaling-up and adoption by the users;
- ii) Upgrading the facilities of ARIs (e.g. development of land, lab, training facility, infrastructure) with due attention to regional and sub-stations;
- iii) Arranging higher studies, training, study visits, etc for HRD and capacity building; and
- iv) Strengthening in-country training providing capacity of ARIs and developing ToTs and training manuals.
- v) Establishing Agricultural Museum for public awareness of agricultural research development.

Demand led Agricultural Extension: Transfer of technologies, diversification and intensification of crop production program through appropriate extension services are of crucial importance. Technology extension mapping will be done based on agro-ecological niches, prevailing productivity gap and regional specificity. The extension services must be able to render required technical advice and management support at the appropriate time and place. Pluralistic extension approach will be adopted to enhance production and productivity. The goal will be to attain food and nutrition security. For which pro-poor services will be strengthened with due care. Extension services will address skill gap, productivity gap and agricultural diversification for attaining food safety, dietary diversity and volume and value addition for agricultural commodities. Currently, the extension service draws its strength from research findings as well as from farmer's innovation. Research-extension-farmers linkages will be further strengthened to sustain high level of productivity. Feedback mechanism from farmers-extension-research linkages will be established for possible solution and again takes back the results to the farmers for their field adoption. Further strengthening of these three way linkages and communicating among research, extension and farmers community will be made in 7FYP for effective research-extension-farmer linkages. The technical committee and Agricultural Technical Committees (ATC), each covering 2-6 districts in similar agro-ecological zone (AEZ) will be strengthened. The composition of National Technical Co-ordination Committee (NTCC) has been amended to include representatives from NGOs and farming community. Agricultural extension together with nutritional awareness program will be further strengthened. The following priority activities will be pursued in 7FYP for extension services:

- Strengthen research –extension - farmer linkages;
- Production program will be organized to promote diversification and value addition;
- Utilization of fallow lands for cultivation;
- Expansion of small scale irrigation technology and surface water for irrigation;
- Extension of Boro rice cultivation in southern Bangladesh;
- Popularization of salt tolerant variety in the coastal region;
- Diversification to high value crops in Barind tracts and Hill districts;
- Seed, pesticide and fertilizer quality will be maintained through field monitoring;
- Organizing technology demonstration, field days, agricultural exhibition, etc;
- Adoption of decentralized extension approach, bottom up planning and micro planning;
- Strengthening of field level activities through proper delegation of authority from headquarters to field level;
- Addressing all categories of farmers with special emphasis on marginal, small, tenant and women farmers;
- Development and promotion of environment friendly farming practices ;
- Promotion of farm mechanization;
- Promotion of community seed production, storage and distribution;
- Promotion of Rice Yield Gap Minimization (RYMG) techniques;
- Reduce yield gap, knowledge gap and productivity gap by productivity enhancing technology;
- Promotion of green growth agriculture using IPM, IDM, ICM, AWD, solar energy, organic farming, use of compost, crop residue, and animal waste;
- Promotion of value chain with efficient marketing system
- Strengthening human resources development program of extension agencies through higher education, training and exposure visit;
- Strengthening MIS (ICT) based knowledge management system and e-agriculture;
- Establishment of more Farmer’s Information and Advisory Center (FIAC) at union level;
- Business development initiative in agriculture;
- Support to farmers during agricultural vulnerability; flood, drought, tidal wave, storms, etc;

Promoting Agricultural Diversification: To make Bangladesh agriculture profitable, sustainable and competitive, agricultural diversifications need to be intensively promoted. Crop diversification is important for increasing productivity, human nutritional security, maintaining soil health and increasing cropping intensity, employment and farm incomes. Bangladesh agro-climatic and socioeconomic conditions support agricultural diversification. Attention towards diversification will allow shifting from cereal-cereal cropping patterns to cereal- non-cereal high value horticultural crop patterns with value added product. Diversification will also help commercialization of agriculture making it more competitive, productive and returning. Through diversification food habit will be changed and nutritional security will be increased. With emphasis on much needed diversification in agriculture, the availability of quality seeds, particularly in case of oil seeds, pulses, horticultural crops become a crucial component for agriculture led growth and development. This would require efficient field operation, improving processing, conserving, marketing, and quality assurance; and strengthening infrastructure for rapid multiplication of disease free planting materials. Agricultural diversification will be strengthened through system based production practices.

Main-streaming Women in Agriculture: Women are crucial in transformation of agricultural products into food and nutritional security in Bangladesh. Gender based inequalities all along the food production chain must be reduced and the active engagement of women at all levels of

decision making is absolutely necessary to attain food and nutritional security. Women will require access to infrastructure services, information, skill and knowledge development training, credit and other business development services in order to targeting new market opportunities along with changing or emerging value chains. The formation of women groups to improve rights and access to services is a well established means of social and economic empowerment in which members increase productivity and income collectively. Capacity building is required to ensure that women remain active members and assure important positions in leadership and decision making in economic organizations. Special policies and provision are often required to ensure that women have control over important income generating activities:

- Developing women friendly technology and business environment;
- Food safety and nutritional training to woman farmers;
- Capacity development of women for small-scale entrepreneurs;
- Collective action and market linkages;
- Supporting homestead agricultural value addition strategies;
- Recruit more women agricultural extension providers and researchers;
- Protection of women and children from health hazards during agricultural operation.

Rural Human Resources Development: Extension departments organize training and demonstration for farmers on agricultural, social and environmental development in their technology transfer process. Several other training institutions teach and train personnel who serve agriculture sector. These institutions are Central Extension Resources Development Institute (CERDI transforming to NATA) in Joydebpur, Graduate Training Institute (GTI) attached to Bangladesh Agricultural University (BAU) in Mymensingh and 12 Agricultural Training Institutes (ATIs) located throughout the country. However, the training facilities vary considerably among the institutes, they are generally inadequate and need support for overall improvement. In order to reduce ‘yield gap’ government will try to reduce ‘information gap’. Modern ICT/MIS tools would be used for agricultural information dissemination. In this connection Farmer’s Information and Advisory Center (FIAC) has been established at union level linking farmers and extension official through ICT/MIS. This will be further strengthened and expanded in the Seventh Five Year Plan (7FYP) period.

6.0 List of policies/programs/projects of achieving the targets of 7 FYP including indicative costs (see Attachment-1)

Attachment-1

Ministry: MoA

Implementing Agency: Crop Research Institutes (BARC, BARI, BRRI, BJRI, BSRI, BINA, CDB)

Sl. No.	Goals	Targets	Activities (policy/program/project) Researchable areas	Program/project wise indicative cost (Lakh Tk. at 2014-15 prices)
(1)	(2)	(3)	(4)	(5)
	Generate demand-led agricultural technology and information	i) Development crop variety	<ul style="list-style-type: none"> Collection & conservation of genetic resources Varietal development of different crops Production of breeder seeds and saplings Development of protocol for tissue culture Development of stress tolerant crop varieties 	BARC= 78805 BARI= 150000 BRRI= 62150 BJRI= 15000 BSRI= 20500
		ii) Development of management technology	<ul style="list-style-type: none"> Development of soil, agronomic & water management technology for different crops Development of crop management technology for constrained areas (Hill, Coastal, Drought, Flood prone, etc.) 	BINA= 15000 CDB = 26600
		iii) Development of pest management technology	<ul style="list-style-type: none"> Development of IPM and IDM technology Strengthening of bio-rational based research and developmental activities Development of vertebrate pest management technology 	
		iv) Location specific technology development	<ul style="list-style-type: none"> Developmental of sustainable irrigation and water management technology for hill, saline and drought prone areas Strengthening farming system research and development Development of location specific eco friendly cropping pattern 	

