COMPREHENSIVE DISTRICT AGRICULTURAL PLAN

Paschim Bardhaman
(2017-18 to 2019-20)

Prepared By

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In Collaboration with

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C O N T E N T S

ABBREVIATIONS USED

ACAS : ADDITIONAL CENTRAL ASSISTANCE SCHEME
AES : AGRICULTURAL ECOLOGICAL SITUATION
APMC : AGRICULTURE PRODUCE MARKET COMMITTEE
ATMA : AGRICULTURE TECHNOLOGY MANAGEMENT AGENCY
BRGF : BACKWARD REGION GRANT FUND
BSF: BLOCK SEED FARM
C-DAP : COMPREHENSIVE DISTRICT AGRICULTURE PLAN
CIGs : COMMON INTEREST GROUPS
DIC : DISTRICT INDUSTRY CENTRE
FLD : FRONT LINE DEMONSTRATIONS
GP : GRAM PANCHAYET
Ha : HECTARE
ICAR : INDIAN COUNCIL OF AGRICULTURE RESEARCH
ICT : INFORMATION AND COMMUNICATION TECHNOLOGY
INM : INTEGRATED NUTRIENT MANAGMENT
IPM : INTEGRATED PEST MANAGMENT
JLGs : JOINT LIABILITY GROUPS
KVK : KRISHI VIGYAN KENDRA
MI : MINOR IRRIGATION
MT : METRIC TON
NABARD : NATIONAL BANK FOR AGRICULTURE & RURAL DEVELOPMENT
NDC : NATIONAL DEVELOPMENT COUNCIL
NFSM : NATIONAL FOOD SECURITY MISSION
NFDB : NATIONAL FISHERIES DEVELOPMENT BOARD
NGO : NON GOVERNMENT ORGANISATION
NHM : NATIONAL HORTICULTURE MISSION
MGNREGA : MAHATMA GANDHI NATIONAL RURAL EMPLOYMENT GUARNTEE ACT
NRM : NATIONAL RESOURCE MANAGMENT
PACS : PRIMARY AGRICULTURE COOPARATIVE SOCIETY PAPU
PPP : PUBLIC PRIVATE PARTNERSHIP
PRA : PARTICIPATORY RURAL APPRAISAL
PRIs : PANCHAYET RAJ INSTITUTIONS
RKVY : RASHTRIYA KRISHI BIKASH YOJANA
SAP : STATE AGRICULTURE PLAN
SAU : STATE AGRICULTURE UNIVERSITIES
SGSY : SWARNA JYANTI GRAM SWAROJGAR YOGANA
SHG : SELF HELP GROUP

SREP : STRATEGIC RESEARCH AND EXTENSION PLAN
SRR : SEED REPLACEMENT RATIO
SWOT : STRENGHTH, WEAKNESS, OPPERTUNITIES AND THREATS
TSG : TECHNICAL SUPPORT GROUP
TSI : TECHNICAL SUPPORT INSTITUTION

EXECUTIVE SUMMARY

1. EXECUTIVE SUMMARY

India is a country that abounds in promises as well as problems. India is the world's largest producer of many fresh fruits and vegetables, milk, major spices, selective fresh meats, selective fibrous crops such as jute, several staples such as millets and castor oil seed. India is the second largest producer of wheat and rice, the world's major food staples. India is also the world's second or third largest producer of several dry fruits, agriculture-based textile raw materials, roots and tuber crops, pulses, farmed fish, eggs, coconut, sugarcane and numerous vegetables. India ranked within the world's five largest producers of over 80% of agricultural produce items, including many cash crops such as coffee and cotton, in 2010. India is also one of the world's five largest producers of livestock and poultry meat, with one of the fastest growth rates, as of 2011. To add on to these the country has some of the world's most fertile tracts where there is enough promise to be the leaders in production of most of agricultural produces. But then, ours' is a country that harbours about 17.1 % of the world population thriving on 2.6 % of land and about 4 % of world's share of water resources; a country where per capita land availability is declining steadily; a country where land is getting degraded faster by day and a country that has to grow 345 million tonnes of foodgrains by 2030 from the present level of 263 million tonnes in 2013-14, meaning an increase at a rate of more than 5%, to feed projected 1.6 billion mouths.

Therefore it is imperative that a comprehensive plan be developed for agriculture to cope up with the future needs. Such plan can only be comprehensive when and if it caters to the need of each of the country's micro agro climatic zones. The need for integrated local area plans, based on specific endowments and needs of each area, was stressed from the beginning of planned development. It has therefore been decided by the Govt. of India that the 'District Plan Process' should be an integral part of the process of preparation of State's Five Year Plans.

The Department of Agriculture & Cooperation, Ministry of Agriculture, Government of India in accordance with the said decision and in consultation with the Planning Commission, has prepared the guidelines for the Rastriya Krishi Vikas Yojana (RKVY). For the planning process of RKVY, each district is required to formulate a Comprehensive District Agriculture Plan (C-DAP) by including the resources from other existing schemes, District, State, or Central schemes such as BRGF, SGSY, NREGS and Bharat Nirman, etc. The District Agriculture Plans would present the financial requirement and the sources of financing the agriculture development plans in a comprehensive way. The C-DAP includes animal husbandry and fishery, minor irrigation projects, rural development works, agricultural marketing schemes and schemes for water harvesting and conservation, etc. keeping in view the natural resources and technological possibilities in each district. The broad objectives of C-DAP are:

a) To prepare a C-DAP through participatory process involving various organizations and stakeholders.
b) To enable optimum utilization of scarce natural, physical and financial resources.
c) To assess and plan for the infrastructure required to support the agriculture development.
d) To establish linkages with the required institutional support services, like credit, technology transfer, ICT, research, etc.
e) To evolve an action plan for achieving sustainable agricultural growth with food security and cropping system that will improve farmers' income.

In this executive summary the contents of the C-DAP are brought out in brief under the following sub heads,

1.1. A brief introduction to the District, its location, features, etc.
1.2. Main points of SWOT of the District
1.3. Areas/ Sectors which need to be addressed in the district
1.4. Various on- going programmes in the district- a brief contextual gist
1.5. The District Plan at a Glance
1.6. Public Private Partnerships that can be envisaged in the proposed Plan
1.7. Expected outcomes as a result of implementation of the Plan

1.1. A brief introduction to the District, its location, features, etc.

The district of Paschim Bardhaman is surrounded on the north by Dumka (of Jharkhand), Birbhum and Murshidabad; on the east by Purba Bardhaman; on the south by Hooghly, Bankura and Purulia and on the west by Dhanbad (of Jharkhand) districts. The district has 2 agricultural sub-divisions. There are 8 nos. of agricultural blocks in the district.

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As per the 2011 Census of India data Paschim Bardhaman district, after bifurcation of Bardhaman district in 2016, had a total population of 2,882,031. There were 1,497,479 (52%) males and 1,384,452 (48%) females. Population below 6 years was 322,268.

As per the 2011 census data the total number of literates in Paschim Bardhaman district, after bifurcation of Bardhaman district in 2017, was 2,015,056 (78.75% of the population over 6 years) out of which males numbered 1,136,990 (85.44% of the male population over 6 years) and females numbered 806,010 (65.55% of the female population over 6 years).

In the 2011 census Hindus numbered 2,442,414 and formed 84.75% of the population in Paschim Bardhaman district. Muslims numbered 384,027 and formed 13.32% of the population. Christians numbered 12,636 and formed 0.44% of the population. Others numbered 42,954 and formed 1.49% of the population.

The district experiences a climate which is transitional between CWg and AW types, where 'C' stands for 'warm temperate rainy climates with mild winter', 'W' for 'dry winter not compensated for by total rain in the rest of the year', 'g ' for 'eastern Ganges type of temperature trend' and 'AW ' for 'tropical savanna climates'. Average temperature in hot season is 30°C while at the cold season is 20°C. Average rainfall is 1186 mm. The cold season starts from about the middle of November and continues till the end of February. March to May is dry summer

intervened by tropical cyclones and storms. June to September is wet summer while October and November is autumn.

The district being chiefly an industrial one, fairly large area in the district (53%) is under non-agricultural use. As compare to nearly 14% of total geographical area (TGA) under forest in the state, the district has 12% area under forest which is below ideal. Ideally at least 33% of TGA should be under tree cover and the country at present has 27% area under tree cover, rapt attention is to be given so that the district becomes greener. The Durgapur forests are continued in the Birbhum district beyond the Ajay while the forest area in the Asansol subdivision forms a part of the forest area of Dumka district of Jharkhand.

Paschim Bardhaman district with its varied tectonic elements and riverine features, is a transitional zone between the Jharkhand plateau which constitutes a portion of peninsular shield. In general the Jharkhand plateau consists of the metasedimentary rocks of precambrian age, Gondwana sedimentary rocks, Rajmahal basalts and upper tertiary sediments. Laterite has developed on these older rocks as well as on early Quaternary sediments. The western half of the district resembles a promontory jutting out from the hill ranges of Chotonagpur plateau and consists of barren, rocky and rolling country with a laterite soil rising into rocky hillocks, the highest being 227 m. These diversify the otherwise monotonous landscape and lend a special charm to the skyline around Asansol subdivision. Ajoy-barakar divide is a convex plateau, the average altitude being 150 m. The gradient is westerly to the west and to the east it is northerly towards Ajay and southerly towards Damodar below the latitude. The Ajoy- Damodar inter-stream tract is made up of several stows consisting of vales and low convex spurs which run in almost all directions except north-east and thus lends a very complicated character to local relief.

As for the soils, mainly coarse gritty soil is blended with rock fragments formed from the weathering of pegmatite, quartz veins and conglomeratic sandstones, where as sandy soil characteristic of granite rocks and sandstones. This soil is of reddish colour, medium to coarse in texture, acidic in reaction, low in nitrogen, calcium, phosphate and other plant nutrients. Water holding capacity of this soil increases with depth as well as with the increase of clay portions.

Paschim Bardhaman is one of the premier districts in India in terms of value of mineral. The Raniganj coalfield was the birth place of the Indian coal industry. Besides coal ,important minerals found in the district are iron ores, calcium carbonate, abrasives, silica bricks and moulding sands, glass sands, building materials, manganese, bauxite, laterite etc.

Main crops of the district are autumn rice and wheat.

Total geographical area in the district is 160300 ha out of which about 47% is cultivated. Total of 48040 ha is net cropped which is about 64% of cultivable area. Gross cropped area is about 58354 ha thereby rendering the cropping intensity to 121% only. This pertains from the fact that the distict is much underdeveloped as regards irrigation which is about 12.3% of net cropped area in the district. The Durgapur barrage and Mithon dam have formed two large reservoirs at the south-western and western periphery of the district.

Table I.1. Cropping systems in the district

(2)	**LATERITIC REGION**	**RAINFED AREA**
	(a) Upland	Fallow – Paddy/Groundnut/Maize – Pulse/Mustard/ Kalai/Vegetable
	(b) Medium Land	Fallow – Paddy – Mustard/Pulse/Paira Crops
	(c) Low Land	Fallow – Paddy – Mustard/Lentil/Gram/Paira Crops
		IRRIGATED AREA
	(a) Upland	Moong – Paddy/Maize/Vegetable – Mustard/Wheat/Maize/Pulse
	(b) Medium Land	Moong/Vegetable/Maize – Paddy – Mustard/Wheat/Maize/Pulse/Potato
	(c) Low Land	Moong/Vegetable – Paddy – Paddy/Vegetable/Pulse/Oilseed/Wheat

1.3: Areas/ Sectors which need to be addressed in the district

There are various issues related to agriculture and allied sectors which need to be addressed properly towards holistic development of agriculture in the district as noted below, sector-wise,

- Increasing irrigation potential(minor and micro)
- Soil health maintenance
- Increasing total factor productivity of crops
- Intensification of cropping system
- Increasing water use efficiency of crops
- Climate resilient technologies
- Rainwater harvesting
- Soil reclamation/amelioration
- Capacity building of stakeholders for improved production techniques
- Knowledge dissemination through ICT and mass media
- Community farming through groups
- Post harvest management and value addition
- Protected cultivation infrastructure
- Site specific nutrient management
- Agro-forestry models
- Integrated farming models
- Silvipastoral models
- Organic farming and profitable marketing of organic produce
- Farm mechanisation
- Popularisation of small implements for drudgery reduction
- Upscaling of organic compost production
- Breed up gradation and regular AI
- Animal feed and disease management
- Ensured availability and market for fodder
- Entrepreneurship development in goat, pig, broiler farming
- Fisheries in open water bodies and canals

- Aquaculture based integrated farming models
- Hatchery development
- Marketing chain
- Cold chain

1.4. Various on-going schemes in the district – A brief contextual gist

Various programmes are currently under way in the district sponsored by either state or central government for development of agriculture and allied sectors, such as,

- Bringing green revolution to eastern India
- Pradhan Mantri Krishi Sinchayee Yojna
- Sub mission on agricultural Mechanization
- RKVY
- NFSM
- NMOOP
- TRFA (Pulse)
- PKVY
- SAME
- SMAM
- Farmers' Old Age Pension Scheme
- Soil health card

1.5. District plan at a glance

The Comprehensive District Agricultural Plan of Paschim Bardhaman is devised with the following growth drivers for augmenting production growth and need based infrastructural support to achieve the target of at least 11% growth in agriculture and allied activities,

Growth drivers

The growth accelerators for agriculture and allied sectors have been decided after situation and trend analysis, and need assessment. Such growth drivers are presented below.

- Soil quality maintenance. Amelioration of problem soil
- Sustainable and judicious management of water resources.
- Popularizing resource conserving technologies.
- Increasing cropping intensity and intercropping.
- Promotion of integrated farming modules
- Development of suitable technologies such as varietal improvement, input management supported by a strong institutional arrangements for the supply of inputs like seed, fertilizers, plant protection chemicals, credit, etc, price support system favourable to

farmers and market infrastructure for major crops like paddy, potato, maize, sugarcane, banana, vegetables, and fodder crops.

- Development of minor and micro irrigation
- Strengthening water harvesting structures like open cast pits, farm ponds, canals and check dams.
- Breed development of cattle
- Promotion of rural poultry
- Ensured availability of fodder
- Capacity building of farmers, traders, and other stakeholders on grading, post harvest technologies, value addition and market intelligence.
- Paradigm shift from production oriented farming to market oriented agriculture with the promotion of Agro processing industries.
- Ensured availability of quality fingerling
- Development of canal fisheries and fishery in open water bodies
- Strengthening the extension machinery for effective dissemination of technology.
- Strengthening of rural markets with storage facilities.
- Strengthening of farmers' market with additional storage facilities.
- Establishment of cattle feed units.
- Inland fisheries development in major tanks and reservoirs and
- Development of sericulture.

Table I.2. District plan in a nutshell

Sl. No.	Sector	Financial requirements 9In lakh)			Total
		2017-18	2018-19	2019-20	
1.	Agriculture	**602.34**	**1233.94**	**1168.29**	**6921.37**
2.	Horticulture	**565.00**	**456.00**	**527.50**	**1548.50**
3.	Animal Resource Development	**978.36**	**682.59**	**581.57**	**2242.52**
4.	Fisheries	**748.33**	**840.04**	**885.96**	**2474.33**
5.	Agricultural Marketing	**353.00**	**353.00**	**353.00**	**1059.00**
6.	Sericulture	**760.00**	**760.00**	**760.00**	**2280.00**
GRAND TOTAL		**4007.03**	**4325.57**	**4276.32**	**16525.72**

1.6. Public Private Partnerships that can be envisaged in the proposed Plan

Public private partnership in the areas of capacity building, demonstration, farm mechanization, infrastructure development, marketing, food processing, animal resource development and marketing, protected cultivation etc. that can be envisaged in the plan are given below, block wise,

Block name	Type of private enterprise	Type of partnership
Andal	SHG/iduals etc.Co-operative/NGO/Private companies/ Individual	Seed production programme, mushroom production unit, oil extraction unit, pulse processing unit, rice processing unit for muri, chira etc., farm mechanization – combined paddy harvester.
Faridpur-Durgapur	SHG, NGO, SHG, NGO, Co-operative society, Private	Seed production unit, conditional Godown with capacity building
	Private	Food processing unit
	Co-operative society	Rural Godown
	Co-operative society	Farm mechanization
	Co-operative society	Agri-clinic(poly clinic), soil testing unit
Hirapur	SHG, NGO	Seed production unit and farmers training
	SHG, NGO	Vermicompost, minor irrigation, water harvesting
	SHG, NGO	Farm implement hub and specialized storage facility
	SHG, NGO	Fruit and vegetable production unit, food processing unit
	SHG, Private	Oil, pulse and maize processing unit
Kanksa	SHG. NGO, Co-operative Society, Private	Seed processing unit
	Capacity building	Vermicompost production, mushroom production
	Skill development of related SHG. NGO, Co-operative Society, Private bodies	Oil extractor unit, Dal processing unit, soil testing lab

1.7. Expected outcomes as a result of implementation of the Plan

- Above all, achieve the target of 11% growth in foodgrain over the period
- Increased cropping intensity from present level of 121% to 160%.
- More area under major, minor and micro irrigation.
- Ensured availability of quality seed and planting material.
- Increased cultivable area at 7% through use of fallow and waste lands, reclamation of problem soil
- Increased output per quanta of land and water resources
- Holistic dissemination of improved technology through farmer-farmer dissemination mode.
- Augmented entrepreneurship development through post harvest value addition of agricultural produce through group formation
- Increase in milk production by 8-10% through improved feed, disease, breed management
- Ensured value-chain for agricultural produces to augment farmers' income

INTRODUCTION

1. INTRODUCTION

1.1 Background and Planning Process

GLOBAL food demand is expected to be doubled by 2050, while production environment and natural resources are continuously shrinking and deteriorating. Across the larger part of the world, inadequate attention to agriculture has led to steep rise in food prices which shed an estimated 100 million more people into poverty. More than one billion people in the world already are earning less than one dollar a day, and more than 800 million are suffering from hunger. Majority of them live in rural areas, and are largely dependent on agriculture. Food crisis has aggravated further because of climate change and diversion of arable lands to urbanization and industrialization. Climate change is another area that has to be coped up with which are making millions of people, particularly in resource-poor areas, vulnerable, when their livelihood and food security is depending on agriculture. To increase food production, augment income of the poor and to alleviate poverty and malnourishment, heads of the governments during the World Food Summit 2008, had reaffirmed the commitment to address challenges of high food prices, climate change and bio-energy. Role of agricultural research, policy support and institutional innovations were cited for reshaping agriculture to meet future demand for food and to eliminate hunger.

Agriculture contribution in the gross domestic product is declining in India, which in 2008-09 touched at 15.7% from about 30% in 1990-91. During the last two decades, the average annual growth of agriculture sector was less than half (around 3%) of the overall average growth of the economy (6 - 7%). Industrial and service sectors have outpaced performance of agriculture sector during the last two decades. But the proportion of workforce engaged in agriculture did not commensurate with the decline of its share in the gross domestic product. At present also, agriculture sector provides employment to about 52 % of the workforce that used to be about 61% in 1990-91. These starkly different trends reveal that incomes in non-agriculture sector are growing faster than agriculture sector. And a sizable workforce from agriculture is needed to be shifted to non-agriculture sector for income and livelihood opportunities. Hence, in the country the research and development focus needs to be reoriented in a way to develop and promote those technologies that raise agricultural income and ensure employment opportunities in the agri-supply chain to a vast majority of the workforce.

Concerned over this pace of growth in agriculture and allied sectors, the National development Council (NDC), in its meeting held on 29th May 2007 resolved that a special Additional Central Assistance Scheme. i.e. National Agriculture Development Programme/Rastriya Krishi Vikas Yojna (RKVY) be launched.

- To incentivize the States for increasing public investment in Agriculture and allied sectors.
- To ensure that agricultural plans of Districts/States are prepared and are based on agro-climatic conditions, availability of technology and natural resources.
- To reduce the yield gap in important crops and increase production and productivity in agriculture and allied sectors through focused and holistic initiatives.
- To ensure the local needs/crops/priorities are better reflected in the agricultural plans of the District/States.

• To provide flexibility and autonomy to States in planning and implementation of agriculture and allied sector schemes.
• To maximize income of farmers in agriculture and allied sectors.

As per the NDC resolution Government of India introduced a New Additional Central Assistance Scheme to incentives States to draw up plans for their agriculture sector more comprehensively, taking agro-climatic conditions, natural resource issues and technology into account, and integrating live stock , poultry and fisheries etc. This involves a new scheme for Additional Central Assistance (ACA) to State Plans, administered by the Union Ministry of Agriculture over and above in existing centrally sponsored schemes to supplement the state specific strategies. In order to rejuvenate the agriculture during XIIth plan a growth rate of 4 percent per annum has to be achieved (as per NDC commitment) by reorienting development strategies that meet the needs of the farmers. The agriculture growth being essential element of the strategy of making growth more inclusive, the NDC advised the State Governments on preparation of Comprehensive District Agriculture Plans (C-DAP) which includes allied agriculture sectors with full and efficient utilization of available resources.

The concept of integrated local area plans (to raise living standard in rural area and over come food shortage) based on specific endowments and needs of each area mooted in 1st Five Year plan in 1951, could not be materialized in true sense as only sporadic efforts and isolated cases of such planning were practically attempted. For success of local area or District level plans the underlying constraints needed to be identified and required infrastructural investment, extension (and research system) revamping and market reach with the systems conduct and performance have to be synchronized through a holistic policy approach.

1.2. Methodology

The methodology of C-DAP has focused on understanding the latent potential of the district for development and identifying initiatives required. These potentials are treated as goals to be achieved with the available and additional resources. In order to prepare the plan, the district statistical compilation is very useful to chalk the plan taking care of all details thereby leading to the understanding of the development perspective of the district. Considering these the district vision was developed and the SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis was carried out blockwise for micro level planning. The strong point for KVK to formulate the plan was present of subject matter specialists of agriculture and allied aspects under one roof which is requisite for developing a comprehensive plan. The Agricultural Technology Management Agency (ATMA) at the district level amply facilitated the process of data collection and compilation for timely submission of the plan

Data collection and consultation:

For paucity of time, primary data from the Gram Panchayat level could not be collected comprehensively. Instead secondary level data were collected from the block level to make the plan comprehensive. All line department officials of department of agriculture at the block level submitted their block level plan to KVK for analysis and compilation of the plan. For the allied sectors plans were taken from the district level.

Although village/GP level plan was not collected primarily, the information gathered in the strategic research and extension plan were made use of for village level information in the different AES of the district. For ensuring farmers participation in the plan each agricultural blocks were requested to submit names of diffrent villages and 15-20 progressive farmers in each village for whom information can be collected for the respective blocks. Formal and informal meetings with Agriculture and line department staffs were held at various level at KVK and office of Deputy Director of Agriculture. With this participatory process the KVK officials collected primary and secondary data and related statistics needed for planning from different departments and other sources.

Revalidation of the data:

The primary as well as secondary data collected was cross-checked through triangulations and verified from information available with different government departments and PRA based exercises with personal contact with farmers or gathering information over phone.

Analysis and compilation of data into CDAP

Information thus collected were scrutinized for uniformity among block and necessary rectifications were done where called for. Thus evolved the Comprehensive District Agricultural Plan of the district of Paschim Bardhaman.

DISTRICT PROFILE

2. GENERAL DESCRIPTION OF THE DISTRICT

2.1. Introduction

The district is a recent addition to the list of the district in the state of West Bengal by diving the earstwhile district of Burdwan into Purba and Paschim Bardhaman. **Paschim Bardhaman district** is a predominantly urban mining-industrial district in West Bengal. The headquarters of the district is Asansol. It was formed on 7 April 2017 after bifurcation of the erstwhile Bardhaman district as the 23rd district of West Bengal. Some historians link the name of the district to the 24th and last Jain *tirthankara*, Mahavira Vardhamana, who came to preach in the area. Alternatively, *Bardhamana* means a prosperous and growing area. It was a forward frontier zone in the progress of Aryanisation by the people in the Upper Gangetic valley. *Paschim* means west.

The rocky undulating topography with laterite soil found in Paschim Bardhaman district is a sort of extension of the Chota Nagpur plateau. For ages the area was heavily forested and infested with plunderers and marauders. The discovery of coal in the 18th century led to industrialisation. Most of the forests in the coal-bearing areas have been cleared but some areas in the eastern part of the district remained thickly forested till more recent times and some are still there. The eastern part of the district gradually slopes down to the rice plains of the agriculturally rich Purba Bardhaman district.

The district comprises two subdivisions: Asansol Sadar and Durgapur.
Asansol is the district headquarters. There are 16 police stations, 8 development blocks, 2 municipal corporations, 62 gram panchayats in this district.
Other than municipality areas, each subdivision contains community development blocks which, in turn, are divided into rural areas and census towns. In total there are 66 urban units: 2 municipal corporations, 3 municipalities (which have subsequently been absorbed in Asansol Municipal Corporation) and 65 census towns.

There are two urban agglomerations (UA).

