District Irrigation Plan (2016-20)
Barpeta
Assam

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Barpeta, Assam

सत्यमेव जयते

GOVERNMENT OF ASSAM

Government of Assam

Directorate of Agriculture,

Assam, Khanpara, Guwahati

NABCONS

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EXECUTIVE SUMMARY

In an agrarian economy like India, agriculture utilizes the major share of country's exploitable water resources. Though the sector utilizes the maximum share of exploitable water resources, availability of the same at different locations to different extent makes it vital to adopt effective utilization of water through storage, channelizing and judicial use. At some places like Punjab and Haryana, the environmental and socio-economic rationale for this capture by the sector is now being questioned. Accordingly, it is needed to challenge and change the fundamentals of the prevailing view of water resources exploitation. A new and more suitable approach to water resources allocation is necessary if the population is to be adequately fed, without further degradation and destruction of the critical ecosystem services. Water productivity needs to be enhanced considerably, and economic cost-benefit analysis and pricing regimes can play a significant role in such a process. However, these economic measures will not be sufficient on their own. They will need to be buttressed by technological innovation and institutional changes in order to encourage a more equitable distribution of resources and to mitigate potential international conflicts across 'shared' water basins.

Water has unique characteristics that determine both its allocation and use as a resource by agriculture. Agricultural use of water for irrigation is itself contingent on land resources. In a situation of growing water scarcity and rising demands for non-agricultural (household and industrial) use of water, reassessment of sectoral allocations of water are inevitable. In developing countries, irrigated agriculture plays a vital role in contributing towards domestic food security and poverty alleviation. Therefore, achievement of these objectives is dependent on adequate allocations of water to agriculture. Justification of such allocations requires that irrigated agriculture be a cost-effective means of achieving stated political or social objectives, such as food security or poverty alleviation, and that all externalities be taken into account in the pricing mechanism. Improved allocation of irrigation water is required within the agriculture sectors in order to achieve greater efficiency in the use of irrigation water and existing irrigation infrastructure. Reallocation is also required in order to reduce waterlogging and salinization of irrigated land, to decrease the negative environmental impacts and other externalities of irrigation (caused by over extraction of groundwater and depletion and pollution of surface water).

Government of India launched Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) to address the constraints in providing assured irrigation as well as increasing efficiency and productivity of current water use to bring more prosperity to the rural areas. Priorities of Government of India were reflected in

the Hon'ble President's address to the joint Session of the Parliament of 16th Lok Sabha where he indicated that "Each drop of water is precious. Government is committed to giving high priority to water security. It will complete the long pending irrigation projects on priority and launch the 'Pradhan Mantri Krishi Sinchayee Yojana' with the motto of 'Har Khet Ko Pani'. There is a need for seriously considering all options including linking of rivers, where feasible; for ensuring optimal use of our water resources to prevent the recurrence of floods and drought. By harnessing rain water through 'Jal Sanchay' and 'Jal Sinchan', we will nurture water conservation and ground water recharge. Micro irrigation will be popularised to ensure 'Per drop-More crop".

PMKSY has been approved with an indicative outlay of Rs.50,000 crore over a period of five years from 2015-16 to 2019-20. The programme is an amalgamation of on-going schemes of Ministry of Water Resources, River Development and Ganga Rejuvenation, Ministry of Agriculture & Cooperation and Ministry of Rural Development. The existing schemes AIBP, CADWM, MI, SWMA, Watershed & Convergence with MGNREGA were brought together under the umbrella program of PMKSY. Further the scheme seeks convergence with scheme like Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNRES), Rashtriya Krishi Vikas Yojana (RKVY), Jawaharlal Nehru National Solar Mission and Rural Electrification programmes (JLNNSM&REP), Rural Infrastructure Development Fund (RIDF), Members of Parliament Local Area Development Scheme (MPLAD), Members of Legislative Assembly Local Area Development Fund (MLALAD), Local Body Funds (LBF), Working Plan of State Forest Department (WPSFD) etc. The PMKSY will be implemented in an area development mode only by adopting a decentralized state level planning and projectised execution structure that will allow the state to draw up their own irrigation development plans based on DIPs and SIPs with a horizon of 5-7 years. The program will be supervised and coordinated utilizing the existing mechanism and structure available under Rashtriya Krishi Vikas Yojana (RKVY) program with state agriculture department acting as the State Nodal Agency for implementation of PMKSY. However, the implementing departments for the four components like AIBP, PMKSY (Har Khet Ko Pani), PMKSY (Per drop more crop) and PMKSY (watershed development) will be decided by the respective program ministry/department.

The five chapters along with introduction chapter, explains the profile of district, its water requirement for agriculture and allied sector, water availability, assessment of water requirement for various sectors and strategic action plan for augmentation and effective management of available water resources.

District Profile

Barpeta district is an important district in Assam . As per 2011 census, the district has a population of 1693622 persons with population density of 742 per sq km. The male and female population in the district is 146,935 and 151932 respectively with a female/male sex ratio of 953/1000. The climate of the district is subtropical and humid. The average temperature ranges from 15 ºC to 30ºC. The winter season starts by November and continues till February. December/January is the coldest and July/August is the hottest period. The air is highly humid through out the year and during rainy season,the relative humidity is about 90 percent.The area receives heavy rainfall every year and out of 2287 mm of annual normal rainfall, 60 to 65% is received during June to September from south west monsoon. The district also receives rainfall during pre-monsoon period from March/April to May in the form of thunder showers and hail storms.

According to climate, topography, soil characteristics and cropping pattern, Barpeta district falls under Lower Brahmaputra Valley Zone (AS-4) agro climatic zone, which is further sub-divided into six Agro-ecological zones. The soil type of Barpeta district in generally vary from sandy to sandy loam. The PH of the soil ranges from 5.5 to 6.5. The extent of severity of the soil acidity varies from block to block about 58.09% of the total acidic soils of the district exist. About 27.34% of the total acidic soils of the district exist in three blocks viz. Mandia , Chakchaka and Gobardhana blocks. About 27.34% of the total acidic soils of the district exist in Sarukhetri,

Agriculture in Barpeta :

The geo-climatic condition of the district is conducive for the cultivation of a variety of agricultural crops. However, paddy is the principal crop which is grown in 1.35 lakh ha (2013-14). As per estimate of 2013-14, the coverage of autumn, winter and summer paddy is reported to be 14.24 %, 50.20 % and 35.50 %, respectively of the total Paddy cultivated area of the district.

In addition to rice, mustard, pulses, wheat and jute are other important field crops either cultivated in commercial scale or for domestic consumption.

The average productivity of the district is reported to be marginally higher as compared to state level productivity. However, the productivity of individual crops is lower than that of national average and far below the potential productivity of crops. The district has net and gross cropped areas of 1,53,881 hectares and 2,59,935 hectares respectively, the net cropped area being 66 percent of the total geographical area. There is about 1,99,889 Ha is under rainfed areas of the district. The percentage of the rainfed areas of the block ranges from 60 % - 90 % in different blocks. The gross area under irrigation is 60046 Ha .

District Water Profile:

In the hydrological point of view, the entire Barpeta district falls under the Brahmaputra basin. The mighty river Brahamputra and its nine tributaries are flowing through the district, covering a total length of about 1460 Km. The tributaries are flowing through the district , covering a total length of about 1460 km. The tributaries namely Beki, Manah, Pallah, Chaulkhowa, Pahumara, Kaldia etc. flows from Royal Bhutan Kingdom to the river Brahamputra of the district. In addition to these tributaries, beels, ponds and other permanent sources of water is utilised for flow and lift irrigation.

Ground water occurs under unconfined condition in shallow aquifer and under semi-confined to confined condition in deeper aquifer. The aquifer is consisting of sand of various grades with little gravel in the southern part, with a very good yield prospect for both shallow and deep tube wells. The water level rests at shallow depth ranging from 2 to 4 m bgl during premonsoon period. The post monsoon ground water level rests between 1 and 2 m bgl. The size of the aquifer materials gradually increases from south to north and the depth of water level is also high. The long term water level trend study shows no significant change of water level in the last 10 years.

The water level trend shows that there is gradual rising of water level in the district.Assessment unit can be categorized into 4 categories as SAFE, SEMI-CRITICAL, CRITICAL, and OVEREXPLOITED. The annual dynamic ground water recharge are estimated to be 183.00 mcm while the net annual ground water draft is 381.67mcm. The present stage of ground water development is only 41 per cent and district is still under ‘safe’ category

Demand for water sources and the gap

The present & projected water demand from various sectors such as domestic, livestock, agriculture, industrial and power in the district is assessed. The total present water demand from various sectors is 818.11 MCM, while future water demand (2020) is 825.86 MCM. To meet this demand, total of 1448.62 MCM surface water and 798.191 MCM ground water is available in the district. Further, water availability of 648.94 MCM will be added by 2020 through ongoing and proposed STP units. Therefore, the present water gap is to the tune of -1522.88MCM, and the projected water gap (2020) shall be to the tune of -1515.13

MCM. The water budget clearly shows the water gap between the water availability and requirement. The negative gap indicates that there is sufficient water resources for irrigation, domestic and the

industrial uses without creating any deficit in our water potential To bridge this gap, strategic action plan has been prepared by various departments.

Proposed financial plan under PMKSY

Total planned outlay for four years works out to be Rs. 111470.0 lakh. Maximum share of Rs. 88631.0 (80%) is for Har Khet Ko Pani & Per drop more crop Component, followed by AIBP Component of Rs. 19770.0 lakh(18%), followed by PMKSY Watershed Component of Rs 3070 lakh (3%). Considering department wise fund requirement, maximum share of Rs 64657 lakh (58 %) is for Agriculture department followed by Irrigation department with Rs. 43743 lakh (39 %) and Soil Conservation department with Rs. 3070.09 lakh (3%).

Expected Outcome

The gross irrigated area in the district is 60046 hectare which is around 23 % of 2,59,935 hectare of the gross cropped area. Various departments of the district have proposed to bring additional 177687 hectares of land under irrigated cultivation system.

INTRODUCTION

I. Background

Preparation of decentralized area specific district planning process visualized in various plans took concrete shape through the years and initiatives like specific guidelines on methodologies and processes for preparation of district plans; framework for preparation of perspective plan, medium term and annual plans by then planning commission in 1969 and the 73rd and 74th constitutional amendments conferring constitutional status to Panchayats at district and sub district level; local self-government in urban areas; constitution of district planning committee to consolidate the plans prepared at Panchayats and municipalities and prepare a draft development plan for the whole district.

The decentralized planning process was further strengthened through emphasis by planning commission on preparation of district level plans and making it an integral part of the process of preparation of the states 11th five year plan. The Planning commission issued guidelines in August 2006 for preparation of the district plans. The guidelines define the District Planning as 'the process of preparing an integrated plan for the local government sector in a district taking into account the resources (natural, human and financial) available and covering the sectoral activities and schemes assigned to the district level and below and those implemented through local governments in a state. The document that embodies this statement of resources and their allocation for various purposes is known as the District Plan".

Government of India through a resolution in National Development Council on 29th May 2007 conceived a special Additional Central Assistance Scheme (ACAS) to address the slow growth of agriculture and allied sectors by incentivizing states to draw up plans for their agriculture sectors more comprehensively. The NDC resolution states "GoI introduced a new Additional Central Assistance Scheme to incentivize states to draw up plans for their agriculture sector more comprehensively, taking agro-climatic conditions, natural resource issues and technology into account, and integrating livestock, poultry and fisheries, etc. This involved a new scheme for Additional Central Assistance (ACA) to State Plans, administered by the Union Ministry of Agriculture over and above its existing Centrally Sponsored Schemes, to supplement the State-specific strategies including special schemes for beneficiaries of land reforms. The newly created National Rainfed Area Authority on request, was to assist States in planning for rainfed areas".

The NDC in its resolution advised the states to prepare a comprehensive district agriculture plans (C-

DAP) that will fully utilize available resources and include allied agriculture sectors. Further, GOI issued a manual on preparation of comprehensive district agriculture plans to help the states prepare C-DAP. As per these guidelines, the objective of district planning is 'to design an integrated and participatory action plan for the development of local area in general and agriculture and allied sectors in particular'. The objectives of Comprehensive District Agriculture Plan (C-DAP) were:

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

The guidelines required the state/district authorities to (i) ensure that the agricultural plans are prepared for the district and then integrated into the agricultural plans of the State based on the agro-climatic conditions, availability of technology, trained manpower and natural resources; (ii) local needs / crops / feed and fodder / animal husbandry / dairying / fisheries / priorities are reflected in the plan; (iii) productivity gaps for important crops and livestock and fisheries are reduced; and (iv) the returns to the farmers from these are maximized.

The latest move in the process of strengthening of decentralized planning process was the Government of India guidelines issued in 2015 in the form of a template for the preparation of District Irrigation Plan (DIP) and State Irrigation Plan (SIP) as part of the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) program and made the preparation of DIP and SIP mandatory for the states to receive funds from the program. The present report is a product of these long drawn efforts of Government of India to strengthen the decentralized planning process in the country focusing on the vital resource i.e., water.

Water is of vital importance for human & animal life, maintenance of ecological balance and promotion of developmental activities. Considering its vital importance and ever increasing demand for water, in the face of population growth, urbanization & industrialization and considerations of climatic change, making water, an increasingly a scarce resource, available to multiple uses, planning and management of this vital

resources, utilization of water economically, optimally and equitably assumes greater importance.

According to the 12th Five year Plan the water budget estimates of India by Ministry of Water Resources suggests an availability of 1123 billion cubic meters (BCM) against a current estimated demand of 710 BCM. The Standing Committee of the Ministry of Water Resources estimates that this water demand will rise to 1093 BCM by 2025. Though the existing water availability in the immediate future seems to be adequate, with the near constant supply of water resources in the face of increasing demand on account of population growth, urbanisation and industrialization will strain the water supply-demand balance.

The per capita water availability which stood at 5,177 cubic meters in 1951 was reduced to 1820 cubic meters in 2001 while the international prescribed limit is 1800 cubic meters. The projected per capita availability of water is 1341 cubic meters in 2025 and 1140 cubic meters in 2050 suggesting shortage of water in the medium term1. Further, the all India water balance estimates does not reflect the variations in water balance across time and space- certain areas having a positive water balance and the others facing acute shortage. The problem is further accentuated by water quality related issues.

With the abundant surface and ground water supply in the first five decades since independence, more than 80 percent of the total available water resources were allocated for irrigation purposes and the rest meeting the domestic and industrial demands. In a recent study2on the demand for water from agriculture, domestic and industrial uses in 2000, 2025 and 2050 seems to suggest that domestic demand (34 BCM in 2000, 66 BCM in 2025 and 101 BCM in 2050) and industrial demand (42 BCM in 2000, 92 BCM in 2025 and 161 BCM in 2050) for water will utilize the total balance water available while agriculture demand for water will be (605 BCM in 2000, 675 BCM in 2025 and 637 BCM in 2050). This change is partly because of the changing sectoral contributions of India's GDP and also partly because of dynamics of irrigation development in the country where the initial expansion in area under irrigation is propelled by the availability of abundant water resources and availability of good quality land. This is no longer the case in many of the states where the availability of land and water are serious constraints for further expansion of irrigation. Further, as per the erstwhile planning commission up to March 2012 out of 141

1Ministry of Water Resources (2011), Strategic Plan for Ministry of Water Resources, Government of India, New Delhi.