Sl. No.	Goals	Targets	Activities (policy/program/project) Researchable areas	Program/project wise indicative cost (Lakh Tk. at 2014-15 prices)
(1)	(2)	(3)	(4)	(5)
		v) Development and popularization of farm machinery	<ul style="list-style-type: none"> • Development and popularization of operator friendly agri machinery • Training to operators and mechanics 	
		vi) Socio economic and market information	<ul style="list-style-type: none"> • Study of adoption status of released crop varieties • Constraints in marketing systems 	
		vii) Post harvest technology development	<ul style="list-style-type: none"> • Assessing post harvest loss of different crops • Development of improved post harvest management • Development of agro processing as income generation activities 	
		viii) Frontline technology transfer and strengthening research-extension-farmers linkages	<ul style="list-style-type: none"> • Organizing technology transfer workshop • Strengthening research-extension-farmers and GO-NOG linkages • Training to extension providers (TOT) and farmers on transferable technology 	
		ix) Strengthening use of ICT in agriculture	<ul style="list-style-type: none"> • Creating ICT facilities • Capacity building in ICT • Use of ICT in Training & Communication 	
		x) Strengthening research infrastructure facilities	<ul style="list-style-type: none"> • Development laboratory facilities • Strengthening field research facilities • Training aids • Infrastructure development 	
		xi) Increase cotton productivity, production, marketing, ginning, credit facilities and farmers will be by providing	<ul style="list-style-type: none"> • Technology Transfer • Expansion of Cotton Cultivation • Providing credit facility to the farmers • Strengthening Ginning and Marketing System 	

Sl. No.	Goals	Targets	Activities (policy/program/project) Researchable areas	Program/project wise indicative cost (Lakh Tk. at 2014-15 prices)
(1)	(2)	(3)	(4)	(5)
		effective extension service (for Cotton Development Board)		
Implementing Agency: Soil Resource Development Institute (SRDI)				
	Generate demand-led agricultural technology and information	i) Preparation/updating of location specific user friendly agricultural planning tools. ii) Providing demand-led analytical and soil survey services to farmers and other stakeholders iii) Development of soil and water management technology for problematic areas iv) Strengthening research infrastructure facilities	<ul style="list-style-type: none"> • Semi detailed soil survey for updating Upazaila Nirdeshika • Conducting semi-detailed soil survey for ground truthing and soil sampling • Preparation of final map and reports (Land and Soil Resource Utilization Guide, popularly known as Upazila Nirdeshika) and publications. <ul style="list-style-type: none"> • Analyses of soil samples in static and mobile soil testing laboratories • Fertilizer Recommendations for different crops based on soil test and crop requirement. <ul style="list-style-type: none"> • Development/adoption of soil conservation and watershed management technologies. • Development saline and acid soil management technologies. <ul style="list-style-type: none"> • Development laboratory facilities • Strengthening field research facilities • Training aids • Infrastructure development 	SRDI= 37000

Sl. No.	Goals	Targets	Activities (policy/program/project) Researchable areas	Program/project wise indicative cost (Lakh Tk. at 2014-15 prices)
(1)	(2)	(3)	(4)	(5)
Implementing Agency: Department of Agricultural Extension (DAE)				
	Increase crop productivity & production and farmers wellbeing by providing effective extension services	1. Technology Transfer	<ul style="list-style-type: none"> Establishment of 3,50,000 nos demonstration (with distribution of quality seed). Arrangement of 12,00,000 nos of farmers training. Arrangement of 3,50,000 nos of Field Day. Establishment of 2,40,000 Farmers Field School. Arrangement of 2500 nos of agriculture fair and organizing 2000 nos of national & regional workshop/seminar. 	510000.00
		2. Expansion of Irrigation Facilities	<ul style="list-style-type: none"> Establishment of 6000 nos of AWD demonstration. Distribution of 3600 nos of hand shower irrigation tools. Distribution of 3000 nos of hose pipe. Establishment of 3000 nos of raised bed irrigation. 	
		3. Popularization of Farm Machineries	<ul style="list-style-type: none"> Subsidy to 2,00,000 farmers for farm machinery procurement. Distribution of 2000 nos of agricultural implements to farmers. Arrangement of training for 10,000 nos of mechanic/ unemployed people. 	
		4. Popularization of IPM/ICM/INM practices (Environmental friendly or green crop production).	<ul style="list-style-type: none"> Block demonstration-70,000 nos. Arrangement of farmers training for 2,00,000 person. Overseas training for 35 batch. 	
		5. Promotion of high value crops and nutrition security.	<ul style="list-style-type: none"> Establishment of 50,000 HVC demonstration with distribution of quality planting materials. Arrangements of training for 6,50,000 farmers. Arrangements of 2000 field day. 	
		6. Strengthening use of ICT in Agricultural Extension Services	<ul style="list-style-type: none"> Online office management. Video conferencing from head quarter to field office. Data base development of 4 crore farmers. Input card Data base development of 3 crore farmers. Establishment of digital technology compendium. Publication of Agricultural Encyclopedia. Establishment of mobile apps store. Establishment of digital documentation & GIS centre. Establishment of E- Agriculture cell for 	

Sl. No.	Goals	Targets	Activities (policy/program/project) Researchable areas	Program/project wise indicative cost (Lakh Tk. at 2014-15 prices)
(1)	(2)	(3)	(4)	(5)
			all upazila. • Development of 10(ten) decision support system.	
		7. Knowledge, skill & technology base farmers training.	• Arrangements of farmers training for 7,50,000 person.	
		8. Organizational Development.	• Infrastructural development (construction, renovation of office building, ATI's & Horticulture centre)- 104 nos • Higher education for officers- 500 nos. • Creation of transport facilities for HQ, Region, District & Upazila- 500 nos. • Overseas Training -100 batch.	
Implementing Agency: Barind Multipurpose Development Authority (BMDA)				
	Increasing productivity, production and diversification in Barind tract providing irrigation facilities	i) Expansion of irrigated area ii) Conjunctive use of surface and ground water iii) Production and marketing of certified seeds iv) Improving rural communication v) Aforestation	• Installation of irrigation equipment and maintenance. • Rain & runoff water harvesting through re-excavation of canal, ponds and construction of submerged weir and rubber dam. • Construction of burried pipe line water distribution system. • Utilization of renewable energy (solar). • Afforestation. • Certified seed production & marketing. • Rural road construction. • Dug well construction. • Training of farmer and official person for technology transfer. • Strengthening of institute.	129295.00
Implementing Agency: Bangladesh Agricultural Development Corporation (BADC)				
	Increasing crop productivity, production and diversification providing seeds, fertilizer, irrigation and mechanization facilities	vi) Expansion of irrigated area vii) Conjunctive use of surface and ground water viii) Production and marketing of certified seeds ix) Marketing of fertilizers	• Installation of irrigation equipment and maintenance. • Development of irrigation cannels • Installation of rubber dam for irrigation • Construction of burried pipe line water distribution system. • Utilization of renewable energy (solar). • Certified seed production & marketing. • Fertilizers marketing • Training of farmer and official person for technology transfer. • Strengthening of institute.	691157.00
Implementing Agency: SCA (Quality Seed Development Distribution Extension)				
	Ensuring quality crop seed development	i) Field certification	• Procurement of technical equipments. • Increasing transport facilities. • Field inspection and sample collection • Modernization of certification tags. • Increasing infrastructure facilities	18734.00
		ii) Seed testing	• Procurement of seed testing laboratory equipments	

Sl. No.	Goals	Targets	Activities (policy/program/project) Researchable areas	Program/project wise indicative cost (Lakh Tk. at 2014-15 prices)
(1)	(2)	(3)	(4)	(5)
			<ul style="list-style-type: none"> Establishment of dehumidified cold storage rooms. Development of seed health testing facilities Seed test for purity, moisture and germination 	
		iii) Post harvest monitoring	<ul style="list-style-type: none"> Increasing transport facilities Collection of seed samples Seed test for purity, moisture and germination 	
		iv) Variety release and registration	<ul style="list-style-type: none"> Procurement of variety testing laboratory equipments Increasing facilities for control farm Conduction of DUS, VCU and DNA finger-printing tests Establishment of dehumidified cold storage rooms. 	
		v) Human Resource Development	<ul style="list-style-type: none"> Procurement of training equipments Increasing training facilities Strengthening ICT facilities 	
Implementing Agency: Agricultural Information Service (AIS)				
	Dissemination of agricultural information	i) Technology transfer using ICT	<ul style="list-style-type: none"> Printing and publications Electronic and print media (newspapers, magazines, bulletins etc.) 	120000.00
		ii) Agricultural service through Krishi-Call Center	<ul style="list-style-type: none"> Establishment of regional KCCs Human Resources development Logistic supports 	
		iii) Early alert on natural hazards	<ul style="list-style-type: none"> Community Radios Community Television Websites and social networks 	
		iv) Strengthening AIS for effective information dissemination	<ul style="list-style-type: none"> Capacity development Digitalized printing machines Revisit (restructuring) Establishment of Agriculture Information and Community Center (AICC) Infrastructure and logistic support Development of area specific information repository (knowledge hub) 	
Implementing Agency: Department of Agricultural Marketing (DAM)				
	Improving agricultural products marketing	i) Providing access to marketing formation	<ul style="list-style-type: none"> Improvement of marketing information collection and dissemination system Improvement of ICT infrastructures 	131000.00
		<ul style="list-style-type: none"> Market access facilitation to farmers, producers and entrepreneurs 	<ul style="list-style-type: none"> Formation of farmers marketing groups Training and motivational tours for farmers group Promotional activities Strengthening of market management system Development market linkage 	