- Asansol, Kulti, Bhanowara, Jamuria, Jemari, Raniganj, Amkula, Murgathaul, Raghunathchak and Ballavpur together form the Asansol UA.
- Durgapur UA consists of Durgapur, Arrah, Bamunara, Amlajora, Kanksa, Panagarh, Mankar, Shibpur, Andal, Ukhra, Kajora, Pandabeswar, Ichhapur and Madhaiganj.

Asansol Sadar subdivision
Asansol Sadar subdivision has 10 police stations, 4 community development blocks, 4 panchayat samitis, 35 gram panchayats, 181 mouzas, 165 inhabited villages, 1 municipal corporation, 3 municipalities and 26 census towns+1 (partly). The single municipal corporation is at Asansol. The municipalities are at: Raniganj, Jamuria and Kulti. The census towns are: Chittaranjan, Hindustan Cables Town, Domohani, Bhanowara, Majiara, Pangachhiya, Charanpur, Kunustara, Topsi, Nimsa, Chinchuria, Kenda, Parasia, Ratibati, Chapui, Jemari (J.K. Nagar Township), Banshra, Belebathan, Chelad, Murgathaul, Amkula, Baktarnagar, Egara, Sahebganj, Raghunathchak, Ballavpur and Kendra Khottamdi (partly). The subdivision has its headquarters at Asansol.

According to the Kolkata Gazette notification of 3 June 2015, the municipal areas of Kulti, Raniganj and Jamuria were included within the jurisdiction of Asansol Municipal Corporation.

Durgapur subdivision

Durgapur subdivision has 6 police stations, 4 community development blocks, 4 panchayat samitis, 27 gram panchayats, 171 mouzas, 151 inhabited villages, 1 municipal corporation and 38 census towns+1 (partly). The single municipal corporation is at Durgapur. The census towns are: Siduli, Khandra, Chak Bankola, Ukhra, Mahira, Dakshin Khanda, Parashkol, Kajora, Harishpur, Palashban, Dignala, Andal (gram), Ondal, Baska, Bilpahari, Ramnagar, Dalurband, Baidyanathpur, Mahal, Konardihi, Nabgram, Sankarpur, Haripur, Chhora, Bahula, Mandarbani, Banagram, Sirsha, Nabaghanapur, Sarpi, Ichhapur, Arra, Gopalpur, Bamunara, Amlajora, Kanksa, Debipur, Prayagpur and Kendra Khottamdi (part). The subdivision has its headquarters at Durgapur.

Fig. 2.1. Administrative map of the district

2.2. District at a Glance

2.2.1. Location and geographical units

Location

The district of Paschim Bardhaman is surrounded on the north by Dumka (of Jharkhand), Birbhum and Murshidabad; on the east by Purba Bardhaman; on the south by Hooghly, Bankura and Purulia and on the west by Dhanbad (of Jharkhand) districts. The district has 2 agricultural sub-divisions. There are 8 nos. of agricultural blocks in the district.

The district being chiefly an industrial one, fairly large area in the district (53%) is under non-agricultural use. As compare to nearly 14% of total geographical area (TGA) under forest in the state, the district has 12% area under forest which is below ideal. Ideally at least 33% of TGA should be under tree cover and the country at present has 27% area under tree cover, rapt attention is to be given so that the district becomes greener. The Durgapur forests are continued in the Birbhum district beyond the Ajay while the forest area in the Asansol subdivision forms a part of the forest area of Dumka district of Jharkhand.

Table 2.1. Geographical units

Sub-Division	Police Station	C.D.Block / M.C. / M	Panchayat			Mouzas	Inhabited Villages	House-holds	Town			
			Samity	Gram	Gram Sansad				Municipal Corporation		Municipality	
						(2001)	(2001)	(2001)	No.	Ward	No.	Ward
Asansol Sub-Div.	**10**	**4/1/3**	**4**	**35**	**271**	**181**	**168**	**277977**	**1**	**50**	**3**	**80**
	Chittaranjan Salanpur	Salanpur	1	11	65	74	67	31176	-	-	-	-
	Barabani	Baraboni	1	8	70	49	49	20089	-	-	-	-
	Asansol (N)-P	Raniganj	1	6	60	12	12	20239	-	-	-	-
	Raniganj	Raniganj (M)	-	-	-	-	-	20368	-	-	1	22
	Jamuria	Jamuria	1	10	76	46	40	22180	-	-	-	-
		Jamuria (M)	-	-	-	-	-	23433	-	-	1	23
	Asansol (Woman) Asansol (N) Asansol (S) Hirapur	Asansol (MC)	-	-	-	-	-	89243	1	50	-	-
	Kulti	Kulti (M)	-	-	-	-	-	51249	-	-	1	35
Durgapur Sub-Div.	**6**	**5/1/0**	**5**	**36**	**492**	**258**	**248**	**263447**	**1**	**43**	**-**	**-**
	Budbud-P Galsi-P	Galsi - I	1	9	112	87	86	35570	-	-	-	-
	Andal Pandabeswar-P Durgapur	Andal	1	8	112	14	13	34676	-	-	-	-
	Faridpur New Township-P	Faridpur-Durgapur	1	6	73	54	51	21601	-	-	-	-
	Pandabeswar Andal-P	Pandabeswar	1	6	93	17	17	31308	-	-	-	-
		Kanksa	1	7	102	86	81	30367	-	-	-	-
	Durgapur Coke Oven	Durgapur (MC)	-	-	-	-	-	109925	1	43	-	-

	New Township											
2	**16**	**9/2/3**	**9**	**71**	**763**	**439**	**416**	**541424**	**2**	**93**	**3**	**80**

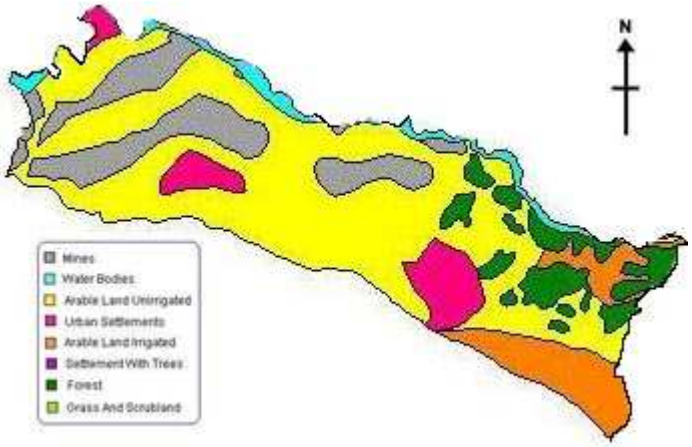
Geographical units

Sub divisions

Rivers

Roads

Geographical units



2.2.2. Demographic Profile

As per the 2011 Census of India data Paschim Bardhaman district, after bifurcation of Bardhaman district in 2016, had a total population of 2,882,031. There were 1,497,479 (52%) males and 1,384,452 (48%) females. Population below 6 years was 322,268.

As per the 2011 census data the total number of literates in Paschim Bardhaman district, after bifurcation of Bardhaman district in 2017, was 2,015,056 (78.75% of the population over 6 years) out of which males numbered 1,136,990 (85.44% of the male population over 6 years) and females numbered 806,010 (65.55% of the female population over 6 years).

In the 2011 census Hindus numbered 2,442,414 and formed 84.75% of the population in Paschim Bardhaman district. Muslims numbered 384,027 and formed 13.32% of the population. Christians numbered 12,636 and formed 0.44% of the population. Others numbered 42,954 and formed 1.49% of the population.

Table 2.2. Block wise population and household

Block	No of House Hold	Total Population	Total Male Population	Total Female Population
Area not under any Sub-district	484029	2276742	1176388	1100354
Barabani	25120	123598	63950	59648
Faridpur Durgapur	25591	115924	60478	55446
Jamuria	26102	123176	64578	58598
Kanksa	40438	178125	91350	86775
Ondal	39704	186915	98149	88766
Pandabeswar	34248	161891	84651	77240
Raniganj	21653	106441	55835	50606
Salanpur	35182	163057	83796	79261

Table 2.3. Caste-wise Population (Total Population)

Block	SC Population	SC Male	SC Female	ST Population	ST Male	ST Female
Area not under any Sub-district	372073	190360	181713	69221	34758	34463
Barabani	35629	18270	17359	17574	8671	8903
Faridpur Durgapur	36641	19005	17636	8073	4037	4036
Jamuria	37793	19391	18402	10272	5264	5008
Kanksa	62329	31830	30499	18239	9110	9129
Ondal	52518	27145	25373	7628	3827	3801
Pandabeswar	49189	25314	23875	10821	5441	5380
Raniganj	37491	19387	18104	9982	5039	4943
Salanpur	39294	20069	19225	17084	8440	8644

Table 2.4. Caste-wise Population (Rural Population)

Block	SC Population	SC Male	SC Female	ST Population	ST Male	ST Female
Area not under any Sub-district	0	0	0	0	0	0
Barabani	23889	12274	11615	13774	6811	6963
Faridpur Durgapur	27799	14348	13451	6322	3134	3188
Jamuria	23239	11907	11332	6476	3359	3117
Kanksa	42853	21971	20882	13605	6832	6773
Ondal	10773	5657	5116	1675	856	819
Pandabeswar	6759	3398	3361	4167	2054	2113
Raniganj	9270	4742	4528	3398	1722	1676
Salanpur	29461	14999	14462	13256	6557	6699

Table 2.5. Caste-wise Population (Urban Population)

Block	SC Population	SC Male	SC Female	ST Population	ST Male	ST Female
Area not under any Sub-district	372073	190360	181713	69221	34758	34463
Barabani	11740	5996	5744	3800	1860	1940
Faridpur Durgapur	8842	4657	4185	1751	903	848
Jamuria	14554	7484	7070	3796	1905	1891
Kanksa	19476	9859	9617	4634	2278	2356
Ondal	41745	21488	20257	5953	2971	2982
Pandabeswar	42430	21916	20514	6654	3387	3267
Raniganj	28221	14645	13576	6584	3317	3267
Salanpur	9833	5070	4763	3828	1883	1945

Table 2.6. Child Population (Total)

Block	Population under age of 6 yrs	Male population under 6 yrs	Female population under 6 yrs
Area not under any Sub-district	232323	120198	112125
Barabani	16192	8361	7831
Faridpur Durgapur	13309	6913	6396
Jamuria	15141	7904	7237
Kanksa	20210	10301	9909
Ondal	20893	10855	10038
Pandabeswar	19709	10095	9614
Raniganj	12885	6699	6186
Salanpur	17118	8880	8238

Table 2.7. Cultivators (Total Population)

Block	Main Cultivator Population	Main Cultivator Males	Main Cultivator Female
Area not under any Sub-district	7776	6913	863
Barabani	2837	2685	152
Faridpur Durgapur	3362	3205	157
Jamuria	3989	3740	249
Kanksa	5394	5032	362
Ondal	855	761	94
Pandabeswar	930	825	105
Raniganj	387	339	48
Salanpur	1370	1161	209

Table 2.8. Working Population (Total Population)

Block	Total Working population	Total Male Working population	Total Female Working Population	Total Main Workers	Male Main Workers	Female Main Workers
Area not under any Sub-district	770592	634529	136063	619126	534654	84472
Barabani	41506	34287	7219	27867	24531	3336
Faridpur Durgapur	40122	32902	7220	25911	23034	2877
Jamuria	41120	34231	6889	27671	24564	3107
Kanksa	75480	53636	21844	47064	38486	8578
Ondal	59131	50156	8975	43673	39049	4624
Pandabeswar	49850	41583	8267	35730	31644	4086
Raniganj	33361	28392	4969	25033	22314	2719
Salanpur	51058	43302	7756	39278	34446	4832

Table 2.9. Non-Working Population (Total Population)

Block	Non Working population	Non Working Males	Non Working Females
Area not under any Sub-district	1506150	541859	964291
Barabani	82092	29663	52429
Faridpur Durgapur	75802	27576	48226
Jamuria	82056	30347	51709
Kanksa	102645	37714	64931
Ondal	127784	47993	79791
Pandabeswar	112041	43068	68973
Raniganj	73080	27443	45637
Salanpur	111999	40494	71505

2.2.3. Topography and Agro Climatic Characteristics

Topography:

Paschim Bardhaman district with its varied tectonic elements and riverine features, is a transitional zone between the Jharkhand plateau which constitutes a portion of peninsular shield. In general the Jharkhand plateau consists of the metasedimentary rocks of precambrian age, Gondwana sedimentary rocks, Rajmahal basalts and upper tertiary sediments. Laterite has developed on these older rocks as well as on early Quaternary sediments. The western half of the district resembles a promontory jutting out from the hill ranges of Chotonagpur plateau and consists of barren, rocky and rolling country with a laterite soil rising into rocky hillocks, the highest being 227 m. These diversify the otherwise monotonous landscape and lend a special charm to the skyline around Asansol subdivision. Ajoy-barakar divide is a convex plateau, the

average altitude being 150 m. The gradient is westerly to the west and to the east it is northerly towards Ajay and southerly towards Damodar below the latitude. The Ajoy- Damodar inter-stream tract is made up of several stows consisting of vales and low convex spurs which run in almost all directions except north-east and thus lends a very complicated character to local relief.

weathering of pegmatite, quartz veins and conglomeratic sandstones, where as sandy soil characteristic of granite rocks and sandstones. This soil is of reddish colour, medium to coarse in texture, acidic in reaction, low in nitrogen, calcium, phosphate and other plant nutrients. Water holding capacity of this soil increases with depth as well as with the increase of clay portions.

Paschim Bardhaman is one of the premier districts in India in terms of value of mineral. The Raniganj coalfield was the birth place of the Indian coal industry. Besides coal ,important minerals found in the district are iron ores, calcium carbonate, abrasives, silica bricks and moulding sands, glass sands, building materials, manganese, bauxite, laterite etc.

Table 2.10: Land classification according to location

Land classification according to location		
a	high land	19033 ha
b	medium land	21745 ha
c	low land	9906 ha

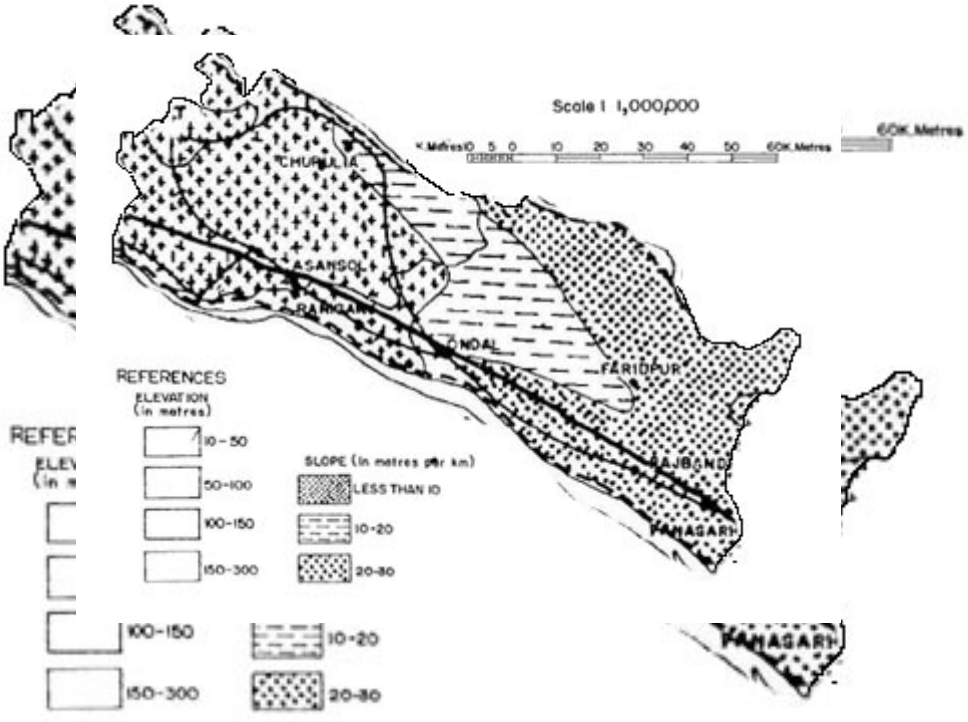


Fig. 2.2. Topographical map of Paschim Bardhaman

Agro- climatic condition

The district experiences a climate which is transitional between CWg and AW types, where 'C' stands for 'warm temperate rainy climates with mild winter', 'W' for 'dry winter not compensated for by total rain in the rest of the year', 'g ' for 'eastern Ganges type of temperature trend' and 'AW ' for 'tropical savanna climates'. Average temperature in hot season is 30°C while at the cold season is 20°C. Average rainfall is 1186 mm. The cold season starts from about the middle of November and continues till the end of February. March to May is dry summer intervened by tropical cyclones and storms. June to September is wet summer while October and November is autumn.

Main crops of the district are autumn rice and wheat.

Total geographical area in the district is 160300 ha out of which about 47% is cultivated. Total of 48040 ha is net cropped which is about 64% of cultivable area. Gross cropped area is about 58354 ha thereby rendering the cropping intensity to 121% only. This pertains from the fact that the distict is much underdeveloped as regards irrigation which is about 12.3% of net cropped area in the district. The Durgapur barrage and Mithon dam have formed two large reservoirs at the south-western and western periphery of the district.

2.2.4. Land Use pattern and Land holdings

Table 2.11. Land use pattern of the district

(Area in thousand hectares)

Year	Block	Reporting Area	Forest Area	Area under Non-agricultural use	Permanent pastures & other grazing land	Cult. waste land	Fallow land other than current fallow	Current fallow	Net area sown
2012-13	Barabani	15.457	1.318	5.450	0.542	0.183	0.313	0.62	7.031
	Faridpur Durgapur	15.728	2.539	2.289	0	0.406	0	0.367	10.127
	Jamuria	14.25	0	5.076	0	0	0	0.3	8.874
	Kanksa	24.62	8.18	3.2	0.07	0.018	0.12	0.07	12.8
	Ondal+Pandaveswar	17.923	0.08	14.183	0.065	0.06	0.03	0.015	3.3
	Raniganj	8.406	0.02	6.406	0	0.2	0.1	0.012	1.277
	Salanpur	10.2	0.276	3.824	0.057	0.4	0.399	0.584	4.65
	Total	**106.584**	**12.413**	**40.428**	**0.734**	**1.267**	**0.962**	**1.968**	**48.059**
2013-14	Barabani	15.457	1.318	5.450	0.542	0.183	0.313	0.651	7.000
	Faridpur Durgapur	15.728	2.539	2.289	0	0.406	0	0.367	10.127
	Jamuria	14.25	0	5.076	0	0	0	0.3	8.874
	Kanksa	24.59	8.16	3.35	0.06	0.16	0.105	0.055	12.7

	Ondal+Pandaveswar	17.923	0.085	14.383	0.06	0.11	0.04	0.03	3.215
	Raniganj	8.406	0.02	6.406	0	0.2	0.1	0.012	1.277
	Salanpur	10.2	0.276	3.824	0.057	0.4	0.399	0.584	4.65
	Total	**106.554**	**12.398**	**40.778**	**0.719**	**1.459**	**0.957**	**1.999**	**47.843**
2014-15	Barabani	15.457	1.115	5.950	0.542	0.183	0.417	0.750	6.500
	Faridpur Durgapur	15.728	2.539	2.289	0	0.406	0	0.367	10.127
	Jamuria	14.25	0	5.076	0	0	0	0.3	8.874
	Kanksa	24.5	8.15	3.5	0.05	0.15	0.1	0.05	12.5
	Ondal+Pandaveswar	17.923	0.095	14.383	0.05	0.11	0.04	0.05	3.195
	Raniganj	8.406	0.02	6.406	0	0.2	0.1	0.012	1.277
	Salanpur	10.2	0.276	3.824	0.057	0.4	0.399	0.584	4.65
	Total	**106.464**	**12.195**	**41.428**	**0.699**	**1.449**	**1.056**	**2.113**	**47.123**

Table 2.12. Operational holding in the district

Block	S I Z E - C L A S S												Average size of holdings (hect.)
	Marginal		Small		Semi-medium		Medium		Large		Total		
	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	
Barabani	4933	2702	1325	2180	319	818					6577	5700	0.87
Faridpur Durgapur	4255	2700	4550	1950	1470	1525	1251	2750	750	3750	12276	12675	1.03
Jamuria	7145	4514	1833	3141	447	1151	30	173	18	195	9473	9174	0.968
Kanksa	5380	3062	1537	2459	1046	2915	8	41	2	185	7973	8662	1.086
Ondal	1450	1320	250	340	25	70	5	25	0	0	1730	1755	1.014
Pandabeswar	1220	1120	245	345	20	50	5	30	0	0	1490	1545	1.037
Raniganj	1891	880	146	231	26	63	0	0	7	103	2070	1277	0.617
Salanpur	3304	1783	695	1092	51	125	0	0	0	0	4050	3000	0.74
Total	**29578**	**18081**	**10581**	**11738**	**3404**	**6717**	**1299**	**3019**	**777**	**4233**	**45639**	**43788**	**0.959**

2.5. Irrigation and Ground water

Only 12.3% of et cropped area is under irrigationThe Durgapur barrage and Mithon dam have formed two large reservoirs at the south-western and western periphery of the district.

Table 2.13. Yearwise area under different kind of irrigation

Year	Block	Area irrigated by						
		Govt.Canal	HDTW	MDTW	LDTW	STW	RLI	Total
2010-	Barabani	0	0	0	0	0	2	2

11	Faridpur Durgapur	331.42	0	0	0	0	166.88	562.3
	Jamuria	0	0	0	0	0	0	200
	Kanksa	2000	--	--	100	1100	800	4000
	Ondal+Pandaveswar	0	0	0	0	60		60
	Raniganj	0	0	0	0	0	30	30
	Salanpur	0	0	0	0	0	0	0
	Total	2331.42	0	0	100	1160	998.88	4854.3
2011-12	Barabani	0	0	0	0	0	2	2
	Faridpur Durgapur	331.42	0	0	0	0	166.88	562.3
	Jamuria	0	0	0	0	0	0	200
	Kanksa	500	0	0	120	1050	900	2570
	Ondal+Pandaveswar	0	0	0	0	60	0	60
	Raniganj	0	0	0	0	0	30	30
	Salanpur	0	0	0	0	0	0	0
	Total	831.42	0	0	120	1110	1098.88	3424.3
2012-13	Barabani	0	0	0	0	0	2	2
	Faridpur Durgapur	331.42	0	0	0	0	166.88	562.3
	Jamuria	0	0	0	0	0	0	200
	Kanksa	2600	0	0	150	1150	950	4850
	Ondal+Pandaveswar	0	0	0	0	50	0	50
	Raniganj	0	0	0	0	0	0	0
	Salanpur	0	0	0	0	0	0	0
	Total	2931.42	0	0	150	1200	1118.88	5664.3

2.6. District Income

The district is mainly an industrial one.

Table 2.14. Sub division and block wise net collection from net savings

Asansol Sub-Division	**34,477**
Salanpur	1,609
Barabani	1,111
Raniganj	607
Jamuria	310
Kulti (M)	2,418
Asansol (M.C.)	25,707
Raniganj (M)	2,501
Jamuria (M)	213
Durgapur Sub-Division	**27,195**
Galsi-I	815

Andal	2,324
Faridpur-Durgapur	152
Pandabeswar	2,123
Kanksa	1,738
Durgapur (M.C.)	20,043

Table 2.15. Block wise cooperative societies in the district

Name of Block	No. of Co-operative Societies	No. of Members	Working Capital ('000 Rs.)
Salanpur	40	18475	212511
Barabani	21	1799	6837
Raniganj	42	11321	237971
Jamuria	23	8245	35389
Andal *	90	25769	137710
Faridpur-Durgapur	469	54800	1068475
Pandabeswar	..	..	..
Kanksa	57	9280	19315

Table 2.16. Block wise commercial and gramin banks in the district

Name of Block	Number of Bank offices		Population served per Bank office(Commercial & Gramin) (No. in thousand)
	Commercial Bank	Gramin Bank	
Salanpur	7	2	17
Barabani	5	2	16
Raniganj	12	2	7
Jamuria	10	1	10
Andal	8	-	21
Faridpur-Durgapur	5	2	15
Pandabeswar	9	-	16
Kanksa	9	3	13

2.3. Development Vision and Strategy

2.3.1. Vision of CDAP

Doubling farmers' income by 2022

Indian Agriculture plays a vital role in the country's economy. Farming is the most important enterprise in our country and farmers are an integral part of our country. Over 58% of rural households depend on agriculture as their principal means of livelihood in India. So far the strategy for development of agriculture sector in India has focused primarily on raising agricultural output and improving food security. Agriculture, along with livestock, fisheries and forestry, is one of the largest contributors to the Gross Domestic Product (GDP). As per the 2nd advance estimates by the Central Statistics Office (CSO), the share of agriculture and allied sectors (including agriculture, livestock, forestry and fishery) was 17.3 per cent of the Gross Value Added (GVA) during 2016-17 at 2011-12 prices. During the period of last 50 years from 1965 to 2015, since the adoption of green revolution, India's food production multiplied 3.7 times while the population multiplied by 2.55 times. During the green revolution the population was about 400- 500 million; now it is 1,300 million and it is predicted to be 3 billion by 2030. The net result has been a 45% increase in per person food production, which has made India not only food self-sufficient at aggregate level, but also an exporting country (NITI Policy Paper No. 1/ 2017 of National Institution for Transforming India (NITI), GoI, New Delhi). While the country achieved commendable position in food production, farming itself turned non-profitable overtime due to rising costs and uneconomical holdings. Farmers' income remains low in relation to income of those working in the non-farm sector. Low level of absolute income as well as deteriorating disparity between income of a farmer and non-agricultural worker constitute an important reason for the emergence of agrarian distress and farmers' unrest in the country. The low and highly fluctuating farm income is causing detrimental effect on the interest in farming community and is also forcing more and more cultivators, particularly young generation, to leave farming. This can cause serious adverse effect on the future of agriculture in the country. In this background, the goal set to double farmers' income by 2022 is central to promote farmer's welfare, reduce agrarian crisis and bring parity between income of farmers and those working in non-agricultural professions. Hence, the paradigm has changed from food security to income security for the farmers.