2Amarasinghe, U.A., Shah T., Turral, H. and Anand, B.K. 2007. *India's water future to 2025-2050:Business-as-usual scenario and deviations*. Research Report 123, International Water Management Institute, Colombo.

million hectares of net sown area in the country 114 (or 81%) million hectares is Irrigation Potential Created (IPC) and 88 (or 62%) million hectares is Irrigation Potential Utilised (IPU) leaving almost 20% of irrigated potential unutilized. This leaves 40 percent of the net sown area in the country dependent on rainfall which makes farming a high risk and less productive.

The competing demands for water resources and the emerging issues and concerns were to be addressed through certain basic principles and commonality in approaches in dealing with planning, development and management of water resources3 under an Integrated Water Resource Management framework. The main objectives of water resource management as delineated in National Water Policy 2012 are:

a) Planning, development and management of water resources need to be governed by common integrated perspective considering local, regional, State and national context, having an environmentally sound basis, keeping in view the human, social and economic needs.

b) Principle of equity and social justice must inform use and allocation of water.

c) Good governance through transparent informed decision making is crucial to the objectives of equity, social justice and sustainability. Meaningful intensive participation, transparency and accountability should guide decision making and regulation of water resources.

d) Water needs to be managed as a common pool community resource held, by the state, under public trust doctrine to achieve food security, support livelihood, and ensure equitable and sustainable development for all.

e) Water is essential for sustenance of eco-system, and therefore, minimum ecological needs should be given due consideration.

f) Safe Water for drinking and sanitation should be considered as pre-emptive needs, followed by high priority allocation for other basic domestic needs (including needs of animals), achieving food security, supporting sustenance agriculture and minimum eco-system needs. Available water,

3Ministry of Water Resources, National Water Policy, 2012, Government of India, New Delhi.

after meeting the above needs, should be allocated in a manner to promote its conservation and efficient use.

g) All the elements of the water cycle, i.e., evapo-transpiration, precipitation, runoff, river, lakes, soil moisture, and ground water, sea, etc., are interdependent and the basic hydrological unit is the river basin, which should be considered as the basic hydrological unit for planning.

h) Given the limits on enhancing the availability of utilizable water resources and increased variability in supplies due to climate change, meeting the future needs will depend more on demand management, and hence, this needs to be given priority, especially through (a) evolving an agricultural system which economizes on water use and maximizes value from water, and (b) bringing in maximum efficiency in use of water and avoiding wastages.

i) Water quality and quantity are interlinked and need to be managed in an integrated manner, consistent with broader environmental management approaches inter-alia including the use of economic incentives and penalties to reduce pollution and wastage.

j) The impact of climate change on water resources availability must be factored into water management related decisions. Water using activities need to be regulated keeping in mind the local geo climatic and hydrological situation.

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2015-16 to 2019-20. The programme is an amalgamation of on-going schemes of Ministry of Water Resources, River Development and Ganga Rejuvenation, Ministry of Agriculture & Cooperation and Ministry of Rural Development. The existing schemes AIBP, CADWM, MI, SWMA, Watershed & Convergence with MGNREGA were brought together under the umbrella program of PMKSY. Further the scheme seeks convergence with scheme likeMahatma Gandhi National Rural Employment Guarantee Scheme (MGNRES), Rashtriya Krishi Vikas Yojana (RKVY), Jawaharlal Nehru National Solar Mission and Rural Electrification programmes (JLNNSM&REP), Rural Infrastructure Development Fund (RIDF), Members of Parliament Local Area Development Scheme (MPLAD), Members of Legislative Assembly Local Area Development Fund (MLALAD), Local Body Funds (LBF), Working Plan of State Forest Department (WPSFD) etc. The PMKSY will be implemented in an area development mode only by adopting a decentralized state level planning and projectised execution structure that will allow the state to draw up their own irrigation development plans based on DIPs and SIPs with a horizon of 5-7 years. The program will be implemented as part of Rashtriya Krishi Vikas Yojana (RKVY) with state agriculture department acting as the State Nodal Agency. However, the implementing departments for the four components like AIBP, PMKSY (Har Khet Ko Pani), PMKSY (Per drop more crop) and PMKSY (watershed development) will be decided by the respective program ministry/department.

The funds under this program would be provided to the states as per the pattern of assistance of Centrally Sponsored Schemes (CSS) decided by the Ministry of Finance and NITI Aayog. During 2015-16 the existing pattern of assistance of ongoing scheme was continued. An outlay of Rs. 50,000 crore has been approved for 2015-20. The financial assistance provided to the state governments from this centrally sponsored scheme is subject to fulfillment of certain conditions. Firstly, a state will become eligible to access PMKSY fund only if it has prepared the District Irrigation Plans (DIP) and State Irrigation Plan (SIP), excepting for the initial year, and the expenditure in water resource development for agriculture sector in the year under consideration is not less than the baseline expenditure, which is defined as the average of the expenditure in irrigation sector irrespective of the department in the state plan in three years prior to the year under consideration. Secondly, States will be given additional weightage for levying charges on water and electricity for irrigation purposes, so as to ensure sustainability of the programme. Thirdly, interstate allocation of PMKSY fund will be decided based on

- Share of percentage of unirrigated area in the state vis-à-vis national average including prominence of areas classified under Desert Development Programme (DDP) and Drought Prone Area

Development Programme (DPAP)

- Increase in percentage share of expenditure on water resource development for agriculture sector in State Plan expenditure in the previous year over three years prior to it and
- Improvement in irrigation efficiency in the state.

II. Vision

The overreaching vision of Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) will be to ensure access to some means of protective irrigation to all agricultural farms in the country, to produce 'per drop more crop', thus bringing much desired rural prosperity.

III. Objective

The objectives of the PMKSY are to:

a) Achieve convergence of investments in irrigation at the field level (preparation of district level and, if required, sub district level water use plans).
b) Enhance the physical access of water on the farm and expand cultivable area under assured irrigation (Har Khet Ko Pani),
c) Integration of water source, distribution and its efficient use, to make best use of water through appropriate technologies and practices.
d) Improve on-farm water use efficiency to reduce wastage and increase availability both in duration and extent,
e) Enhance the adoption of precision-irrigation and other water saving technologies (More crop per drop).
f) Enhance recharge of aquifers and introduce sustainable water conservation practices
g) Ensure the integrated development of rainfed areas using the watershed approach towards soil and water conservation, regeneration of ground water, arresting runoff, providing livelihood options and other NRM activities.
h) Promote extension activities relating to water harvesting, water management and crop alignment for farmers and grass root level field functionaries.
i) Explore the feasibility of reusing treated municipal waste water for peri-urban agriculture, and
j) Attract greater private investments in irrigation.

IV. Strategy/approach

To achieve these objectives PMKSY adopted strategies that include

a) Creation of new water sources; repair, restoration and renovation of defunct water sources; construction of water harvesting structures, secondary & micro storage, groundwater development, enhancing potentials of traditional water bodies at village level like Jal Mandir (Gujarat); Khatri, Kuhl (H.P.); Zabo (Nagaland); Eri, Ooranis (T.N.); Dongs (Assam); Katas, Bandhas (Odisha and M.P.) etc.
b) Developing/augmenting distribution network where irrigation sources (both assured and protective) are available or created;
c) Promotion of scientific moisture conservation and run off control measures to improve ground water recharge so as to create opportunities for farmers to access recharged water through shallow tube/dug wells;
d) Promoting efficient water conveyance and field application devices within the farm viz, underground piping system, Drip & Sprinklers, pivots, rain-guns and other application devices etc.;
e) Encouraging community irrigation through registered user groups/farmer producers' organisations/ NGOs; and
f) Farmer oriented activities like capacity building, training and exposure visits, demonstrations, farm schools, skill development in efficient water and crop management practices (crop alignment) including large scale awareness on more crop per drop of water through mass media campaign, exhibitions, field days, and extension activities through short animation films etc.

V. Programme Components

PMKSY has following four components:

1. Accelerated Irrigation Benefit Programme (AIBP)

To focus on faster completion of ongoing Major and Medium Irrigation including National Projects.

2. PMKSY (Har Khet ko Pani)

This component focuses on-

a) Creation of new water sources through Minor Irrigation (both surface and ground water)

b) Repair, restoration and renovation of water bodies; strengthening carrying capacity of traditional water sources, construction rain water harvesting structures (Jal Sanchay);

c) Command area development, strengthening and creation of distribution network from source to the farm;

d) Ground water development in the areas where it is abundant, so that sink is created to store runoff/ flood water during peak rainy season.

e) Improvement in water management and distribution system for water bodies to take advantage of the available source which is not tapped to its fullest capacity (deriving benefits from low hanging fruits). At least 10% of the command area to be covered under micro/precision irrigation.

f) Diversion of water from source of different location where it is plenty to nearby water scarce areas, lift irrigation from water bodies/rivers at lower elevation to supplement requirements beyond IWMP and MGNREGS irrespective of irrigation command.

g) Creating and rejuvenating traditional water storage systems like Khatri, Kuhl etc. at feasible locations.

3. PMKSY (Per Drop More Crop)

a) Programme management, preparation of State/District Irrigation Plan, approval of annual action plan, Monitoring etc.

b) Promoting efficient water conveyance and precision water application devices like drips, sprinklers, pivots, rain-guns in the farm (Jal Sinchan);

c) Topping up of input cost particularly under civil construction beyond permissible limit (40%), under MGNREGS for activities like lining inlet, outlet, silt traps, distribution system etc.

d) Construction of micro irrigation structures to supplement source creation activities including tube wells and dug wells (in areas where ground water is available and not under semi critical/ critical/ over exploited category of development) which are not supported under AIBP, PMKSY (Har Khet Ko Pani), PMKSY (Watershed) and MGNREGS as per block/district irrigation plan.

e) Secondary storage structures at tail end of canal system to store water when available in abundance (rainy season) or from perennial sources like streams for use during dry periods through effective on-farm water management;

f) Water lifting devices like diesel/ electric/ solar pumpsets including water carriage pipes, underground piping system.

g) Extension activities for promotion of scientific moisture conservation and agronomic measures including cropping alignment to maximise use of available water including rainfall and minimise irrigation requirement (Jal Sarankchan);

h) Capacity building, training and awareness campaign including low cost publications, use of pico projectors and low cost films for encouraging potential use water source through technological, agronomic and management practices including community irrigation.

i) The extension workers will be empowered to disseminate relevant technologies under PMKSY only after requisite training is provided to them especially in the area of promotion of scientific moisture conservation and agronomic measures, improved/ innovative distribution system like pipe and box outlet system, etc. Appropriate Domain Experts will act as Master Trainers.

j) Information Communication Technology (ICT) interventions through NeGP-A to be made use in the field of water use efficiency, precision irrigation technologies, on farm water management, crop alignment etc. and also to do intensive monitoring of the Scheme.

4. PMKSY (Watershed Development)

a) Effective management of runoff water and improved soil & moisture conservation activities such as ridge area treatment, drainage line treatment, rain water harvesting, in-situ moisture conservation and other allied activities on watershed basis.

b) Converging with MGNREGS for creation of water source to full potential in identified backward rainfed blocks including renovation of traditional water bodies

VI. Rationale/ Justification

In reference to the status and need of irrigation, the water resource management including irrigation related priorities was identified for Barpeta district by the peoples' representatives of district with support from administration and technical experts. For instance the reports of Strategic Research and Extension Plan (SREP) prepared under ATMA program, Comprehensive District Agriculture Plan (C-DAP) prepared as part of Rashtriya Krishi Vikas Yojana (RKVY), Potential Linked Credit Plans (PLP) of NABARD and the Integrated District Development Plan etc. identified number of irrigation related issues for Golaghat district including (i) promoting water use efficiency through sprinkler and drip irrigation; (iii) promoting protected polyhouse cultivation to minimize risk factors and enhance quality and productivity; (iv) Improvement of on-farm water delivery and efficiency of existing irrigation systems; (v) promotion of soil conservation of arable & non-arable land through engineering measures; (vi) creation of new water harvesting structures, check dams, ponds, tanks, etc (vii) increase the forest cover in the district and (viii) land improvement measures.

VII. Methodology

During the course of preparation of District Irrigation Plan (DIP) the team visited Barpeta district to collect data and have interaction with all the stakeholders. Methodology adopted to prepare DIP is outlined in brief as under:

a) Collection of primary and secondary data from field from various sources including published documents and websites.

b) Various meetings were held to obtain ground level realities and data from key personnel/stakeholders through structured, unstructured interviews, focused group discussions etc.

c) Meetings with various State Government departments and related institutions were held

d) Meeting through VC was also held with State Level authorities.

e) GIS maps of the area's/clusters were studied to understand the land morphology, topography of the district.

f) Focused group discussions and interaction with of agriculture officers, horticulture officers, soil conservation officers, rural development department, animal husbandry department, irrigation officers both at blocks and district level for identifying the key issues and focus areas of the region.

g) Discussion with NABARD officer of Barpeta district was also held during the visit.

h) Team members also participated in the State Level workshop and held active discussions with GoI officers, State Level officers and scientists of various institutions

i) In the district at Panchayat level schemes were identified as per the need and potential and resolutions were passed by the Panchayat to include the schemes in PMKSY. The Panchayat resolutions were then consolidated and put up in the Block Development Committee and a block plan was put up in the Zila Parishad along with the programme of other line departments participating in implementation of PMKSY. Besides IWMP prepared by District Water Development agency was also proposed and approved by the Zila Parishad Barpeta in its meeting.

On the basis of detailed discussion and analysis of data, the team arrived at the projections of various components of PMKSY and Department wise plan for four years from 2016-17 to 2019-20 as detailed in the plan.

CHAPTER –I

1. General Information of the District

1.1 District Profile

Barpeta is the district located in lower Brahamputra valley with the total geographical area of the district is about 2,32,597.8 Ha and is bounded by international border i.e. Bhutan Hills in the North, Nalbari District in the East, Kamrup and Goalpara District in the South and Bongaigaon District in the West. The District lies between latitude 26'5" North - 26'49" North and longitude 90'39' East - 91'17' East. It has almost the flat topography with gentle slope towards the south. The North Part is mostly covered by forest.

The word Barpeta derives from "Bar" meaning big and "Peta" meaning pond. Thus Barpeta means "land of big ponds", as in pre-modern times Barpeta was full of large ponds. The river Brahmaputra flows from east to west across the Southern part of the district. The tributaries of these river that flows through the District are Beki, Manah, Pohumara, Kaldia, Palla, Nakhanda, Marachaulkhowa and Bhelengi flowing from North to South. Rivers Pohumara and Kaldia joins near Barpeta town to form river Nakhanda whereas Palla and Beki join with Nakhanda to ultimately form Chaulkhowa river.