Sl. No.	Goals	Targets	Activities (policy/program/project) Researchable areas	Program/project wise indicative cost (Lakh Tk. at 2014-15 prices)
(1)	(2)	(3)	(4)	(5)
		<ul style="list-style-type: none"> Support to agro-processors and agri-business entrepreneurs ii) Support to group marketing 	<ul style="list-style-type: none"> Development of agribusiness entrepreneurs Provide credit support Development of value chain linkage Promoting agro-processing Establishment of processing infrastructure 	
		<ul style="list-style-type: none"> Improvement of marketing infrastructure 	<ul style="list-style-type: none"> Establishment/ renovation of market infrastructure Establishment/ renovation of storage system and expansion of SHOGORIP model Establishment of multipurpose cold storage facility Provide transport support for producers and market functionaries 	
		4 Improvement of marketing extension services and value addition	<ul style="list-style-type: none"> Support transfer and use of modern post harvest technologies Development of post harvest skill and knowledge Development of Quality and Safety Certification System 	
		<ul style="list-style-type: none"> Capacity building of DAM for better marketing service delivery 	<ul style="list-style-type: none"> Training for DAM human resources Development technical and research skill development for DAM human resources Research on various marketing related issues 	
Implementing Agency: BIRTAN (Nutrition & Human Health)				
	Improve nutritional status of people	i) Nutritional awareness building of people ii) Determination of nutritional value iii) To construct buildings for BIRTAN head office, regional offices, research laboratories, training centers, residential quarters, and to develop experimental fields and farms for the research activities of BIRTAN.	<ul style="list-style-type: none"> Trainers Training on Food Based Nutrition Infrastructure development and strengthening of Bangladesh Institute of Research and Training on Applied Nutrition (BIRTAN) Integrated Agricultural Approach for ensuring Nutrition and Food Security Project (IANFP) Applied nutrition and food science education and training activities project 	26100.00

Sl. No.	Goals	Targets	Activities (policy/program/project) Researchable areas	Program/project wise indicative cost (Lakh Tk. at 2014-15 prices)
(1)	(2)	(3)	(4)	(5)
Implementing Agency: For All Research & Extension Agencies (Human Resources Development)				
		Human resources development and institutional capacity building for all research & extension agencies	<ul style="list-style-type: none"> i) Higher study (MS, PhD/Post Doc) at home & abroad; ii) Skill development training for officers and staffs at home & abroad; iii) Capacity building training in ICT; iv) Overseas training & study visits, seminar, workshop for scientists/officers; v) Knowledge & technology based skill development training for farmers, traders & entrepreneurs; vi) Motivational tours/exposure visit for farmers. 	

7.0 Institutional mechanism for monitoring progress of 7FYP implementation and list of indicators (covering input, output and impact indicators (Attachment-2)

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
Bangladesh Agricultural Research Council (BARC)					
A. Sub-Sector: Crops					
1	Ensure food security	Improve crop productivity and production	Development of high yielding and modern varieties with of appropriate production package technologies of major crops to increase production to meet up the future demand.	Developed a number of high yielding varieties	Production will be increased
			Development of climate resilient crop varieties and technologies to address the challenges of climate change through biotechnological tools	Increases crop production	Livelihood will be changed and improve farmers income
			Development of technologies for quality seed production, processing, packaging and improve management/distribution system	Production increased	Quality seed will be available to the growers
			Dissemination of newly developed agricultural technologies to the end users (farmers).	Yield increased	Production of crops will be increased
2	Development of suitable technologies for saline and drought prone areas	Crop diversification for potential utilization of agricultural	Development of suitable technologies for hill farming, char-land, drought and coastal agriculture.	Proper used of hilly land, char, saline and drought areas	Production will increased
		Safe food production	Safe food production and protect environment through minimizing hazardous chemical (pesticides) uses.	Healthy food available	Healthy food will be available in the markets
		Promotion of high value crop	Development of technologies for the production of high value horticulture crops, spices, aromatic and fine grain rice etc.	Horticulture crops and aromatic rice available	Vegetables and aromatic rice will be available to the consumers
		Reduction of post harvest loss and value addition.	Development of technologies to reduce post harvest loss, improve processing	Reduce post harvest loss	Farmers will get more benefit
B. Sub-Sector: Livestock					
1	Maintenance of native germplasm	Conservation and improvement of native germplasm	Conservation and improvement of indigenous ruminant germplasm for rural development	Egg, milk and meat production will be increased	Quality egg, milk and meat available in the local markets
			Conservation and development of native chicken and duck germplasm for rural development		
			Fodder germplasm conservation, improvement and production matching with cropping system		
2	Ensure nutrition of the people	Nutrition and productivity	Housing, feed information and feeding standards for livestock and	Quality of meats, milk and eggs	Quality of

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
		improvement	poultry; Value addition of livestock and poultry products and bi-products	will be improved and the presence of antibiotic residues, fungal toxins, vaccines and important drugs will be reduced..	meats, milk and eggs, vaccines , drugs will available in the local markets
		Food safety and quality control	Investigation on the quality of meats, milk and eggs, and the presence of antibiotic residues, fungal toxins (Aflatoxins) and other toxins in meats, milk and eggs; Efficacy studies of livestock and poultry vaccines and important drugs available in Bangladesh		
C. Sub-Sector: Fisheries					
1	Production enhancement and self sufficiency in fish produces by 2020	Enhancing aquaculture production	Development of fish biotechnology for stock improvement, in-situ conservation, disease prevention and quality control	Quality fish increased	Quality fish will be available
			Gene pool conservation and gene banking of endangered fish species and improved strains		
			Development of organic aquaculture practices		
			Development of cost-effective quality feed for fish and shrimp		
			Aquaculture hygiene, bio-safety and disease control		
			Climate change adaptation on fish breeding and aquaculture		
		Coastal aquaculture development	Brood development and seed production of brackish water shell and fin fishes	Development of culture practices and increases of capture fisheries in saline water	Fish production in the coastal area will be increased
			Development of organic and improved shrimp/prawn culture technique		
			Integrated and rotational production system of rice-shrimp-fish/prawn in the coastal region		
			Biotechnological management of ecosystem and shrimp health		
			Empowerment in shrimp culture system and value chain addition to south-west Bangladesh		
			Integrated Coastal Fisheries Management and adaptation of aquaculture to climate changes		
			Development of eco-friendly and export-oriented shrimp culture practice in Bagerhat region		
		Management and biodiversity conservation of Inland open water fisheries	Hilsa fisheries Management	Increase production of Inland open water fisheries	Inland open water fishes be available in local market
			Brood development and seed production of riverine species		
			Refinement and promotion of cage and pen culture		
			Population dynamics, stock assessment and identification of major spawning and nursery grounds of hilsa, major carp and catfish		