The per capita income of the people involved in agriculture is almost one third of an average Indian. Further, within the agriculture sector, the inequitable distribution of landholdings (85 per cent of small/ marginal farmers cultivating in 45 per cent of area) makes the small and marginal farms the poverty hotspot of the country. Hence, every effort to inclusive growth has to address the income enhancement in agriculture and those weak, within the sector. The Government of India (GoI) announcement of doubling farmers' income by 2022, having a direct impact on almost half of the population, comes as an endorsement of the above strategy, aiming for a sense of income

security to farmers in a time bound manner to reduce agrarian distress and promote farmers' welfare.

The subject has attracted of lot of attention, generating thoughts and debates on policy, strategy and implementation to achieve the goal. There are hardly any data sources that can give income estimates for farmers. The major source of information on income of farmers based on large sample survey is Situation Assessment Survey (SAS) by National Sample Survey Office (NSSO) conducted during 2002-03 for the first time and repeated during 2012-13. Total income per an average agricultural household grew annually at 11.75 per cent from to Rs.77,112 during 2012-13 from Rs.25,380 during 2002-03. That is, it doubled in about 6 years. However, when measured in real terms (after neutralising the effect of inflation), the income growth was 5.24 per cent and doubling of income would take 14 years at this rate. Large farmers took less number of years to double their incomes compared to lower marginal farmers. And, one must note that 85% of the operational holdings in the country are marginal and small. The growth rates in income of farm households across major States of the country varied from 6.71 per cent in West Bengal to 17.48 per cent in Haryana. Income doubling time is 8 to 11 years for States like West Bengal, Assam, Bihar and Jharkhand.

Some economists suggested that if anything is to be doubled by the year 2022- 23, it will require an annual growth rate of 10.41 per cent. During the past 22 years, between 1993- 94 and 2015- 16, farmers' income in nominal terms increased 9.18 times. Farm income increased at different rates in different periods depending upon the growth rate in output, increase in wage bill, and changes in prices received by the farmers relative to the changes in consumer price index for agricultural labour. According to NITI Policy Paper No. 1/ 2017 of National Institution for Transforming India (NITI), GoI, New Delhi, it is documented that if inflation in agricultural prices is high, farmers' income in nominal terms will double in a much shorter period. In the last 30 years, farmers' income at nominal prices almost doubled in five years twice, one during 1987- 88 to 1992- 93 and then during 2004- 05 to 2009- 10. Inflation in agricultural prices also leads to increase in real farm income if agricultural prices received by the farmers increase at a faster rate relative to the prices paid by the farmers, i.e. when terms of trade for agricultural improves. In a situation where non-agricultural prices do not rise, or rise at a very small rate, the growth in farmers' income at real prices to be almost the same as in nominal prices. Anyway, the government's intension seems to be to double the income of the farmers from farming in real terms.

Doubling real income of the farmers till 2022- 23 over the base year of 2015- 16, requires annual growth of 10.41 per cent in farmers' income. This implies that the on-going and previously achieved rate of growth in farm income has to be sharply accelerated. Therefore, strong measures will be needed to harness all possible sources of growth in farmers' income within as well as outside agriculture sector. According to NITI Policy Paper No. 1/ 2017 of National Institution for Transforming India (NITI), GoI, New Delhi, the major sources need to be increased by 2022 within agriculture sector are:

(i) increase in productivity of crops by 4.1 per cent each year,
(ii) increase in productivity of livestock by 6.0 per cent each year,

(iii) improvement in efficiency of input use, or saving in cost of production by 3.0 per cent
each year,
(iv) increase in cropping intensity by 1.3 per cent each year,
(v) diversification towards high value crops by 5.17 per cent each year.

The increase of sources outside agriculture includes:

(i) shifting of cultivators from farm to non- farm occupations by 2.4 per cent each year,
(ii) improvement in terms of trade for farmers or better price realisation by 17.0 per cent each year.

Doubling farmers' income by 2022 is quite challenging, but it is needed and is attainable. The whole programme may be undertaken focusing **three broad strategies**:

(i) Strategy I: Development initiatives including infrastructure,
(ii) Strategy II: Technology generation and dissemination,
(iii) Strategy III: Policies and reforms in agriculture.

2.3.2. Discussion on strategies to fulfill the vision

2.3.2.1. Strategy I: Development initiatives including infrastructure

2.3.2.1.1 Irrigation facilities

- Purba Bardhaman has a geographical area of about 542100 ha out of which 74% is cultivable area. Net cropped area of the district is about 3,9 lakh ha which is 97% of cultivable area. About 3.6 lakh ha is under assured irrigation which is abut 93% of net cropped area.

The main source of irrigation is govt. canals covering 2.32 lakh ha with RLI, DTW, STW and tanks cumulatively accounting for 1.28 lakh ha.

With the objective of providing water to every field, Pradhan Mantri Krishi Sinchai Yojana (PMKSY) has been launched on July 1, 2015 to provide end to end solution in irrigation supply chain, water resources, network distribution as well as farm level application. PMKSY, not only focusses on resource building for assured irrigation, but also on the water conservation through rain water harvesting for protected irrigation.

• In view of the climate change driven erraticness in precipitation, groundwater availability will be a major concern in the coming years. Simulataneous emphasis on irrigation with surface water should be strengthened upon. Water harvesting structures (10 % of a farming unit), farm pond may be done utilizing fund from MNREGA and RKVY. In areas, where there is no electricity, solar energy operated pump may be explored.

• Although the district is endowed with good irrigation facility, crop water use efficiency and water budgeting for crops remains a major issue to be addressed. Emphasis is to be given on increasing water use efciency of crops like, potato, oilseeds and pulses through micro irrigation. The modern irrigation systems, drip and sprinkler

can act as a mitigation measure. The component of 'More Crop Per Drop' in Pradhan Mantri Krishi Sinchai Yojana (PMKSY) should be astutely emphasized among farming community for efficient water use.

• The largest share of energy is utilized for pumping of irrigation water. Micro/ precision irrigation system could be installed with solar energy system to utilize available ground water/ surface water to the maximum possible extent for increase in horizontal coverage as well as cropping intensity.

2.3.2.1.2. Farm mechanization

• Due to continuing fragmentation, the average size of operational holdings is shrinking in the district and the percentage of marginal, small and semi-medium operational holdings is increasing. This is making individual ownership of agricultural machinery progressively more difficult. Hence, cooperative farming modalities should be chalked out to use heavy machineries like, laser guided land leveler and others. Similarly emphasis is to be placed on use of small implements to reduce cost of cultivation as much as possible. The scope for mechanization exits in cultivation of almost all the major crops grown grown in the district, viz. paddy, mustard, groundnut, potato, jute etc. There is also scope of mechanization of horticultural crops mainly for crop protection and harvesting operations.

• The exiting level of available farm power is about 1.25 KW/ ha which is inadequate to enhance the cropping intensity and output of the farm sector. This level needs to be raised to 3.0 KW/ ha by 2022.

• There is a need of establishment of more and more custom hiring centres for making available of laser land leveler, tractors, potato transplanter, power tillers, rice transplanter, reapers, threshers, sprayers, power sprayers, power weeder, grass cutters, fruit pluckers, mini trucks to the farmers on a cooperative mode. Rs 25,000/ ha may be saved annually from the custom hiring centres. Mechanization options that allow direct sowing, minimum/reduced tillage, land levelling, retention of crop residues will result in sustainable economic growth. The outstanding success of no-till and conservation agriculture practices is a good example of the approach to be taken.

• Ergonomic tools and women-friendly tools in farming operations that could significantly enhance human labour productivity should be introduced through some programs.

• Govt. subsidy may be offered to the interested farmers for purchasing farm implements.

• Training needs to be imparted to the farmers on use of farm machineries along with maintenance and their repair.

• Mini Rice Mill with a capacity of 500 -1000 kg/hr may be installed at the gram panchayat level and facility of milling to be made available to the farmers.

• Oil and dal mill may be established at the gram panchayat level so that farmers will be interested to grow Toria /Mustard, Lentil and Arhar in a large.

• There is an emerging nuiscence of buring rice crop residue in the district. This not pnly hurts the human environment but the soil environment as well. If this continues, sustainability of production would be a major concern in the district, like is Punjab and Haryana. Machines like redsidue binder should be an essential implement I the custom hiring centres to overcome this problem.

2.3.2.1.3. Fertilizers

• Restoration of soil fertility is the need of the hour all over the world, especially in the context of food security. The consumption of fertilizers in the district has been rising over the years. The importance of organic manure and bio-fertilizers has increased to enhance organic carbon content and microbial activities in the soil so that it becomes more responsive to crop production practices. Organic inputs not only reduce cost of production, but also help in healthy food production being environment friendly. Emphasis is to be given on production of organic ammendments and necessary incentivizing measures should be adopted.

• Soil testing infrastructure facilities at district and block level for comprehensive soil analysis need to be strengthened and soil health card based Site Specific Integrated Nutrient Management may be introduced.

2.3.2.1.4. Feeds and fodders

• Good quality feed ingredients like maize, soybean oilcakes to the animals for exploiting the potential of the breed is the need of the hour.

• Availability of feed at affordable rate is a serious constraint in livestock and fish farming. Govt. may take initiative to establish cattle, pig, poultry, fish and shrimp feed manufacturing units and thus produce and make available of animal feed at reasonable rate for the farmers. This can be done either through private sector investment or PPP mode with government providing basic infrastructure.

• A small demonstration unit should be established in each block of the district for production and conservation of fodders through silage/ hay.

• Emphasis is to be given on capacity building of farmers on production of fodder and improved concentrate feed made from locally available sources.

2.3.2.1.5. Hatcheries and other infrastructures

• The district of Purba Bardhaman has large scope for inland fisheriesin tanks, reservoirs or canals. There is a good scope of setting up more number of hatcheries in for seed production and meeting the demand.

• Low cost portable carp hatchery like CIFA model or 'Chandra Hatchery' should be made popularized among farmers for meeting site specific demand.

• Private-Public partnership should be encouraged for production of concentrated fish feed.

2.3.2.1.6. Strengthening network of diagnosis, treatment and control of diseases in livestock, poultry birds and fishes

• Prophylaxis health coverage and regular deworming are to be strengthened for maintaining animal health.

• Establishment of additional Pathological Laboratories at Sub-Divisional level may be helpful for disease diagnosis in livestock and poultry birds.

• There is a need of up-gradation of existing Animal Health Centres to deliver updated treatment facilities.

• Mobile veterinary clinics and services should be implemented in the block level.

2.3.2.1.7. Storage facilities

• The district is one of the leading in potato production. Yet there is not sufficient infrastructure for storage of potato thereby compelling farmers going for distress sale. Private-Public partnership should be encouraged for establishing storage infrastructures for perishable commodities like potato. Also the district is coming up in a big way regarding onion production. Hence, proper storage infrastructure for onion storge may be ensured.

• Government should ensure better post harvest management to the farmers. To avoid undesirable spoilage of a significant loss of perishable horticultural crops and also for greater realization of prize of the commodities produced by the farmers, it is necessary to create facilities for better post harvest care and management which include creation of on farm handling unit, collection centres, cool chamber, bulb stores, provision of motorized, vending card, organizing aggregators etc.

• There is enough investment opportunity for setting up ice plants, cold storages, insulated vans for dedicated chain of retail market for fish trading. It is necessary to establish multipurpose cold storage facilities for fish preservation either through private sector investment or PPP mode with government providing basic infrastructure.

• Considering the acute energy crisis and the non-availability of abundant cool storage facility, low cost/ low energy environment friendly commercial size (6-8 ton capacity) cool chambers may be promoted. Just like the Pusa Zero Energy Cool Chamber; this chamber can also reduce the temperature and maintain high humidity throughout the year and can increase the shelf life and retain quality. The commercial size cool chamber has already been found to be useful for the storage of citrus, banana, potato, tomato etc.

and during the rainy season onion can be stored if water supply is stopped in the big cool chamber.

2.3.2.1.8. Food processing units

• Most of the food grains are being processed and has enormous potential to improve their processing efficiency. At present, rice milling installed capacity is inadequate. Maize processing is insignificant despite high demand for starch, corn oil, corn flacks and poultry feed. Existing fruits and vegetable processing units are engaged in the manufacturing of fruit juices, fruit pulps, squashes, jam/jelly, fruit beverages, pickles, tomato sauces/puree/paste, etc. However, most of the agro-processing units are unorganized. It is essential to develop necessary infrastructure in this sector including setting up of R&D laboratories. Grant is needed for setting up/expansion/modernization of existing food processing industries for development new products.

• Minimum 10% of the funds for any such scheme should be earmarked for food processing sector. There should be block level infrastructure for the establishment of primary food processing center in the district.

• Value addition to the farm produces could be the boon for the additional income of the farmers. Enhancing income of farmers through value addition, product diversification and entrepreneurship development must be the thrust areas. Block level clusters may be formed keeping in view the available major farm products for establishment of primary/secondary food processing units or value addition units, like muri mill, value addition of fruits. The groups/clusters shuld be suitably incentivized for the purpose. Processing and value-addition through development of products like flakes, granules, powder, chips, french fry from potato; sauce, ketchup, paste, puree from tomato; pickles from mixed vegetables, dehydration of cabbage, cauliflower, onion *etc.* for meeting demands in domestic and export markets thus saving from gluts and generate more employment opportunities among rural women and youth.

• The district is endowed with good dairy resources. But the productivity is much belo par. To accentuate development of this sector, apart from measures like improved breed and feed management, necessary value addition units for producing milk products should be established in PPP mode.

• The problem for fishery sector again is the lack of organized infrastructure in terms of automated and hygienic processing units. With its tropical climate and proximity to ports, the district has the potential to develop into a significant producers of processed fish, value added fish and meat products in the state. Excellent investment opportunities are there for setting up large scale fish and meat processing units and by products.

2.3.2.1.9. ICT based agri-extension portal

• The use of Information and Communication Technologies (ICTs) for agricultural extension is one way of addressing the information needs of farmers. ICTs can directly support farmers' access to timely and relevant information, as well as empower the farming community itself. The public, private, and non-governmental organization

(NGO) extension services will be able to increase their effectiveness by using these ICT tools.

• ICT based agri-extension portal, a dynamic platform is to be used massively to disseminate crop, livestock and fishery related solution to the farmers at farm-gate level. The 'Matir Katha' app in this respect is very useful to the farmers. Likewise similar app based information portal may be developed for knowledge enhancement of farmers.

• A comprehensive database of famres in village level should be built with all possible information for micro level planning and development..

• Marketing forms a key issue in any agrarian development. Market intelligence will provide information on what to grow, where to grow, how to grow, when to grow, where to sell, at what price to sell etc. The farmers are to be provided with the latest market updated for their products with the use of the modern ICT tools.

• An *e-pashudhan haat* portal has also been launched by the Central Govt. since November, 2016 to link the breeders of indigenous breeds and farmers, under which so far 43 million semen doses have been sold. Over 17000 full details of cow and buffalo are also made available on this portal, so that an interested farmer could purchase them transparently. Efforts is to be given on registering successful animal growers on this portal in the district level.

• The Call Centre are to be strengthened and reorganised with the help of technical staff so that the queries can be answered in the specific manner on the best packages of practices, post-harvest technology, general agricultural news, crop insurance schemes and information on Government's agricultural development programmes.

2.3.2.2. Strategy II: Technology generation and dissemination

2.3.2.2.1. Availability of quality certified seeds/ planting materials

• Being an agrarian district with relatively high level of cropping intensity and diversified crop production, the production and productivity has a direct correlation to the availability of quality seed which forms the critical production input. It is well documented that improved seed quality alone can increase 20% crop yield. The most important component in increasing crop production and productivity resulting in increase in farmers' income is 'quality seed'.

• Production of certified seeds should be de-centralized. Emphasis needs to given on decentralized production through ***"seed village concept"*** with active involvement of progressive farmers, farmers' clubs, PACs/ societies. Active involvement of district KVK both in production as well as extending technical support to farmers/ other agencies should be ensured.

• The State is emphasizing for self sufficiency in quality seed production. Production of certified seed should be continued in the Government Farms as well as in farmer's field with proper seed testing, seed processing, and storage facilities. Seed certification wing has to be strengthened by means of laboratory support and HR support. Accredited seed testing laboratories should come up in both private sector and/ or PPP mode to cope up

with the tight time schedule and demand for quality.

• It is essential to put a system of recognition of nurseries in place to facilitate, promote and monitor production and trade of quality planting materials of conventional vegetable crops/ fruit plants. Thus it is necessary to strengthen the infrastructure facilities of public sector stakeholders like KVKs etc. to ensure the availability of quality planting materials among the vegetable growers.

• There is a need for standardization of location specific potato seed production technologies in the district to ensure timely availability of quality seed on long term basis.

• Training needs to be imparted to generate awareness among the farmers about the benefit in the use of quality seed/ planting materials.

2.3.2.2.2. Soil health and nutrient management

• Soil deterioration is a major challenge in the district for sustaibnable productivity. There is large scale variation in major nutrients in difffrent part of the district with some essential micro nutrients content in soil is on the wane. Restoration of soil fertility is the need of the hour all over the world, especially in the context of food security.

• Soil testing and issue of 'Soil Health Card' to all farmers has to be done to take stock of the soil health status at a regular interval. Scheme like 'Swasth Dhara- Khet Hara' has been launched to maintain the soil health fertility where in Soil Health Cards are being issued to the farmers.

• Based upon soil test results (pH of soil) necessary liming programme should be taken. Basic slag can be an alternative cheap source of liming material produced by the steel plants. Suitable infrastructres should be made in the district for transport of this idutrial waste and grinding them into proper size fraction for end use of farmers.

• Site Specific Integraed Nutrient Management (SSINM) practices in rice, pulse, oilseeds production needs to be popularized.

• Use of organic manure in the soil would be the effective step in maintaining the health of the soil. Composting, vermicomposting, use of Farm Yard Manure, use of green manure crops, green leaf manuring etc., would be promoted as part of it. The availability of these types of natural organic manures is to be assured by employing effective mechanisms and logistic networks so that the organic content of the soil is increased to the level ideal for shifting towards 'Organic Farming' without affecting the returns. Suitable incentive/subsidy schemes should be in place for encouraging farmers to produce organic ammendments.

2.3.2.2.3. Technologies for conservation and management of natural resources

• Effective use of land and water is fundamental to growth and sustainable development. Soil and water conservation, agriculture development and allied activities like animal husbandry, pisciculture, etc, will be carried out in an integrated manner with a full involvement and participation of the farmers. The programmes should aim at improving water, soil, biomass and other natural resources which would help the

rural livelihoods and institutionalizing and scaling up participatory approaches and processes in natural resource management with a focus on livelihoods.

• It is important to preserve and promote traditional varieties of crops.

• Intervention is needed for increasing productivity of land by mixed cropping, cover cropping, crop rotation, conservation tillage and leveling.

• Different types of plant protection chemicals are being used by the farming community in the district. These plant protection chemicals severely affect the bio resources available in soil and water. Pesticide residues are being found increasingly in our farm produces posing a threat to human health. Use of chemical pesticide needs to be declined. Use of bio-pesticide and botanical pesticide is being emphasized.

• Awareness, training and capacity building of the farmers are to be organized on use and management of natural resources.

2.3.2.2.4. Integrated Farming System (IFS) approach

• For the small and marginal farmers of the State, IFS approach involving integration of crops + cattle + fish + duck for lowland situation may be promoted to augment the farmers' income.

•IFS model needs to be promoted involving synergic blending of crops, horticulture, dairy, fisheries, poultry, etc. which is a viable option to provide regular income and at site employment to small land holder, decreasing cultivation cost through multiple use of resources.

• Integrated fish farming especially poultry/duck/pig/dairy/paddy-cum-pisciculture with horticulture and seasonal vegetables on the embankments may be encouraged. This will encourage organic fish farming and simultaneously utilize a number of organic wastes including domestic sewage thus enabling eco-restoration.

• In-situ crop residue incorporation should be encouraged.

2.3.2.2.5. Utilization of rice fallow area

• Although the irrigation facility in the district is excellent, large area amounting to 2.32 lakh ha is irrigated by means of canals. Climate change, slowly but surely, is altering the precipitation regime thereby making non-availbility of sufficient water in the reservoirs. As such ensuring release of water in the boro season is often becoming irregular and large area in the district remains fallow after *Kharif* rice. So, there is a fairly good scope to utilize reice-fallow area for pulse production in West Bengal.

• A very/ super early pulse crop (lentil/ green gram) should be sandwiched between early/ medium kharif paddy and boro paddy in the cropping sequence.

• Location specific 2nd crop (pulse/ oilseed/ maize) should be selected in the rice fallow area so as to cover entire rice fallow in the district. It may be grown as paira crop or as sole crop sown by zero/ minimal tillage method.

• Where late kharif paddy is in practice or where high residual moisture is retained up to the end of November, sunflower/ summer green gram can be a good alternative to cover the fallow.

2.3.2.2.6. Crop diversification and cultivation of high-value crops

• Adaptation of rice based profitable crop sequence; preferably including one leguminous pulse crop can be an additional source of income. Cereal or other crops in the prevailing rice- wheat cropping systems may be replaced with high yielding varieties of pulses. Short duration varieties of pulses as catch crop may be included. Cultivation of pulses in the irrigated area in rabi season may be increased. The cropping intensity by incorporating short duration forage crops in rice based cropping sequence (e.g. Rice- Grass pea- Vegetables) may be improved. Pigeonpea may be cultivated on bunds.

• Crop diversification such as pulses, oilseeds, vegetables, tuber crops may be brought under massive programme.

• Inter-cropping with the growing of two or more crops simultaneously in the same field may be encouraged. Generally, individual crop yield slightly less when intercropped, but total productivity is higher than in monoculture. Enhancement of cropping intensity uniformly from 184 % to 200 -250 % in all sorts of land and training to the farmers for accepting the need of intercropping in various area should be organized. Fruits, vegetables and even spices can give relatively higher profit than cereals and pulses. To increase additional production of vegetables and to make vegetables available round the year there is a need to encourage cultivation of high value/ off season vegetables in protected structure. Cultivation of strawberries and capsicum should be undertaken as high value crops.

• Short or medium range programme on vegetable based cropping systems; ployhouse or low plastic tunnel cultivation of high value vegetables like coriander leaf (early autumn), coloured capsicum, cherry tomato, okra, gherkin, broccoli, red cabbage, savoy cabbage, lettuce, celery etc. (autumn-winter) will bring perceptible change/ improvement in production of different vegetables. Advanced concept of protected cultivation of high value and high quality vegetables need to be promoted on a large scale.

• Flowers which can fetch good ensured market value should be targeted. Rose, gladiolus, jasmine, marigold and tuberose are the important flowers. Export market of these crops should be explored. Quality certification is to be imposed and ensured. Accessing quality seeds and plant materials, adopting improved management practices and strengthening supply chains through appropriate institutional arrangements are the key challenges in exploring the potential of horticultural commodities.

• Production of high-value commodities can suit the needs and resource endowments of the farmers having small land holdings. These commodities can give higher, regular and quick returns to the smallholder farmers. Introduction of some new vegetable crops such as baby corn, sweet corn, cherry tomato, lettuce, celery, leek, teasle gourd, etc. have the potential to widen the demand of vegetables and increase income of the farmers.

• Diversification towards dairy is one of the most promising options to enhance farmers' income. About 70% of marketed milk is contributed by the households having one or two milch animals. In this context, the role of Co-operative Milk Producers Federation is important in transforming agriculture towards dairy sector. The members

of the Dairy Co-operative are always able to fetch better profit as compared to their counter parts not associated with Co-operatives.

• Diversification of freshwater aquaculture involving high value species such as Magur, Koi, Pabda, Tangra, Pangasius etc, may be undertaken.

• Feed is the most important single item that accounts for more than 70% to 75% of the recurring cost of a farm. Production of main ingredients for feed, particularly maize, is insignificant in West Bengal. Another important ingredient is soya bean which is not grown in the State. Farmers, especially in North Bengal, may be encouraged to grow maize in more land to meet the demand.

2.3.2.2.7.Application of climate resilient technologies to address climate change challenges

• Resource Conservation Technologies (RCTs) need to be promoted for farming such as "no tillage" as it saves water, labour and energy, helps early sowing, improves soil organic C, reduces soil compaction, increases fertilizer use efficiency, and reduces soil erosion.