Table 1: District Profile

Sr. No.	Name of the District	District code	Latitude	Longitude
1	Barpeta	303	26.19" N to 26.54" N	89.46' E to 90.38' E

Source: Census of India, 2011

Admisitrative set up

The Barpeta district, headed by the Deputy Commissioner , With the view to run the district smoothly , the entire district is divided into two sub-divisions viz., Barpeta and Bajali. Again each sub-division is divided into revenue circles and under revenue circles there are Mouzas comprising revenue villages. Barpeta district has 9 Revenue Circles with 835 villages.There are 6 statutory towns and 3 census town in the district. The names of the Revenue Circles are Barnagar(Pt), Kalgaicha, Baghbor, Barpeta, Chenga,

Sarthebari, Bajali(Pt), Sarupeta(Pt) and Jalah(Pt). The district possesses 12 Community Development Blocks.

1.2 Demography

As per 2011 census, the population of the district is 1693622 which is 5.42 % of the state's population. With a population density of 742 person per square kilometer, Barpeta is relatively more densed compared to the population density of the state (398 person per square kilometer). The number of males and females in the district are 867004 and 826618 respectively forming a sex ratio of 953 female per 1000 male. The decadal population growth (2001-2011) of the district is 21.43 %.

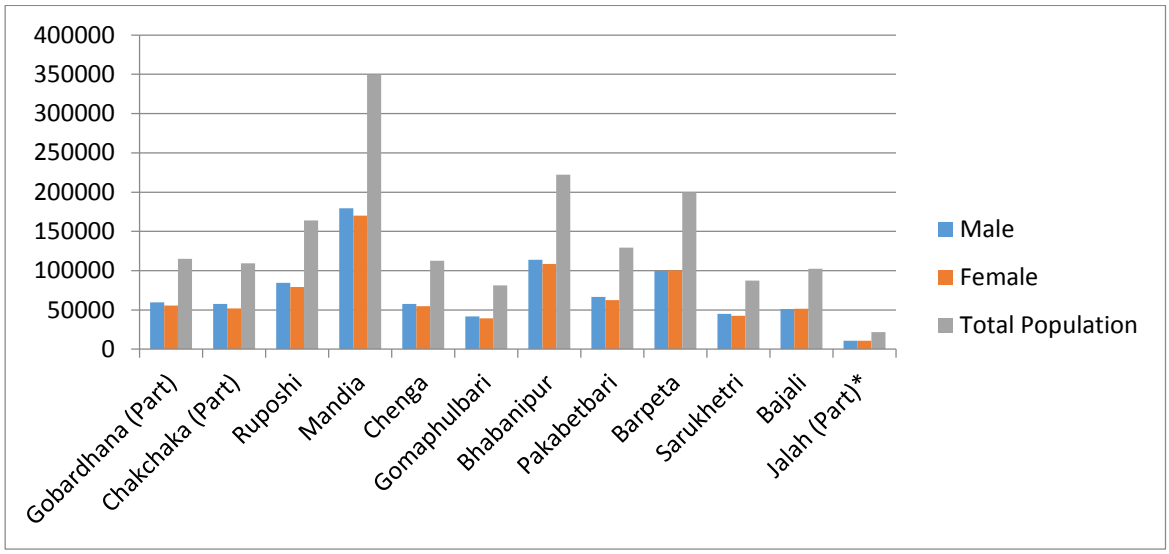
The scheduled caste and scheduled tribes population of the district is 95320 and 27344 respectively consisting 5.63 % and 1.61 % of the total population of the district respectively. The Population structure on the basis of religion comprises of Hindu (40.28%), Muslim (59.37%) & Others (0.39%) The total literacy rate of the population in the district stands at 63.81% with a female literacy rate at 58.06; which is lower than the state average of 72.19% & 58.06% respectively.

Table 2: Gender wise population

Blocks	Male	Female	Total Population
Gobardhana (Part)	59488	55504	114992
Chakchaka (Part)	57452	51852	109304
Ruposhi	84549	79216	163765
Mandia	179275	170053	349328
Chenga	57643	54857	112500
Gomaphulbari	41658	39420	81078
Bhabanipur	113925	108389	222314
Pakabetbari	66685	62605	129290
Barpeta	99532	100297	199829
Sarukhetri	44782	42477	87259
Bajali	51160	51265	102425
Jalah (Part)*	10855	10683	21538
Total	867004	826618	1693622

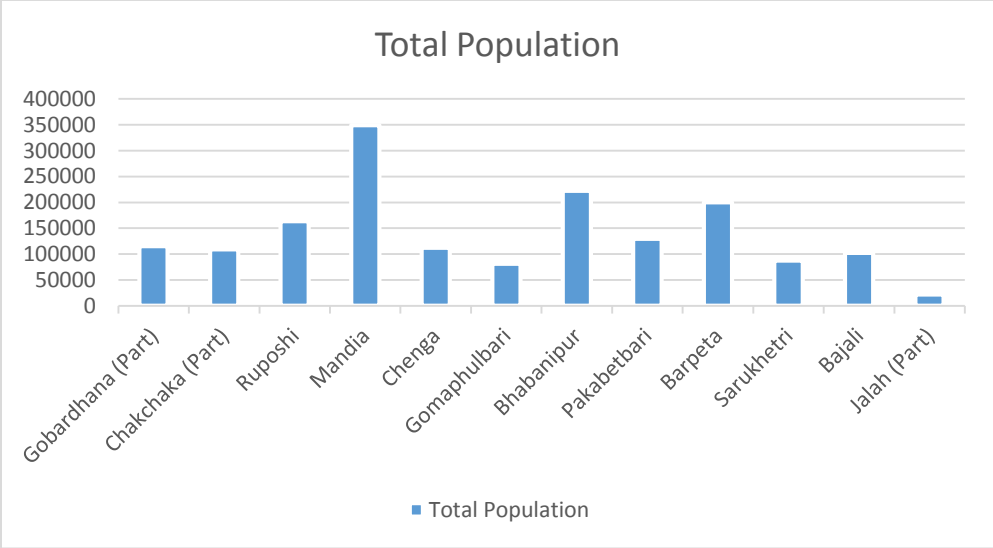
Source : Census of India, 2011

Chart 1: Gender wise population



Source: Census of India , 2011

Chart 2:Block wise population distribution



Source : Census of India , 2011

Table 3 : Category wise population

S.No.	Blocks	SC	ST	General	Total
1.	**Gobardhana (Part)**	12424	1065	101503	114992
2.	**Chakchaka (Part)**	5209	1985	102110	109304
3.	**Ruposhi**	1035	104	162626	163765
4.	**Mandia**	6047	50	343231	349328
5.	**Chenga**	8743	509	103248	112500
6.	**Gomaphulbari**	439	7	80632	81078
7.	**Bhabanipur**	12721	4744	204849	222314
8.	**Pakabetbari**	13426	1264	114600	129290
9.	**Barpeta**	21434	8016	170379	199829
10.	**Sarukhetri**	4415	3035	79809	87259
11.	**Bajali**	8581	4097	89747	102425
12.	**Jalah (Part)**	846	2468	18224	21538
	Total	**95320**	**27344**	**1570958**	**1693622**

Source : Census of India , 2011

We observed that the majority of population in the district belong to general category. The proportion of SC population is very marginal and less than 5 % in all Talukas of the district. The proportion of ST population is also marginal and less than 1.61 % in all 9 Talukas of the district.

The engagement of male population in pursuing agricultural activities is quite higher as compared to their female counterpart in the district.The male cultivators outnumbered the female cultivators being its portion at 36.53%. But in the the category of agricultural labour is also dominated by the female workers (24.78%). Thus, the participation of women in agricultural activities in the district is quite low. However the portion of the female workers in the household industries in substantially higher than the male worker.

1.3 Biomass and Livestock

Next to Agriculture and Horticulture, Livestock rearing is an important enterprise of the district. Cows, buffaloes, draft animals, goats pigs, poultry/ducks are main commodities of livestock enterprise. Cross breed cows, improved breed buffaloes and upgraded pigs in small numbers are also reared in almost all the blocks of the district. Mostly the local breeds are common. The population of the Large, Small, Milch or meat animals including the draft animals (Buffalos/yak/bulls etc) are given in Table 4.

Animal Husbandry is an important enterprise of the district and rearing of the milch cow is a pre dominant activities followed by poultry & piggery. The total livestock population in the district, as per the livestock census 2007 is 13,80,224 of which 13,71,355 are small animals 4,16,142 are large animals. Assuming 0.02% as a annual growth rate in the livestock population, the current & future population for 2015 & 2020 has been calculated.

Table 4: Livestock Population

Name of Block	Small Animals					Large Animals		Total
	Fowls	**Ducks**	**Pigs (Nos.)**	**Horses & Pones**	**Sheeps & Goat (Nos.)**	**Hybrid Cow (Nos.)/ Buffalos**	**In descriptive Buffalo (Nos.)**	
Rupshi	102891	34268	43	323	20533	0	347	**158405**
Gobardhana	50118	19987	7693	0	44280	0	1456	**123534**
Chakchaka	43782	22875	1283	7	16244	0	351	**84542**
Mondia	52436	28244	728	10	15624	0	585	**97627**
Pakabetbari	121306	10169	407	7	19323	0	758	**151970**
Sarukhetri	35370	63291	715	0	10849	0	795	**111020**
Gumafulbari	132887	41176	41	29	15624	0	2435	**192192**
Chenga	89500	3957	628	0	38408	0	793	**133286**
Barpeta	58210	30139	885	10	18432	0	692	**108368**
Bajali	33645	51383	5762	1	28891	0	273	**119955**
Bhabanipur	17257	43281	2738	50	35615	0	384	**99325**
Total	**737402**	**348770**	**20923**	**437**	**263823**	**0**	**8869**	**1380224**

Source: Live Stock Census 2007

1.4 Agro-Ecology, Climate, Hydrology and Topography

The Barpeta District is situated at the plains of Brahmaputra valley and northern part of the District is covered by hilly area. In the Southern and Western side of the district, Char areas are created by Brahmaputra and by Beki rivers, which comprises a major part of the district.

The district has among the flat topography with gentle slope towards south. The northern part of the district is slightly elevated and mostly covered with forest and tall grasses while southern part of it is close to northern bank of the river Brahamputra with low lying flood prone areas.

The Barpeta district is divided into six agro ecological situation (AES) viz:

- Foot hills old mountain,
- Forest & foot hills Area
- Flood prone recent riverine alluvial plain
- Flood free
- Beel
- Char Land

Table 5: Block wise area under different agro ecological zones

AES / Blocks	I.Foot Hills old Mountain Valley	II. Forest & Foot Hills area	III. Flood Prone recent riverine alluvial plain	IV. Flood free	V. Beel	VI. Char Land
Sarukhetri	**0**	**0**	**11572**	**0**	**358**	**0**
Chenga	**0**	**0**	**10746**	**4298**	**0**	**6447**
Barpeta	**0**	**0**	**8543**	**8542**	**0**	**0**
Gumafulbari	**0**	**0**	**13864**	**0**	**0**	**3466**
Mandia	**0**	**0**	**31985**	**0**	**0**	**26169**
Pakabetbari	**0**	**0**	**15661**	**0**	**824**	**0**
Rupsi	**0**	**0**	**18627**	**0**	**0**	**0**
Chakchaka	**747**	**1121**	**0**	**16434**	**373**	**0**
Gobardhana	**16375**	**22407**	**0**	**4309**	**0**	**0**
Bhawanipur	**0**	**0**	**7836**	**7836**	**0**	**0**
Bajali	**0**	**0**	**0**	**26115**	**0**	**0**

Source: Agriculture Dept, Barpeta

Barpeta has subtropical climate, with chilly winters and hot humid summers. The climate of Barpeta remains mild and pleasant round the year. Tropical monsoon climate of the District provides two distinct seasons- summer and winter. The summer season of March to May is followed by the Monsoon from June to September.This is followed by cool winter season from the month of October to February. The average rainfall from the southwest monsoon is 1792 mm

The climate of the district is subtropical and humid. The average temperature ranges from 15 ºC to 30ºC. The winter season starts by November and continues till February. December/January is the coldest and July/August is the hottest period. The air is highly humid through out the year and during rainy season,the relative humidity is about 90 percent.The area receives heavy rainfall every year and out of 2287 mm of annual normal rainfall, 60 to 65% is received during June to September from south west monsoon. The district also receives rainfall during pre-monsoon period from March/April to May in the form of thunder showers and hail storms.

Table 6: Climate

Rainfall	Normal Rainfall (mm)	Normal Rainy Days	Normal Onset	Normal Cessation
SW monsoon (June - Sept)	1792		1st week of June	4th week of September
NE monsoon (Oct – Dec)	15		2nd week of October	2nd week of November
Winter (Jan – march)	6		-	-
Summer (April – May)	474		-	-
Annual	2287		-	-

Source: Contingency plan 2012 , Barpeta

1.5 Soil Profile

Physiographically almost the entire district is occupied by an alluvial deposit with flat topography and there is a very gentle slope towards the Brahmaputra river, which makes the southern boundary of the district. The northern parts extends up to the foothills of the Bhutan Himalayas, where high level terrace exists, commonly referred to as piedmont plain of "Bhabar Belt", similar to the Ganga valley exhibits high slope towards south. The district has soil cover of younger and older alluvial soil which has undergone diversified pedagogical changes. The soils are characterised by medium to high organic carbon and low to medium phosphorous and potash contents. Deep red coloured soil is developed in forested and foothill

areas in the extreme northern region and the texture of these soils ranges from clay to sandy loam.The alluvial soils are light yellow to light grey in colour of Recent age. The texture of the soil ranges from sandy loam to silty loan in nature.

Different classes of soils are available in the district. The texture classes vary from sandy to sandy loam. The PH of the soil ranges from 5.5 to 6.5. Mainly three types of soils viz. alluvial soil, sandy soil and sandy loam soil exist in the district. The predominant type of soil is alluvial soil, which covers 63.92% area; sandy loam 24.83% and 11.25% area in under sandy soil. Block wise coverage under alluvial soil varies from 40-43%, sandy soils from 5-40% and sandy loams from 20-34%. From the point of textural classification of the existing soils of the district of all type of crops except temperate crop can be grown successfully provided on other parameter may inhibits the growth and development.

National Bureau of Soil Survey and Land Use Planning , GOI has identified three soil series in the district. All the three series are placed under the suitability class " moderately suitable " with the limitation of low organic matter and low fertility.