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
			Survey of existing crafts and gears, their CPUE and development for selective fishing in open water ecosystem		
			Bio-monitoring of the water pollution in major rivers		
D. Sub-Sector: Agricultural Economics					
1	Ensure markets price of the produces and value chain development of high value crops	Improved market linkages	Subsidy on Inputs (Fertilizer and Irrigation) and Price Supports to Farm Products Marketing Channels, Price Fluctuations and State Interventions towards Price Stability of Farm Products including milk, eggs etc. BADC's Seed Production Programmes: Limits and Constraints. Export of Fresh Vegetables: Benefits to Growers. Studies on Agri-business in Horticultural crops	Ensure the product prices	Farmers will be benefitted
E. Sub-Sector: Human Resource Development (HRD)					
1	Capacity building of the NARS scientists	Skilled manpower Development	PhD at home and abroad Post Doctoral Programme in abroad (One year each) Short term training Programme in abroad (2-3 months each) Study tour/ Seminar/ Workshop programme in abroad Local training including Seminar/ Workshop	100 PhD; 20 Post Doctoral, 100 Short term training Programmes, 400 Study tour/ Seminar/ Workshop programmes in abroad, 200 local training including Seminar/ Workshop	Skill of the NARS scientists will be increased to a considerable extent
F. Sub-Sector: Information and Communication Technology (ICT)					
1	Capacity building in ICT	Development of skilled manpower in ICT	In-country training Foreign training Training on Hardware Training on Database Development Training on repair and maintenance of Hardwares	Skilled management in ICT	Use of ICT in agriculture will be extended.
Bangladesh Agricultural Research Institute (BARI)					
1.	Ensure food security	Improve crop productivity	<ul style="list-style-type: none"> To develop HYV of BARI mandated crops along with appropriate production technologies. To ensure the supply of quality seeds/saplings. To enrich the plant genetic recourses 	<ul style="list-style-type: none"> High yielding varieties Improved technologies Increased yield Easy availability of seeds/saplings Rich collection of plant 	<ul style="list-style-type: none"> Production will be increased Livelihood will be changed Production will be increased Scope of crop improvement

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
				genetic resource	will be ensured
			<ul style="list-style-type: none"> To strengthen the hill farming 	<ul style="list-style-type: none"> Proper use of hilly areas 	Improved livelihood
			<ul style="list-style-type: none"> To minimize the post harvest loss 	<ul style="list-style-type: none"> Reduced post harvest loss 	Improved economic condition
2.	Mitigation of climate change effect	Strengthening climate based research capabilities	<ul style="list-style-type: none"> To ensure safe management of insect pests 	Availability of safe yield	Healthy commodities will be available
			<ul style="list-style-type: none"> To develop proper water management technologies 	Judicious use of water	Safe environment
			<ul style="list-style-type: none"> To identify environment friendly cropping patterns through carbon sequestration and green house gas measurement 	Healthy environment	Healthy life
3.	Improvement of livelihood	Reducing poverty & generating income of farmers	<ul style="list-style-type: none"> To improve the socio-economic condition of growers through increased flower production 	Increased flower production	Improved livelihood
			<ul style="list-style-type: none"> To develop location specific integrated farm development technologies 	Improved integrated farm development technologies	Farmers will be benefited
			<ul style="list-style-type: none"> To popularize diverse use of maize 	Increased maize yield and utilization	Improved economic condition
4.	Socio-economic study	Assessment of adoption level and constraints	<ul style="list-style-type: none"> To assess the livelihood patterns, adoption of BARI technologies and constraints 	Livelihood patterns & adoption level are known Constraints identified	Proper planning can be formulated
5.	Manpower development	Human Resource Development	<ul style="list-style-type: none"> To strengthen the training facilities and manpower development 	Increased training facilities Skilled manpower	Increased capacity of research.
6.	Improvement of ICT.	Easy communication and dissemination of technology	<ul style="list-style-type: none"> To pave the way for quick and easy dissemination of information and BARI developed technologies 	Strong network Easy dissemination of information and technologies	Easy availability of information and technologies

Bangladesh Rice Research Institute (BRI)

1	Generation of Demand-lead Rice Technology and Information	1. Development of rice variety	1. Development of modern and hybrid rice variety using conventional and biotechnological tools { Abiotic (Salinity, drought, water submergence, cold, heat, etc) and biotic (diseases, insect, etc) resistant, Vitamin A (Golden rice) and other mineral enriched rice varieties }	Rice variety- 20	- per capita consumption of rice - agricultural wage rate - agricultural growth rate - household food security - employment by sub-sector, -head-count ratio
			2. Breeder seed and truthfully level seed (TLS) production and distribution program	625 metric. tones	
			3. Characterization of rice germplasm and conservation of rice heritage	7000	
		2.	1.Crop-Soil-Water management	10	

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
		Development of rice management technology	technology development program		
		3. Pest management	1. Rice disease, insect and weed management program	10	
		4. Location specific rice technology development (On-farm research)	1. Rice based profitable cropping pattern as well as cropping system development	5	
		5. Development of farm tools and machinery	1. Development and popularization of farm tools and machinery	5	
			2. Standardization of farm tools and machinery	10	
		6. Socio-economic and market information	1. Socio-economic aspect of rice production technology	5	
		7. Post-harvest technology development	1. Research and popularization of post harvest technology	3	
		8. Front-line technology transfer and research-extension linkage	1. Validation and adaption of rice technology	30	
			2. Rice production technology training for extension workers/ service provider	25,000	
			3. Publication of rice journal and different research reports	45,000 copies of 7 types reports	
		9. Human resources development (HRD)	1. Manpower development program (PhD, MS, Short/long duration training, etc)	200	
		10. Strengthening Research Capacity of Bangladesh Rice Research Institute(BRRI)	1. Out-reach research facilities development and modernization of research laboratory	10	
Bangladesh Jute Research Institute (BJRI)					
1.	Generation of demand led agricultural technologies on jute and allied fibre crops.	Development of High Yielding Varieties of Jute and allied fibre (JAF) crops.	Experimental field and laboratory, Equipment and chemicals laboratory of biotechnological research, agricultural inputs, budgetary allocation, scientific manpower.	7 High Yielding Variety of JAF Crops including 2 stress (Biotic and abiotic) tolerant varieties will be developed. 30 Intellectual Property Right will be established	Develop new variety, increase jute production
		Development	Experimental field, agricultural	5 agronomic	Develop new

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
		of crop management technologies for JAF crops.	inputs, budgetary allocation, scientific manpower.	information for new varieties will be developed, 50% Yield gap will be reduced, 5 technologies of soil & fertilizer management will be developed	technology, increase jute production
		Pest management for quality fibre and seed production of jute and allied fibre crops.	Experimental field and laboratory, agricultural inputs, budgetary allocation, scientific manpower.	5 new disease and pest management technologies will be developed.	Ensure intellectual property right.
		Development of farm tools and machineries.	Laboratory, budgetary allocation, scientific manpower.	2 machineries will be developed.	Develop new technology, increase jute production
		Location specific technology generation.	Experimental field, agricultural inputs, budgetary allocation, scientific manpower.	5 new jute based profitable cropping pattern will be developed..	Fibre production increment and farmers income generation.
		Front line technology transfer and research extension linkage.	Demonstration, training, publicity, budgetary allocation and scientific manpower.	10000 farmers will be trained.	Transfer technology and farmers income generation.
		Post harvest technology development on jute retting.	Experimental field and laboratory, agricultural inputs, budgetary allocation, scientific manpower.	Microorganism based appropriate fast retting technology and power ribboner will be development	Increase of quality fibre and price.
		Post harvest technology development on jute industry.	Laboratory, necessary equipment, budgetary allocation, scientific manpower.	20 new diversified jute products including reinforced jute composite, jute-plastic, bio-pulp, environment friendly dyeing and printing technology, jute-cotton blended yarn and fabric etc. will be developed	Increase diversified use and demand of jute.