• Development and cultivation of climate resilient crops need to be promoted.

• Protected cultivation may be one option.

• Animal shed is essential for alleviating heat stress in livestock. It is necessary to provide low-cost, improved animal shelter with proper dimensions, sufficient light and ventilation for protecting the valuable animals from rain, sunlight and cold and keeping the animals stress free.

• To combat fodder shortage, fodder development needs to have an additional impetus from the government by promoting mixed crop system, growing fodder on waste land, agro forestry etc.

• Crop insurance is must to avoid economic loss out of crop failure due to climate related disastrous. A new scheme 'Pradhan Mantri Fasal Bima Yojana' (PMFBY) from Kharif 2016 has been launched across the country overcoming the inherent deficiencies of Crop Insurance Scheme. The Government is taking effective and substantial measures to reduce the risk of agriculture sector through Restructured Weather Based Crop Insurance Scheme (RWBCIS) so that farmers feel secure even during the occurance of natural calamities.

• Insurance of domestic animals, such as poultry birds, cattle, goat and pig is essential to avoid economic loss at the time of disease outbreak in villages.

2.3.2.2.8.Strengthen capacity of the farmers through skill training

• Skill development training on crop husbandry, livestock rearing, fisheries, home science and other areas would benefit the farmers for farming in a better way and thus bring a change in more income generation.

• Protected nursery raising technology under low plastic tunnel or poly house through plug plant production is highly suitable and can be established as a small scale industry in major vegetable growing areas of the state by progressive farmers especially in peri-

urban areas. By this way the vegetable growers will get disease-free healthy and off-season nursery as per their requirement and it can generate extra employment in urban and peri-urban areas. Similarly, grafting vegetable seedlings of a susceptible scion onto a resistant rootstock can quickly provide resistance against soil-borne diseases such as bacterial wilt, *Fusarium* wilt and rootstock vigor, thus enabling production of high value vegetable crops in areas under predominant soil-borne pathogens. Mass-scale production of grafted seedlings could generate more employment opportunities among rural youth of the state.

• Large-scale awareness programmes on pre- and post-harvest management systems of vegetable/ fruit crops among rural educated youth will help in entrepreneurship development.

• Livestock management is an important area to keep the animals healthy and productive. Hands on training may be undertaken on different aspects of cleaning and sanitation in and around the livestock shed and there is a scope to take such programme in the light of 'Swachh Bharat Abhiyan' throughout the year for the welfare of the livestock as well as the livestock owners. Capacity building on fodder production and conservation technology needs to be organized.

• Educating the people about the importance of river in fisheries perspective and conservation of biodiversity through government sponsored mass awareness programmes.

• Adequate awareness needs to be created among all private hatcheries to follow appropriate breeding protocol to arrest possible inbreeding.

• The selected youths may be trained to provide farm based extension services relating to fish breeding, fish seed raising, soil-water testing, fish disease diagnostic and other technical services akin to Prani Bandhu in the Animal Resource Development Department and Krishi Bandhu in the Agriculture Department of the State.

2.3.2.3. Strategy III: Policies and reforms in agriculture

2.3.2.3.1. Reduction of cost of production

- Increase in use of farm power through farm mechanization should be targeted.
- Use of small farm tools will reduce the cost of production.
- Use of recommended seed rate, spacing and depth will reduce the cost of cultivation.
- Need based application of agricultural inputs is essential reduce the cost of cultivation. In house production and use of organic manure/ compost/ vermin compost need to be promoted.
- In house production and use of low cost animal feed may reduce the cost of production of milk, meat and eggs.
- Animal feed may be provided to the farmers through Govt rationing system.

2.3.2.3.2. Markets and marketing for agriculture commodities

• Reforms in agricultural marketing policies are intended to improve the efficiency and effectiveness of the marketing system in the State so that the benefits such as increase in farmers' net income, assuring remunerative and profitable price to farmers and affordable supplies of food stuff is realized.
• Minimum Support Price (MSP) and/ or remunerative price must be ensured by the Govt. to avoid distress sale. Policies for better market price realization need to be implemented.
• Procurement of food grains must be assured and and FCI should make arrangements to procure food grains including pulses.

2.3.2.3.3. Public Private Partnership (PPP)

• Instead of depending on some private seed producing companies and a few public sector companies, seed production should be targeted through FPO (FPC) and FIG in seed production. This will not only reduce the cost of quality seeds but also will increase accessibility of the farmers to quality seeds.

• Quality poultry birds, fish fingerlings may be produced in PPP mode. Hatcheries for fresh water prawn, mud crab, and ornamental fishes need to be set up in the state under PPP mode.

• Biofertilizer, biopesticide, animal feed may be produced in PPP mode.

2.3.2.3.4. Programmes for SC, ST, backward classes and women in agriculture

• Kitchen gardening with local crop varieties may be promoted.

• Specific perennial horticultural crops may be grown in the cultivable wastelands owned by the tribal families.

• Pig farming could be the best option for the tribal farmers to augment income for livelihood.

• Backyard poultry farming and goat rearing programme may be undertaken for women farmers.

SWOT ANALYSIS

3.1. Introduction

One of most widely used strategic planning tools is a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis. SWOT analysis is often used as basic guide for strategic planning. The term SWOT is the acronym made up of four words viz., Strengths, Weaknesses, Opportunities and Threats. The first two variables are internal to a sector whereas the last two are external. SWOT stands for strengths, weaknesses, opportunities and threats.

The following points highlight its importance:
1. SWOT Analysis brings to light whether the sector is healthy or sick.
2. An undertaking comes to know of both internal as well as external factors affecting the success or failure of the strategic plan.
3. It helps in the formation of a strategy so as to make preparations for the possible threats from the externalities.
4. SWOT analysis evaluates the sector environment in a detailed manner so as to take strategic decisions for the future course of action.

3.2. SWOT analysis of the district

For making the SWOT analysis comprehensive, for agricultural activities the same was made blockwise to draw out the picture with greater clarity as presented below. For the allied sectors, however, these were made department wise mentioned after that.

Table 3.1. Agricultural SWOT of selected blocks of the district

block	Strength	Weakness	Opportunity	Threat
Andal	1. Good Marketing facility at Durgapur. 2. Assured demand for Agricultural product.	1. Low rainfall & poor water holding capacity of soil. 2. Agricultural fields are scattered, major portion of land is under ECL/DVC/Aerocity etc. 3. Irrigation facility is very poor (only 15% of cultivable land).That irrigated area is not assured. 4. Shortage of Agricultural labours and skilled labours. 5. Poor use of farm mechanization. 6. Shortage of extension personals at village level.	1. By improving irrigation facility crop coverage can be improved .Farmers will cultivate rabi crops in a large scale as a result Cropping intensity in this block is possible to increase above 200% . 2. Scope for crop diversification and growing pulse and oilseed crops. 3. Scope for investment in Marketing and processing infrastructure of agricultural products. 4. Strengthening agricultural extension system.	1. ECL, Aerocity, DVC - Industrialization & Urbanization. 2. Declining area under agriculture due to land acquisition by ECL, Aerocity, DVC, Small industry etc. 3. As 85% of the cultivable land is under monocrop(due to lack of irrigation facilities) the farmers are losing their interest on agriculture farming . They are adopting other professions for their livelihood.
Barabani	**1.** Communication facility. **2**. Availability of more/ less sufficient water bodies. **3.** Availability of market	**1.** Decline Soil Fertility status due to non availability of organic matter. 2. Farmers are not interested in remunerative agricultural activities 3. Non availability of credit in	1. Development of water harvesting structure 2. Soil health management and development 3. Scope for awareness the farmers regarding quality seed production and soil health	**1.** Soil erosion and Land development. **2.** Crop diversification **3.** Heavy metal toxicity **4.** Use of Chemical fertilizer due to non availability of

	4. Favourable weather condition for seed production.	agricultural sector 4. Very weak and under develop Irrigation facility 5. Under develop of allied activities. 6. Poor Agricultural Extension system due to shortage of field level extension personnel/ worker. 7. Undulating Land and poor water holding capacity. 8. Soil is highly acidic in nature.	management. 4. Scope for development of allied activities i.e Horticulture, fisheries, Animal husbandry etc. 5. Scope of development of Local market 6 . Scope for development of Agri-polyclinic under P.P.P mode.	organic manure.
Faridpur-Durgapur	1. More or less satisfactory road network. 2. Presence of enough water bodies. 3. Condition suitable for seed production. 4. Good demand of quality agricultural produce and processed products in the urban areas.	1. Depleting soil fertility status because of insufficient availability and use of Organic Manure. 2. Lack of interest among farmers for less remunerative agricultural engagement vis-à-vis industrial activities. 3. Non-availability of recorded land for farmers to obtain credit facilities. 4. Non-availability of credit facilities in the agricultural sector. 5. Very weak and under-developed irrigation facilities. 6. Under-development of allied activities like livestock, sericulture, fishery, horticulture so that demand for green fodder, feed, flowers, fruits etc. develops. 7. Poor Agricultural Extension system for lack of field-level workers.	1. Scope of awareness and subsequent quality seed production. 2. Scope of land-grading and awareness for subsequent Farm Mechanisation. 3. Scope of creation of water-harvesting structures to harvest rain-water together with soil and water conservation activities. 4. Great scope for development of allied activities and post-harvest technologies to serve a rich market for table products. 5. Scope of development of post-harvest and food-processing industries under P.P.P. mode. 6. Scope of development of Agri-polyclinics under P.P.P. mode. 7. Use of ICT for better network and dissemination of knowledge.	1. Soil erosion and Land degradation. 2. Conversion of Agricultural land. 3. Dependence on chemical fertilizers because of non-availability of sufficient organic matter. 4. Heavy metal toxicity apprehended together with change in soil characteristics in pockets due to excavation work for Coal Bed Methane.
Kanksa	1.Communication facility 2. Marketing Facility 3. DVC canal through the block	1.Shortage of extension personnel 2. Villages are scattered, large area of block, major portion forest area 3. Rainfed area mostly, irrigation facility poor 4. Agril. labourers less 5. Poor use of farm mechanization	1.Three GPs are agriculturally potential	1.Industrialization 2. Declining area under agriculture due to housing, industry etc.
Kulti	1. Presence of urban market 2. More or less satisfactory of road network 3. No /or minimum disease pest infestation	1. Erratic climatic condition and agriculture depends mainly on rainfall 2. No or extremely poor irrigation facilities/potentialities 3. Non-presence of allied departments like livestock, fisheries, sericulture, horticulture etc. 4. Poor Agricultural Extension	1. Scope of creation of water-harvesting structures to harvest rain-water together with soil and water conservation activities 2. Crop diversification includes horticulture, rainfed agriculture, mixed farming etc. 3. Use of ICT for better network and dissemination of knowledge	1.Soil erosion and Land degradation 2.Conversion of Agricultural land 3.Lack of life saving irrigation

		system for lack of field-level workers 5. Undulating land structure and lack of credit facilities cause hindrance to machanization		
Salanpur	1. Presence of urban market 2. More or less satisfactory of road network 3. No /or minimum disease pest infestation	1. Lack of fulltime Officer/ Asst. Director of Agriculture since last **SIX YEARS.** Situation is extremely difficult for an officer-in- additional charge to meet the multi-dimensional developmental need of a block. 2. Poor Agricultural Extension system for lack of field-level workers 3. Erratic climatic condition and agriculture depends mainly on rainfall 4. Undulating land structure and lack of credit facilities cause hindrance to machanization 5. No or extremely poor irrigation facilities/potentialities	1. Scope of creation of water-harvesting structures to harvest rain-water together with soil and water conservation activities 2.Crop diversification includes horticulture, rainfed agriculture, mixed farming etc. 3. Use of ICT for better network and dissemination of knowledge	1.Soil erosion and Land degradation 2.Conversion of Agricultural land 3.Lack of life saving irrigation

Horticulture

Strength

- Diversified soil condition helping different crops to be grown
- The agro-climatic condition of the district is suitable for growing variety of flowers and fruits like marigold, chrysanthemum, tuberose, mango, guava, papaya, lime, etc.
- Vast lateritic tracts suitable for orchards
- Good demand of fruits, vegetables and flowers in industrial urban areas and rural areas also
- Recently, production of some non-traditional fruit crops like pine apple, cashew nuts, etc. have been undertaken to a limited extent
- Adequate market facility

Weakness

- Un availability of high producing horticultural crop seed/planting materials
- Water stress condition in all part of district
- Lack of knowledge & technical know-how of farmers with respect to horticultural crops.
- Poor availability of good quality planting material and seeds
- Acute shortage of Staff and officer in the District, practically speaking, no Staff and only One Officer for such a large district
- Low availability of organic manures

Opportunity

- Scope of producing high cost horticultural crops having good market value
- Market demand for production of high cost horticultural crops
- Farmers attitude towards diversified production
- Suitable for cultivation of flower and fruits

- Cultivation of vegetables (early and off-time) using net-house and polyhouse technology
- Floriculture and vegetable market complex based on which cultivation of flowers (open field like marigold, tuberose; protected like gerbera, rose) can be done
- Well connected to Kolkata through rail and road linkages
- National Horticultural Board extend subsidy assistance for promotion of Hi-Tech/Commercial Horticulture including nursery

Threat

- Outbreak of pest and diseases
- Inappropriate technology adoption by the farmers and entrepreneurs
- Inadequate government support
- Inadequate consultancy services

Animal Husbandry

Strength

- Huge Agricultural activities in the District yields huge amount of Agri. By-products which provides potential source of animal nutrition.
- Large number of people from minority community, SC/ST and backward classes besides others earns their livelihood through animal husbandry activities solely.
- Widespread infrastructure of ARD Department upto G.P. Level and availability of doorstep services from Pranibandhus.
- Availability of Chicks and Khaki Campbell ducklings from Govt. Poultry farms situated in the district namely State poultry Farm- Durgapur.
- Easy availability of animal feed from Govt. and non-Govt. feed plants including EPIC Feed Plant at Durgapur and fodder from natural grassland and forest fringe areas.
- Presence of so many organized broiler and layer poultry farms as well as organized input and marketing chains.

Weakness

- Rapid urbanization diminishing scope of animal rearing in some area.
- Lack of large organized cattle / goat/ pig farms.
- Breeds maintained by small animal farmers are indigenous and their productivity is very low,
- Breed upgradation / cross breeding, scientific animal husbandry, animal insurance etc. has not yet been so developed,
- Infrastructures of ARD Dept. at different level remaining unmanned as vacancies are not filled regularly.
- High cost of feed ingredients like corns, oil cakes, fish meals etc. as those are procured from other states.
- Lack of infrastructure to control the entry of animal for surrounding states.

Opportunity

- Involvement of SGHs in poultry dev. Schemes is getting momentum. There is enormous scope of making non-functioning / poorly functioning Pry. Milk Co-ops active.
- With increasing number of Rice Bran Oil Industries being set up in the district, De-oiled Rice Bran , a major source of animal nutrition is getting available at a lower price,
- Large number of SC/ST and backward classes population leaves huge opportunity of pig farming,
- In addition to present infrastructure of ARD Deptt. Including PRANIBANDHU, PRANIMITRA (self employed *Kshudra Prani Palan Sahayika*) will be introduced in each G.P. to extend doorstep vaccination facility for small animals,
- Highly fertile land of this area can be used for commercial cultivation of multi-various high quality fodder crops ,
- Organized marketing channels for milk and other animal products are developing in the district
- **Modified Bishes Go Sampad Bikash Abhijan** is helping cattle farmers for potential development of high yielding cattle breeds.
- Introduction of Low Input Variety of poultry bird in rural areas boosting the egg as well as meat production.

Threat

- Young people of this area are losing interest in agriculture and animal farming as well.
- Risk of Bird Flu, Swine Fever and Encephalitis are major threats for poultry and pig farming.
- Recently developed tremendous demand of cow meat in Middle East after out break of Mad Cow Disease in beef exporting country like U.K. is a major cause of potentially productive cattle being slaughtered.
- Increasing objections from residents around animal farms in fear of pollution prohibiting willing farmers from erecting new farms and even old farmers are also losing interest.
- Trend of major portion of butchers cum meat sellers not to abide by the Rules and Regulations regarding slaughter imposing the risk of meat borne diseases.
- Imposing ban on **cage system of layer faring** may perturb the private organizations to enter into this industry.

Fishery

Strength

- Sufficient waterbody
- Avaivality of Local Fish feed ingredients like Rice Bran
- Subsidy oriented SchemesLike NFDB,FFDA, RKVY etc
- Availability of Quality Fish seed from Local Hatcheries/ Fish seed producers

Weakness

- Shortage of staff
- Traditional method of Culture
- Agricultural return is high so people based only on fishery is limited
- Insufficient Knowledge of the Farmenr in scientific Pisciculture
- Utilization of Open cast colliary Pits
- Strengthening of Co-Opt. Socities

- High silt and regular natural calamities restrict the fish capture from the rivers
- Non availability of good quality fish seed specially for air breathing fishes
- Absence of fish processing and preserving facilities

Opportunity
- Opportunity of Training and motivation of Fishfarmers on scientific Pisciculture
- Scope of fishery in abandoned open cast mines in western zone of the district
- There is an opportunity of supply of fish seed to private hatcheries
- Ample scope of inland fishery in domestic tanks, reservoirs, canals, railway ditches, etc.
- Scope for promoting polyculture and freshwater prawn culture
- Sufficient scope for ornamental fish culture

Threat
- Poaching & Poisoning
- Outbreak of diseases
- Lack of insurance in Aquaculture
- Natural calamity is a major threat to capture fishery
- High siltation in the rivers restricts fish production

Sericulture

Strength
- Agro-climatic condition of western lateritic part of the district highly favour production of Tasar
- In 2008-09 Tasar production of Paschim Bardhaman was highest in the State. About 186 acre Tasar plantation was done that year with target of 100 acre
- Both mulberry and tasar can be produced in the district
- Adequate funding for sericulture programme
- Adaptation of technology by the farmers is promising
- There are 2 Technology Service Centers (TSCs) in Kanksa and Aushgram-I block

Weakness
- Inadequate infrastructure – District office and TSCs are all located in rented premises
- Shortage of vehicle for transportation of cocoon to reeling and weaving centers of Birbhum
- Delay in implementation of need based schemes due to shortage of skilled and motivated manpower
- No marketing infrastructure in Paschim Bardhaman – solely depends on the purchasers of Birbhum
- Inadequate IT infrastructure and trained manpower

Opportunity
- Potential of tasar production in Paschim Bardhaman is very high
- The return from sericulture is high
- Arjun trees planted under Social Forestry Department in Durgapur sub-division can be used for Tasar cultivation if departmental tie up can be established at higher level
- Developing SHGs only for sericulture
- Arrangement of training, exhibition and exposure visit for SHGs

- With Tasar, the farmers can do intercropping with vegetables and other short-term crops for better financial return
- Development of Tasar cultivation in western part can prevent people from coal-stealing for livelihood

Threat

- Shortage of skilled and motivated manpower

Soil Conservation

Strength

- Soil health is still good

Weakness

- Indiscriminate and imbalanced use of fertilizers and pesticides has negative affect on soil making it acidic
- Sand deposition after flood water is a menace
- Internal drainage problem due to heavy sub-soil
- Inadequate government soil testing laboratory exists and it is cumbersome and time consuming for the farmers to get the test result
- Shortage of manpower in government laboratories

Opportunity

- Establishing more soil testing laboratory in the blocks on PPP mode can be beneficial
- Mobile soil testing van can be helpful

Threat

- Slowly the soil is losing potash content due to high phosphate content
- Loss of micro and macro nutrients from soil
- pH value of the top soil is slowly turning acidic due to high use of chemical fertilizer and chemical-mixed irrigation water
- Flood poses a major threat due to riverbank erosion

3.3. Accommodating SWOT

Strategies for accommodating SWOT into the comprehensive plan is as below,

Agriculture

- Soil reclamation and preserving soil quality for sustainable crop production
- Increasing cropping intensity with suitable intervention. Promotion of pulse crops to be largely enhanced
- Productivity augmentation through judicious fertilizer and pest management. Introduction of improved cultivars, dissemination of promising technologies, seed treatment, farm mechanisation
- Capacity building of extension workers for efficient dessimination of technologies
- Implementing strategies for producing more per quanta of land and water through judicious use of resources. Adoption of integrated farming methodologies wherever applicable for enhancing farmers income is called for.
- Correction of soil acidity by using Dolomites, basic slugs, ash etc should be undertaken judiciously so that the effect should be sustainable. Fly ash from the thermal power stations in Paschim Bardhaman can be purchased in a very low price and can be distributed among the farmers in place of Dolomite. This will ensure more procurement and less expenditure on transport and procurement.
- Production of quality seed material through participatory approach
- Adoption of climate resilient technologies to cope up with climate change which is imminent
- More emphasis on red and lateritic zone for agriculture intensification through creation of water harvesting structures, watersheds etc.
- Value addition to agricultural produce to be given emphasis. SHGs, common interest groups, JLGs to be

Horticulture Sector

- Strengthening of horticultural department in the line of agriculture, ARD and fisheries department with block level officials and support staff
- Capacity building of farmers and extension workers for speedy development of horticulture in the district
- Protected cultivation techniques to be much strengthened
- Potential for horticulture development in the red and lateritic region is to be exploited. Extension of horticultural activities in this zone by supply of saplings (fruits and tree species) and undertaking plantation activities should be taken up. Plantation of *Arjun* in the lateritic zone can help the poor farmers, basically tribals by introducing Tasar cultivation in collaboration with Sericulture department.
- Emphasis to be given on production as well as marketing of high value horticultural crops
- Attention to be given on management of water resource through establishment of micro irrigation for fruit, plantation and vegetable crops.
- Entrepreneurship development through value addition to horticultural produces is to be pressed

Animal husbandry

- Breed up-gradation of livestock and poultry
- Capacity building of extension workers/ animal raisers for efficient dissemination of technologies
- Augmentation of productivity of livestock and poultry
- Emphasis on infrastructure of Artificial insemination
- Strengthening of animal feed resource through production of green fodder, preparation of home made concentrate feed and complete feed block
- Availability of medicines through *Pranibandhus* at the doorstep
- Provision for insurance and credit facility
- Strengthening of Post harvest operation including value addition of animal products
- Unorganised market should be converted into organised market linkages
- Removal of technological gap in nutrition, management and housing of poultry birds

Fishery

- Ensuring ready supply of quality fingerling in the district.
- Aquaculture based integrated farming modules to be implemented in all the excavated pond under MGNREGA scheme
- Entrepreneurship development in the area of fingerling production.
- Capacity building of fish farmers for improved techniques of fish production, including pond management, feed management, stocking species and density, multiple tire carp farming etc.
- Efficient marketing chain development through feasible cold chain establishment
- Entrepreneurship development in ornamental fish culture.
- Exploiting potential for fishery development in canals, enclosed large water bodies etc.

Agricultural marketing

- Partnership farming
- SHG/JLG/CIG mediated marketing strategy
- Infrastructural support for SHG/JLG/CIGs involved in production and marketing of agricultural produce

Sericulture

- Development of silvi-pastoral models with required plantation
- Ensure availability of seed
- Ensured availability of market

Credit & Cooperation

- Storage system for vegetables, followers etc. - Veg. godown & multipurpose godown is needed.
- Efficient linkage to be established between produced crops and marketing mainly for non-conventional crops.
- Farmers' club, adequate training, using modern – scientific technique for production of crops is needed.
- All the S.K.U.S.s should have well metal road connection for fertiliser business & other various purposed.
- Agro processing unit to form by Joint venture with S.K.U.S.s – if possible.
- PACS in the district should be promoted for all kinds of agricultural based activities, including production of seeds, distribution of fertilisers etc

- Credit linkages should be increased for the farmers so that they can market their products and a handsome amount

Irrigation

- Increase in minor as well as micro irrigation
- Construction of rain water harvesting structures
- Renovation of sub-canals
- Use of open cast pits in the lateritic zone

3.4. Growth drivers

The growth accelerators for agriculture and allied sectors have been decided after situation and trend analysis, and need assessment. Such growth drivers are presented below.

- Soil quality maintenance. Amelioration of problem soil
- Sustainable and judicious management of water resources.
- Popularizing resource conserving technologies.
- Increasing cropping intensity and intercropping.
- Promotion of integrated farming modules
- Development of suitable technologies such as varietal improvement, input management supported by a strong institutional arrangements for the supply of inputs like seed, fertilizers, plant protection chemicals, credit, etc, price support system favourable to farmers and market infrastructure for major crops like paddy, potato, maize, sugarcane, banana, vegetables, and fodder crops.
- Development of minor and micro irrigation
- Strengthening water harvesting structures like open cast pits, farm ponds, canals and check dams.
- Breed development of cattle
- Promotion of rural poultry
- Ensured availability of fodder
- Capacity building of farmers, traders, and other stakeholders on grading, post harvest technologies, value addition and market intelligence.
- Paradigm shift from production oriented farming to market oriented agriculture with the promotion of Agro processing industries.
- Ensured availability of quality fingerling
- Development of canal fisheries and fishery in open water bodies
- Strengthening the extension machinery for effective dissemination of technology.
- Strengthening of rural markets with storage facilities.
- Strengthening of farmers' market with additional storage facilities.
- Establishment of cattle feed units.
- Inland fisheries development in major tanks and reservoirs and
- Development of sericulture.