The extent of severity of the soil acidity varies from block to block about 58.09% of the total acidic soils of the district exist. About 27.34% of the total acidic soils of the district exist in three blocks viz. Mandia , Chakchaka and Gobardhana blocks. About 27.34% of the total acidic soils of the district exist in Sarukhetri, Barpeta , Pakabetbari, Bhawanipur and Bajali blocks and about 14.57% acidic soils are available in Chenga , Gumafulbari and Rupshi, which are mild to severe acidic in reaction. Except Gumafulbari , Chakchaka and Pakabetbari development blocks about 7039 ha area of all the blocks are affected by iron toxicity with the affected areas varying between 315 ha to 2350 ha. Soil erosion due to regular occurrence of the flood is a major cause of concern to the people of Barpeta district. (CDAP, Barpeta 2009)

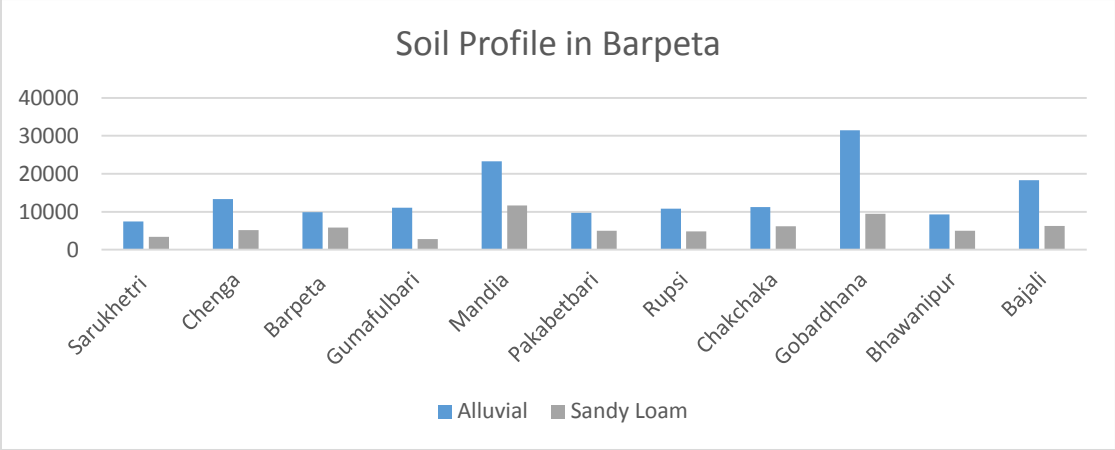
Table 7: Soil Profile

Name of Block	Major Soil Classes					
	Alluvial		Sandy		Sandy Loam	
	Area (ha)	%	Area (ha)	%	Area (ha)	%
Sarukhetri	7390	62	1200	10	3340	28
Chenga	13321	62	3010	14	5160	24
Barpeta	9906	58	1369	8	5810	34
Gumafulbari	11091	64	3466	20	2773	16
Mandia	23260	40	13260	40	11634	20
Pakabetbari	9725	59	1815	11	4945	30

Rupsi	10804	58	2980	16	4843	26
Chakchaka	11205	60	1307	7	6163	33
Gobardhana	31456	73	2155	5	9480	22
Bhawanipur	9247	59	1410	9	5015	32
Bajali	18281	70	1567	6	6267	24

Source: DADS (ATMA), of Barpeta District

Chart 3: Soil profile



1.6 Soil Erosion & Runoff Status

Soil erosion is a serious problem in Assam especially in the hilly regions and areas in the north bank of the Brahmaputra bordering Bhutan and Arunachal Pradesh. Sheet and river bank erosion of the Brahmaputra and land-slides in the hilly terrains contribute substantially to the sedimentation problem of the rivers and productivity decline of farm land covering lakhs of hectares. The catchment of the Brahmaputra is characterized by very steep hill slopes with coarse soil texture and unstable land mass. This causes high instantaneous run-off and heavy siltation in the tributaries as well as in the channels of the main river. It is also frightening that the mighty river is drifting its course now towards southern bank and causing sedimentation in the north bank.

The river Brahamputra causes severe erosion in many places of Mandia, Rupshi, Gumafulbari and Chenga blocks. The extent of soil erosion has been noticed from medium to very severe in all the blocks of the district.

1.7 Land Use Pattern

Total geographical area of the district is 2,32,597.8 ha. Net area under cultivation of different crops is 1,53,881 ha. The share of net area sown to total geographical area is 66 per cent.

Table 8: land use pattern

Name of the Block	Total Geographical area (ha)	Area under Agriculture (in ha)			Cropping Intensity (%)	Area in ha.		
		Grossed cropped area (1)	Net sown area (2)	Area sown more than once (1-2)		Area under forest	Area under Wast land	Area under other uses
Rupshi Block	16411.84	27902	13033	14869	214	0	798	1975.5
Gobardhana Block	6029	9961	4376	5585	228	0	0	1653
Chakchaka Block	14260	14052	10400	3652	135	170	853	2263
Mondia Block	60477	79757	41740	38017	191	104	0	14186
Pakabetbari Block	14591	15043	10095	4948	149	35	460	4317
Sarukhetri Block	11452	12838	8080	4758	159	0	406	2960
Gumafulbari Block	22570	12889	9611	3278	134	0	21	70
Chenga Block	16233	17382	8891	8491	196	37	52	133
Barpeta Block	26027	24019	17389	6630	138	0	0	3895
Bajali Block	20925	21678	14647	7031	148	0	0	6277
Bhawanipur Block	23622	24414	15619	8795	156	116	948	4494
Total	**232597.8**	**259935**	**153881**	**106054**	**169**	**462**	**3538**	**42224**

Source: Department of Agriculture, Barpeta

CHAPTER II:

2. District Water Profile

Water is vital for survival of both plants and animals. It is the central component of the planet Earth controlling the weather, climate, plant and animal kingdom. It supports agriculture, forestry, navigation, industries and hydroelectricity generation and other uses such as for recreation, water sports activities etc. The importance of water has been recognized all over the world. Water resource development and management practices are given top priorities all over the world to avoid the water crisis in future. This chapter outlines the different type of crops, productivity and irrigation status of the Barpeta district

2.1 Area Wise, Crop Wise Irrigation Status

The economy of Barpeta district is agriculture-based. Tea, rice and sugar cane are the main agricultural crops grown in the district, with tea being is the largest agricultural industry.

Rice is the most dominant crop followed by vegetables, pulses, oilseeds, tuber crops in the district. The productivity of all these crops are not satisfactory and below national average, Among the horticultural crops Banana, Citrus, Pineapple, Arecanut and Coconut are grown by the farmers in the extensive area. Apart from agricultural crops sericulture food plants also covering a sizable area. Generally Sali rice, Ginger, turmeric, sericulture fodder plants, sugarcane etc. are practiced in monoculture in majority parts of the district.

The district has net and gross cropped areas of 1,53,881 hectares and 2,59,935 hectares respectively, the net cropped area being 66 percent of the total geographical area. The crop wise irrigated and rainfed area sown in different seasons like Kharif, Rabi and Summer in the district for each block is given in

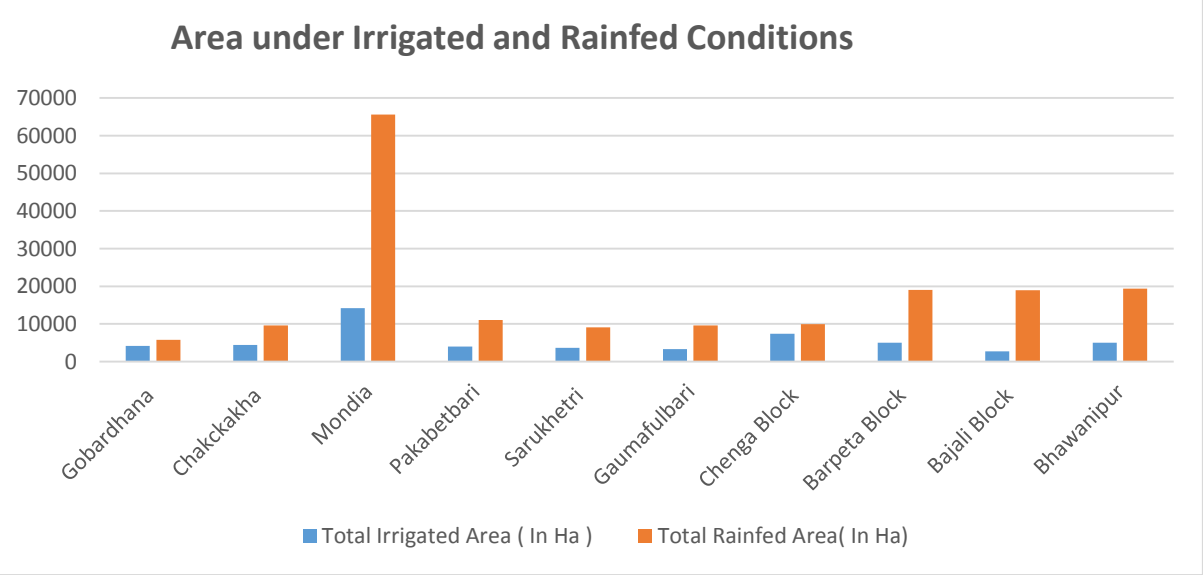
Annexure I.

Table 9: Area under Irrigated and Rainfed conditions (In Ha)

Blocks	Total Irrigated Area (In Ha)	Total Rainfed Area (In Ha)
Rupsi	6046	21856
Gobardhana	4175	5786
Chakckakha	4412	9640
Mondia	14208	65549
Pakabetbari	3998	11045
Sarukhetri	3701	9137
Gaumafulbari	3296	9593
Chenga Block	7407	9975
Barpeta Block	5015	19004
Bajali Block	2751	18927
Bhawanipur	5037	19377
Total	**60046**	**199889**

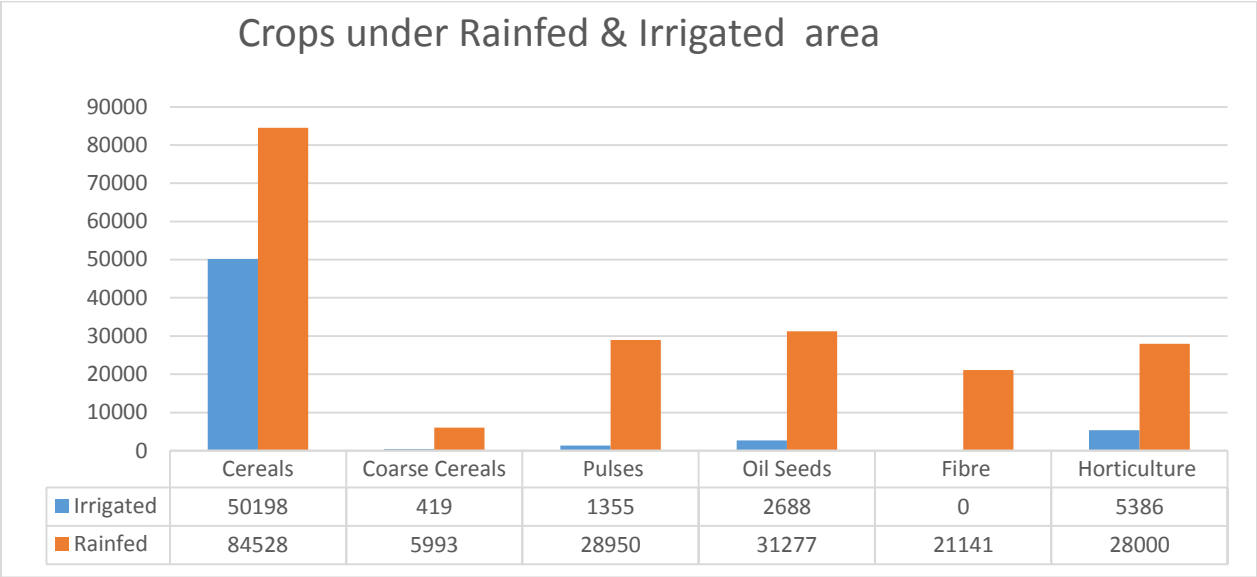
Source: Agriculture Dept. Barpeta

Chart 4: Total Irrigated and Rainfed Area (in Ha) in Barpeta District



We observed that the Mondia block have the maximum rainfed area (65,549 ha) and irrigated area (14208 ha). Under the cereals, Paddy is the most cultivated crop grown in Barpeta district which is mainly rainfed followed by the oilseeds & Pulses

Chart 5: Crops under Rainfed and Irrigated area



	Cereals	Coarse Cereals	Pulses	Oil Seeds	Fibre	Horticulture
Irrigated	50198	419	1355	2688	0	5386
Rainfed	84528	5993	28950	31277	21141	28000

2.2 Production and Productivity of Major Crops

The geoclimatic condition of the district is conducive for the cultivation of a variety of agricultural crops. However, paddy is the principal crop which is cultivated area of the district. As per the estimate of 2014-15, the coverage of autumn, winter and summer paddy reported to be 14.24% , 50.20%, and 35.50% respectively of the total paddy cultivated area of the district.

In addition to rice, mustard, pulses, wheat and jute are other important field crops either cultivated in commercial scale or for domestic consumption. The block wise detail of the major crop is in Annexure II

2.3 Irrigation Based Classification

The economy of Barpeta is predominantly agricultural based. The total geographical area of the State is 2,32,597.8 Ha out of which the gross cropped area of the district is 25,9,935 Ha. In order to cope up with the food deficit caused by growth in population and to ensure food security, multiple cropping with irrigation support is highly necessary. Moreover due to vagaries of nature, global warming, ecological imbalance and erratic monsoon, the rain fall is not taking place at right time to the help of the agricultural practices. As such irrigation input is found to be the only alternative which can provide right amount of water at right time to carry out agricultural activity.

There is about 1,99,889 Ha is under rainfed areas of the district. The percentage of the rainfed areas of the block ranges from 60 % - 90 % in different blocks. The gross area under irrigation is 60046 Ha .

Table 10: Irrigation based classification

Name of Block	Irrigated Area (ha)		Rainfed Area (ha)	
	Gross Irrigated Area	**Net Irrigated Area**	**Partially Irrigated/ Protective Irrigation**	**Un- Irrigated or Totally Rainfed**
Rupshi	6046	4184	0	21856
Gobardhana	4175	2856	0	5786
Chakchaka	4412	2306	0	9640
Mondia	14208	10622	0	65549
Pakabetbari	3998	6530	0	11045
Sarukhetri	3701	3058	0	9137
Gumafulbari	3296	4900	0	9593
Chenga	7407	4054	0	9975
Barpeta	5015	4026	0	19004
Bajali	2751	2217	0	18927
Bhawanipur	5037	3500	0	19377
Total	**60046**	**48253**	**0**	**199889**

Source: Agriculture Department, Barpeta

CHAPTER III:

3. Water Availability

Water availability is an important issue for ascertaining the demand of water for domestic, livestock, irrigation, industrial and power generation projects. The water availability depends on topography, climatic conditions, rainfall, soil profile, infiltration rate, run off and human activities over the catchment area. The changes in the water levels of the surface source are mainly because of the variations in the inflow from the upper catchments. The fluctuations constitute a sensitive indicator of past and present climate and human activities at a local and regional scale. In the hydrological point of view, the entire Barpeta district falls under the Brahmaputra basin.