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
		Strengthening ICT sector	Budgetary provision and technical manpower.	9 MIS module, WAN with regional/sub-stations, remaining LAN will be established.	Improve e-governance.
Bangladesh Sugarcane Research Institute (BSRI)					
1.	Strengthening research capabilities	<ul style="list-style-type: none"> • Manpower recruitment and development • Establishment of sub-stations and regional stations • Establishment of sugarcane Breeding station • Enrich research facilities • Infrastructure development • Providing emphasis on biotechnology and agricultural mechanization research 	<ul style="list-style-type: none"> • Expenses on building establishment • Recruitment and manpower development expenditure • Procurement of Implements and instruments 	<ul style="list-style-type: none"> • Established two regional stations two sub-stations, and one breeding station • Developed research facilities both in infrastructures and instruments • Efficient manpower (10 MS and 20 Phd) in HRD programme • Improved biotechnological tool and agricultural machineries/ implements 	<ul style="list-style-type: none"> • Amount of cane, chewing cane, beet and goor production • Advanced research Initiation • Improved technology development • Coverage and quantity of sugarcane mechanization • Frequency of Biotechnology tool use • Marketing system of cane and beet • Farmers' acceptance of the technologies developed • Frequency of communication through ICT
2.	Varietal development	<ul style="list-style-type: none"> • 1/2 high yielding, location based, stress tolerant variety of sugarcane and sugarbeet • Selection of 	<ul style="list-style-type: none"> • Amount of quality seed • Number of germ-plasms involved 	<ul style="list-style-type: none"> • New high yielding sugarcane and sugarbeet varieties released • Stress tolerant site specific sugarcane and sugarbeet 	

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
		high yielding local and noble germ-plasms of date palm and palmyra palm		varieties released • Multiplication and seedling raising of high yielding seeds of date palm and palmyra palm started	
3.	Innovation and Dissemination of technologies	<ul style="list-style-type: none"> • Innovation of farm based production technology packages/systems • Development of sugarcane, date palm, palmyra palm juice preservation technologies suitable for small industries • Introduction of Highly efficient irrigation and fertilizer application methods • Improving year round chewing cane production system • Assessment of Sustainable marketing chain of sugarcane and other 	<ul style="list-style-type: none"> • Allocation of agricultural research fund • NAP 2013 • 7FYP 2016-2020 • Election manifesto 2014 • Perspective plan 2021 • SDG 	<ul style="list-style-type: none"> • New farm based systems/packages developed • Post-harvest technology Developed suitable for small and cottage industries • Highly efficient irrigation and fertilizer application methods introduced • Sustainable marketing chains developed • Location based intercropping systems developed • Effective ICT based communication evolved • Efficient farming practice through farmers 	

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
		<p>crops</p> <ul style="list-style-type: none"> • Standardization of intercrop packages based on locations • Executing mass communication activities like training, rally, seminar, workshop etc • Maintaining close contact with ICT activities 			
4.	Distribution of clean seed	<ul style="list-style-type: none"> • Providing clean seed half of the amount of the total requirement for Bangladesh 	<ul style="list-style-type: none"> • Total amount of foundation seed • Production cost 	viii) Produced and distributed clean seed of sugarcane	
Bangladesh Institute of Nuclear Agriculture (BINA)					
1.	Generation of demand led agricultural technology and information	<ul style="list-style-type: none"> ○ Development of crops variety using nuclear technique and biotechnology ○ Development of crop management technology ○ Development of pest management technology ○ Location specific technology (on farm) ○ Socio-economic & marketing information ○ Frontline 	<ul style="list-style-type: none"> ○ Expenditure on agriculture by sub-sector as percentage of total public expenditure ○ Expenditure on agricultural research. ○ Ensure timely availability of research funds & inputs ○ Ensure quality and availability of seeds 	<ul style="list-style-type: none"> ○ Development of twenty modern climate resilient varieties (HYVs) ○ Production of 1285 ton breeder and truthfully labeled seed ○ Development of 10 non-commodity technology ○ Increased acreage of BINA varieties ○ Increased crop production up to 10% - 15% by 2020 ○ Increased cropping 	<ul style="list-style-type: none"> ○ Per capita income ○ Per capita consumption of food grains and vegetables ○ Increased agricultural growth rate ○ Household food security ○ Employment by sub-sector (male/female) ○ Improved livelihood of farm community

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
		technology transfer ○ Human resource development ○ Strengthening research facilities of BINA Head quarter and sub-stations		intensity	
Soil Resource Development Institute (SRDI)					
1.	Generation of demand led Agricultural Technologies and Information.	a. Preparation/ updating of location specific user friendly agricultural planning tools.	i. Review of base materials (aerial photographs, topo sheet, photo mosaic, satellite imageries, previous maps and report. Aerial photo interpretation and preparation of draft Soil and Landform Map. ii. Conducting semi-detailed soil survey for ground truthing and soil sampling. iii. Soil sample analysis in the laboratories. iv. Preparation of final map and reports (Land and Soil Resource Utilization Guide, popularly known as Upazila Nirdeshika) and publications. v. Preparation of “Union Land, Soil and Fertilizer Recommendation Guide (Union Sahayika)” and publications.	• 400 upazilas. • 80,000 samples. • 400 Nos. • 2000 Nos.	• Increase crop yield by 15-25%. • Local level agriculture planning based on land and soil resources data base.
		b. Development of mineralogical and microbiological database and preparation of land use and crop zoning maps.	i. Development of mineralogical database for benchmark soils of Bangladesh. ii. Development of microbiological database for benchmark soils of Bangladesh. iii. Updating of Land Use Map of Bangladesh. iv. Preparation of Crop Zoning Maps for major crops.	• 56 soil series. • 56 soil series • 1 Nos. • 1 Nos.	• Development of soil mineralogical database for better soil fertility and fertilizer management. • Development of soil microbiological database for better soil fertility and fertilizer management. • Database for national agricultural planning. • Selection of suitable zones for major

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
					crops.
		c. Demand driven analytical services to farmers and other stakeholders for better yield.	i. Analyses of soil samples in static and mobile soil testing laboratories. ii. Analyses fertilizer, plant and water samples in static laboratories. iii. Fertilizer Recommendations for different crops based on soil test and crop requirement.	<ul style="list-style-type: none"> • 3,00,000 samples • 40,000 samples • 3,00,000 farmers. 	<ul style="list-style-type: none"> • Balanced fertilizer recommendation on available to farmers. • Quality fertilizers available in market chain. • Increase crop yield by 15-25%.
		d. Development of soil and water management technologies for constraint areas.	i. Development/adoption of soil conservation and watershed management technologies. ii. Development saline soil management technologies. iii. Delineation of soil acidity and determination of lime requirement. iv. Preparation and publication of user friendly guides for stress soil management for conservation and better yield. v. Dissemination of technologies through training and demonstrations.	<ul style="list-style-type: none"> • 5 Nos. • 5 Nos. • 1 map 1 technology. • 3 Nos. • 340 batch and 1000 demo. 	<ul style="list-style-type: none"> • Better utilizations of hill soils and improve livelihood of hill dwellers. • Better utilizations of saline soils and improve livelihood of farmers of saline zone. • Increase crop yield.
		e. Strengthening of infrastructure and research facilities.	i. Construction of 7 (seven) storied building at SRDI headquarter and 3 (three) four storied building at Comilla, Rajshahi and Khulna for laboratory and field offices. ii. Procurement of ICT and GIS instruments, laboratory equipments, glassware and chemicals, field survey instrument, cartography instrument, computers, office equipments etc.	<ul style="list-style-type: none"> • 1 seven storied building. 3 four storied building. • Lump sum. 	<ul style="list-style-type: none"> • Better working atmosphere in SRDI. • Smooth functioning of ICT, GIS, Laboratories, Research Centers and Field offices.
		f. Demand driven detail soil survey and reporting to stakeholders.	i. Detailed soil survey, soil sampling, and analysis. ii. Preparation of maps and reports with specific recommendations.	<ul style="list-style-type: none"> • 5 Nos. • 5 Nos. 	<ul style="list-style-type: none"> • Judicious and profitable use land and soil resources.
		g. Providing	i. Proving ToT on Upazila	• 30 batches.	• Capacity

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
		Training of Trainers (ToT) on Upazila Nirdeshika and Union Sahayika.	Nirdeshika and Union Sahayika to DAE officers and other stakeholders.		building of stake holders.
			ii. Providing training to SAAO, fertilizer dealers and farmers.	• 300 batches.	
		h. Establishment of ICT Backbone	i. Establishment and upgrading of ICT backbones at SRDI field offices and headquarter.	• 43 + 1 =44 Nos.	• Better facilities to provide digital technology dissemination.
			ii. Established web based Virtual Soil Museum (VSM).	• 1 Nos.	• Generation and dissemination of knowledge to researchers, students and scientist.
		i. Human Resource Development (HRD)	i. Higher education in country.	• 40 Nos.	• Capacity building of SRDI staff.
			ii. Higher education in abroad.	• 20 Nos.	
			iii. Training in country and abroad.	• 200 Nos.	
Cotton Development Board (CDB)					
1.	Increase cotton production by increasing unit yield and area expansion	a. Development of high yielding, short duration, pest resistant, salt and drought tolerant variety and hybrid variety through conventional breeding and biotechnological intervention. b. Increase availability of quality cotton seed by producing breeder, foundation and TLS. c. Dissemination of modern cotton technologies to the farmers through demonstration, field day farmers rally,	#Funds should be available in time for conducting research, seed production, extension and skill development activities	# High yielding, short duration, pest resistant, salt and drought tolerant varieties will be developed. #Cotton research with modern laboratory facilities will be established # Improved management technologies of cotton Will be generated. # CDB researcher and extension workers and cotton farmers will be trained and knowledge and skill will be improved # Marketing and ginning facilities will be improved.	- Modern research facilities are developed at the research stations of CDB. - Quality and improved seeds are produced. - Manpower of CDB is developed. -Cotton cultivation area and per unit yield are increased