DEVELOPMENT OF AGRICULTURE

4.1. Introduction

Through oodles of rigorous revolutions and heaps of meticulous missions in food materials like green revolution in cereal crops, brown revolution in pulses, white revolution in milk, blue revolution in fish or missions like food security mission, horticulture mission, oilseeds and pulses mission India is now the leader or second best leader in gross production of many food and fibre materials like rice, wheat, cotton or animal products like milk, egg**.** But then we have to bear in mind that ours' is a country that harbours 17% of global population in only 2.3% land mass supported by 4% of fresh water resources and that we are some distance behind the leaders regarding productivity of food materials with our soils being relentlessly mined of essential nutrients while increasing the loads of nonessential or toxic ones. There is no denying the fact that the net cultivable area in the country of around 140 Mha is remaining constant or even squeezing on account of the pressures from urbanization, industrialization, infrastructure development, and to house the ever-increasing populace etc. Then loss of productive soil is another concern. Around 5 billion tonnes of soil is washed away every year taking away with it nearly 6 million tonnes of nutrients due to ill soil and water management practices.

According to the vision of Indian Council of Agricultural Research, the premier agricultural body in India, our country has to grow 345 million tonnes of foodgrains by 2030 from the present level of 263 million tonnes in 2013-14, meaning increase at a rate of more than 5%, to feed projected 1.6 billion mouths. Concerns are being voiced all over the country that contribution of agriculture and allied sector to the overall GDP is decreasing much rapidly. In fact the same has fallen from 53.7% in 1950-51 to 16.2 % in 2011-12 at factor cost at constant prices (2004-05).

Paschim Bardhaman is one of the premier districts in India in terms of value of mineral. The Raniganj coalfield was the birth place of the Indian coal industry. Besides coal ,important minerals found in the district are iron ores, calcium carbonate, abrasives, silica bricks and moulding sands, glass sands, building materials, manganese, bauxite, laterite etc.

Main crops of the district are autumn rice and wheat.

Total geographical area in the district is 160300 ha out of which about 47% is cultivated. Total of 48040 ha is net cropped which is about 64% of cultivable area. Gross cropped area is about 58354 ha thereby rendering the cropping intensity to 121% only. This pertains from the fact that the distict is much underdeveloped as regards irrigation which is about 12.3% of net cropped area in the district. The Durgapur barrage and Mithon dam have formed two large reservoirs at the south-western and western periphery of the district.

4.2 Land use

The district being chiefly an industrial one, fairly large area in the district (53%) is under non-agricultural use. As compare to nearly 14% of total geographical area (TGA) under forest in the state, the district has 12% area under forest which is below ideal. Ideally at least 33% of TGA should be under tree cover and the country at present has 27% area under tree cover, rapt attention is to be given so that the district becomes greener. The Durgapur forests are continued in the Birbhum district beyond the Ajay while the forest area in the Asansol subdivision forms a part of the forest area of Dumka district of Jharkhand.

4.3. Soil health

Soil status of Paschim Bardhaman

Lateritic & Gravelly Soil – It covers the entire district which is highly porous and acidic in nature and deficient in organic matter. This soil is prone to erosion.

The Soil in the alluvium Zone is deep and fertile. In this region all type of crops are grown. As a matter of fact the district of Paschim Bardhaman is called "Granary of West Bengal" because of high productivity of soil in this region. Fortunately this type of soil occurs in major parts of the district.

Red and Lateritic Soil prevails with low fertility status resulting to low productivity. Undulated and terraced topography of land is found in this tract. Soil is porous with low moisture holding capacity. These factors coupled with drought prone nature has made it low in productivity. The average productivity of different crops in this tract are substantially low because of low fertility status of the soil.

The soils in the district is suffering from Soil Erosion to a great extent due to undulating nature of the land. Soil conservation measures should be taken to control the erosion of fertile soils and silting of rivers. Again, due to high temperatures in summer and light texture of the soil , the organic matter content of the soils are very poor in the western part of the district.

Soil maps of the district

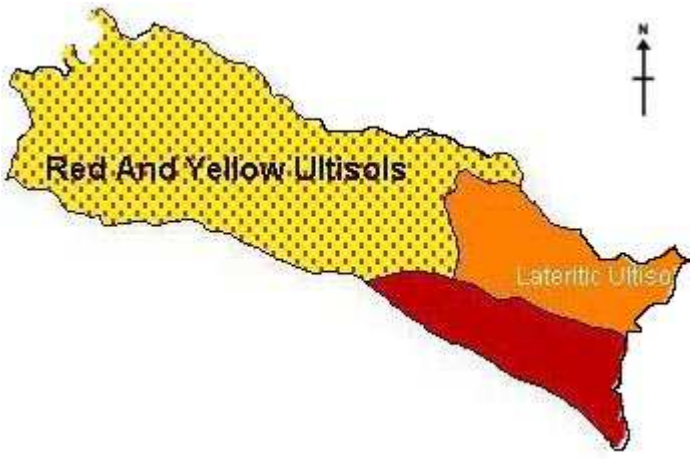


Fig. 4.1. Major soil classification in the district

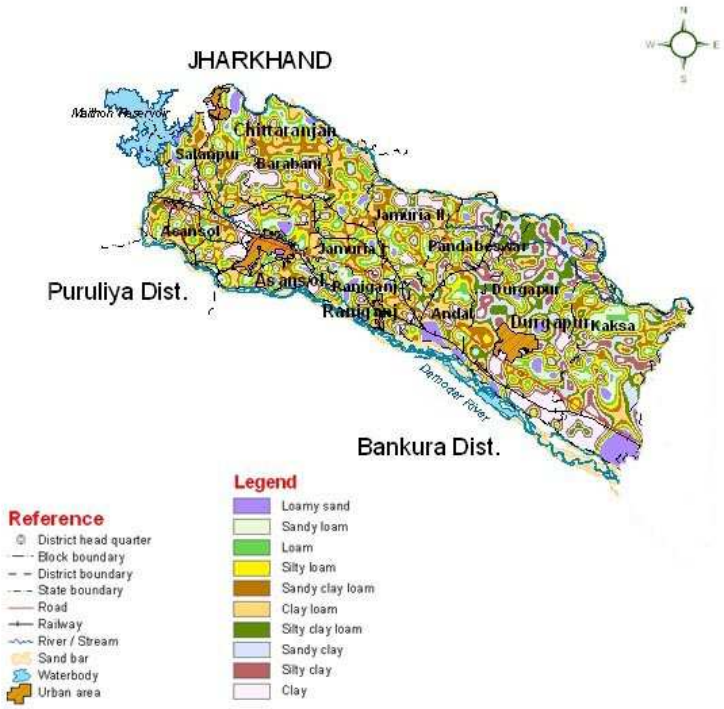


Fig. 4.2. Surface soil texture characteristics in the district

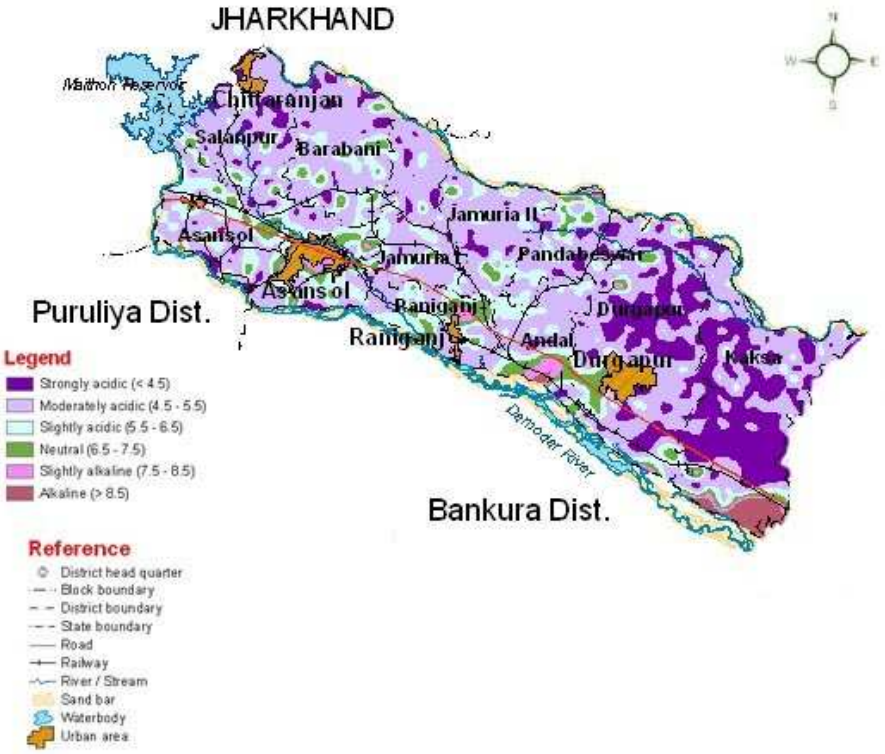


Fig. 4.3. Soil reaction map of the district

Fig. 4.4. Soil organic carbon map of the district

Fig. 4.5. Soil available nitrogen map of the district

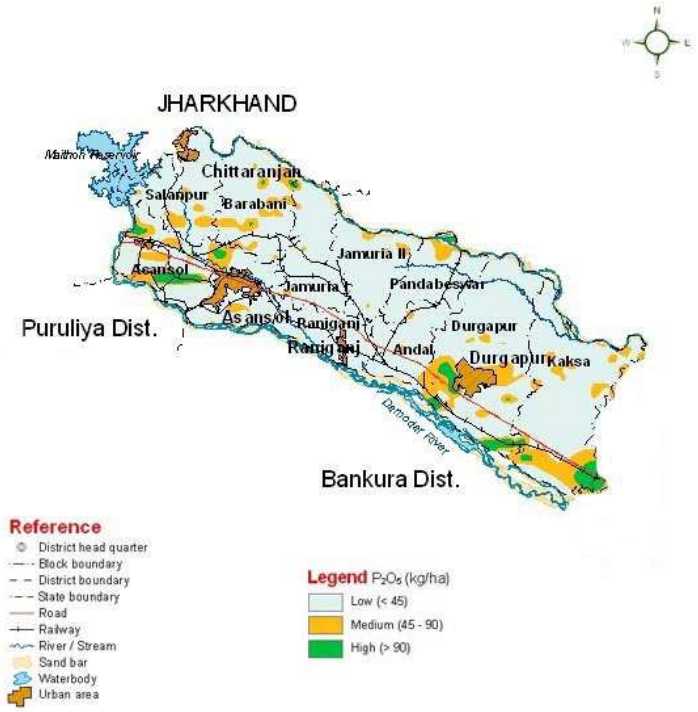


Fig. 4.6. Soil available phosphorus map of the district

Fig. 4.7. Soil available potassium map of the district

Fig. 4.8. Soil available sulfur map of the district

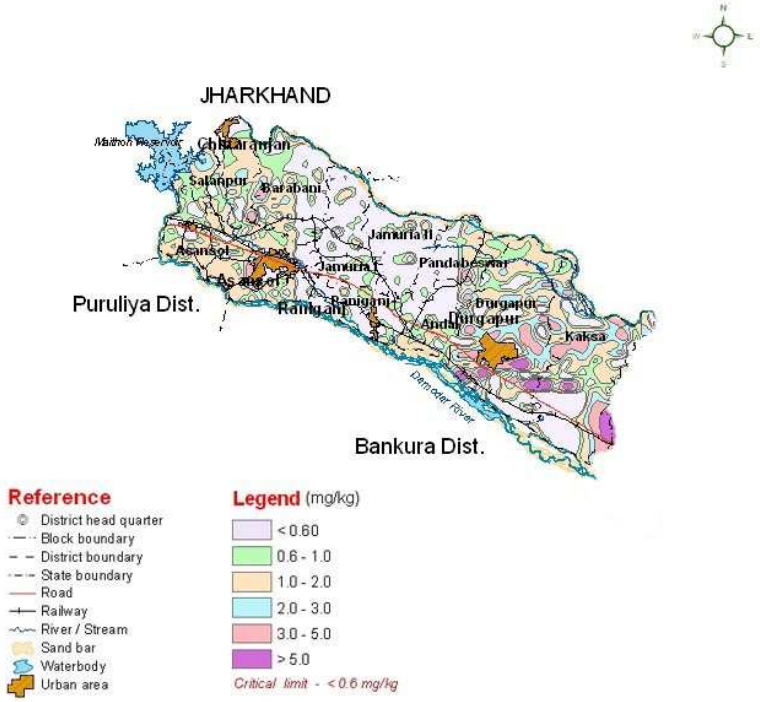


Fig. 4.9. Soil available zinc map of the district

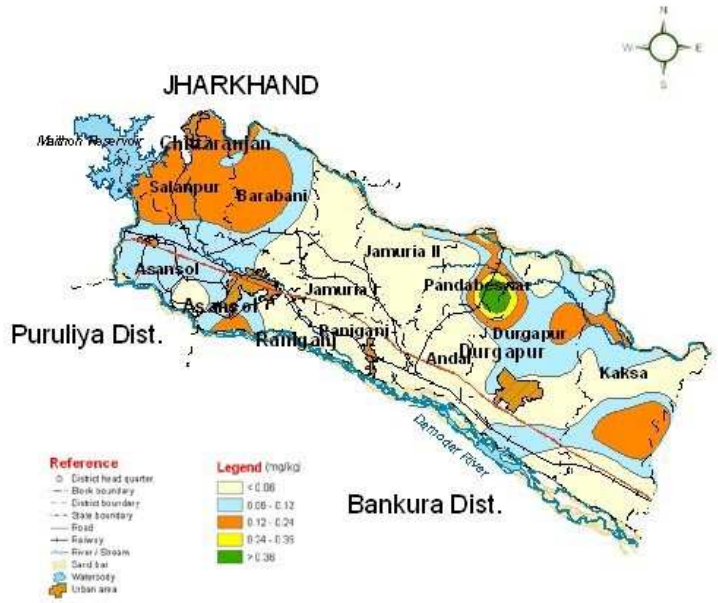


Fig. 4.10. Soil available boron map of the district

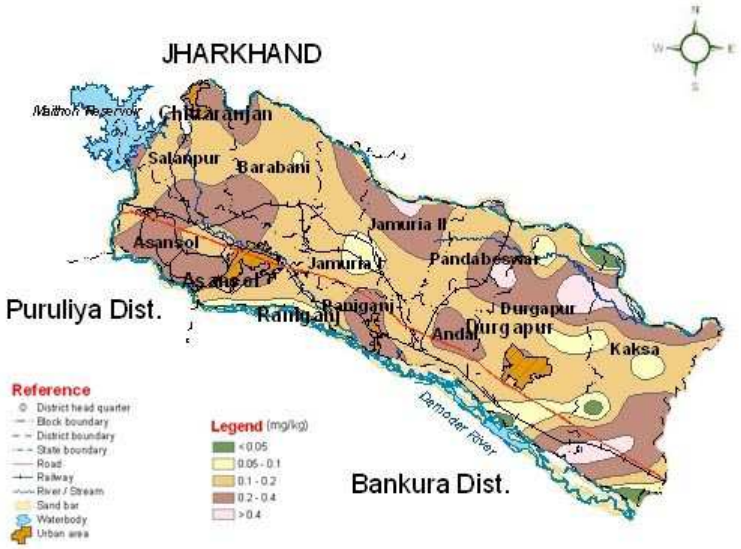


Fig. 4.11. Soil available molybdenum map of the district

Soil health management

Table 4.1. Status of Soil Health Card Scheme

Year	Target for soil sample (No.)	Soil Sample collected (No.)	Soil Health Card Distributed (No.)
2015-16	3198	4126	4126
2016-17	3382	2454	51806
2017-18	3290	874	-
Total	**9870**	**7454**	**55932**

Table 4.2. Reclamation and Development of acid soil

Name of block	Area under acid Soil (ha)	Area treated (ha) up to 2013	Balance Area (ha)
Andal	2400	500	1900
Barabani	7500	1500	6000
Faridpur-Durgapur	9540	2020	7520
Jamuria – I	3000	1200	1800
Jamuria – II	5400	2500	2900
Kanksa	10000	2000	8000
Kulti	2000	200	1800
Salanpur	5000	500	4500
Total	**44840**	**10420**	**34420**

4.4. Water Resources & Management

The water resource in the district is grossly underdeveloped.

Ground Water

As per information received from the Water Resource Investigation Department it is understood that the surface water taping is only 11 percent. The blocks of surface water taping includes Barabani, Faridpur- Durgapur, Kanksa, Salanpur Raniganj, Jamuria, Andal and Pandebeswar. The problem of rainwater harvesting is prominent in this district – non-availability of land is one of the major constraints in harvesting rain water. Community land can be utilized for rain water harvesting structure.

The subdivision of Asansol and Durgapur are unfit for lifting groundwater.

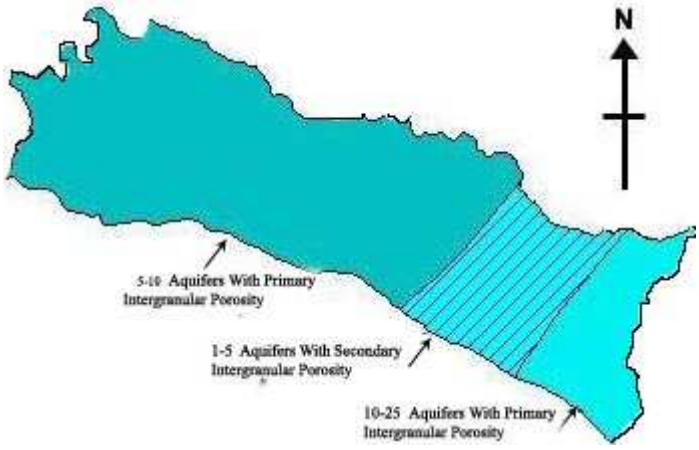


Fig. 4.12. Aquifer map of the district

4.5. Major Crops and Varieties in the District

Table 4.3. Prevalent cropping patterns in Paschim Bardhaman district

LATERITIC REGION	RAINFED AREA
(a) Upland	Fallow – Paddy/Groundnut/Maize – Pulse/Mustard/ Kalai/Vegetable
(b) Medium Land	Fallow – Paddy – Mustard/Pulse/Paira Crops
© Low Land	Fallow – Paddy – Mustard/Lentil/Gram/Paira Crops
	IRRIGATED AREA
(a) Upland	Moong – Paddy/Maize/Vegetable – Mustard/Wheat/Maize/Pulse
(b) Medium Land	Moong/Vegetable/Maize – Paddy – Mustard/Wheat/Maize/Pulse/Potato
© Low Land	Moong/Vegetable – Paddy – Paddy/Vegetable/Pulse/Oilseed/Wheat

4.6. Input management

F e r t i l i z e r

Fertilizer is one of the major inputs and it plays a great role in accelerating the productivity of crops. The use of fertilizer for boosting up the crop production increased to many fold since its introduction but the farmers are not using the fertilizers in judicious manner. The imbalance use of fertilizers creates problems in physiochemical characteristics of soil, lowering down the soil pH and fertility status of soil. Fertilizers should be used along with organic manures

adequately. Intregated approach of application of Organic Manure, Biofertilizer, Chemical Fertilizer and Micronutrient should be maintained to enhance the Soil health & Fertility.

Table 4.4. No. of Fertilizer, Seed and Pesticide dealers operating in different Blocks of Paschim Bardhaman district

Name of the Block	Fertilizer			Seed	Pesticide
	Wholesale	Retail	Total		
Faridpur-Durgapur	2	36	38	6	15
Kanksa	3	46	49	4	14
Asansol	-	7	7	4	9
Galsi-I	5	60	65	6	25
Barabani	-	12	12	-	3
Hirapur	1	6	7	3	3
Jamuria-I	-	7	7	3	1
Jamuria-II	-	25	25	-	2
Kulti	-	2	2	4	4
Salanpur	-	8	8	3	2
Andal	-	14	14	6	6
Raniganj	1	3	4	3	7
Sub-division Total:	**12**	**226**	**238**	**42**	**91**
District level dealers	**64**	**-**	**64**	**18**	**-**
District Total:	**187**	**1984**	**2171**	**314**	**1180**

Table 4.5. Seed Production under trial cum demonstration

Name of the Block	Crop	Seed production during 2013(q)	Proposed Seed Production (q)		
			2014-15	2015-16	2016-17
Faridpur-Durgapur	Paddy	14400	15000	15000	15000
	Wheat	1200	2800	3000	3000
	Mustard	75	100	100	100
	Maize	230	250	250	250
Total		**15905**	**18150**	**18350**	**18350**

4.7. Farm Mechanization/ Farm equipments

Importance of farm mechanization

The efficiency of mechanization can be judged from the fact that modern plough is about 200 to 300 % efficient than indigenous plough, efficient machinery helps in increasing productivity by about 30% besides, enabling the farmers to raise a second crop or multi crop making the Indian agriculture attractive and a way of life by becoming commercial instead of subsistence. There is a need to double the food production by 2020. This will call for raising more crops in a year thus limiting the turn around time. Increased production will require more use of agricultural inputs and protection of crops from biotic and abiotic stresses. This will call for greater engineering inputs which will require development and introduction of high capacity, precision, reliable and energy efficient equipment

Earlier, it was considered that mechanization creates unemployment. The myth has been broken and it has been observed that, agricultural mechanization besides increasing production and productivity, also generates income and employment opportunities. Several studies conducted in different parts of India have shown that mechanization has helped in increasing production, productivity, generation of income and employment. Punjab, a highly mechanized state, employs 7.0 lakh laborers from adjoining states, out of which 3.5 lakh are employed on a regular basis and remaining during the main cropping season.Total farm power availability has increased from 0.25 kW/ha in 1951 with animate power contributing 97.4 percent to 1.15 kW/ha in 1997 with animate sources contributing only 22.7 percent, mechanical sources 43.5 percent and electrical sources 33.8 percent.

The availability of draft animals is reducing, thus shortfalls have to be met mostly through electromechanical power sources. The number of land holdings is increasing and holding size has declined from 2.30 ha in 1970-71 to 1.57 ha in 1990-91. Small (1 to 2 ha) and marginal (below 1 ha) farms numbering 78 per cent of the total number of holdings, cultivate only 32.1 percent of the area; whereas 20.4 percent medium farms (2 to10 ha) account for 50.4 percent of the cultivated area and 1.7 percent large farms (above 10 ha) account for 17.5 percent of the cultivated area.

However, it is heartening to note that average emerging land holdings are large enough for mechanized farming as evidenced in Punjab and Haryana.As discussed in the earlier paragraph, one of the major constraints of increasing agricultural production and productivity is the inadequacy of farm power and machinery with the farmers. The average farm power availability needs to be increased from the current 1.15 kW/ha to at least 2 kW/ha to assure timeliness and quality in field operations, undertake heavy field operations like sub soiling, chiseling, deep ploughing, summer ploughing, handling agricultural produce and byproducts efficiently, process them for value addition, income and employment generation. All these works in agricultural operations is possible to be attended only when adequate agricultural mechanization infrastructure is created.