The mighty river Brahamputra and its nine tributaries are flowing through the district, covering a total length of about 1460 Km. The tributaries are flowing through the district , covering a total length of about 1460 km. The tributaries namely Beki, Manah, Pallah, Chaulkhowa, Pahumara, Kaldia etc. flows from Royal Bhutan Kingdom to the river Brahamputra of the district. In addition to these tributaries, beels, ponds and other permanent sources of water is utilised for flow and lift irrigation.

3.1 Status of Water Availability

For creating access to water source either assured or protective to each farmer will require a demand and supply assessment of crop water requirements, effective rainfall and potential source of existing and new water sources considering the geo-hydrological and agro ecological scenario of the block. The master plan will include information on all sources of available water, distribution network, defunct water bodies, new potential water sources both surface and sub surface system, application to conveyance provisions, crops and cropping system aligned to available/designed quantity of water and suitability to local agro ecology. All activities pertaining to water harvesting, water augmentation from surface ad sub surface sources, distribution and application of water including repair, renovation and restoration of water bodies, major, medium and minor irrigation works, command area development etc. are to be taken up within the frame work of this master plan. Emphasis is to be given for deriving the potential benefit from low hanging fruits like extending the reach/coverage of water source through effective distribution and application mechanism, reducing the gap between potential created and utilized through more focus on command area development and precision irrigation. Proper integration of creation of diversion head work and water

harvesting structures, distribution system like canals and command area development works and precision farming is to be made for best possible use of water resources.

Sources of water supply include: Major & medium irrigation canals, Minor irrigation tanks, Diversion channels, Rain water harvesting structures and Ground water extraction structures such as bore wells.

Table 11: Status of water availability

(BCM per Ha)

S.No.	Sources	Kharif	Rabi	Summer	Total
1	**Surface Irrigation**	0.00001435	0.0000041	0.00000205	0.0000205
2	**Ground Water**	0.00000952	0.000000272	0.000000136	0.00000136

Source: Irrigation Dept., Barpeta

3.2 Status of Ground Water Availability

Hygeogeologically, the entire area in Barpeta is occupied by alluvial sediments of Quaternary age. Piedmont deposits comprising of coarse clastic sediments like boulder, pebble, gravel associated with sand and silt from the ground water bearing formation in the northern part of the district.

Ground water occurs under unconfined condition in shallow aquifer and under semi-confined to confined condition in deeper aquifer. The aquifer is consisting of sand of various grades with little gravel in the southern part, with a very good yield prospect for both shallow and deep tube wells. The water level rests at shallow depth ranging from 2 to 4 m bgl during premonsoon period. The post monsoon ground water level rests between 1 and 2 m bgl. The size of the aquifer materials gradually increases from south to north and the depth of water level is also high. The long term water level trend study shows no significant change of water level in the last 10 years.

Ground water resource

The water level trend shows that there is gradual rising of water level in the district. Assessment unit can be categorized into 4 categories as SAFE, SEMI-CRITICAL, CRITICAL, and OVEREXPLOITED. The annual dynamic ground water recharge are estimated to be 183.00 MCM while the net annual ground water draft is 381.67mcm. The present stage of ground water
development is only 41 per cent and district is still under ‘safe’ category.

The detailed status of ground water, draft, recharge and gaps for the district as collected from CGWB is given separately in table below.

Table 12: Status of Ground Water Availability

District	Status of Block as per Central Ground Water Board Notification			Ground Water (MCM)		
	Critical	Semi-Critical	Safe	Draft	Recharge	Gap
Barpeta			Safe	381.67	183	198.67

Source: CGWB, Guwahati Regional Office

The hydrogeological set up and availability of huge ground water resources and the present stage of ground water draft, it can be concluded that the district has an ample scope for the development of ground water through construction of different ground water structures in a planned way

3.3 Status of Command Area

The command area in the district can be categorized as Canal command and other services command, which encompasses command created by ponds, tanks and tube wells. The command area for eight districts is given in the table below :

Table 13:Status of the command area

Sl. No.	Information of Canal Command			Total Area	
	Total Area (in Ha)	Developed Area (in Ha)	Undeveloped Area (in Ha)	Developed Area (in Ha)	Undeveloped Area (in Ha)
Barpeta	4,192.16	989.15	3,203.01	989.15	3,203.01
Sarukhetri	665.61	368.36	297.25	368.36	297.25
Gumaphulbari	468.02	468.02	NA	468.02	NA
Gobardhana	848.92	848.92	NA	848.92	NA
Mandia	4990.74	1639.28	3351.46	1639.28	3351.46
Chakchaka	5607.92	3667.81	1940.11	3667.81	1940.11
Chenga	2336.74	896.2	NA	896.2	NA
Paka Betbari	2621.76	1482.33	1124.43	1482.33	1124.43
Bhawanipur	8448.22	7634.14	NA	7634.14	NA

3.4 Existing type of Irrigation

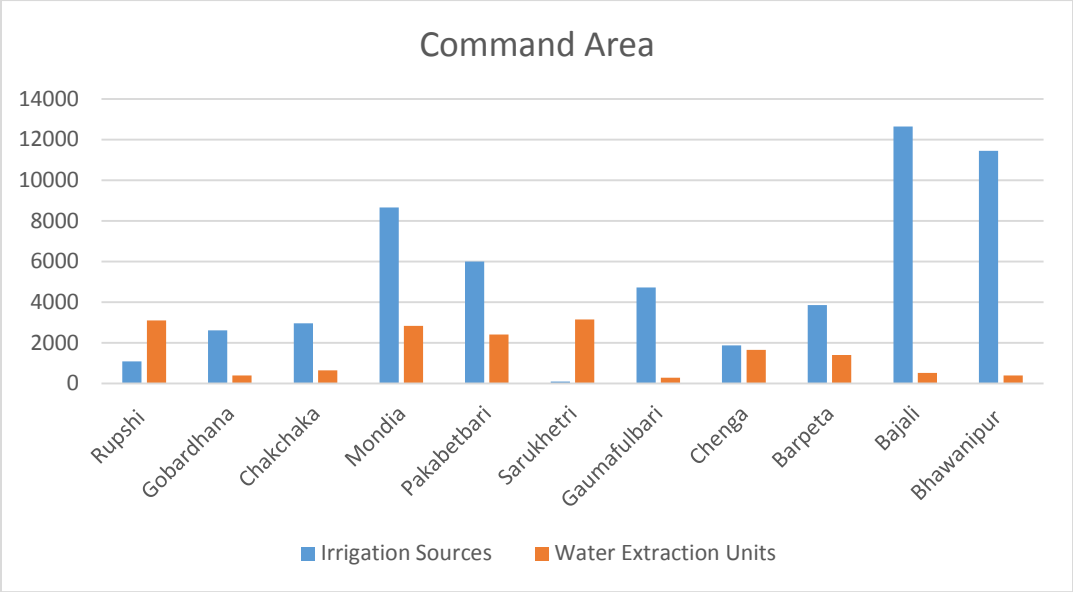
We observed that Bajali block has the highest canal command area which is 13164 hectares while the lowest canal command area is for Gobardhana block which is 3016 hectares under various irrigation sources and water extraction units. In this region, due to high availability of the ground water, ground water extraction can increase the irrigated area. Block wise existing types of Irrigation is given in Annexure IV

Table 14: Block wise Command Area (In. Ha)

Blocks	Irrigation Sources	Water Extracting units	Total
Rupshi	1084	3100	4184
Gobardhana	2614	402	3016
Chakchaka	2961	642	3603
Mondia	8654	2838	11492
Pakabetbari	6000	2410	8410
Sarukhetri	90	3148	3238
Gaumafulbari	4730	290	5020
Chenga	1880	1652	3532
Barpeta	3856	1405	5261
Bajali	12639	525	13164
Bhawanipur	11447	400	11847
Total	**55955**	**16812**	**72767**

Source : Irrigation Dept., Barpeta

Chart 6:Command Area (in Ha)



CHAPTER IV:

4. Water Requirement /Demand

The earlier Chapters deal with the general profile, water profile and water availability in Barpeta district. The present chapter deals with the current (2015) and projected (2020) demand for water from various sectors. The demand has been worked out on the basis of data collected from different departments which has already been presented in previous chapters. The unit for volume of water has been chosen as million cubic meters (MCM) instead of Billion cubic meters as suggested in the guidelines.

4.1 Domestic Water Demand

This includes the water requirement by the household for drinking, cooking, bathing, lawn sprinkling, gardening, sanitary purposes etc. The amount of domestic water consumption per person shall vary according to the living condition.

The total domestic water demand shall be equal to the total design population multiplied by the per capita domestic consumption i.e. 135 litre/day. As the last population census was made in 2011, the actual population of the district in 2015 is not readily available. Considering the population of the Barpeta district as per Census, 2011 the projected population in 2020 is worked out assuming the last decadal growth of 21% and annual exponential growth rate of 0.021% to apply for the period 2011-2020 (9 years). The domestic water demand is given in the table below.

Table 15: Domestic Water Demand 2015

Blocks	Population 2015	Gross Water Demand (MCM)2015
Gobardhana (Part)	124743	6.15
Chakchaka (Part)	118573	5.84
Ruposhi	177652	8.75
Mandia	378951	18.67
Chenga	122040	6.01
Gomaphulbari	87953	4.33
Bhabanipur	241166	11.88
Pakabetbari	140254	6.91
Barpeta	216774	10.68
Sarukhetri	94659	4.66
Bajali	111111	5.47
Total	**1813877**	**89.38**

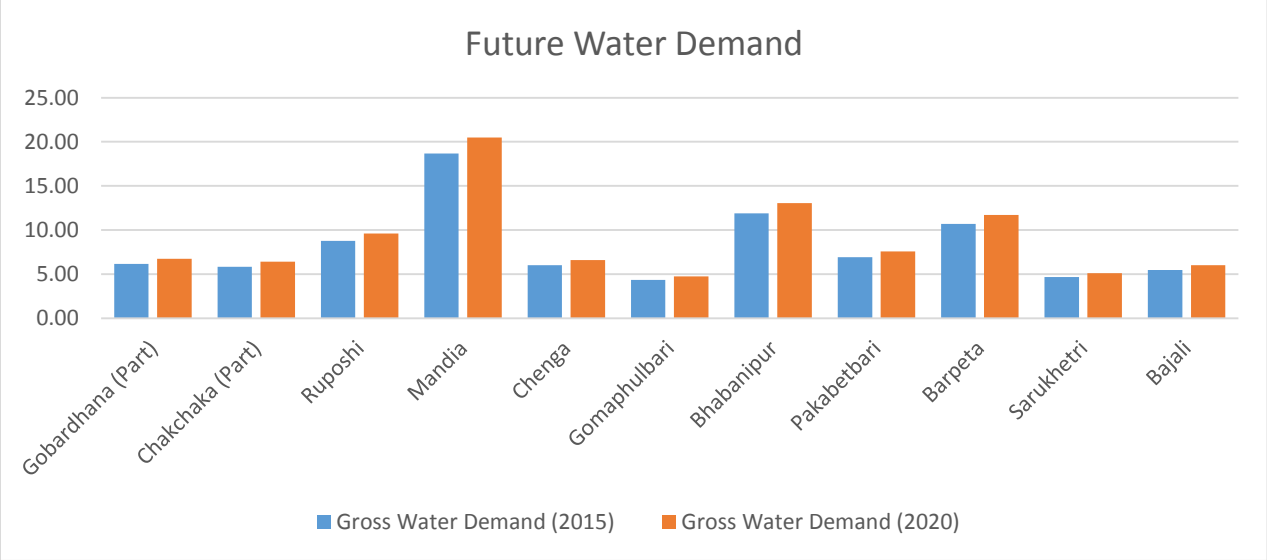
We have observed that total present domestic water demand is 89.38 MCM. Sources of supplying domestic water include: local tube wells , open wells , borewells, canals ,tanks pond reservoirs etc.

Table 16: Water Demand 2020

Blocks	Population 2020	Gross Water Demand 2020 (MCM)
Gobardhana (Part)	136932	6.75
Chakchaka (Part)	130159	6.41
Ruposhi	195011	9.61
Mandia	415980	20.50
Chenga	133965	6.60
Gomaphulbari	96548	4.76
Bhabanipur	264732	13.04
Pakabetbari	153959	7.59
Barpeta	237956	11.73
Sarukhetri	103908	5.12
Bajali	121968	6.01
Total	**1991118**	**98.11**

We observed that projected future domestic water demand (2020) is 98.11 MCM, and will increase by 9.44%, as compared to present domestic water demand (2015).

Chart 7: Future Water Demand 2020



4.2 Crop Water Requirement

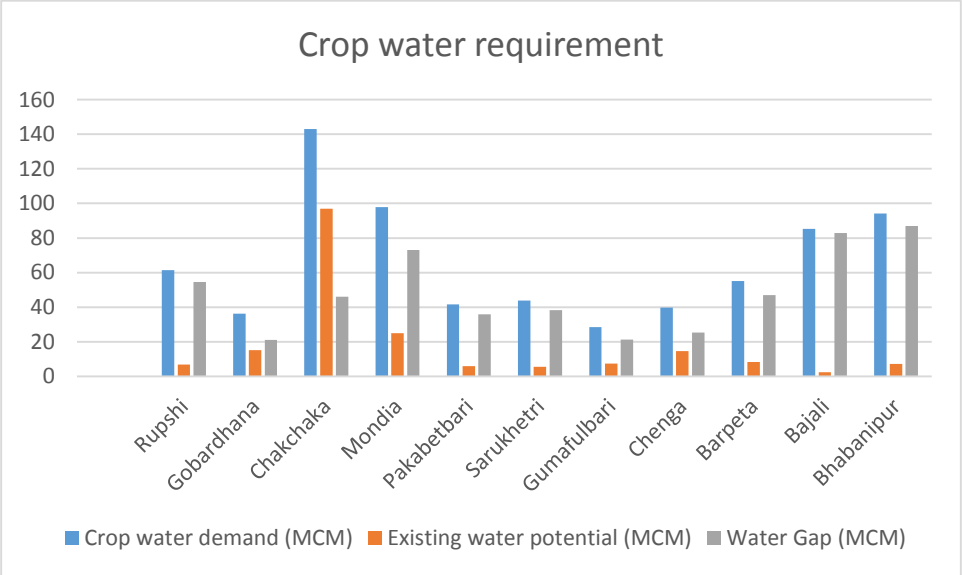
Water requirement of a crop means the total quantity and the way in which a crop requires water, from the time it is sawn to the time it is harvested (crop period). Different crops will have different water requirements and the same crop may have different water requirements at different places of the same country depending upon the climate, type of soil, method of cultivation and useful rainfall etc. The total quantity of water required by the crop for its full growth may be expressed in Hectare-m or in Million Cubic meter or simply as a depth to which the total supplied irrigation water would stand above the surface without percolation or evaporation. This depth is known as delta for the crop. On the other hand duty is defined as the area irrigated per cumec of discharge running for the base period. The duty helps us in designing the efficient canal irrigation system. If we know the crops area required to be irrigated and their duties, we can work out the discharge required for designing the canal.