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
		group meeting d. Skill and knowledge of cotton researcher, extension workers and cotton farmers will be improved through training, exchange visit, higher education etc. e. Develop marketing and ginning facilities to improve quality and market stability			
2.	Increase research capacity of Cotton Development Board (CDB)	a. Creating laboratory facilities for every discipline at all research farms/centers of CDB; b. Establishing green houses at the research farms/centers for conducting research under controlled environment; c. Developing knowledge and skill of scientists through training and higher education and d. Ensuring participation of farmers and extension	- Funds for procuring equipments, Machineries, Furniture are supplied in time and procurement made as per schedule; - Funds for well equipments laboratory rooms, green house, gene bank and other infrastructure are released in time and constructions made as per schedule; - Funds for repair and maintenance of vehicles, furniture, -other infrastructure are released in time and repairs done as per schedule; - Funds for supplies and services are released in time and procurement made as per schedule; -Existing land and other resources of CDB are utilized	- New and improved cotton varieties are evolved. - Modern soil, crop and pest management technologies of cotton are generated. - Well equipments, Modern laboratories, green houses, gene bank and libraries are established. -Training facilities are increased.	This project has been designed for developing research capabilities of CDB for improvement of cotton and facilitating participatory research. Through implementation of the project discipline wise research capabilities will be developed. By carrying out the above mentioned research and technology transfer

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
		personnel in technology generation and dissemination processes.			program, sustainable cotton production practices will be adopted by cotton farmers which in turn, will increase the yield of cotton.
3.	Increase cotton production in the country through technological intervention and area expansion by improving capacities and capabilities of Cotton Development Board.	<p>a. Char land, drought and saline prone areas will be brought under cotton cultivation within June, 2018.</p> <p>b. Cultivation area of HYV and modern varieties will be expanded and other management technology will be transfer to the farmers throughout the project period.</p> <p>c. Foundation and TLS seed of modern and HYV varieties will be produced in every year within the Project period.</p> <p>d. Training, Higher studies, Study tour, Workshop/Seminar will be organized to improve HR throughout the project period.</p> <p>e. Central fibre technology lab.</p>	<p>Total project cost: BDT 10500.00 lakh</p> <ul style="list-style-type: none"> - Project Personnel-BDT 333.89 lakh - Supplies and Services- BDT 4265.20 lakh - Repair, Maintenance and Rehabilitation- BDT 840.00 lakh - Acquisition of Assets- BDT 2690.70 lakh - Construction works- BDT 2210.00 lakh <p>Physical and Price contingency- BDT 155.20 lakh</p>	<ul style="list-style-type: none"> - High land of river bank, char land, drought and saline prone areas will be brought under cotton cultivation. - Cotton cultivation will be expanded in the Hill slope and Hill valley. - Cotton cultivation will be expanded in the agro-forestry system within the Project period. - Cotton based cropping system and intercropping and other cropping system will be popularized. - Tobacco will be replaced gradually up to June, 2018 - Silk cotton plantation will be expanded in the 	<ul style="list-style-type: none"> -Bringing new areas under cotton cultivation in the less cropping intensity areas of river bank, char land, drought and saline prone areas, Hill slopes and valley's.; -Popularize profitable cotton based cropping pattern, intercropping and cotton cultivation in the agro forestry system and other cropping systems; -Dissemination of improved and modern technologies through

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
		<p>Zonal and regional office, Unit Office-cum-godown, Ginning centres will be construct and renovate existing infrastructures and logistics within June, 2018.</p> <p>f. Vehicles and other logistics will be provided or improved within June, 2018</p> <p>g. Ginning Machineries, HVI Machine for fibre quality testing and other agricultural machinery will be purchased</p>		<p>homestead areas.</p> <ul style="list-style-type: none"> - About 200 no. of CDB officers will be trained through training, higher education, study tour, exchange visit, workshop/seminar/symposium home and abroad. About 19200 farmers will be trained through training and exchange visit. - 1000 ha block demonstration and 5000 ha demonstration will be conducted - 66000 farmers will be motivated through field day and farmers rally. - New technology will be circulated through poster, leaflet, booklet and publicity. - 3300 sq m. new building will be constructed - 7000 sq m. new boundary wall be constructed - Existing machineries, equipment, vehicles, infrastructure 	<p>demonstration, field day, farmers rally, training and using other extension tools;</p> <p>-Producing foundation seeds of modern and HYV varieties of cotton at research farms/centers of Cotton Development Board and TLS seed through contract farmers at the Zonal level;</p> <p>i) Enrich knowledge and skills of extension workers through training, study tour and higher education;</p> <p>ii) Enrich skills and knowledge of farmers in cotton cultivation through training;</p> <p>iii) Build close collaboration and sharing the knowledge and</p>

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
				will be renovated - 1 (One) Jeep, 5 (Five) double cabin pickup, 3 (Three) mini truck, 2 (Two) coaster and 130 (One Hundred and Thirty) motorcycle will be purchased within the project period. Equipments and machineries for fibre lab., ginning and cotton production will be purchased within June, 2018.	skills of cotton experts among the cotton growing countries and institutions through study tour, seminar, workshop etc.; -Construct and repair essential infrastructures of Cotton Development Board; -Improve logistics, capacities and capabilities of Cotton Development Board to perform better extension activities.
4.	a. Research capacity development b. Development of high yielding cotton genotypes c. Development of short duration cotton genotypes - Development of insect pests and disease resistant cotton genotypes - Development of salt tolerant varieties	- Skilled cotton researcher with adequate laboratory facilities - High yielding cotton varieties - Short duration cotton varieties - Insect pests and disease resistant cotton varieties - Salt tolerant varieties	<i>Japanese expert</i> Three experts in biotechnology in the areas of cell biology/molecular biology/microbiology <i>Training in Japan</i> - 5 Postdoc -5 PhD -50 short duration training (3-6 moths) In-country training -100 short duration training(1-2 weeks) Seminars and workshop -1 annual seminar/workshop in Japan -2 biennial seminar /workshop in Bangladesh Equipments Required equipments to establish a molecular laboratory.	-Skilled cotton researcher with adequate laboratory facilities -High yielding cotton varieties -Short duration cotton varieties -Insect pests and disease resistant cotton varieties -Salt tolerant varieties	-80 thousand cotton farmers, cotton ginneries and textile industries in Bangladesh will be directly benefitted from the project. Moreover, thousands of women workers in the garment sector will be indirectly benefitted.

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
Department of Agricultural Extension (DAE)					
1.	Increase in crop production and productivity.	20% yield increase in different crops and Cropping intensity to be increase up to 195% in place of existing 192% .	Agricultural inputs like quality seed, fertilizer pesticides, and equipments distributed. Improving soil health.	Cereal production increased up to 34.60 million metric tons.	National & household food security ensured. Soil health improved.
2.	Expansion of Irrigated areas	20% non-irrigated area to be taken under irrigation.	Distribution of irrigation equipments and creation of irrigation & drainage facilities.	20% yield increase due to irrigation.	Farmer's income Increase in 20% and Production cost minimized up to 25%.
3.	Combating climate change.	Awareness has to be build up in to 100% in coastal region. Farmers in the project area are well known to the adaptation & mitigation technology.	Technology Introduction, training, awareness, capacity building & advocacy.	100% farmers of the affected area are well aware about the effect of climate change & they are well capacitated to adaptation & mitigation technology application.	Damage or crop loss minimizing up to 80% in the affected area.
4.	Mechanization in Agriculture	At least 25% farming area to be taken under mechanized agriculture.	Distribution of farm machineries under group approach.	Increase crop yield and minimize labor intensiveness.	Production cost decrease and increase in production.
5.	Environmental safety and organic based crop production.	10% farming area to be taken under organic agriculture. 30% farmers to use IPM/ICM production	Training & motivation towards organic agriculture.	100% safe food production.	People to be free from food based health hazards.
6.	Mainstreaming women in agriculture	20% participation of women in agricultural activities.	Motivation & Training	Women are well aware about improve production technologies.	Women farmers are encouraged to lead and occupy decision making position.
7.	Strengthening urban agriculture	50% household in the urban area to be taken under roof top & fallow land gardening to be taken under horticultural crop	Motivation, Training & input supply	Awareness to be developed in the urban households.	Food based nutrition to be ensured & supply of safe food.