Table 4.6. Pysical and financial achievement infarm mechanization in Paschim Bardhaman

(2017-18)

Component	Physical (No.)		Financial (Rs. in Crore)	
	Target	Achievement	Target	Achievement
FSSM	200	80	0.96	0.31205
OTA-SFI	1000	348	0.35	0.1199838
CHC	7	7	0.60	-

4.8. Special Projects/ Programmes on- going in the district

Various programmes are currently under way in the district sponsored by either state or central government for development of agriculture and allied sectors, such as,

- Bringing green revolution to eastern India
- Pradhan Mantri Krishi Sinchayee Yojna
- Sub mission on agricultural Mechanization
- RKVY
- NFSM
- NMOOP
- TRFA (Pulse)
- PKVY
- SAME
- SMAM
- Farmers' Old Age Pension Scheme
- Soil health card

Below is a brief financial accomplishment of the major programmes

Table 4.7. Financial achievement of major special schemes

Sl No.	Name of the Scheme	Intervention	No.	Area (ha)	No. of Beneficiaries (expected)
A	BGREI	Demonstration	26	2600	6100
		Distribution of critical inputs		6418	9625
		Farmers Training			
		Total	**26**	**9018**	**15725**
B	NFSM (Pulse)	Cluster Demonstration	01	100	350
		Cropping System Based Demonstration	00	00	00
		Training Meeting	01	--	100
		Total	**02**	**100**	**450**
C	NMOOP	Hybrid Mustard D.C.	08	08	40
		Ground Nut D.C.	00	00	00
		Sun Flower D.C.	04	04	21
		Farmers Training	04	--	80
		Total	**16**	**12**	**141**
D	RKVY	Expansion of area under Aromatic Rice	1	100	450
		Seed Treatment Campaign		1220	2400
		Total		**1320**	**2850**
E	PMKSY	Per drop more crop	4	80	280
		Micro Irrigation	60	60	60
		Total	**64**	**140**	**340**
		Grand Total	**108**	**10590**	**19506**

Name of the Scheme	Intervention	No.	Area (ha)	No. of Beneficiaries (expected)	Target Amount (in Lakh)	Achievement	Remarks
	Demonstration						
BGREI	Kharif Paddy DC	6	600	1950	36	**36**	
	Kharif Paddy + Maize DC	2	200	1200	23	**23**	
	Kharif Paddy + Lentil DC	1	100	900	12.5	**12.5**	
	Kharif Paddy +Mustard DC	1	100	500	9.5	**9.5**	
	Wheat DC	5	500	1860	37.28	**37.28**	
	BORO Paddy	2	200	512	12	**12**	
	P.P. Chemical	1500	1500	4050	6.25	**6.25**	
	Micronutrient	1800	1800	6400	9	**9**	
	Bio-fertilizer	2000	2000	5400	6	**6**	
	Weedicides	1250	1250	4400	6.25	**6.25**	
	Cropping System Based Training meeting	22		660	3.08	**3.08**	
	Total			**27832**	**160.86**	**160.86**	
DRY Land	**Demonstration**					**0**	
	Normal (Maize+Mustard+Lentil + Trg)	2184	283.92	2184	22.61	**22.61**	
	SCP (Maize+Mustard+Lentil + Trg)	1894	246.22	1894	19.49	**19.49**	
	TSP (Maize+Mustard+Lentil + Trg)	1744	226.72	1744	17.99	**17.99**	
	Total			**5822**	**60.09**	**60.09**	
TRFA(Pulse)	Demonstration						
	Lentil + Gram + Black Gram + Green Gram	1650	1650	7354	123.75	**123.75**	
	Micronutrient	5800	5800	18210	36.25	**36.25**	
	Bio-fertilizer	4000	4000	13010	12	**12**	
	P.P. Chemical including Bio-Pesticide	4900	4900	14450	24.5	**24.5**	
	Pump-set	280	280	280	28	**28**	
	Pipe (PVC) for carrying water	6950	6950	116	2.4325	**2.4325**	
	Misc. Expenditure				3.78	**3.78**	
	Total			**53420**	**230.7125**	**230.713**	

Name of the Scheme	Intervention	No.	Area (ha)	No. of Beneficiaries (expected)	Target Amount (in Lakh)	Achievement	Remarks
NFSM (Pulse)	Cluster Demonstration on Lentil	2	200	600	15	15	
	Cluster Demonstration on Khesari	1	100	375	7.5	7.5	
	Micronutrient	1000	1000	1500	5	5	
	Bio-fertilizer	400	400	1350	1.2	1.2	
	P.P. Chemical	600	600	1750	3	3	
	Pump-set	20	20	20	2	2	
	Cropping System Based Training meeting	1	1	30	0.14	0.14	
	Dal-Mill	2	2	2	4	4	
	Total			**7627**	**37.84**	**37.84**	
NMOOP	Hybrid + BYV Mustard DC	100	100	351	3	3	
	Sesame	50	50	227	1.5	1.5	
	IPM DC (FFS)	3	3	90	0.801	0.801	
	Farmers Training	5	5	100	1.32	1.32	
	SSP	500	500		3.75	0	
	P. P. Chemicals	50	50	81	0.25	0.25	
	Total			**844**	**10.621**	**6.871**	
FSSM	FSSM	**80**		**80**	**96.35**	**31.205**	
OTA-SFI	OTA-SFI	348		348	35	**11.9984**	
CHC	CHC	**7**		**7**	**60**	**0**	
RKVY	Expansion of area under Aromatic Rice	1	100	300	3.883	3.885	
	Seed Treatment Campaign	970	970	1650	1.3588	1.3588	
	Seed Prod. in Govt. Farm		25.6		1.73127	1.73127	
	Total			**2150**	**6.97507**	**6.97507**	
PKVY	PKVY	**1**	**20**	77	**6.04969**		**under progress**
PMKSY	Per drop more crop cluster	**8**	**160**	**560**	**128**		**under progress**
	Micro Irrigation (Drip & Sprinkler)	**120**	**120**	**120**	**16**		**under progress**
	Total			**757**	**150.84969**	**0**	
FOAP	FOAP	**1352**		**1352**	**100.98**	**85.68**	
SDRF	Status SDRF		**68.8**	**159**	**16**	**4.7855**	
KrishiMela	KrishiMela	**8**			**19.4**	**19.4**	
Farmers' Sos Training	Farmers Training	**4**		**120**	**0.84**	**0.84**	
Field oriented Gr. Meeting	Field oriented Gr. Meeting	**15**		**425**	**0.525**	**0.525**	

Table 4.8. Progress report of Farmers' Old Age Pension (As on 31.03.2012)

Name of Sub-division	Sanctioned strength of pensioners (in No.)			Achievement (in No.)		
	General	MIC	Total	General	MIC	Total
Durgapur	1244	06	1250	1155	06	1161
District Total	**3610**	**53**	**3663**	**3280**	**52**	**3332**

4.9. Constraint Analysis

For constraint analysis selected blocks from the three different AES in the district, i.e. old alluvium, new alluvium and red and lateritic, were chosen to have an in depth overview about the constraints faced by the crop husbandry sector. Block wise constraints identified are as follows,

Table 4.9. Block wise identified constraints in the crop husbandry sector

Block	Constraints Identified
Andal	i. **Physical:** Only 15 % areas of cultivable land are Irrigation. That irrigated area is not assured. ii. **Social:** Lack of awareness & interest. iii. iii. **Financial:** Govt. support
Barabani	i. **Physical:** Irrigation, Seed ii. **Social:** Awareness iii. **Financial:** Govt, support
Faridpur-Durgapur	i. **Physical:** Undulating or rolling topography of the Block together with the primarily low organic matter content of the soil rendering very low organic carbon content of the soil is the main impediment towards low productivity of agricultural crops. Extremely high temperature during the summer months burns away the organic matter content and does not allow sufficient scope for decomposition. Water holding capacity and CEC of the soil – Lateritic Ultisols – are hence quite low. To aggravate the situation, very poor status of irrigation facility is also a cause of hindrance for appreciable agricultural development in the otherwise agriculturally well-developed district. **ii. Social:** The development of the large scale public sector heavy industries like the Durgapur Steel Plant, Alloy Steel Plant, Durgapur Projects Limited, the D.V.C. -D.T.P.S. and their likes have lured the larger chunk of the population of the Block and its surroundings from decades past towards industrial engagement rather than agricultural engagement primarily because the former being much more remunerative. Agriculture thus remains at the back seat in the predominantly industrial area. **iii. Financial:** Credit facilities to the secondary agrarian community is a much neglected issue, the commercial financial institutions in the Block being reluctant to offer their services to the farmers, more so, as definite delineation of sectarian (Agriculture Sector) responsibility is not available to them. The Co-operative Sector has not developed in this Block to serve the purpose.
Kanksa	i. **Physical:** Irrigation, Seed ii. **Social:** Awareness iii. **Financial:** Govt. support

Kulti	i. **Physical:** a. Undulating topography and uneven land condition /or micro agro-climatic condition b. Lack water for irrigation and irrigation structures **ii. Social:** **a.** Lack of community approach among farmers for development in agriculture **b.** Lack of initiative towards problem which needs social intervention like problems of grazing by farm animals etc. **c.** Industrial opportunities in this belt has often weakened the gross interest towards agriculture. **iii. Financial:** **a.** Credit facilities through KCC have not matured for inadequate provisions in the municipal areas. **b.** The Co-operative Sector has not developed in this Block to serve the purpose.
Salanpur	i. **Physical:** a. Undulating topography and uneven land condition /or micro agro-climatic condition b. Lack water for irrigation and irrigation structures **ii. Social:** **a.** Lack of community approach among farmers for development in agriculture **b.** Lack of initiative towards problem which needs social intervention like problems of grazing by farm animals etc. **c.** Industrial opportunities in this belt have often weakened the gross interest towards agriculture. **iii. Financial:** **a.** Credit facilities through KCC have not matured due to lack proper documents. **b.** The Co-operative Sector has not developed in this Block to serve the purpose.

4.9.1. Yield gap analysis of major crops and reasons for gaps

Table 4.10. Block wise yield gap and reasons for gap

Name of crops	Yield (q/ha)		Yield gap (q/ha)	Reasons for gap
	District av. Of 5 years	Avarage from 20 FLDs		
Kharif Paddy	41.00	72.60	31.88	• Non adoption of SRI principles • Imbalanced fertilisation • Non adotion of INM • Lack of disease resistant variety • Non adotion of IPM • Poor soil health • Ill timing of transplanting • Lack of quality seed
Mustard	9.51	13.46	3.95	• Lack of disease resistant variety • Soil acidity • Ill timing of sowing

				• Non use of sulfur
Lentil	6.62	12.6	5.98	• Lack of HYV seed • No use of biofertiliser • Less use of phosphatic fertiliser • Poor pest and disease management • Soil acidty
Sesame	5.95	9.95	4	• Non use of sulphur • Lack of quality seed • Imbalanced fertilization • Ill weed management

4.9.2. Research/ Extension/ Adoption gaps

There are certain research and extension gap in crop production. In most of the cases convergence is not at all done by the allied department in case of demonstration and training. Extension gap is very prominent in agriculture sector. This is due to lack of sufficient number of extension machinery in the field level. The KPSs have been undertaking the extension works to the doorsteps of the farmers but their number is inadequate to the service and no new recruitment is being done.

4.9.3. Processing/ Storage/ Marketing gaps

Due to marketing gap in soyabean and cotton in Durgapur subdivision, the area of the above mentioned crops are being decreased over the years.

Paschim Bardhaman produces significant quantity of groundnut, pulse, maize etc. But for lack of processing unit farmers are forced to sell their products in a very low rate and most of the cases incur loss. Proper arrangement of processing units needs to be established in order to increase the area and production of the crops.

Requirement felt for processing units given below –

- Dal Mills are proposed in the blocks where large quantity of pulse production
- Low cost maize sheller developed by CIFE, ICAR to be promoted
- Wheat thresher is required in Raniganj, Jamalpur, Salanpur, Andal and Paschim Bardhaman Sadar etc
- Sugarcane crusher is required in Kanksa block
- Maize crusher is needed in Raniganj, Durgapur-Faridpur block.

4.9.4. Existing Institutional Mechanism in the Government Sector

Below are the existing institutional mechanisms in the govt sector

Table 4.11. Storage structures and markets

Block	Storage Structures						Markets (Numbers)	
	Rural Godowns		Cold storage		Any other		Main market	Sub market
	Nos.	Capacity (MT)	Nos.	Capacity (MT)	Nos.	Capacity (MT)		
Andal	0	0	0	0	0	0	03	08
Barabani	0	0	0	0	0	0	1	05
Faridpur-Durgapur							3	12
Kanksa	0	0	1	150000	0	0	01	06
Kulti							3	10
Salanpur							3	5
Total	**0**	**0**	**1**	**150000**	**0**	**0**	**14**	**46**

(Capacity in tonnes)

Table 4.12 Farm Level Storage Plan existing facilities (2013-14)

Block	Type	No.	Capacity (MT)
Total	---	**Nil**	**Nil**

(Capacity in tones and investment Rs. In lakh)

Table 4.13. Agro Processing Unit in the block (including Sugar, Milk, Silk, etc., related to Agriculture only) N.A.

Block	Type of Agro-Processing unit	No. of Processing units
Andal	Small Rice dehusker	05
	Muri mill	10
Barabani	Rice Mill	01
	Small Rice dehusker	12
	Muri Mill	02
	Chira Mill	02
Faridpur-Durgapur	Dal Mill	1
	Puffed Rice Mill ('Muri')	5
	Rice Mill	1
Jamuria – I	Rice Mill	03
	Small Rice dehusker	10
	Muri Mill	10
Jamuria – II	Rice Mill	01
	Small Rice dehusker	30
	Muri Mill	15
Kanksa	Rice Mill	3
	Small Rice dehusker	30
Salanpur	Rice Mill	1
Total		**7142**

4.10: Recommended interventions for the district, with detailed Action Plan with costs for achieving the production target

The crop wise interventions in the district are as below to meet up the production target,

Rice

(i) Promotion of latest High Yielding Varieties (HYVs)/Hybrids of rice and increase of seed replacement rate (SRR) upto 80 per cent in coming years in HYVs, and 100 per cent in case of hybrids.

(ii) Promotion of bio-fortified high nutrient rich varieties, such as high protein & zinc content rice varieties for nutritional security Over the years, Research Institutes in the country have developed several varieties for increasing per cent yields. Additionally, there has also been, the emphasis on improving the nutritional quality of rice varieties, leading to varieties with improved quality attributes such as high protein content (CR Dhan 310, CR Dhan 311); high zinc content (DRR Dhan 45; Chhattisgarh Zinc Rice 1); and low glycemic index (Improved Sambha Mahsuri).

(iv) Promotion of salt tolerant/stress tolerant/climate resilient/semi-cum-deep water/upland varieties in specific areas for higher productivity. Several crop varieties with enhanced tolerance to biotic and abiotic stresses have been released. Recently, a climate-smart variety. CR Dhan 801 has been released which is tolerant to both submergence and drought situations. It is in the background of very popular variety Swarna with maturity duration of 140 days.

(v) Promotion of System of Rice Intensification (SRI) technique
The basic principles of SRI are transplanting of young seedlings of around 8-15 days in age; transplanting of one seedling per hill at under wider spacing; controlling weeds by mechanical means, initially with rotary pushed weeder or conoweeder; maintaining moist soil under nonsaturated conditions during the vegetative phase; and use of organic manure (compost) instead of chemical fertilizer for maintaining optimum biological activity of the soil. This technique has been widely tested in states like Odisha and Andhra Pradesh transferring higher yields and incomes to the farmers. This technology helps in realizing higher per unit yields at loer cost of cultivation. However, it is labour intensive, and is therefore, optimal in case of family farms, wherein all members of the family engage themselves as labour on their farm.

(vi) Promotion of Direct Seeded Rice (DSR) for increasing production and productivity. Rice is commonly established by transplanting in puddled soil. It is labour, water and energy intensive and is less profitable. These factors demand a major shift from transplanting to direct seeding of rice (DSR). There are 3 principles of DSR i.e., dry seeding (sowing dry seeds into dry soil), wet seeding (sowing of pre germinated seeds in wet puddle soils), and water seeding (seeds sown into standing water). However, high weed infestation is a major constraint for adoption of DSR. Application of post-emergent recommended herbicide at proper time and/or application of early post-emergent herbicide followed by mechanical weed control by motorized weeder in heavy infested areas can successfully control the weeds.

(vii) Promotion of farm implements for rice crop, pre-germinated seed sowing by drum seeder is a good option compared to broadcasting method of seed sowing. Sowing with drum seeder saves seed, fertilizer and other inputs and also provides uniform row to row spacing to perform subsequent field operations. In order to promote drum seeder for sowing of pre-germinated paddy seeds, ICAR-NRRI has developed manually operated four and six row drum seeder and power operated eight row drum seeder, which reduce cost of sowing substantially. Suitably designed farm machinery deployed at various cultivation. Stages will improve farming efficiency, reduce cost of cultivation and enhance net returns. Promoting use of renewable energy in farm equipment segment such as solar-powered pumps can improve efficiency of farm operations and also create alternate source of revenue for the farmers who can sell the additional power. However, a suitable policy will be required for this purpose.

(viii) Application of balanced nutrient fertilization on soil test base including biofertilizers. Soil test based nutrient management can result in higher productivity and sustainability. Sitespecific use of micro/secondary-nutrients combined with soil amendments would result in greater benefit. Green manuring, as also bio-manures need encouragement to improve soil structure and fertility. Customized five-panel leaf colour chart (CLCC) for nitrogen management in rice developed at NRRI Cuttack, is an effective, low-cost, easy to use diagnostic tool which can be used by the farmers to monitor the relative greenness of rice leaf as an indicator of the leaf N status, and decide when and how much N should be applied to the crop. Customized leaf colour chart (CLCC) based N application enhanced yield by 10.3-13.3 per cent and 9.9-10.9 per cent over conventionally applied urea (RDF urea) in direct seeded (DSR) and transplanted rice (PTR), respectively. The CLCC based N application produced 11.2-18.7 per cent more yield. Farmer's feedback data obtained from deputy directors of agriculture (DDA) from different district indicated yield advantage of 5-20 per cent due to use of CLCC.

(ix) Adopting plant protection measures to protect the crops from weeds, insects pests and diseases. There is need to promote latest generation agro-chemicals so that residual effect may not occur. IPM (Integrated Pest Management) may also be promoted among the farmers. The stem borer, brown plant hopper (BPH), leaf folder, gundhi bugh are the major insect pests of rice. The major diseases of rice are brown spot, bacterial leaf blight and blast.

Critical Issues relating to Paddy Cultivation need to be addressed

(i) Crop residue burning
(ii) Water use efficiency
(iii) Crop substitution
(iv) Promotion of bio-fortified and special quality paddy
(v) Strengthening of market forces

Wheat

Wheat is the second and most important food grain crop in our state. Demand of wheat is increasing day by day due to growing population. Beside that, a considerable mass uses wheat as a substitute of rice. So the target of coverage and production of this crop in this district has been fixed with higher aspiration.

Following measures are to be taken up for reaching the targetted production of wheat:

1) **Use of Quality Seeds:**
   Use of quality seeds (certified) to be increased to the extent of 80% at least. Arrangements for distribution of certified seeds both from Govt. and Private trade channel would be continued like previous year.
2) **Replacement of Old Varieties:**
   Farmers would be advised by the extension personnel to discard old varieties and to use improved recently released varieties where ever available.
3) **Judicious application of Fertilizer:**
   Timely application of Chemical Fertilizers on the basis of soil testing report or use of recommended dose of fertilizer in absence of soil testing report would be made acceptable to farmers along with the application of organic manure of recommended quantity.
4) **Application of Micronutrients:**
   Extension personnel should give due importance on use of specific micronutrients in deficite areas.
5) **Plant Protection:**
   Due emphasis would be given towards need based Plant Protection Measures observing principle of Integrated Pest Management.
6) **Timely sowing of seeds in West Bengal:**
   Winter season does not last for long period; attention to be given on timely sowing of seeds because it is a key factor of producitivity of wheat crop.
7) **Transfer of latest technology:**
   Extension agencies would intensify the transfer of latest technology to farmers as evolved from field trials and demonstrations through T & V Programme.
8) **Irrigation:**
   Judicious application of irrigation to the crop at critical stages of growth depending on availability of water as far as possible.
9) **Trials and Demonstrations:**
   On going trials and demonstration on newly evolved varieties to be continued like previous years which have become susceptable to various pest hazards.

Oil Seeds

In agricultural economy the oilseeds stand next only to the food grains in acreage, tonnage and value. Vegetable oils are essential part of human diet. Vegetable oils are also used in making industrial products like soap, paints, lubricants, cosmetics, hair oil, pharmaceuticals etc. Oil cakes and de-oil meals are used in making food products for human consupmptions and animal feeds as well as manures and raw materials for industrial use. Some oilseeds, oils, oil cakes/de-oil meals are exported for earning foreign exchange.

Historically we are deficient in production of oilseeds to its requirement, though we have made a good progress in the field of oilseed production, programmes to be taken up for doubling the food production and making our country hunger free in ten years. The production of oilseeds during 10th to 11th Plan period will also be taken up so that gap between the requirement and production could be narrowed down.

Rapeseed-Mustard are major oilseed crops in this district. It occupies more than 85% of total area under oilseed. There has been a real break through in the expansion of area and to some extent production. In a decade the area has increased three fold, but the production not to that extent.It remained static or it showed down ward trend. Seasamum is the second important oilseed crop in this district. Area of this crop is also increasing and its productivity is encouraging. Next to seasmum is groundnut, which is gaining popularity and has been included in expansion programme of oilseeds in this district. With its present level of production the district has given emphasis to increase the productivity of the crop so that with the limited area available under oilseed, the production of oilseeds can be doubled at the end of 11th 5 year Plan.

Follwing strategies for the increase of production of oilseed crops would be adopted:
Area Approach –

1) Diversion of low yielding rice areas of lateritic region to Kharif Groundnut crops in the Western part of the district i.e. Durgapur Sub-division.
2) To introduce cultivation of Kharif Sesamum in the Western part of the district instead of Rice cultivation where irrigation is not sufficient.
3) To campaign for higher coverage under short duration Toria as a catch crop before start of Rabi season.
4) Diversion of area under rainfed Wheat to Rapeseed-Mustard.
5) Inter-cropping, mixed cropping of Mustard with Autumn-sown Sugarcane, Gram, Lentil and in the border of Potato field.
6) Extensive cultivation of Rabi-Summer Groundnut after the harvest of Aman crop with available soil moisture.
7) Area of Potato are increasing day by day, Sesamum can be grown in those areas after the harvest of Potato Crop.
8) Timely sowing – Farmers should be motivated for timely sowing of Oilseed crops due to short span of winter season.
9) Recently Sunflower has been introduced as a source of alternate Oilseed. Demonstrations are being organized in farmers' field to make it popular. However, if marketing facilities may be provided to the farmers, they can take up Sunflower as an alternate oilseed crop.

Pulses

Pulse cultivation as a major crop could not be popularized due to its low yield in comparison to other field crops. As a result, this crop has become less remunarative to the farmers which replace the interest of farmers from pulse cultivation. Due to this reason a wide gap has been created between the requirement and production of the crop.

However with a view to bridge the gap between the demand and production of the crop, certain measures may be taken up as follows:

1) Cultivation of Pulse Crop in Western tracts of the district -
In the Western rainfed tracts of the district (Durgapur Sub-division) Kharif Pulse i.e. Kalai, Mung and Cowpea cultivation would be adopted in large areas especially in drought prone areas with Maize.

2) Stabilisation of Pulse Area –
Pulse area should be stabilized by adopting Intercropping, Mixed cropping and Paira cropping.

3) Summer Pulse Cultivation –
The pulse area can be increased by growing Summer Mung and Kalai after harvest of Rabi crops. Similarly, in Potato harvested fields, cultivation of Mung can be introduced.

4) Pulse in Non-traditional Areas -
Growing of Pulse crop in Non-traditional areas of Waste land and Water-shed development areas may be introduced.

5) Improved Technology -
Introduction and adoption of improved modern scientific technology of cultivation in traditional areas under pulse in the Kalna and Katwa Sub-division may be done where Lentil, Gram, Arahar have already occupied considerable areas.

6) Rabi Pulse Cultivation in Irrigation Command Area -
Short duration Rabi-Pulse i.e. Arahar cultivation may be popularized and it can be introduced in fringe areas of irrigation command areas.

7) Soil amendments –
Use of Soil amendments (i.e. Basic Slag etc.) for correcting the soil acidity in pulse growing areas would be encouraged for cultivation of pulse crop.

8) Multiplication & Distribution of Quality Seeds –
Multiplication of quality seeds (Foundation / Certified) of various pulse crops in Government concern and other seed producing concern like West Bengal State Seed Croporation Ltd. would be encouraged and adopted for distribution of quality seeds to farmers for enhancing production and productivity of pulse crop.

9) Use of Phosphatic and Bio-fertilizers -
Phosphatic Bio-fertilizers including Phosphate Solubilising Bacterias (PSB) would be introduced in pulse cultivation and spraying of DAP and Micronutrient in deficient areas may also be adopted to boost up pulse production.

10) Plant Protection -
Necessary Plant Protection measures may be adopted maintaining the principle of Integrated Pest Management and use of NPV for control of Pod borer in case of Arahar by organizing Result Demonstration Centre.

Sugarcane

Sugarcane is an important commercial crop. Its coverage in the district could not be increased significantly as it is an annual crop and due to the lack of Processing Industry / Sugar Mill in Purba Bardhaman district. Following measures would be taken to achieve the targetted production.

a. Production & Distribution of short duration varieties –

Intensification of production of short duration improved varieties and distribution of disease free planting materials.

b. Improved Cultural Practices –

Adoption of improved cultural practices including treatment of sets and use of balanced fertilizer as per soil testing report or recommended dose in absence of soil testing report.

c. Coverage under Autumn Planting –

The extension personnel right from grass root level should motivate the farmers for increasing the area of coverage of Autumn Planting for making availability of Canes to Sugar Mills (if established).

d. Intercropping -

Practice of Intercropping with companion crops both in autumn and spring season would be advocated.

e. Demonstrations –

Conducting more numbers of Technological Demonstration Centre and establishment of Seedcane Multiplication Nursery Centres with application of advanced modern scientific technology would be organized.

f. Transport Subsidy –

Transport subsidy would be allowed to farmers for bringing quality seedcane from different authentic seedcane production centres.

g. Marketing price of Seedcane –

Action would be taken up so that the quality seed cane growers get remunerative marketing price of their produce from the Mill owners.