Consumptive use for a particular crop may be defined as the total amount of water used by the plant in transpiration (building of plant tissues etc.) and evaporation from adjacent soils or from plant leaves, in any specified time. Therefore, crop water requirements are defined as "the depth of water needed to meet the water loss through evapo-transpiration of a disease free crop, growing in large fields under non restricting soil conditions including soil water and fertility and achieving full production under the given growing environment. Consumptive use for a particular crop may be defined as the total amount of water used by the plant in transpiration (building of plant tissues etc.) and evaporation from adjacent soils or from plant leaves, in any specified time. Thus crop water requirement is nothing but the consumptive use itself, but exclusive of effective precipitation, stored soil moisture or ground water. Consumptive use or evapotranspiration depends upon all those factors on which evaporation and transpiration depend such as, temperature, sunlight, wind movement etc. The crop water requirement of different bocks in the Barpeta district has been worked out and a statement is prepared as shown in table below which outlines the required and available water potential in the district.

Table 17: Crop Water Requirement

Blocks	Rainfed Area (ha)	Irrigated area (ha)	Crop water demand (MCM)	Existing water potential (MCM)	Water Gap (MCM)
Rupshi	21856	6046	61.37	6.74	54.63
Gobardhana	5786	4175	36.17	15.17	21.00
Chakchaka	9640	4412	143.03	96.92	46.11
Mondia	65549	14208	97.95	24.93	73.02
Pakabetbari	11045	3998	41.63	5.80	35.83
Sarukhetri	9137	3701	43.82	5.56	38.26
Gumafulbari	9593	3296	28.52	7.32	21.20
Chenga	9975	7407	39.84	14.60	25.24
Barpeta	19004	5015	55.11	8.20	46.91
Bajali	18927	2751	85.34	2.39	82.95
Bhabanipur	19377	5037	94.08	7.14	86.93
Total	**199889**	**60046**	**726.85**	**194.77**	**532.08**

Chart 8: Crop water requirement



4.2 Livestock Water Requirement

As per the livestock census of 2007 & 2012, there was a population growth of 10.77% in five years (Average yearly growth rate being 2 %). The livestock water demand of the district is determined by multiplying the total livestock population in the district by the per capita water requirement (litres/day/No) for each category of the population. With the existing population recorded for a base year, the total projected livestock population in 2020 may be worked out and accordingly the livestock water demand is worked out. The livestock water demand is given in the table below.

Table 18: Livestock Water Requirement

Block	Total number of livestock 2015		Total number of livestock 2020		Present water demand (MCM)	Water demand in 2020 (MCM)	Existing Water potential (MCM)	Water potential to be created (MCM)
	Big Animals	Small Animals	Big Animals	Small Animals				
Rupshi	407	185295	444	202317	0.21	0.23	0.21	0.02
Gobardhana	1707	143114	1864	156262	0.18	0.19	0.18	0.02
Chakchaka	411	98699	449	107766	0.11	0.12	0.11	0.01
Mondia	686	113764	749	124216	0.13	0.14	0.13	0.01
Pakabetbari	889	177269	970	193554	0.20	0.22	0.20	0.02
Sarukhetri	932	129219	1018	141090	0.15	0.17	0.15	0.01
Gumafulbari	2855	222456	3117	242893	0.27	0.30	0.27	0.03
Chenga	930	155324	1015	169594	0.18	0.20	0.18	0.02
Barpeta	811	126231	886	137827	0.15	0.16	0.15	0.01
Bajali	320	140306	349	153195	0.16	0.17	0.16	0.01
Bhabanipur	450	115991	492	126646	0.13	0.14	0.13	0.01
Total	10397	1607666	11352	1755362	1.87	2.05	1.87	0.17

It has been assumed that the existing water potential is equal to present water demand of livestock. Thus, the water potential to be created implies the quantum of water availability to be created to meet livestock water demand in 2020. It can be observed that water potential to be created is to the tune of 0.17 MCM for Barpeta district.

4.3 Industrial Water Demand

This includes the quantity of water required to be supplied to offices, factories, different industries, hostels, hospitals etc. This quantity will vary considerably with the nature of city and with the type of industries and commercial establishments present in it. The industrial water demand is negligible in an area.

4.4 Water Demand for Power Generation

The district is not having any thermal or nuclear power plant where water may be consumed. Therefore, demand of water for power generation has been taken as nil

4.6 Total Water Demand of the district for various sectors

The total water demand of the district for all the sectors described in 4.1 to 4.5 are given in the are assessed by summing up all the values of water demand for domestic uses, livestock, power and industrial/commercial uses etc. The current water demand has been indicated in Table 19 and the projected water demand has been depicted in Table 20. Total present water requirement for the district is 818.11 MCM while the total future water requirement for the district is 825.86 MCM. In present, maximum water demand is for Chakchaka block which is 148.98 MCM while minimum is for Sarukhetri block which is 33.13 MCM. In projected future, maximum water demand is for Chackchaka block which is 149.57 MCM while minimum is for Gumafulbari block which is 33.58 MCM.

Table 19: Present water Demand (2015)

S.No.	Block	Components					Total (MCM)
		Domestic	Crop	Livestock	Industrial	Power Generation	
1	**Rupshi**	8.75	61.37	0.21	0	0	70.33
2	**Gobardhana**	6.15	36.17	0.18	0	0	42.49
3	**Chakchaka**	5.84	143.03	0.11	0	0	148.99
4	**Mondia**	18.67	97.95	0.13	0	0	116.75
5	**Pakabetbari**	6.91	41.63	0.20	0	0	48.74
6	**Sarukhetri**	4.66	43.82	0.15	0	0	48.64
7	**Gumafulbari**	4.33	28.52	0.27	0	0	33.13
8	**Chenga**	6.01	39.84	0.18	0	0	46.03
9	**Barpeta**	10.68	55.11	0.15	0	0	65.94
10	**Bajali**	5.47	85.34	0.16	0	0	90.97
11	**Bhabanipur**	11.88	94.08	0.13	0	0	106.10
	Total	**89.38**	**726.86**	**1.87**	**0.00**	**0.00**	**818.11**

Table 20: Future Water Demand (2020)

S.No.	Block	Components					Total (MCM)
		Domestic	Crop	Livestock	Industrial	Power Generation	
1	**Rupshi**	9.61	61.37	0.23	0	0	71.21
2	**Gobardhana**	6.75	36.17	0.19	0	0	43.11
3	**Chakchaka**	6.41	143.03	0.12	0	0	149.57
4	**Mondia**	20.50	97.95	0.14	0	0	118.59

5	**Pakabetbari**	7.59	41.63	0.22	0	0	49.44
6	**Sarukhetri**	5.12	43.82	0.17	0	0	49.11
7	**Gumafulbari**	4.76	28.52	0.30	0	0	33.58
8	**Chenga**	6.60	39.84	0.20	0	0	46.64
9	**Barpeta**	11.73	55.11	0.16	0	0	67.00
10	**Bajali**	6.01	85.34	0.17	0	0	91.52
11	**Bhabanipur**	11.88	94.08	0.14	0	0	106.11
	Total	**96.95**	**726.86**	**2.05**	**0.00**	**0.00**	**825.86**

4.7 Water Budget

The water budget of the district for the base year 2015-16 and 2020-21 as per water availability and demand is given in the table below. The present water availability/demand and also for 2020 are worked out as explained above and the water gap is found out. The water budget clearly shows the water gap between the water availability and requirement**.** The negative gap indicates that there is sufficient water resources for irrigation, domestic and the industrial uses without creating any deficit in our water potential.

Table 21: Water Budget (Volume in MCM)

Name of District	Existing Water Availability		Total (MCM)	Water Demand (BCM)		Water Gap (BCM)	
	Surface Water	**Ground Water**		**Present**	**Projected (2020)**	**Present**	**Projected (2020)**
Barpeta	1448.62	798.191	2246.81	723.93	731.68	-1522.88	-1515.13

CHAPTER V

5 Strategic Action Plan for Irrigation in District under PMKSY

A strategic plan for four years has been prepared starting from 2016-17 to 2019-20. The strategic action plan is broadly prepared under five heads namely: AIBP, Har Khet ko Pani, PMKSY Watershed and Per drop more crop. Various departments which have prepared the strategic action plan include:

- Irrigation Department , Barpeta
- Soil Conservation Department, Barpeta
- Agriculture Department , Barpeta

5.1 Component wise Strategic Action Plan

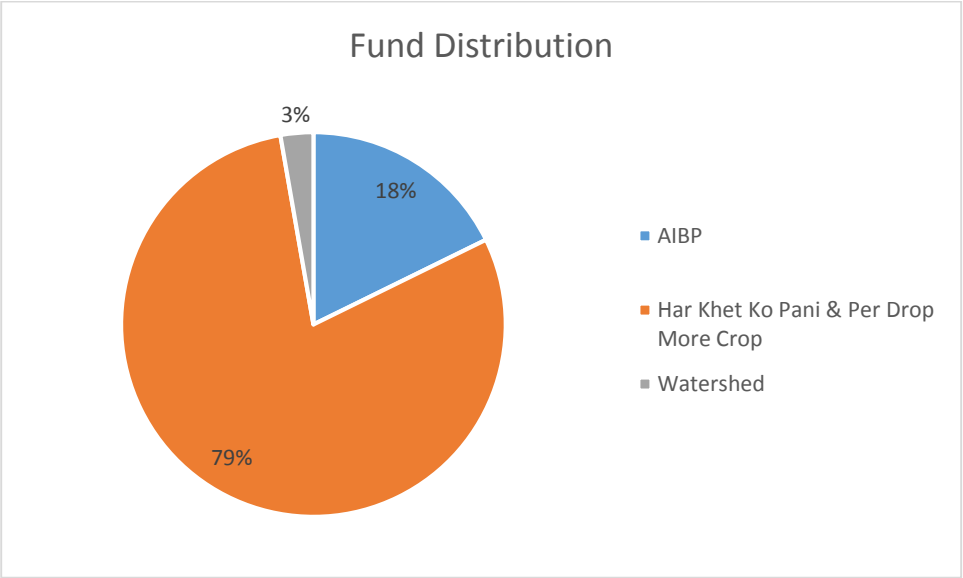
Total planned outlay for four years works out to be Rs. 111470.0 lakh. Maximum share of Rs. 88631.0 (80%) is for Har Khet Ko Pani & Per drop more crop Component, followed by AIBP Component of Rs. 19770.0 lakh(18%), followed by PMKSY Watershed Component of Rs 3070 lakh (3%). Detailed component wise break up of financial outlay can be observed in the following table.

Table 22: Component wise Strategic Action Plan Budget

Component	Yr16-17	Yr17-18	Yr18-19	Yr19-20	Total Budget (Rs Lakhs)	% Share
AIBP	**4500**	**5542**	**4942**	**4785**	19770	18%
Har Khet Ko Pani & Per Drop More Crop	21558	22700	22216	22157	88631	80%
Watershed	862	1008	789	411	3070	3%
Total	26920	29250	27947	27353	111470	

AIBP component is to be executed mainly by irrigation department, Har Khet ko Pani and Per Drop More Crop (PDMC) component will be implemented by agriculture department.Water shed component will be taken care of by the soil conservation department. However, all the stakeholders need to have coordination among themselves to have the maximum irrigation efficiency and to avoid duplicity

Chart 9: component wise fund distribution



5.2 Department wise allocation of Budget

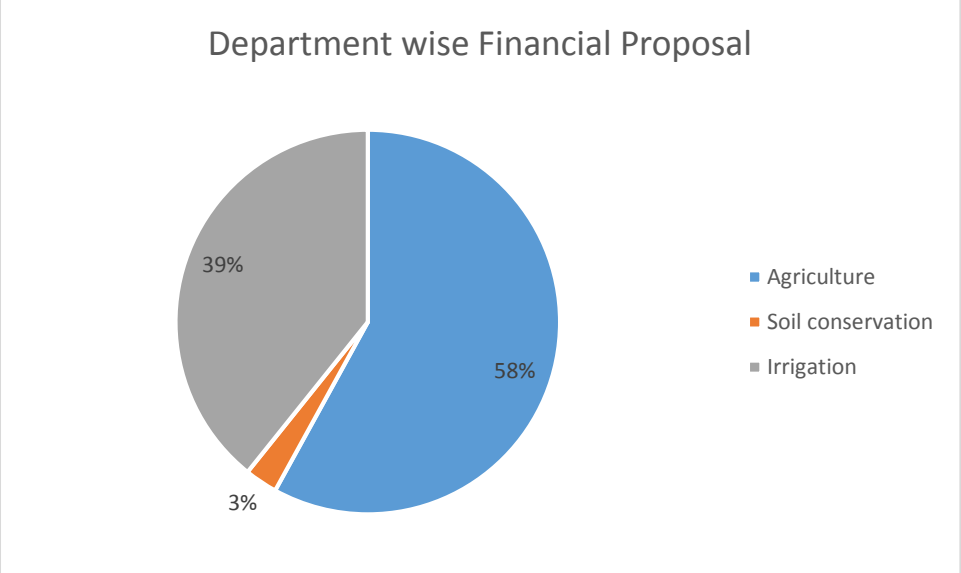
Total plan of Barpeta district for four years works out to be Rs.111470 lakh (Table 24). Maximum share of Rs 64657 lakh (58 %) is for Agriculture department followed by Irrigation department with Rs. 43743 lakh (39 %) and Soil Conservation department with Rs. 3070.09 lakh (3%). The total plan of four years is equally divided in to 4 years i.e. 2016-17, 2017-18, 2018-19 and 2019-20. Table 24 indicates department-wise year -wise share in PMKSY for four years from 2016-17 to 2019-20.