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
		production.			
8.	Ensuring E-Agriculture	ICT based knowledge sharing to be developed.	Establishment of ICT network.	Rapid communication and enhancing production & productivity.	Time saving low cost technology will enhance crop production.
Implementing Agency: Barind Multipurpose Development Authority (BMDA)					
	Increase crop productivity and production and diversification in Barind Tract Providing irrigation facilities.	i) Expansion of irrigated area. ii) Consuming use of surface and ground water. iii) Production & marketing certified seed. iv) Improving rural road communication . v) Afforestation.	i) Installation of irrigation equipment and maintenance. ii) Rain & runoff water harvesting through re-excavation of canal, ponds and construction of submerged weir and rubber dam. iii) Construction of burried pipe line water distribution system. iv) Utilization of renewable energy (solar).	i) 800 nos. of irrigation equipment will be installed and 15000 nos. irrigation equipment will be maintenance. 14400 hectare land will be got under irrigation. Which 1.50 lakh MT of crops will be produce. ii) 700 KM derelict khal, 850 nos. ponds, 5 nos. of bill and 20 nos. of large water body will be re-excavated. 250 nos. of Submerged weir and 2 nos. of rubber dam will be constructed. Thus 16000 hectare land will be got under irrigation. Which 1.60 lakh MT of crops will be produce. iii) 1800 KM burried pipe line will be constructed. Thus approximately 30% of irrigation water will be saved from losses. iv) 1500 nos. of solar pump will be installed. Thus 15000 hectare land will be got under irrigation. Which 1.52 lakh MT of crops will	Increase of crop production resulting improve of socio economic condition of the people and environmental development and enhancing surface water use and ground water recharge in the project area. Marketing facilities of crops will be improved for Road construction

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
				be produce.	
			v) Afforestation.	v) 15 lakh sampling will be planted.	
			vi) Certified seed production & marketing.	vi) 1500 MT Quality seed will be available for the farmer.	
			vii) Rural road construction.	vii) 150 KM Road will be constructed.	
			viii) Dug well construction.	viii) 675 nos. of dug well will be constructed.	
			ix) Training of farmer and official person for technology transfer.	ix) 30000 nos. of farmer will be trained up in agricultural knowledge.	
			x) Strengthening of institute.	x) Strengthening of the institute makes good service for the farmer.	
Bangladesh Agricultural Development Corporation (BADC)					
1.	- Production and supply of high yielding varieties of quality seeds of different crops. - Transfer seed production technologies and provide services to the private sector for development of seed industry.	Seed production – 37.00 lakh metric ton Seed storage – 36.00 lakh metric ton Fruit production – 3.30 lakh metric ton Seed multiplication farm establishment - 3 nos.	Establishment of Seed Multiplication Farm	Seed Production Seed Distribution Seed Processing and Storage Fruit Production	Poverty reduction Food security Nutrition security Flood control Safe drinking water Agricultural development
2.		Dehumidified godown construction - 50 nos.	Setup of Dehumidified godown.		Unemployment reduction
3.		Modern seed testing lab establishment - 3 nos.	Establishment of Seed testing laboratory		
4.		Farmers seed center establishment - 10 nos.	Farmer's Seed Center setup		

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
5.		Auto seed processing plant establishment- 5 nos.	Establishment of Auto Seed Processing Plant		
6.		Tissue culture lab establishment- 10 nos.	Establishment of Tissue Culture Laboratory		
7.	- Built buffer stock of quality fertilizer and ensure supply of fertilizer to the farmers.	Fertilizer import - 55 lakh metric ton Fertilizer distribution - 51 lakh metric ton	Fertilizer import	Fertilizer distribution	
8.		Fertilizer godown repair- 118 nos.	Fertilizer godown repair		
9.		Pre-Fabricated steel godown establishment- 14 nos.	Construction of pre-fabricated steel godown		
10.		Increment of capacity of fertilizer godown-1.54 to 2.70 lakh metric ton.	Increment capacity of fertilizer godown		
11.	- Provide irrigation facilities to the farmer through minor irrigation activities. - Innovation of appropriate technologies for increasing irrigation efficiency.	Re excavation of Khal - 5500 km Expansion of irrigation area - 5 lakh ha	Re-excavation of Khal	Expansion of Irrigation	
12.		Construction of surface irrigation channel - 3000 km	Construction of surface Irrigation Channel		
13.		Construction of sub-surface irrigation channel - 500 km	Construction of surface Irrigation Channel		
14.		Solar energy driver pump setup - 500 nos.	Installation of solar Energy driven Pump		
15.		Rubber dam construction - 10 nos.	Construction of Rubber Dam		
16.		Establishment of Deep tube well - 600 nos. Rehabilitation	Setup of Deep Tube Well		

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
		of Deep tube well - 700 nos.			
17.		Construction of water retention structure (Jiribadh)-100 nos.	Construction of Water retention structure (Jiri badh)		
18.		Construction of protection dam (Bari badh) - 170 km	Construction of Protection dam (Bari badh)		
19.		Sinking of dug well - 75 nos.	Sinking of dug well		
20.		Sinking of Artisan well - 400 nos.	Sinking of Artisan well		
21.		Rubber hose pipe connection - 100 km	Rubber hose pipe utilization		
22.		Submerged ware construction - 100 nos.	Submerge ware construction		
23.		Water logging eradication - 3000 ha	Eradication of Water logging		
24.		Low Lift pump setup - 800 nos.	Installation of LLP		
25.		Irrigation control pipe setup - 1000 nos.	Irrigation control pipe (sanipa)		
26.		Automatic water level recorder installation - 200 nos.	Setup of Automatic water level records		
27.		Floating pump setup - 50 nos.	Floating pump installation		
28.		Hydraulic structure construction - 4400 nos.	Construction of Hydraulic structure		
29.		Farmers training - 90000 nos.	Farmers training		
Seed Certification Agency (SCA)					
	Ensuring crop seed quality	<ul style="list-style-type: none"> Field certification 	<ol style="list-style-type: none"> 1. Procurement of technical equipments. 2. Increasing transport facilities. 3. Field inspection and sample collection 4. Modernization of 	<ol style="list-style-type: none"> 1. 400 technical equipments will be procured. 2. 179 vehicles (motor cycle, pick-up and jeep) will be 	<ul style="list-style-type: none"> - 522000 tons of certified seeds will be produced. -Quality seed availability will be

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
			certification tags. 5. Increasing	procures. 3. 124500 ha field will be inspected. 4. 25000 samples will be collected for testing 4.30000000 Certification tag with security label will be printed and distributed. 5. Regional and district offices will start functioning in all divisions and districts. 6. 2000 furniture will be procured.	increased to 35% from 25%. - Seed adulteration by fraudulent traders will be decreased. - Skilled manpower will be added in seed sector - Crop production and human nutrition will be increased due to release and registration of high quality crop varieties.
		• Seed testing	1. Procurement of seed testing laboratory equipments 2. Establishment of dehumidified sample storage rooms. 3. Development of seed health testing facilities 4. Seed test for purity, moisture and germination	1. 500 technical equipments will be procured 2. 8 dehumidified sample storage rooms will be established. 3. Seed health testing facilities will be developed in 8 seed testing laboratories 4. 40000 samples will be tested for purity, moisture and germination	
		• Post harvest monitoring	1. Collection of seed samples 2. Seed test for purity, moisture and germination	1. 10000 seed dealers will be inspected 2. 15000 seed samples will be collected for testing purity, moisture and germination	
		• Variety release and registration	1. Procurement of variety testing laboratory equipments 2. Increasing facilities for control farm 3. Conduction of DUS, VCU and DNA finger-printing tests	1. 100 technical equipments will be procured 2. One control farm will be established	