Table 4.14. Financial requirement for reclamation and Development of acid soil

Name of Block	Area to be reclaimed and fund requirement*						Total	
	2017-18		2018-19		2019-20			
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Andal	190	14	380	29	380	29	950	71
Barabani	600	45	1200	90	1200	90	3000	225
Faridpur-Durgapur	752	56	1504	113	1504	113	3760	282
Jamuria – I	180	14	360	27	360	27	900	68
Jamuria – II	290	22	580	44	580	44	1450	109
Kanksa	800	60	1600	120	1600	120	4000	300
Kulti	180	14	360	27	360	27	900	68
Salanpur	450	34	900	68	900	68	2250	169
Total	**3442**	**259**	**6884**	**518**	**6884**	**518**	**17210**	**1292**

Table 4.15. Seed Production under trial cum demonstration

Name of the Block	Crop	Seed production during 2013(q)	Proposed Seed Production (q)		
			2014-15	2015-16	2016-17
Faridpur-Durgapur	Paddy	14400	15000	15000	15000
	Wheat	1200	2800	3000	3000
	Mustard	75	100	100	100
	Maize	230	250	250	250
Total		**15905**	**18150**	**18350**	**18350**

Table 4.16. Proposed Plan to Improve Agriculture & Allied Training Facilities for Farmers at block level

Block	New Agro polyclinics proposed	Govt./ Non Govt.	Capacity generated (No. of farmers)	Requirement of Funds for renovation of old / establishment of new agro polyclinics		
				Type of Facility Required	Financial Requirement (Rs. In Lakh)	Additional Capacity generated through farmers training (No. of farmers)
Andal	01	Govt.	100	• Plant Pathological clinic, Farmers (50 nos) training hall with AV aids.	20	1000
Barabani	01	Govt.	100	• Disease Diagnosis., Soil testing	15	800
Faridpur-Durgapur	2	Govt.	15000	• Disease diagnosis • Soil Testing	30	1000
Kanksa	01	Govt.	100	• Testing apparatus, reagents, soil testing kits, training hall with AV aids.	15	800
Total	**5**		**15300**		**80**	**3600**

Table 4.17. Planning for Farmers Training Programme Related to Agriculture and Allied Departments in block

Name of Block	Name of technologies to be transferred	No of farmers to be trained and fund requirement*					
		2017-18		2018-19		2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin
Andal	Zero tillage	400	1.2	600	1.8	1000	3
	Drum Seeder etc.	400	1.2	600	1.8	1000	3
	Organic farming	400	1.2	600	1.8	1000	3
	Crop diversification	400	1.2	600	1.8	1000	3
	Agriculture mechanization	400	1.2	600	1.8	1000	3
	IPM/INM	400	1.2	600	1.8	1000	3
Barabani	Zero tillage	300	0.9	400	1.2	800	2.4
	SRI	200	0.6	300	0.9	600	1.8

	Drum Seeder etc.	200	0.6	300	0.9	600	1.8
	Crop diversification	200	0.6	300	0.9	600	1.8
	Agriculture mechanization	300	0.9	400	1.2	800	2.4
	Organic farming	200	0.6	300	0.9	600	1.8
Faridpur-Durgapur	SRI	500	1.5	500	1.5	1500	4.5
	Zero tillage	500	1.5	500	1.5	1500	4.5
	Drum Seeder	500	1.5	500	1.5	1500	4.5
	Bio village	100	0.3	100	0.3	300	0.9
Kanksa	Zero tillage	300	0.9	400	1.2	800	2.4
	SRI	200	0.6	300	0.9	600	1.8
	Drum Seeder etc.	200	0.6	300	0.9	600	1.8
	Crop diversification	200	0.6	300	0.9	600	1.8
	Agriculture mechanization	300	0.9	400	1.2	800	2.4
	Organic farming	200	0.6	300	0.9	600	1.8
Kulti	Improved Methods of cultivation of Paddy like SRI, ZeroTillage, Drum Seeder etc.	100	0.3	100	0.3	100	0.3
	Rainfed Agriculture with special emphasis to cultivation of pulses	100	0.3	100	0.3	100	0.3
	Improved method of cultivation of Maize and Wheat	100	0.3	100	0.3	100	0.3
	INM	50	0.15	50	0.15	50	0.15
Salanpur	SRI, Zero Tillage, Drum Seeder.	100	0.3	100	0.3	100	0.3
	Rainfed Agriculture with special emphasis to cultivation of pulses	100	0.3	100	0.3	100	0.3
	Improved method of cultivation of Maize and Wheat	100	0.3	100	0.3	100	0.3
Total		**7450**	**22.35**	**9850**	**29.55**	**19450**	**58.35**

*(Phy. in no. and fin. in lakh Rs.)

Total financial requirement for capacity building programme under the plan

= (22.35+ 29.55+58.35) lakh = 110.25

Table 4.18. Planning of Agriculture Inputs in the District – Seed

Block Name	Name of the Crop	Area under Crop (ha)	Present SRR	Target SRR
Andal	Kharif Paddy	2700	60	100
	Wheat	150	80	100
	Mustard	155	60	100
	Lentil	80	80	100
Barabani	Kharif Paddy	6500	15	25
Faridpur-Durgapur	Paddy	8750	20	30

	Wheat	90	100	100
Jamuria – I	Kharif Paddy	3000	15	25
Jamuria – II	Kharif Paddy	6000	15	25
Kanksa	Kharif Paddy	12500	20	35
	Boro Paddy	4000	40	35
Kulti	Paddy	2000	20	25
	Wheat	150	50	60
Salanpur	Paddy	4500	20	25
	Wheat	150	80	100
Total		**50725**	**675**	**885**

SRR – Seed Replacement Rate

Table 4.19. IPM Demonstrations in 3 years

Block	Name of crop	Present Area under IPM (ha)	IPM Demonstration Projections					
			2017-18		2018-19		2019-20	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Andal	Paddy(K)	50	60	2.4	72	2.88	86	3.46
	Vegetables	20	24	0.96	29	1.15	35	1.38
	Pulse	20	24	0.96	29	1.15	35	1.38
Barabani	Paddy	50	60	2.4	72	2.88	86	3.46
Faridpur-Durgapur	Paddy	200	240	9.6	288	11.52	346	13.82
	Vegetables	20	24	0.96	29	1.15	35	1.38
	Maize	50	60	2.4	72	2.88	86	3.46
	Mustard	20	24	0.96	29	1.15	35	1.38
Jamuria – I	Paddy	40	48	1.92	58	2.30	69	2.76
Jamuria – II	Paddy	60	72	2.88	86	3.46	104	4.15
Kanksa	Paddy	12	14.4	0.576	17	0.69	21	0.83
	Mustard	10	12	0.48	14	0.58	17	0.69
Kulti	Paddy	10	12	0.48	14	0.58	17	0.69
Salanpur	Paddy	100	120	4.8	144	5.76	173	6.91
Total		662	794.40	31.78	953.28	38.13	1143.94	45.76

(Phy – Area covered in ha.; Fin – Rs. In lakh)

Total fund requirement = (31.78 +38.13+45.76) or 115.66 lakh

Table 4.20. INM Demonstrations in 3 years

Block	Name of crop	Present Area under INM (ha)	IPM Demonstration Projections					
			2017-18		2018-19		2019-20	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Andal	Aman Paddy	80	150	6	180	7.20	216	8.64
	Wheat	100	100	4	120	4.80	144	5.76
	Mustard	50	60	2.4	72	2.88	86	3.46
	Lentil	20	24	0.96	29	1.15	35	1.38
	Vegetables	90	140	5.6	168	6.72	202	8.06

Barabani	Paddy	300	110	4.4	132	5.28	158	6.34
Faridpur-Durgapur	Paddy	300	160	6.4	192	7.68	230	9.22
	Wheat	200	150	6	180	7.20	216	8.64
Jamuria – I	Paddy	200	150	6	180	7.20	216	8.64
Jamuria – II	Paddy	150	130	5.2	156	6.24	187	7.49
Kanksa	Paddy	200	150	6	180	7.20	216	8.64
Kulti	Paddy	440	120	4.8	144	5.76	173	6.91
Salanpur	Paddy	250	140	5.6	168	6.72	202	8.06
Total		2380	1584.00	63.36	1900.80	76.03	2280.96	91.24

(Phy – Area covered in ha.; Fin – Rs. In lakh)

Total fund requirement = (63.36+76.03+91.24) or 230.63 lakh

Table 4.21. Varietal Demonstration in 3 years

Block	Name of crop	Average Area per demon-stration (ha.)	Present Area under Varietal demon. (ha)	Varietal Demonstration Projection					
				2017-18		2018-19		2019-20	
				Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Andal	Aman Paddy	0.4	100	150	6	180	7.20	216	8.64
	Mustard	0.13	50	100	4	120	4.80	144	5.76
	Lentil	0.13	50	60	2.4	72	2.88	86	3.46
	Maize	0.13	150	180	7.2	216	8.64	259	10.37
Barabani	Aman Paddy	0.4	200	140	5.6	168	6.72	202	8.06
Faridpur-Durgapur	Paddy	0.4	150	110	4.4	132	5.28	158	6.34
	Wheat	0.4	150	160	6.4	192	7.68	230	9.22
	Mustard	0.4	50	150	6	180	7.20	216	8.64
	Maize	0.4	100	150	6	180	7.20	216	8.64
Jamuria – I	Aman Paddy	0.4	200	130	5.2	156	6.24	187	7.49
Jamuria – II	Aman Paddy	0.4	200	150	6	180	7.20	216	8.64
Kanksa	Aman Paddy	0.8	300	120	4.8	144	5.76	173	6.91
	Boro Paddy	0.4	500	140	5.6	168	6.72	202	8.06
	Mustard	0.26	200	150	6	180	7.20	216	8.64
Kulti	Paddy	0.4	250	100	4	120	4.80	144	5.76
	Wheat	0.4	200	240	9.6	288	11.52	346	13.82
	Maize	0.4	100	120	4.8	144	5.76	173	6.91
	Arhar	0.4	50	140	5.6	168	6.72	202	8.06
	Paddy	0.8	400	110	4.4	132	5.28	158	6.34
	Wheat	0.4	500	160	6.4	192	7.68	230	9.22
	Maize	0.4	100	150	6	180	7.20	216	8.64
Salanpur	Arhar	0.4	100	150	6	180	7.20	216	8.64
Total		**8.65**	3200	2010.00	80.40	2412.00	96.48	2894.40	115.78

(Phy Area covered in ha) (Fin – Rs. In lakh)

Total fund requirement = (80.40 +96.48 +115.78) lakh = 292.66 lakh

Table 4.22. Farmers Field Schools Projection in 3 years

Block	Name of crop	2017-18		2018-19		2019-20	
		No. of FFS	No .of villages to be covered	No. of FFS	No. of villages to be covered	No. of FFS	No. of villages to be covered
Andal	Paddy	1	8	4	8	8	1
Barabani	Paddy	2	10	1	10	5	10
	Wheat	1	5	1	5	4	5
Faridpur-Durgapur	Paddy	1	10	4	10	1	10
	Wheat	1	5	2	5	1	5
Jamuria – I	Paddy	2	10	2	10	3	10
Jamuria – II	Paddy	2	10	2	10	3	10
	Wheat	2	5	1	5	4	5
Kanksa	Paddy	1	10	4	10		10
Kulti	Paddy	1	10	1	10	1	10
Total		**14**	**83**	**22**	**83**	**30**	**76**

Total fund requirement for FFS:

Fund requirement for one (1) FFS = 0.8 lakh

Total FFS planned in the plan = (14+22+30) = 66

Therefore, total fund requirement = 66 * 0.8 = 52.8 lakh

Table 4.23. Crop Diversification Plan in 3 years

Block	Existing Cropping Pattern 2016-17		Crop Diversification Proposed (Area in ha.)					
			2017-18		2018-19		2019-20	
	Crop Group	Area	Area under crop	Change in area with reference to 13-14 (+/-)	Area under crop	Change in area with reference to 13-14 (+/-)	Area under crop	Change in area with reference to 13-14 (+/-)
Andal	Aman Paddy – fallow	2200	2000	-200	1800	-400	1620	-580
	Aman paddy-Wheat	150	250	100	275	125	247.5	97.5
	Aman Paddy - Mustard	150	300	150	330	180	297	147
	Aman Paddy – Lentil/Gram	100	300	200	330	230	297	197
	Aman Paddy –	100	150	50	165	65	148.5	48.5

	Veg. – Veg.							
Barabani	Aman Paddy – fallow	4000	2000	-2000	1800	-2200	1620	-2380
	Aman Paddy - Mustard	6000	6500	500	7150	1150	6435	435
	Aman Paddy – Potato - Till	500	750	250	825	325	742.5	242.5
	Aman Paddy – Veg. – Veg.	500	750	250	825	325	742.5	242.5
Faridpur-Durgapur	Cereals	9200	8000	-1200	7200	-2000	6480	-2720
	Pulses	50	150	100	165	115	148.5	98.5
Jamuria – I	Aman Paddy – fallow- Cereals	3000	2400	-600	2160	-840	1944	-1056
	Aman Paddy – Mustard - Pulse			0	0	0	0	0
	Aman Paddy – Potato – Till Oil seed	3000	3500	500	3850	850	3465	465
	Veg. - Potato			0	0	0	0	0
Jamuria – II	Aman Paddy – fallow- Cereals	120	500	380	550	430	495	375
	Aman Paddy – Mustard -Pulse			0	0	0	0	0
	Aman Paddy – Potato – Till Oil seed	100	150	50	165	65	148.5	48.5
	Veg. - Potato			0	0	0	0	0
Kanksa	Aman Paddy – fallow	1200	1500	300	1650	450	1485	285
	Aman Paddy - Mustard	800	1500	700	1650	850	1485	685
	Aman Paddy – Potato - Till	12400	8000	-4400	7200	-5200	6480	-5920
	Aman Paddy – Veg. – Veg.	5200	50	-5150	55	-5145	49.5	-5150.5
Kulti	Cereals	200	8700	8500	9570	9370	8613	8413
	Pulses	150	8550	8400	9405	9255	8464.5	8314.5
Salanpur	Cereals	7000	7100	100	7810	810	7029	29
	Pulses	200	250	50	275	75	247.5	47.5
Total		**56320**	**63350**	**7030**	**65205**	**8885**	**58684.5**	**2364.5**

Table 4.24. Additional area to be brought / under Organic Farming in 3 years

Block	**Present area (2016-17) under Organic Farming (ha)**	**Year wise area to be brought under organic farming (ha)**			
		2017-18	**2018-19**	**2019-20**	**Total**
Andal		5	10	15	30
Barabani			5	10	15
Faridpur-Durgapur			5	5	10

Jamuria-I			3	6	9
Jamuria – II			5	10	15
Kanksa		5	10	20	35
Kulti		2	2	2	6
Salanpur		2	2	2	6
Total		**14**	**42**	**70**	**126**

Table 4.25. Infrastructure and assets sector

Block	**Activity proposed**	**Target**					
		2017-18		**2018-19**		**2019-20**	
		Phy.	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**
Andal	Construction of new ADA office including farmers training hall, godown, lab, polyclinic.					1	100
Faridpur-Durgapur	Office with training hall			1	40		40
	Godown			1	20		
	Conditional godown			1	50		
	Seed godown (rural)			3	40	3	40
Hirapur	ADA office building			1	50		
	Training hall			1	20		
	Implement hub			1	20	1	20
	Irrigation channel				10		20
	Marketing infrastructure			2	10	2	10
	Soil testing lab			1	20		10
Kanksa	ADA office including training hall, godown			1	50		
	Boundary wall						50
Total			**0**	**13**	**330**	**6**	**190**

(Phy. in nos. and Fin. in Lakh)

Total fund requirement for other activities = (0+330+190) lakh = 520 lakh

Apart from these regular activities, few innovative programme to be undertaken, e.g. information kiosk at ADA office/model village, soil health card, multi component integrated farming system, climate resilient programmes, protection of plant varieties, identification and promotion of farmers innovation, farmer-farmer technology dissemination etc. for meeting the projected growth target from 2017-18 to 2019-20. These are enumerated below, blockwise,

Table 4.26. Innovative programme to be undertaken

Name of Blocks	**Proposed Programmes**	**Fund required (Lakh)**
Andal	Information Kiosk at ADA office	2.50
	Soil health card	2.0
	Multi component integrated farming system	5.00
	Model village	5.00
Kanksa	Soil health card	2.50

	Information Kiosk at ADA office	2.50
Durgapur-Faridpur	Information Kiosk at model village/ADA office	2.50
	Multi component integrated farming system at model village	5.00
	Farmer to farmer technology dissemination like plastic drum seeder, zero-tillage technology	10.00
Total		**37.00**

Agri Irrigation

The existing agri-irrigation facilities prevailing in the district is as follows,

Table 4.27. Block-wise statement on both surface water and ground water irrigation structure In the district of Paschim Bardhaman during 2015-16

Name of Block	No. of RLI				NO. Of DTW (Figure in No.)				No. Of MDTW (Figure in No.)				No.of SDTW (Figure in No.)			
	Govt.	Private	Defunct	Area (in hect)	Govt.	Private	Defunct.	Area (in hect)	Govt.	Private.	Defunct	Area (in hect)	Govt.	Private.	Defunct	Area (in hect)
Faridpur-Durgapur	8	107	1	320	-	-	-	-	-»	-	-	-	-	—	—	—
Kanksa	24	97	9	720	1	-	-	**40**	-	-	-	-	62	640	24	300
Asansol	-	-	-	-	-	-	-	-	-	-	-	<-	1	12	-	50

Table 4.28. Proposal for new installation of irrigation facilities

Name of Block	Submersible Pump up to 5HP with G.I. Pipe @6 Lack per unit				Water Detention Tank (WDT) up to 50 decimal @ Rs. 15 lack per unit				Water lifts Pump from Surface / Open Caste Pit / River Channel / Bandh with Eump and Transformer and Pipe line (300 meter approx) *((0,* 10 lack per unit				Total amount (in lakh)
	No.	Benefited Area in ha.	No. of farmers will be benefit	Amount (Rs. in lack)	No.	Benefited Area in ha	No. of farmers will be benefite	Amount (Rs. in lack)	No. of Lift Iriga-	Benefited Area in ha	No. of farmers w i l l be benefited	Amount (Rs. in lack)	
Durgapur-Faridpur	3	15	60	18	20	40	80	300	5	125	250	50	368
Kanksa	2	10	40	12	10	20	40	150	5	125	250	50	212
Asansol	-	-	-	-	20	40	80	300	5	125	250	50	350
Galsi-I	5	25	100	30	10	20	40	150	4	100	200	40	220
Barabani	-	-	-	-	20	40	80	300	6	150	300	60	360
Hirapur	-	-		-	20	40	40	150	3	75	150	30	180
Jamuria-1	-	-	-		20	40	80	300	4	100	200	40	340
Jamuria-II	-	-	-	30		60	120	450	6	150	300	60	510
Kulti	-	-	--		20	40	80	300	4	100	150	40	340
Salanpur		-	-	-	20	40	80	300	4	100	150	40	'

Andal		-	-	-	15	30	60	225	4	100	150	40	265
Raniganj		-	-	-	15	30	60	225	4	100	150	40	265
Sub-Div.	**10**	**50**	**200**	60	**190**	440	**840**	**3150**	**86**	**1075**	**2500**	**540**	**3750**
District **Total**	**10**	**50**	**200**	60	**190**	440	**840**	**3150**	**86**	**1075**	**2500**	**540**	**3750**

Soil conservation

The main objective of the work is to bring additional area under cultivation by way of developing culturable / cultivable wastelands into arable one and to increase the irrigation potential by conserving as much as rainwater in the surface, sub-surface and underground and utilization of the same for agricultural development by increasing production & productivity of agricultural crops and allied sectors.
Considering the existing infrastructural facility available under this establishment, following blocks of Paschim Bardhaman District have been taken for development. The main constrains to higher agricultural productivity of this agro-climatic zone are as follows.

Table 4.29. Main constraints to higher productivity of the area of operation

Agro-climatic zones	Operational Blocks	Constraints to higher productivity
Undulating Lateritic zone	Salanpur	[Average annual rainfall – 1427 mm, Air temperature – Maximum – 37.0 0 C; Minimum – 14.8 0 C] Undulating topography with mounds & hillocks, unbunded cultivable wastelands, sloppy lands, excessive runoff, susceptible to soil erosion, moisture stress, Soil depth shallow at ridges & deep in valleys, low pH, acidic soils, low in organic matter, The organic carbon content, potash, phosphate, base saturation is significantly low in the ridges and increases down the slope, Micro nutrient deficiencies like Bo, Zn, Mo and S etc observed. inadequate irrigation facility, ground water economically not trappable, Application of low input due to lack of economic access of the farmers.
	Barabani	
	Durgapur - Faridpur	
	Pandabeswar	
	Andal	
	Kanksa	

Strategy & action proposed for soil & water conservation measures in the degraded lands of undulating Lateritic Agro-climatic zone of Paschim Bardhaman District :

To bring more area under cultivation by development of cultivable wastelands into arable land. Cultivable wastelands in the ridge areas which are lying unbunded, will be developed through land levelling, field bunding, graded bunding, bench terracing, gully control measures etc and

thereby a significant area can be brought under cultivation additionally. This measure also promotes in-situ moisture conservation to a great extent.
The wastelands which have been developed in to cultivable lands, at least one crop will be grown during kharif season, resulting increase in 100% cropping intensity. By creating water resources adjacent to the same location, two or three additional crops can also be grown, resulting increase in cropping intensity up to 200% or 300%. This will contribute towards additional agricultural production & productivity to a great extent which ultimately contributes towards the growth of agriculture as desired under the RKVY scheme.

To intercept and reduce runoff and induce larger and extensive in-situ absorption of rainwater into the soil profile as well as trap eroded materials (thus reduce sediment production either into the streams or reservoirs) through vegetative barriers, loose boulder checks, earthen checks / bunds, earthen bunds fortified with vegetative support / grass turfing / sodding etc. Depending upon the specific sites, the estimates for each structure varies from place to place. To harvest our precious rainwater on the surface, sub-surface and also for recharging underground water through construction / excavation of plenty of water storage structures, dug-out ponds, farm ponds / tanks, water harvesting structures, check dams, wells / dug wells / ring wells etc. to maximize the water storage capacity of the area for irrigation purpose to increase the cropping intensity of the area and also to increase fisheries production.

To maximize the water storage capacity of existing surface water bodies / canals through re-excavation of partially silted-up tanks / farm ponds / surface water bodies / water harvesting structures etc for life saving irrigation to crops during post rainy season and also for development of fisheries. This will not only ensure assured kharif production to a larger extent but also increase the production & productivity of rabi crops to a great extent.

To reduce water loss during transmission of irrigation water from the source, pucca water transmission channels will be constructed.

To rejuvenate the un culturable wastelands / degraded lands, plantation of cashew nut, mango, guava, citrus etc delivered a significant result and also remunerative one. This measure converts those un culturable wastelands into productive lands.