Table 23: Department-wise year-wise proposal under PMKSY

(Rs. Lakh)

Department wise	2016-17	2017-18	2018-19	2019-20	Total	% Share
Agriculture	16164	16165	16164	16164	64657	58%
Soil conservation	862	1008	789	411	3070	3%
Irrigation	10935	11537	11335	9936	43743	39%
Total	**27961**	**28711**	**28288**	**26510**	**111470**	

Chart 10: Department wise financial Proposal



5.3 Block wise, year wise plan

Block wise, year wise plan for the district is as shown in table below. For all the blocks, the amount has been distributed for each year i.e. 2016-17, 2017-18, 2018-19 and 2019-20. Overall, the maximum amount has been proposed for Bajali block which is Rs. 22294 lakh and the minimum amount is proposed for Sarukhetri block which is Rs 3954 lakh. Block wise plan for every department has given in Annexure IV

Table 24: Block wise year wise plan (Rs. Lakh)

Name of the Blocks/Sub Districts	2016-17	2017-18	2018-19	2019-20	Total
Barpeta	1959	1937	1944	1888	7727
Bhabanipur	3036	3430	3186	3097	12749
Chakchaka	1597	1715	1623	1636	6570
Rupshi	4314	4371	4327	4286	17297
Sarukhetri	989	990	986	988	3954
Pakabetbari	1558	1591	1562	1581	6291
Mandia	3916	3832	3862	3772	15382
Gumafulbari	1197	1205	1176	1136	4714
Gabardhana	1690	1631	1660	1605	6587
Chenga	1963	1989	1969	1984	7906
Bajali	5074	6074	5573	5574	22294
Total	**27292**	**28765**	**27867**	**27547**	**111470**

5.3 Block wise, component wise plan (Rs. Lakh)

Block wise, component wise plan for the district is as shown in table below. For AIBP component, Barpeta block has the highest amount of Rs. 1050 lakh while several blocks has the nil amount. For Har Khet Ko Pani component, Rupshi block has the highest amount of Rs. 16834 lakh while Sarukhetri block has the lowest amount of Rs. 3932 lakh. For PMKSY-Watershed component, Chakchaka block has the highest amount of Rs. 603 lakh while Sarukhetri block has the lowest amount of Rs. 21 lakh.

Table 25: Block wise component wise plan (In Rs. Lakh)

Name of the Blocks/Sub Districts	AIBP	Har Khet Ko Pani/ PDMC	Watershed	Total
Barpeta	1050	6399	277	7726.701
Bhabanipur	0	12410	340	12749.39
Chakchaka	371	5597	603	6570.49
Rupshi	0	16834	463	17297.06
Sarukhetri	0	3932	21	3953.505
Pakabetbari	444	5723	123	6291.22
Mandia	0	15030	352	15381.63
Gumafulbari	0	4374	339	4713.36
Gabardhana	250	6128	209	6586.703
Chenga	0	7778	127	7905.51
Bajali	17654	4425	216	22294.46
Total	19770	88631	3070	111470

5.4 Block wise, department wise plan

Block wise, component wise plan for the district is as shown in table below. Agriculture department has proposed highest amount for Rupshi block (Rs. 16474.32 lakh). Irrigation department has proposed highest amount for Bajali block (Rs.21483 lakh) while the lowest for Gumafulbari block (Rs. 100 lakh). Soil Conservation department has proposed highest amount for Chakchaka block (Rs. 603 lakh) while the lowest for Sarukhetri block (Rs. 21lakh).

Table 26:Block wise Department wise plan (In Rs. Lakh)

Name of the Blocks/Sub Districts	Agriculture	Soil	Irrigation	Total
Barpeta	4055	277	3394	7727
Bhabanipur	360	340	12050	12749
Chakchaka	4127	603	1841	6570
Rupshi	16474	463	360	17297
Sarukhetri	3572	21	360	3954
Pakabetbari	4998	123	1169	6291
Mandia	13599	352	1431	15382
Gumafulbari	4274	340	100	4714
Gabardhana	5808	209	570	6587
Chenga	6793	127	985	7906
Bajali	596	216	21483	22294
Total	64657	3070	43743	111470

5.6 Expected Output and Outcome

As stated earlier the gross irrigated area in the district is 60046 hectare which is around 24 % of 248609 hectare of the gross cropped area. Various departments of the district have proposed to bring additional 177687 hectares of land under irrigated cultivation system. Table below represents the target proposed by various department to bring additional land under irrigated cultivation through PMKSY.

Table 27: Block wise command area under PMKSY components (In Ha)

Name of the Blocks/Sub Districts	AIBP	Har Khet Ko Pani /PDMC	Watershed	Total
Barpeta	1538	11506	1763	14807
Bhabanipur	0	10740	2697	13437
Chakchaka	300	9454	4299	14053
Rupshi	0	22367	3264	25631
Sarukhetri	0	9888	133	10021
Pakabetbari	1200	10200	877	12277
Mandia	0	31277	2511	33788

Gumafulbari	0	9374	2506	11880
Gabardhana	100	8298	1564	9962
Chenga	0	16240	945	17185
Bajali	7468	5786	1393	14647
Total	10606	145130	21951	**177687**

5.7 Conclusion

The following benefits are intended from the District Irrigation Plan.

1. A total of 177687 Hectares of Irrigation potential is proposed to be created under the four components of PMKSY. It would boost up the gross crop intensity significantly as the farmers would be able to go for multiple cropping sequences throughout the year.

2. Under AIBP component of PMKSY, 10606 hectares of land is contemplated to be brought under irrigation with the total amount of Rs. 19770 lakh by Irrigation department.

3. Under the component 'Har Khet Ko Pani' and Per Drop More Crop 145130 hectares of land is contemplated to be brought under irrigation with the total amount of Rs. 88631lakh by Irrigation and Agriculture department.

4. Under Watershed component, 21951 hectares of land is contemplated to be brought under irrigation with the total amount of Rs. 3070 lakh by Soil Conservation department.

Thus, the overall economy of the district would get better and better in the days to come after the contemplated projects get implemented and yield results in terms of enhanced crop production.

ANNEXURES

Annexures I: Area wise Crop wise Irrigation Status

Chapter II. WATER PROFILE OF RUPSHI BLOCK

Area wise Crop wise Irrigation Status of Rupsi Block

Crop type	Kharif (Area in ha.)			Rabi (Area in ha.)			Summer Crop(Area in ha.)			Total (Area in ha.)			Horticulture & Plantation & Plantation Crop Area (ha)		
	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total
A) Cereals	0	6300	6300	190	3021	3211	5470	2713	8183	5660	12034	17694	80	1418	1498
B) Coarse Cereals	0	160	160	6	590	596	0	0	0	6	750	756	0	0	0
C) Pulses	0	1018	1018	0	2665	2665	0	0	0	0	3683	3683	0	0	0
D) Oil Seeds	0	60	60	300	2103	2403	0	0	0	300	2163	2463	0	0	0
E) Fibre	0	1808	1808	0	0	0	0	0	0	0	1808	1808	0	0	0
Total	0	9346	9346	496	8379	8875	5470	2713	8183	5966	20438	26404	80	1418	1498
									G Tot	6046	21856	27902			

Chapter II. WATER PROFILE OF GOBARDHANA BLOCK

Area wise Crop wise Irrigation Status

Crop type	Kharif (Area in ha.)			Rabi (Area in ha.)			Summer Crop(Area in ha.)			Total (Area in ha.)			Horticulture & Plantation & Plantation Crop Area (ha)		
	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total
A) Cereals	2025	3110	5035	1482	240	1722	390	975	1365	3897	4225	8122	175	777	952
B) Coarse Cereals															
C) Pulses	18	244	262	0	0	0	0	0	0	18	244	262			
D) Oil Seeds	0	20	20	85	400	485	0	0	0	85	420	505			
E) Fibre	0	120	120	0	0	0	0	0	0	0	120	120			
Total	2043	3494	5437	1567	640	2207	390	975	1365	4000	5009	9009	175	777	952
									G Total	4175	5786	9961			

Chapter II. WATER PROFILE OF CHAKCHAKA BLOCK

Area wise Crop wise Irrigation Status

Crop type	Kharif (Area in ha.)			Rabi (Area in ha.)			Summer Crop(Area in ha.)			Total (Area in ha.)			Horticulture & Plantation & Plantation Crop Area (ha)		
	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total
A) Cereals	110	7079	7189	1383	425	1808	1545	210	1755	3038	7714	10752	394	525	919

B) Coarse Cereals	0	211	211	105	190	295	0	0	0	105	401	506	0	0	0
C) Pulses	0	92	92	550	198	748	0	0	0	550	290	840	0	0	0
D) Oil Seeds	0	10	10	325	325	650	0	0	0	325	335	660	0	0	0
E) Fibre	0	375	375	0	0	0	0	0	0	0	375	375	0	0	0
Total	110	7767	7877	2363	1138	3501	1545	210	1755	4018	9115	13133	394	525	919
									Total	4412	9640	14052			

Chapter II. WATER PROFILE OF MONDIA BLOCK

Area wise Crop wise Irrigation Status

Crop type	Kharif (Area in ha.)			Rabi (Area in ha.)			Summer Crop(Area in ha.)			Total (Area in ha.)			Horticulture & Plantation Crop Area (ha)		
	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total
A) Cereals	804	3290	4094	315	736	1051	13089	700	13789	14208	4726	18934	0	17467	17467
B) Coarse Cereals	0	650	650	0	750	750	0	0	0	0	1400	1400	0	0	0
C) Pulses	0	265	265	0	14532	14532	0	0	0	0	14797	14797	0	0	0
D) Oil Seeds	0	134	134	0	14475	14475	0	0	0	0	14609	14609	0	0	0
E) Fibre	0	12550	12550	0	0	0	0	0	0	0	12550	12550	0	0	0
F) Horticulture &	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Plantation Crop															
Total	804	16889	17693	315	30493	30808	13089	700	13789	14208	48082	62290	0	1747	17467
									Total	14208	65549	79757			

Chapter II. WATER PROFILE OF PAKABETBARI BLOCK

Area wise Crop wise Irrigation Status

Crop type	Kharif (Area in ha.)			Rabi (Area in ha.)			Summer Crop(Area in ha.)			Total (Area in ha.)			Horticulture & Plantation Crop Area (ha)		
	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total
A) Cereals	0	4718	4718	60	220	280	3691	1015	4706	3751	5953	9704	205	686	891
B) Coarse Cereals	0	216	216	0	212	212	0	0	0	0	428	428			
C) Pulses	0	136	136	0	983	983	0	0	0	0	1119	1119			
D) Oil Seeds	0	123	123	42	2054	2096	0	0	0	42	2177	2219			
E) Fibre	0	682	682	0	0	0	0	0	0	0	682	682			
Total	0	5875	5875	102	3469	3571	3691	1015	4706	3793	10359	14152	205	686	891
									Total	3998	11045	15043			

Chapter II. WATER PROFILE OF SARUKHETRI BLOCK

Area wise Crop wise Irrigation Status

Crop type	Kharif (Area in ha.)			Rabi (Area in ha.)			Summer Crop(Area in ha.)			Total (Area in ha.)			Horticulture & Plantation & Plantation Crop Area (ha)		
	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total
A) Cereals	0	5873	5873	26	155	181	1920	660	2580	1946	6688	8634	540	440	980
B) Coarse Ceraels	0	100	100	0	200	200	0	0	0	0	300	300	0	0	0
C) Pulses	0	155	155	0	500	500	0	0	0	0	655	655	0	0	0
D) Oil Seeds	0	112	112	1215	568	1783	0	0	0	1215	680	1895	0	0	0
E) Fibre	0	374	374	0	0	0	0	0	0	0	374	374	0	0	0
Total	0	6614	6614	1241	1423	2664	1920	660	2580	3161	8697	11858	540	440	980
										3701	9137	12838			

Chapter II. WATER PROFILE OF GUMAFULBARI BLOCK

Area wise Crop wise Irrigation Status															
Crop type	Kharif (Area in ha.)			Rabi (Area in ha.)			Summer Crop(Area in ha.)			Total (Area in ha.)			Horticulture & Plantation & Plantation Crop Area (ha)		
	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total
A) Cereals	628	2099	2727	1542	313	1855	500	1649	2149	2670	4061	6731	365	750	1115
B) Coarse Cereals	0	200	200	15	263	278			0	15	463	478			

C) Pulses	36	369	405	25	732	757			0	61	1101	1162			
D) Oil Seeds	0	138	138	185	1598	1783			0	185	1736	1921			
F. Fibre crops	0	1482	1482			0			0	0	1482	1482			
Total	664	4288	4952	1767	2906	4673	500	1649	2149	2931	8843	11774	365	750	1115
									Total	3296	9593	12889			

Chapter II. WATER PROFILE OF CHENGA BLOCK

Area wise Crop wise Irrigation Status

Crop type	Kharif (Area in ha.)			Rabi (Area in ha.)			Summer Crop (Area in ha.)			Total (Area in ha.)			Horticulture & Plantation Crop Area (ha)		
	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total
A) Cereals	1177	2807	3984	1817	747	2564	1757	1023	2780	4751	4577	9328	1883	810	2693
B) Coarse Cereals	54	235	289	126	269	395	0	0	0	180	504	684			0
C) Pulses	48	126	174	161	1224	1385	42	112	154	251	1462	1713			0
D) Oil Seeds	12	25	37	330	1434	1764	0	0	0	342	1459	1801			0
E) Fibre	0	1163	1163			0			0	0	1163	1163			
Total	1291	4356	5647	2434	3674	6108	1799	1135	2934	5524	9165	14689	1883	810	2693
									Total	7407	9975	17382			

Chapter II. WATER PROFILE OF BARPETA BLOCK

Area wise Crop wise Irrigation Status

Crop type	Kharif (Area in ha.)			Rabi (Area in ha.)			Summer Crop(Area in ha.)			Total (Area in ha.)			Horticulture & Plantation Crop Area (ha)		
	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total
A) Cereals	220	5213	5433	316	282	598	4000	1625	5625	4536	7120	11656	285	3280	3565
B) Coarse Cerals	0	270	270	0	560	560	0	0	0	0	830	830			
C) Pulses	0	268	268	0	3000	3000	0	0	0	0	3268	3268			
D) Oil Seeds	0	242	242	194	3102	3296	0	0	0	194	3344	3538			
E) Fibre	0	1162	1162	0	0	0	0	0	0	0	1162	1162			
Total	220	7155	7375	510	6944	7454	4000	1625	5625	4730	15724	20454	285	3280	3565
									total	5015	19004	24019			

Chapter II. WATER PROFILE OF BAJALI BLOCK

Area wise Crop wise Irrigation Status

Crop type	Kharif (Area in ha.)			Rabi (Area in ha.)			Summer Crop(Area in ha.)			Total (Area in ha.)			Horticulture & Plantation Crop Area (ha)		
	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total
A) Cereals	0	12822	12822	1179	200	1379	0	408	408	1179	13430	14609	1459	922	2381

B) Coarse Cereals	0	105	105	113	250	363	0	0	0	113	355	468			0
C) Pulses	0	146	146	0	971	971	0	359	359	0	1476	1476			0
D) Oil Seeds	0	128	128	0	2226	2226	0	0	0	0	2354	2354			0
E) Fibre	0	390	390	0	0	0	0	0	0	0	390	390			0
Total	0	13591	13591	1292	3647	4939	0	767	767	1292	18005	19297	1459	922	2381
									total	2751	18927	21678			

Chapter II. WATER PROFILE OF BHAWANIPUR BLOCK

Area wise Crop wise Irrigation Status

Crop type	Kharif (Area in ha.)			Rabi (Area in ha.)			Summer Crop(Area in ha.)			Total (Area in ha.)			Horticulture & Plantation Crop Area (ha)		
	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total
A) Cereals	0	13350	13350	0	200	200	4562	450	5012	4562	14000	18562	0	925	925
B) Coarse Cereals	0	312	312	0	250	250	0	0	0	0	562	562	0	0	0
C) Pulses	0	250	250	475	605	1080	0	0	0	475	855	1330	0	0	0
D) Oil Seeds	0	50	50	0	1950	1950	0	0	0	0	2000	2000	0	0	0
E) Fibre	0	1035	1035	0	0	0	0	0	0	0	1035	1035	0	0	0
	0	14997	14997	475	3005	3480	4562	450	5012	5037	18452	23489	0	925	925