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
			2. Establishment of humidified cold storage rooms.	3. DUS of 650 varieties and VCU for 500 varieties will be conducted. 4. 1 humidified cold storage will be established	
		<ul style="list-style-type: none"> Human resource development 	1. Procurement of training equipments 2. Increasing training facilities 3. Strengthening ICT facilities.	1. 50 training equipments will be procured 2. Training hall will be made well furnished 3. 15000 personnel will be trained on seed technology related fields. 4. Broadband line will be set-up 5. ICT infrastructure facilities with 3	
Agricultural Information Service (AIS)					
01	Dissemination of Agricultural Information	Technology Transfer Using ICT	Digitalized Printing machines and High quality printing materials	Yearly 3 (three) millions printing materials (magazines, leaflet, booklet, Poster etc)	Documentation of authentic information for stakeholders. Empowering farmers through ICT
			Modern electronic studio with stereo sound system, Digital video Camera, Editing panel	Yearly 1000 video documentaries will be developed	Effective knowledge sharing and information dissemination
		Service through Krishi Call Centers (KCC)	Krishi Call Centers (KCC) will be established in different Agricultural Regions, Policies & Guidelines for KCC	15 KCCs will be established where 150 Agricultural Graduates (crops, livestock and fisheries) will be recruited, Annually 3 million calls will be respond	Experts & Farmers linkage established
		Early alert of agricultural hazards	Krishi Radio (community radio) will be established in different agricultural regions.	14 Krishi radio will be established where 140 staffs	Technology friendly producer community

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
				will be recruited, At least 30 million people will be brought under coverage	developed
			Community based Krishi TV and broadcasting policy	One channel in southern region, Telecasting 24/7 hours Agriculture based program, At least 100 staffs will be recruited, 20 million coverage	Knowledge based community developed through Advertisement & dissemination of different agricultural programs and technologies
			Social networking, software development, climate resilient films and fillers production, guidelines for knowledge sharing etc.	Climate management database (1) establish, Inter Organizational linkage development (one initiative), 50 mobile apps	Technology friendly producer community developed
		Strengthening AIS for information dissemination	Revisit (restructuring) of AIS, Recruitment of Skilled manpower, Human resource management	890 skilled manpower	Demand led quality service delivery, Increased yield in farmer's field
			Well equipped Agriculture Information & communication center, guidelines for AICCs	1000 AICCs will be established, at least 50000 farmers will be brought under proper guidance	Information gap reduced
			Development of area specific information repository (knowledge hub)	14 regional repositories with networking up to Upazila level	
			Infrastructure and logistics	14 Regional Offices will be established	Quality network and information delivery system established
Department of Agricultural Marketing (DAM)					
1	Improvement of agricultural marketing services and agribusiness to ensure fair	Access to market information	- Value of financial resources employed, - Quantity of person days employed, - ICT equipment engaged - Contracts/Agreements/MOUs with Tele communication operators	- No. of reports published - No. of information disseminated - Number of stakeholders	- Increase of producer's income - Reduction of price spread -

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
	returns to the producers and increasing value addition to the national GDP			covered directly under Mobile based Push Service - Number of Public Display/kiosk Systems of Price information of agricultural produces	
2		Market access facilitation	- Value of financial resources employed, - Quantity of person days employed, - Technical knowledge - Training hour	- Training and motivational tours (1000 nos.) - Farmers group (500 nos.) - Market linkage (300 nos.)	- Increase of producer's income - Improvement in enabling environment - Improvement of marketing practice, and performance
3		Support to agribusiness entrepreneurs	- Value of financial resources employed, - Quantity of person days employed, - Marketing and credit support - Training hour provided to entrepreneurs	- Agribusiness Enterprise developed (30,000 nos.) - Value chain developed (100 nos.)	- Employment generation - Increased agricultural GDP - Increased processing of agricultural produces
4		Improvement of marketing infrastructure	- Value of financial resources employed, - Quantity of person days employed, - Physical Resources, like land	- Markets and assemble centres developed (100 nos.) - Storage facility developed (100 nos.) - Cold storage developed (20 nos.) - Cool van (50 nos.)	- Increase market linkage; - Reduction in post harvest loss, - Increasing of Farmers' income
5		Improvement of market extension services	- Value of financial resources employed, - Quantity of person days employed, - Technology transfer - Processing equipments	- Amount of processed food (5000 MT) - Processing centre developed (25 nos.) - Quality certification unit developed (10 nos.)	- Reduction of post-harvest loss - Ensuring safety of marketed agricultural produces
6		Capacity building of DAM for better marketing service delivery	Value of financial resources employed, - No of manpower increased - Training hours employed - Technical knowledge	- Training (100 nos.) - Research Output (10 nos.) - Nos. of Upazilla wih DAM field office	- Better marketing service delivery

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
				Nos. of market covered under AMIS	
Bangladesh Institute of Research and Training on Applied Nutrition (BIRTAN)					
1.	Improved nutritional status of the people.	<ul style="list-style-type: none"> Awareness building of the people. 	<ul style="list-style-type: none"> Time Training materials Budgetary allocation Manpower Evaluation forms 	12,000 Trainees from different GO & NGOs, School Teachers, Imam, UP members, farmers will be trained on food based nutrition	Improved nutritional status of the people of the country.
2.	Improved nutritional status of the people	<ul style="list-style-type: none"> Awareness building of the people. Nutritional value determination. To construct buildings for BIRTAN head office, regional offices, research laboratories, training centers, residential quarters, and to develop experimental fields and farms for the research activities of BIRTAN. 	<ul style="list-style-type: none"> Time Training materials Budgetary allocation Manpower Evaluation forms Recruit manpower Skilled manpower for constructing buildings. 	10,080 Trainees from different GO & NGOs, School Teachers, Imam, UP members, farmers will be trained on food based nutrition/quality processing and preservation of agro-products/ awareness building on the importance of nutrition information.	<ul style="list-style-type: none"> Improved nutritional status of the people of the country. Increased employment opportunity Improved health condition of the people
3.	Improved nutritional status of the people .	<ul style="list-style-type: none"> Awareness building of the people. 	<ul style="list-style-type: none"> Time Training materials Budgetary allocation Manpower Evaluation forms 	6000 people of the country will be benefited	Improved nutritional status of the people of the country.
4.	Improved nutritional status of the people .	<ul style="list-style-type: none"> Awareness building of the people. Nutritional value determination. 	<ul style="list-style-type: none"> Time Training materials Budgetary allocation Manpower Evaluation forms 	15000 people of the country will be benefited	<ul style="list-style-type: none"> Increased Skilled manpower on food and nutrition Improved nutritional status of the

Sl. No.	Goals	Targets to attain	Input indicators (resources/policy changes, etc)	Output indicators (Measurable)	Impact indicators
(1)	(2)	(3)	(4)	(5)	(6)
					people of the country. <ul style="list-style-type: none"> • Increased employment opportunity • Improved health condition of the people

8. Suggest mechanism for improving implementation capacity of the public sector policies/programs/projects.

Improving implementation capacity is also essential for sustainable development of the public sector policies/programs/projects. Several quarters of beneficiaries dependable mostly on agriculture is enjoying the benefits of strengthening sectoral capacity directly or indirectly for their livelihoods. It is necessary to focus the rural poverty reduction through sustainable increase in agricultural productivity in all programs/projects. Since the last two decades agricultural development has ranked to the priority list of government assistance, the country has attained nearly self sufficiency in food production. However, sector needs more attention in improving implementation capacity fostering present trend of development. Following mechanisms are suggested to improve the implementation capacity of the public sector policies/programs/projects:

- Introducing institutional reform and good governance making both public and private sector more transparent and accountable to people;
- Rationalizing public expenditure allocation, increasing public investment in infrastructure and public good services and promoting private investment in agriculture;
- Improving physical facilities of organizations/institutes in the context of present demand of research, extension and business agriculture;
- Strengthening research-extension-farmers linkages to gear the management capacity of various levels;
- Developing need based human resources and improving their knowledge and skills for better performance and outcomes;
- Establishing ICT/MIS and developing web-based platform in research-extension for database and knowledge sharing for effective coordination and guidance; and
- Introducing results based frameworks for field monitoring and progress assessment through proper delegation of authority from senior management level.