Depending upon the specific sites of execution, the estimates for each activity may vary from block to block. The physical target may vary to some extent and smaller or bigger size may be allowed depending upon the location & site, availability of land, type of activity, size & shape of the activity and actual need of the area. The payment will however be made on the basis of actual measurement of each structure as per the existing schedule of rates of the State Government. For successful implementation of the programme, one percent amount of the total allocated fund will be utilised as contingent expenditure for supervision & monitoring of schemes during execution, transport cost towards movement of officials and miscellaneous unforeseen expenses etc.
The proposal for implementation of "Land & water resources development through soil & water conservation measures in Paschim Bardhaman District" under RKVY programme for the year 2017 -18 to 2019 -20 is detailed in the following pages :-

Table 4.30. Soil conservation plan under RKVY in 3 years

Sl. No.	Components	Sub-scheme / Item of Soil & Water Conservation Measures	Unit Cost	2017-18		2018-19		2019-20		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	In-situ moisture conservation & development of culturable wastelands in to arable lands	In-situ moisture conservation and development of culturable wastelands into arable lands through land leveling, field bunding, graded bunding etc in the Undulating Lateritic Agro-climatic Zone of Paschim Bardhaman District.	0.30	5	1.50	5	1.50	5	1.50	15	4.50
		Plantation of fruit / horticultural crops / mixed plantation in the unculturable wastelands and converting into productive lands.	0.30	1	0.30	2	0.60	2	0.60	5	1.50
		Control of gully & rill erosion of arable & non- arable land through loose boulder structure, brush wood dam, drop spillway, chute spillway etc. in the Undulating Lateritic Agro-climatic Zone of Paschim Bardhaman District.	1.00	5	5.00	5	5.00	5	5.00	15	15.00
2	Water Resources Development	Excavation of new Water Harvesting Structures / Dug well etc in the Lateritic Agro-climatic Zone	3.50	10	35.00	10	35.00	10	35.00	30	105.00
		Re-excavation of existing small water bodies in Lateritic Agro-climatic Zone	3.00	12	36.00	12	36.00	11	33.00	35	105.00
		Re-excavation of existing big water bodies in Lateritic Agro-climatic Zone	8.50	3	25.50	3	25.50	4	34.00	10	85.00
		Construction of Dhal Bandh (embankment) / big size WHS / Check Dam etc in Lateritic Agro-climatic Zone	15.00	2	30.00	2	30.00	2	30.00	6	90.00
		Pucca Irrigation channel / water transmission channel etc.	0.03	800	2.40	800	2.40	800	2.40	2400	7.20
		Supply of water lifting devises with necessary delivery pipes for the efficient use of irrigation water.	0.40	10	4.00	10	4.00	5	2.00	25	10.00

3	Maintenance of created assets	Maintenance of fruit / horticultural crops / mixed plantation created during previous years	0	0	0.8	0	0.8	0	0.7	0	2.30
4	Training Camp	Generation of mass awareness among the people regarding reasons & effect of soil erosion, conservation & management of rainwater.	0.25	10.00	2.50	10.00	2.50	10.00	2.50	30	7.50
5	ICT	Maintenance & fortification of existing infrastructural facilities, creation of new infrastructural facilities etc.	0	0	1.00	0	1.00	0	1.00	0	3.00
6	Contingency				1.45		1.45		1.46		4.36
		GRAND TOTAL			**145.45**		**145.75**		**149.16**		**440.36**

Therefore, total requirement for soil conservation = 440.36 lakh

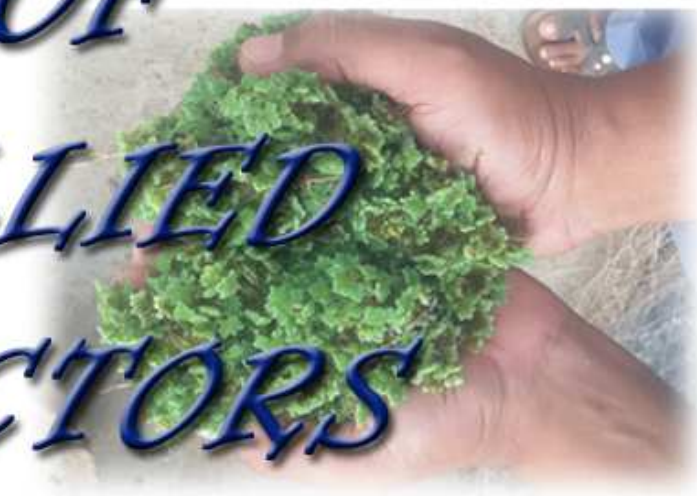
4.11: Researchable issues in the district

The researchable issues in the district are as below,

Table 4.31. Researchable issues

Block Name	Researchable issues
Andal	1. Soil acidity amelioration. 2. Mixed Fruit orchard – mango, apple, kool, etc.
Faridpur-Durgapur	1. Soil acidity amelioration.
Ranigunj	1. Yield increase of paddy, wheat vegetables. 2. Crop diversification. 3. Location specific bio-pesticide.
Kanksa	1. Soil acidity neutralization. 2. On farm resrevoir

DEVELOPMENT OF ALLIED SECTORS



5.1 Introduction

Apart from the horticulture, other Allied sectors like animal husbandry, fisheries development, sericulture, forestry and agricultural marketing contribute substantially to agricultural growth of the district. Animal resources and aquatic resource of the district also help in employment generation, supplementing family nutrition as well as income generation among the rural and semi urban communities. In Durgapur Subdivision, there are huge prospects of development of fruit orchard specially gouva, bel and ber cashew with development of water harvesting shed to make the area clean and green. The resource poor and weaker section of the society of Andal, Salanpur, Jamuria, Faridpur- Durgapur, Pandabeswar, Barabani etc can be developed through animal husbandry, sericulture and horticulture activities for better livelihood support. Therefore development of Allied sectors assumes to create a significant impact in the district to ensure the food security of the district as well as the nation.

5.2. Horticulture

The horticulture sector of the district offers a wide variety of crops, vegetables, fruits and medicinal plants. The agro climatic situation of the district is ideal and conducive for the growth and development of horticultural crops. The horticulture of the district includes fruits, vegetables, flowers, spices, plantation crops, medicinal and aromatic plants. This sector has necessity to emphasize in planed manner for sustainable growth and production in the district.

Objectives of the development:

- To encourage the small and marginal farmers to adopt the horticulture practices for the economic upliftment
- Utilization of high / medium land which are under waste / barren / bushy land as well as coastal embankment, small river, canal and village road side for horticulture programme
- Marginal waste land need to be brought under the cultivation of legumes & grasses & reduce the soil erosion & restore the soil & moisture
- Preservation of horticulture product like vegetable, flower & fruits etc.
- To establish the multi cold storage to promote the preservation facility of vegetables, fruits & flowers etc. during off-season
- To strengthen drip and sprinkler irrigation facility for cultivation of vegetables, fruits, flowers, spices and other horticultural crops
- To develop the skill of the farmers on vegetables, fruits, flowers, spices and other horticultural crops production

Table 5.1: Financial plan for horticulture development:

Name of activities	2017-18		2018-19		2019-20		Total Financial cost (Rs. In lakh)
	Physical	Financial	Physical	Financial	Physical	Financial	
NHM (Post harvest management)	25 no low cost onion storage	12.50	30 no low cost onion storage	15.00	40 no low cost onion storage	20.00	47.50
Horticultural mechanization	10 no tractor	30.00	12 no tractor	36.00	15 no tractor	45.00	111.00
	15 no power tiller	22.50	20 no power tiller	30.00	25 no power tiller	37.50	90.00
Protective cultivation unit	30	300.00	20	200.00	20	200.00	700.00
Demonstration of micro-irrigation system	50	100.00	50	100.00	50	100.00	300.00
Development of high value orchard	10 ha	50.00	10 ha	50.00	20 ha	100.00	200.00
Construction of Water harvesting structure in western part of the district	20	50.00	10	25.00	10	25.00	100.00
Total		565.00		456.00		527.50	**1548.50**

Therefore, total outlay for horticulture = 1548.50 lakh

5.3: Animal husbandry Development:

The district has a gigantic livestock and poultry population. The sector gives a significant economic contribution through production of milk, meat, eggs and hides. The major livestock enterprises are cattle, goat, sheep, pig, buffalo, poultry and duck.

The visions of the sector are

i) improvement of animal productivity including poultry sector to reduce the demand gap and ii) generation of livelihood of rural/semi-urban communities through improved livestock husbandry practice.

Very small numbers of Emu has been introducing for meat and oil production. The population of crossbred cattle is near about 14 % of the total cattle population. The district runs a central funded scheme in the name of **Bishes Go Sampad Bikash Abhijan** for fast and sustainable crossbreeding programme. The district also creates a good animal polyclinic at Fagupur, Paschim Bardhaman with latest health care facilities. There are many constraints in livestock like poor genetic stock of the animals and poultry, scarcity of feed, improper scientific

knowledge, low productivity, distressed selling of livestock produces specially milk. Therefore district needs to be emphasized for sustainable growth of animal husbandry to ensure district as well as national food security.

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Objectives of the development of ARD sector of the district:

- Strengthening of A.I. facilities by infusion of exotic germ plasm for breed up -gradation to enhance milk production
- Strengthening of State Poultry Farm, which acts as nodal unit for providing inputs like (chicks/ducklings/hatching eggs) for implementation of different Govt. shemes and increasing production and productivity of the existing stock reared under backyard system.
- For providing better health coverage facilities to livestock and poultry of the district, health units at district, sub-division and blocks requires to be equipped with necessary equipments and other infrastructures. At G.P. level the Animal Dev. Aid Centres will be provided with facilities for A.I.
- Economic upliftment of weaker section of the community by providing subsidized distribution of poultry/piggery/goatery/fodder plot / enrichment of cellulosic waste units under family base programme through departmental scheme
- Improvement of production and productivity of livestock through adoption of location specific technologies and improved extension programme like training, demonstration, health camp and exposure visit.

Table 5.2. Livestock Census of the district Paschim Bardhaman (source: District ARD Paschim Bardhaman)

Name of Block	Total Cattle	Cross bred Cattle (%)	Total Buffalo	Total Sheep	Total Goat	Total Pig	Total Fowl	Total Duck
Andal	14655	11.14	2187	367	12854	919	22292	6637
Durgapur-	37159	6.70	1952	2341	22823	2689	534064	26214
Kanksa	42996	7.60	2392	1851	26961	2516	198320	25392
Pandabeswar	12375	12.18	1512	101	7928	2334	13040	2729
Durgapur (MC)	36725	38.06	7314	390	22772	2709	42858	12383
Baraboni	39325	3.54	4096	4415	26917	6435	34501	15829
Jamuria	27554	2.65	1856	1203	15112	3196	39246	6566
Raniganj	14402	6.89	1051	0	4974	936	8578	855
Salanpur	22616	11.81	1845	1575	15628	4003	41767	4283
Asansol (MC)	18840	41.24	7974	304	14043	2051	31519	3063
Jamuria (M)	14308	6.22	989	217	12022	2510	29923	6005
Kulti (M)	18879	26.42	3407	2806	15287	1800	26718	6359
Raniganj (M)	6663	18.79	1553	0	5197	1810	6348	810
Total	**306497**	**193.24**	**38128**	**15570**	**202518**	**33908**	**1029174**	**117125**

Table 5.3. Financial plan of the Department of Animal Husbandry

A. Budget for production growth

Sl. No.	Name of Activity	2017-18			2018-19			2019-20			Total Financial Involvement
		Unit cost	Physical	Financial	Unit cost	Physical	Financial	Unit cost	Physical	Financial	
1	Organization of Animal Health Camp (24 camps in each block)	0.05	744	37.20	0.055	744	40.92	0.06	744	44.64	122.76
2	Organization of Fertility Camp (4 camps in each block)	0.10	124	12.40	0.11	124	13.64	0.12	124	14.88	40.92
3	Distribution of pig (3 sows/ beneficiary & 2 boar/) among SHG members (16 SHG i.e 160 beneficiary for the district)	3.50	6	21.00	3.80	5	19.00	4.20	5	21.00	61.00
4	Distribution of goat (4 does/beneficiary & 2 bucks/group) among SHG members (2 SHG i.e 20 beneficiary /GP)	1.00	184	184.00	1.10	185	203.50	1.2	185	222.00	609.50
5	Assistance to goat rearers for renovation of shelter, medicinal support and training. (500 beneficiaries from each block)	0.015	5500	82.50	0.0175	5000	87.50	0.020	5000	100.00	270.00
6	Distribution of Chick/Duckling among Women SHG (60 SHG from each block)	0.066	1860	122.76	0.073	1860	135.78	0.080	1860	144.80	403.34
7	Purchase of FAX and photocopier (1 set/ block including district HQ)	0.50	16	8.00	16	0.50	8.00	-	-	-	16.00
8	Installation of public addressing system in all three farms for training	1.00	1	1.00	1.00	1	1.00	1.00	1	1.00	3.00
9	Renovation of Rasulpur Fodder farm and demonstrative Goat Farm.	20.00	1	20.00	-	-	-	-	-	-	20.00
10	Demonstrative Dairy Farm for farmers	-	-	-	20.00	1	20.00	-	-	-	20.00
11	Setting up laboratory of the Veterinary Polyclinic at Fagupur, Paschim Bardhaman.	10.00		5.00						5.00	10.00
12	20 bed residential set up for farmers in all three SPF/DCF	25.00	1	25.00	25.00	1	25.00	25.00	1	25.00	75.00

	Total			**498.86**			**534.34**			**558.32**	**1591.52**

B. Budget for infrastructure and asset

Activity proposed	**Target (Rs. In Lakh)**						Total	
	2017-18		**2018-19**		**2019-20**		XII plan	
	Phy.	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**	Physical	Financial
Feed plan	1	75.00	-	-	-	-	1	75.00
Office of the DD, ARD including J.D. office Paschim Bardhaman division zone – III	1	300.00	1(Furnishing)	100	-	-	2	400.00
Vety. Poly clinics and A.B.H. C.	32	32.00	32	32.00	1	20	63	84.00
A.I. container	100	7.50	50	3.25	50	3.25	200	14.00
Fodder Kiosk/livestock Kiosk	32	64.00	6	12.00	-	-	38	76.00
Bulk cooler for milk collection	1	1.00	1	1.00	-	-		2.00
Total	**167**	**479.5**	**90**	**148.25**	**51**	**23.25**	304	651.00
Total Financial plan	**(A +B)= 1591.52 +651.00= 2242.52**							

Therefore, total potlay for the sector = 2242.52 lakh

5.4: Fishery Development

During last three decades the Fisheries Department has made effort in the field of Seed & table fish production by motivating people with training and financial assistance through F.F.D.A. This has resulted in employment generation and uplifted socio-economic condition of the fishermen community. The species cultivated are *Telapia*, *Parshe*, *Anabus* sp., Indian major carps, Indian minor carps, pangus, etc. There is one central fishery society and 55 nos of primary society. In this sector, insufficient fish seed, lack of ownership of community water bodies, technological gap and lack of processing and storage facilities are the major production constrains. The sectors should be emphasized for development in holistic manner to reduce the production and demand gaps.

The objectives of development of this sector:

- To make the district self sufficient in fish production increasing productivity of the water areas already in culture or bringing them under culture through scientific pisciculture
- To develop skill of the fish farmers to enrich their technical knowledge for scientific fish culture
- To develop pisciculture in tanks owned by different Govt. Department / Institution / Panchayat bodies for fish culture through social fishery scheme
- To Strengthen the production of quality fish seed by setting up of carps as well as magur hatcheries
- Top develop the production of fresh water prawn and magur culture by setting up demonstration centres.
- To help the poor fishermen through different welfare measures by introducing pension scheme and development of infrastructural facilities.
- To introduce ornamental fish breeding and culture through self help groups
- To generate employment to the rural youth and to meet the demand of protein in our society.

Table: 5.4. Financial target

A. Budget for production Growth Rs. 1593.73 lakhs

Activity proposed	Target (Phy. in ha. and Fin. in Lakh)					
	2017-18		2018-19		2019-20	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Culture of indigenous small fish in backyard ponds	100	30	110	33	150	45
Seed Mahotsav	20	10	30	15	40	20
Liberation of fish fingerlings in the ponds excavated under MGNREGS	40	4	50	5	60	6
Scheme for intensive fish culture	900	331.20	1000	368	1100	404.80
Scheme for production of fingerling of carps	300	34.50	330	37.95	360	41.40
Culture of magur in small ponds	08	2.928	09	3.292	10	3.66
Scheme for brooders management and production of quality spawn of IMC	100	20	110	22	120	24
Culture of Monosex Tilapia	100	30	110	33	120	36
Rearing of indigenous small fish seed from wild collection	100	10	110	11	120	12
	1668	**472.628**	**1859**	**528.242**	**2080**	**592.86**

B. Budget for Infrastructure and assets : Rs. 880.60 lakhs

Activity proposed	Target (financial- Rs. In Lakhs)					
	2017-18		2018-19		2019-20	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Distribution of hygienic insulated box to fish vendors	1800	59.40	2000	66.00	2200	72.60
Distribution of bi-cycle with insulated box to fish vendors	360	28.80	400	32.00	440	35.20
Distribution of matsyajan	70	35.00	75	37.50	80	40.00
Construction and commissioning of block lab. cum trg. center.	6	43.20	6	72.00	3	36.00
Soil and water testing kits	100	70.00	100	80.00	100	80.00
Infrastructure for oxygen packing of fish seed	31	9.30	31	9.30	31	9.30
Fish seed carrying vehicle.	6	30.00	3	15.00	4	20.00
Total	**2373**	**275.7**	**2615**	**311.8**	**2858**	**293.1**

Total financial budget for fishery development: (A+B)= (1593.73 +880.60)= Rs. 2474.33 lakhs

5.5: Sericulture development:

Sericulture in Paschim Bardhaman is only 14 years old. Soil status of Paschim Bardhaman favours both Mulberry and Tassar, as *Tassar* requires less irrigation so it has a very good prospect in western lateritic zone. Mulberry requires more irrigation and so it can be grown in the eastern parts of the district except Durgapur sub-division but the farmers have not shown interest in growing mulberry in the fertile soil. Rather crop farming is their primary focus. *Tassar*, on the other hand can be grown in the lateritic area in Arjun plantations.

Sericulture provides an alternate livelihood opportunity for women, disadvantaged and landless people of the district especially in the lateritic zones. It is low investment farming with lucrative profit. The district has a great scope for tassar silk production and has been the highest producer in the state in 2010-11. There is one Technical Support Centres (TSCs) in Kanksa block.

The objectives of sericulture development in the district are ;

- Overall development of the silk industry
- Expanding land acreage/ coverage increasing the number of farmers/families in Sericulture
- Maintenance of quality basic seed Supply of disease free silkworm seeds
- Prevention and control of disease and pest of silkworm and their food plants
- Extending marketing support to the producers
- Development of Tasar silk
- Popularization of silk reeling and weaving activity
- Dissemination of improve technological knowledge to farmers, revelers through the officials
- Providing institutional / financial support, collaboration with other Govt. organizations or non-Govt. Organization for a wider financial and logistic support

Table 5.5. Financial budget for sericulture development: (Rs. In Lakhs)

Sl. No.	Particulars of Work	Unit	2017-18		2018-19		2019-20		Total	
			Phy.	Fin. Rs in lakhs)	Phy.	Fin. (Rs in lakhs)	Phy.	Fin. Rs in lakhs)	Phy.	Fin. (Rs in lakhs)
A	Egg Supply	'000	30000	30.00	30000	30.00	30000	30.00	90000	90.00
	Transportation			10.00		10.00		10.00		30.00
	Supply of kit to the farmers	Per kit	100	20.00	100	20.00	100	20.00	300	60.00
B	Cocoon purchase from the farmers	Kahan	100000	80.00	100000	80.00	100000	80.00	300000	240.00
	Purchase of Cocoon collection van	Unit van	1	120.00	1	120.00	1	120.00	3	360.00
	Cocoon storing unit in the collection centers	Unit	1	500.00	1	500.00	1	500.00	3	1500.00
	Grand Total (A+B): :		130102	760	130102	760	130102	760	390306	**2280.00**

Therefore, financial outlay for sericulture = 2280.00 lakh

5.6. Agricultural Marketing

The department is playing a vital role in development of agriculture marketing, transportation of produces and setting up the Minimum Support Price (MSP) of agricultural produces. The basic vision of the department is to develop the vast and strong market network of farm produces for better profitability of farmers and better linkage between producers and consumers. .

The basic objectives of the sector are

- To establish the modern krishak bazaar at all blocks of the district
- To promote agricultural processing for minimization of post harvest losses and value addition of produces
- Promotion of indigenous agricultural produces of the district for better market linkage
- To develop the organized market through SHGS and Co-operatives

Table 5.6. Plan of Agriculture Marketing

Sl.no.	Activity	Financial requirement (in lakh Rs.)			
		2017-18	**2018-19**	**2019-20**	Total
1	Processing & Preservation of Fruits & Vegetables-001	2.00	2.00	2.00	6.00
2	Farmer's Training in Post Harvest Technology-003	2.00	2.00	2.00	6.00
3	Construction and Improvement of Storage Structure-800	50.00	50.00	50.00	150
4	Development of farm to Market Link Roads	50.00	50.00	50.00	150.00
5	Development of Rural and Primary Markets	50.00	50.00	50.00	150.00
6	Development of Regulated Markets	100.00	100.00	100.00	300.00
7	Export Promotion of flower	8.00	8.00	8.00	24.00
8	Training and Marketing Officials & Others	5.00	5.00	5.00	15.00
9	Introduction of Pledge Finance	4.00	4.00	4.00	12.00
10	Agril. Marketing Information & Exhibition	15.00	15.00	15.00	45.00
11	Annual Macro Management Mode Work Plan	1.00	1.00	1.00	3.00
12	Subsidy to Bullock Cart & Van Rickshaw	60.00	60.00	60.00	180.00
13	Scheme for Strengthening & Supervision of Cold Storages	6.00	6.00	6.00	18.00
	Total:				**1059.00**

Therefore, total outlay for sericulture = 1059.00 lakh

DISTRICT PLAN

6.1. Introduction

A major revival package is essential for the growth and development of the agriculture and allied sector linked to higher investment and strategies to make agriculture attractive and profitable. Different strategies in combination with technology, credit, marketing, risk management and institutional support would be required to revitalize the agricultural economy of the district. Among the sub-sectors, a major increase has been proposed for crop husbandry, animal husbandry, fisheries and agricultural research. Enhancement of food grain production, supplementary income sources through livestock and fish production have been given thrust in the annual plan 2008-09 based on the broad framework of the Twelfth Five Year Plan. Innovative schemes have been suggested for promotion of organic farming, soil health maintenance, integrated farming system and diversification.

6.2. Growth drivers

The growth drivers to fulfill the vision are as follows,

Agriculture

- Soil reclamation and preserving soil quality for sustainable crop production
- Increasing cropping intensity with suitable intervention. Promotion of pulse crops to be largely enhanced
- Productivity augmentation through judicious fertilizer and pest management. Introduction of improved cultivars, dissemination of promising technologies, seed treatment, farm mechanisation
- Capacity building of extension workers for efficient dessimination of technologies
- Implementing strategies for producing more per quanta of land and water through judicious use of resources. Adoption of integrated farming methodologies wherever applicable for enhancing farmers income is called for.
- Correction of soil acidity by using Dolomites, basic slugs, ash etc should be undertaken judiciously so that the effect should be sustainable. Fly ash from the thermal power stations in Paschim Bardhaman can be purchased in a very low price and can be distributed among the farmers in place of Dolomite. This will ensure more procurement and less expenditure on transport and procurement.
- Production of quality seed material through participatory approach
- Adoption of climate resilient technologies to cope up with climate change which is imminent
- More emphasis on red and lateritic zone for agriculture intensification through creation of water harvesting structures, watersheds etc.

- Value addition to agricultural produce to be given emphasis. SHGs, common interest groups, JLGs to be

Horticulture Sector

- Strengthening of horticultural department in the line of agriculture, ARD and fisheries department with block level officials and support staff
- Capacity building of farmers and extension workers for speedy development of horticulture in the district
- Protected cultivation techniques to be much strengthened
- Potential for horticulture development in the red and lateritic region is to be exploited. Extension of horticultural activities in this zone by supply of saplings (fruits and tree species) and undertaking plantation activities should be taken up. Plantation of *Arjun* in the lateritic zone can help the poor farmers, basically tribals by introducing Tasar cultivation in collaboration with Sericulture department.
- Emphasis to be given on production as well as marketing of high value horticultural crops
- Attention to be given on management of water resource through establishment of micro irrigation for fruit, plantation and vegetable crops.
- Entrepreneurship development through value addition to horticultural produces is to be pressed

Animal husbandry

- Breed up-gradation of livestock and poultry
- Capacity building of extension workers/ animal raisers for efficient dissemination of technologies
- Augmentation of productivity of livestock and poultry
- Emphasis on infrastructure of Artificial insemination
- Strengthening of animal feed resource through production of green fodder, preparation of home made concentrate feed and complete feed block
- Availability of medicines through *Pranibandhus* at the doorstep
- Provision for insurance and credit facility
- Strengthening of Post harvest operation including value addition of animal products
- Unorganised market should be converted into organised market linkages
- Removal of technological gap in nutrition, management and housing of poultry birds

Fishery

- Ensuring ready supply of quality fingerling in the district.
- Aquaculture based integrated farming modules to be implemented in all the excavated pond under MGNREGA scheme
- Entrepreneurship development in the area of fingerling production.
- Capacity building of fish farmers for improved techniques of fish production, including pond management, feed management, stocking species and density, multiple tire carp

farming etc.
- Efficient marketing chain development through feasible cold chain establishment
- Entrepreneurship development in ornamental fish culture.
- Exploiting potential for fishery development in canals, enclosed large water bodies etc.

Agricultural marketing
- Partnership farming
- SHG/JLG/CIG mediated marketing strategy
- Infrastructural support for SHG/JLG/CIGs involved in production and marketing of agricultural produce

Sericulture
- Development of silvi-pastoral models with required plantation
- Ensure availability of seed
- Ensured availability of market

Irrigation
- Increase in minor as well as micro irrigation
- Construction of rain water harvesting structures
- Renovation of sub-canals
- Use of open cast pits in the lateritic zone

6.3. District plan in a nutshell

Table 6. 1. Estimated outlay for district plan during 2017-18 to 2019-20

Sector	Proposed broad activities	2017-18	2018-19	2019-20	Total outlay (in lakh)
Agriculture	Reclamation and Development of acid soil	259	518	518	1292
	Training Facilities infrastructure	--	--	--	80
	Capacity building of farmers	22.35	29.55	58.35	110.25
	IPM Demonstrations	31.78	38.13	45.76	115.67
	INM Demonstrations	63.36	76.03	91.24	230.63
	Varietal Demonstration	80.4	96.48	115.78	292.66
	Farmers' Field School	--	--	--	52.8
	Additional activities for infrastructure and assets	0	330	190	520
	Innovative programme	-	--	--	37.0
	Agri Irrigation	--	--	--	3750.00
	Soil conservation	145.45	145.75	149.16	440.36
	Sub Total	602.34	1233.94	1168.29	6921.37
Allied sectors	Horticulture	565.00	456.00	527.50	1548.50
	Animal husbandry	978.36	682.59	581.57	2242.52
	Fisheries	748.33	840.04	885.96	2474.33
	Agricultural Marketing	353.00	353.00	353.00	1059.00
	Sericulture	760.00	760.00	760.00	2280.00
	Sub Total	3404.69	3091.63	3108.03	9604.35
	Grand Total	4007.03	4325.57	4276.32	16525.72