									Total	5037	19377	24414			

Annexure II: Production and Productivity of major crops

2.2 Production and Productivity of major crops RUPSHI BLOCK													
Season	Crop Sown	Rainfed				Irrigated				Total			
		Area (Ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)
Kharif Cereals	Paddy	5932	160164	2700	18750	0	0	0	0	5932	160164	2700	18750
	Bao Paddy	368	5888	1600	12000	0	0	0	0	368	5888	1600	12000
Kharif Course Cereals	Maize	160	3840	2400	22500	0	0	0	0	160	3840	2400	22500
Kharif Pulses	Blackgram	624	5616	900	15000	0	0	0	0	624	5616	900	15000
	Greengram	265	1855	700	15000	0	0	0	0	265	1855	700	15000
	Arahar	129	1290	1000	18750	0	0	0	0	129	1290	1000	18750
Kharif Oil seed	Sesamum	60	225	375	11250	0	0	0	0	60	225	375	11250
Kharif Fibre crop	Jute	1808	37064	2050	22500	0	0	0	0	1808	37064	2050	22500
Rabi Pulses	Lentil	2050	24600	1200	10000	0	0	0	0	2050	24600	1200	10000
	Black Gram	165	1650	1000	15000	0	0	0	0	165	1650	1000	15000
	Pea	450	0				0			450	0		
Rabi Cereals	Early Ahu (Transp)	270	5940	2200	0	0	0	0	0	270	5940	2200	0
	Wheat	2751	41265	1500	18750	190	3135	1650	19875	2941	44115	1500	18750
Rabi Course Cereals	Maize	590	14160	2400	22500	6	144	2400	22500	596	14304	2400	22500

Rabi Oil seed	Mustard	2103	16561.125	787.5	7500	300	2475	825	8000	2403	20725.875	862.5	8937.5
Summer Cereal	Summer Paddy	2713	48834	1800	18750	5470	295380	5400	33750	8183	368235	4500	29062.5
Horticulture & Plantation Crops		1418	28360	2000	16875	80	2280	2850	18750	1498	33143.25	2212.5	18750
	Total	**21856**				**6046**				**27902**			
2.2 Production and Productivity of major crops GOBARDHANA BLOCK													
Season	Crop Sown	Rainfed				Irrigated				Total			
		Area (Ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)
Kharif Cereals	Sali Paddy	2850	51300	1800	18750	2025	109350	5400	37500	4875	160650	3600	28125
	Maize	160	1920	1200	22500	0	0	0	0	160	1920	1200	22500
Kharif Pulses	Blackgram	202	1616	800	15000	18	198	1100	18750	220	1814	950	16875
	Greengram	0	0	0	0	0	0	0	0	0	0	0	0
	Arahar	42	252	1000	18750	0	0	0	0	42	252	1000	18750
Kharif Oil seed	Sesamum	20	75	375	11250	0	0	0	0	20	75	375	11250
Kharif Fibre Crop	Jute	120	2160	1800	22500	0	0	0	0	120	2160	1800	22500
Rabi Cereals	Boro Paddy	0	0	0	0	1082	58428	5400	37500	1082	58428	5400	37500
	Early Ahu (Translanting)	0	0	0	0	400	21600	5400	37500	400	21600	5400	37500
	Wheat	40	360	900	18750	0	0	0	0	40	360	900	18750
	Maize	200	2400	1200	22500	0	0	0	0	200	2400	1200	22500

Rabi Oil seed		400	3000	750	7500	85	829	975	11250	485	3829	862	9375
Summer Cereal	Summer Paddy	975	17550	1800	18750	390	21060	5400	37500	1365	38610	3600	28125
Horticulture & Plantation crops		777	15540	2000	11250	175	5320	3040	18750	952	20860	2520	15000
	Total	5786				4175				9961			
2.2 Production and Productivity of major crops CHAKCHAKA BLOCK													
Season	Crop Sown	Rainfed				Irrigated				Total			
		Area (Ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)
Kharif cereals	Sali Paddy	7079	127422	1800		110	5940	5400		7189	0		
	Maize	211	4051.2	1920		0	0			211	4051.2	1920	
Kharif Pulses	Bgram	65	520	800		0	0			65	715	1100	
	G gram	10	90	900		0	0			10	90	900	
	Arahar	17	170	1000		0	0			17	170	1000	
Kharir Oil seed	Sesamum	10	90	900		0	0			10	90	900	
Kharif Fibre	Jute	375	8100	2160		0	0			375	8100	2160	
Rabi Pulses	Lentil	50	400	800		180	0			230	1840	800	
	Pea	23	276	1200		90	1350	1500		113	1525.5	1350	
	Blackgram	85	765	900		160	1600	1000		245	2327.5	950	
	Greengram	20	180	900		90	900	1000		110	1045	950	
	Arahar	20	200	1000		30	240	800		50	500	1000	

Rabi Cereals	Boro Paddy	260	5720	2200		868	46872	5400		1128	42864	3800	
	Early Ahu (Transp)	80	2400	3000		370	19980	5400		450	18900	4200	
	Wheat	85	1530	1800		145	2900	2000		230	20700	9000	
	Maize	190	7600	4000		105	5250	5000		295	13275	4500	
Rabi Oil seeds	Mustard	205	1640	800		205	2050	1000		410	3690	900	
	Nizer	30	150	500		45	315	700		75	450	600	
	Sesamum	65	520	800		40	360	900		105	892.5	850	
	Linseed	25	0			35	0			60	0		
Summer Cereals	Summer Paddy	210	4200	2000		1545	83430	5400		1755	64935	3700	
Horticulture & Plantation Crops		525	0			394	0			919	0		
	Total	9640				4412				14052			
2.2 Production and Productivity of major crops MONDIABLOCK													
Season	Crop Sown	Rainfed				Irrigated				Total			
		Area (Ha)	Production (qtl/ Yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)
Kharif Cereals	Sali Paddy	3290	98700	3000	18750	804	43416	5400	37500	4094	171948	4200	28125
Kharif Course Cereals	Maize	650	7800	1200	22500	0	0	0	0	650	7800	1200	22500
Kharif Pulses	Blackgram	0	0	0	0	0	0	0	0	0	0	0	0
	Greengram	265	2650	1000	15000	0	0	0	0	265	2650	1000	15000
	Arahar	0	0	0	0	0	0	0	0	0	0	0	0

Kharif Oil seed	Sesamum	134	938	700	11250	0	0	0	0	134	938	700	11250
Kharif Fibre Crop	Jute	12550	225900	1800	15000	0	0	0	0	12550	225900	1800	15000
Rabi Cereals	Boro Paddy	0	0	0	0	0	0	0	0	0	0	0	0
	Early Ahu (Transp)	90	1980	2200	0	315	18900	6000	37500	405	16605	4100	37500
	Wheat	646	5814	900	18750	0	0	0	0	646	5814	900	18750
Kharif Course Cereals	Maize	750	9000	1200	22500	0	0	0	0	750	9000	1200	22500
Robi Pulses	Black Gram	5465	65580	1200	15000	0	0	0	0	5465	65580	1200	15000
	Lentil	7385	59080	800	11250	0	0	0	0	7385	59080	800	11250
	Pea	1682	15138	900	12500	0	0	0	0	1682	15138	900	12500
Rabi Oil seed	*Rape & Mustard*	11150	86970	780	7500	0	0	0	0	11150	86970	780	7500
	Groundnut	3325	149625	4500	22500	0	0	0	0	3325	149625	4500	22500
Summer Cereal	Summer Paddy	700	15400	2200	0	13089	981675	7500	37500	13789	668766.5	4850	37500
Horticulture & Plantation Crop	*Vegetables (Rabi+Summer +Kharif)*	14250	2636250	18500	7500	0	0	0	0	14250	2636250	18500	7500
	Potato	2667	226695	8500	60000	0	0	0	0	2667	226695	8500	60000
	Banana	550	4950	900	12500	0	0	0	0	550	4950	900	12500
	Total	65549				14208				79757			
2.2 Production and Productivity of major crops PAKABETBARI BLOCK													
Season	Crop Sown	Rainfed				Irrigated				Total			

		Area (Ha)	Production (qtl/ha)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)
Kharif Cereals	Sali Paddy	4198	75564	1800	18750	0	0	0	0	4198	75564	1800	18750
	Bao paddy	520	9360	1800	16000	0	0			520	9360	1800	16000
Kharif Course cereals	Maize	216	2570.4	1190	22000	0	0			216	2570.4	1190	22000
Kharif Pulses	Blackgram	60	492	820	15000	0	0			60	492	820	15000
	Greengram	12	132	1100	15000	0	0			12	132	1100	15000
	Arahar	9	90	1000	18000	0	0			9	90	1000	18000
	Pulses	55	605	1100		0	0			55	605	1100	
Kharif Oil seed	Sesamum	63	504	800	11250	0	0			63	504	800	11250
	Groundnut	60	2640	4400		0	0			60	2640	4400	
Kharif Fibre Crop	Jute	682	12276	1800	22500	0	0			682	12276	1800	22500
Rabi Pulses		983	9830	1000		0	0			983	9830	1000	
Rabi Cereals	Boro Paddy	200	6000	3000	18750	35	1400	4000	35000	235	9400	4000	26875
	Wheat	20	280	1400	18750	25	450	1800	22500	45	720	1600	20625
Rabi Course cereals	Maize	212	1908	900	18750	0	0	0	0	212	1908	900	18750
Rabi Oil seed	Mustard	2054	15405	750	22500	42	0			2096	15720	750	22500
Summer Cereal	Summer Paddy	1015	18270	1800	18750	3691	191932	5200	37500	4706	164710	3500	28125
Horticulture & Plantation Crops		686	13720	2000	11000	205	6150	3000	18750	891	22275	2500	14875

	Total	11045				3998				15043			
2.2 Production and Productivity of major crops SARUKHETRI BLOCK													
Season	Crop Sown	Rainfed				Irrigated				Total			
		Area (Ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)
Kharif Cereals	Sali Paddy	5338	112098	2100	18750		0			5338	112098	2100	18750
	Bao Paddy	535	8560	1600			0			535	8560	1600	
Kharif Course cereala	Maize	100	1200	1200	22500	0	0			100	1200	1200	22500
Kharif Pulses	Blackgram	125	1000	800	15000		0			125	1000	800	15000
	Greengram	22	132	600	15000		0			22	132	600	15000
	Arahar	8	80	1000	18750		0			8	80	1000	18750
Kharif Oil seed	Sesamum	112	896	800	11250	0	0			112	896	800	11250
Kharif Fibre Crop	Jute	374	6732	1800	22500	0	0			374	6732	1800	22500
Rabi Cereals	Boro Paddy	85	2550	3000	18750		0			85	2550	3000	18750
	Early Ahu (Tranp)	70	1540	2200			0			70	1540	2200	
	Wheat	0	0	0	0	26	364	1400	18750	26	364	1400	18750
Rabi Course cereals	Maize	200	8000	4000	22500	0	0	0	0	200	8000	4000	22500
Rabi pulses		500	5000	1000		0	0			500	5000	1000	
Rabi Oil seed	Mustard	568	4260	750	7500	1215	10935	900	11250	1783	14709.75	825	9375

Summer Cereal	Summer Paddy	660	11880	1800	18750	1920	103680	5400	37500	2580	92880	3600	28125
Horticulture & Plantation Crop		440	8800	2000	11250	540	15390	2850	18750	980	23765	2425	15000
	Total	9137				3701				12838			
2.2 Production and Productivity of major crops GUMAFULBARI BLOCK													
Season	Crop Sown	Rainfed				Irrigated				Total			
		Area (Ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)
Kharif ereals	Sali Paddy	2099	41980	2000		628	33912	5400		2727	2000	3700	
Kharif Course cereals	Maize	200	8000	4000		0	0			200	8000	4000	
Kharif Pulses	Blackgram	284	2840	1000		18	216	1200		302	3322	1100	
	Greengram	50	500	1000		18	216	1200		68	748	1100	
	Arahar	35	315	900		0	0			35	900	700	
Kharif Oil seed	Sesamum	138	1104	800		0	0			138	1104	800	
Kharif Fibre Crop	Jute	1482	29640	2000		0	0			1482	29640	2000	
Rabi Cereals	Boro Paddy	0	0			1202	64908	5400		1202	64908	5400	
	Early Ahu (Translanting)	200	4400	2200		330	17820	5400		530	20140	3800	
	Wheat	113	2034	1800		10	200	2000		123	2337	1900	

Rabi course cereals	Maize	263	10520	4000		15	750	5000		278	12510	4500	
Rabi Oil seed		1598	14382	900		185	0		1100	1783	17830	1000	
Rabi Pulses		732	8052	1100		25	300	1200		757	8705.5	1150	
Summer Cereal	Summer Paddy	1649	36278	2200		500	27000	5400		2149	81662	3800	
Horticulture & Plantation	Hort & plantation crops	750	0			365	0			1115	0		
	Total	9593				3296				12889			

2.2 Production and Productivity of major crops of CHENGA BLOCK

Season	**Crop Sown**	**Rainfed**				**Irrigated**				**Total**			
		Area (Ha)	**Production (qtl/ yr)**	**Productivity (kg/ha)**	**Cost of cultivation (Rs/ha)**	**Area (ha)**	**Production (qtl/yr)**	**Productivity (kg/ha)**	**Cost of cultivation (Rs/ha)**	**Area (ha)**	**Production (qtl/yr)**	**Productivity (kg/ha)**	**Cost of cultivation (Rs/ha)**
Kharif Cereals	Sali Paddy	2807	81403	2900	25937.5	1177	67089	5700	46125	3984	171312	4300	36031
Kharif Course cereals	Maize	235	2820	1200	22500	54	0	0	0	289	3468	1200	22500
Kharif Pulses	Blackgram	67	536	800	15000	22	242	1100	18750	89	845.5	950	16875
	Greengram	51	408	800	15000	23	253	1100	18750	74	703	950	16875
	Arahar	8	80	1000	0	3	0	0	0	11	110	1000	0
Kharif Oil seed	Sesamum	16	128	800	11250	7	0	0	0	23	184	800	11250
	Groundnut	9	0			5	0			14	0		

Kharif Fibre Crop	Jute	1163	27912	2400	36250	0	0	0	0	1163	27912	2400	36250
Rabi Cereals	Boro paddy	590	12390	2100		1791	94923	5300		2381	88097	3700	
	Early Ahu	100	2200	2200			0	5400		100	3800	3800	
	Wheat	57	912	1600		26	468	1800		83	1411	1700	
Rabi Course cereals	Maize	269	10760	4000		126	6300	5000		395	17775	4500	
Rabi Pulses	Black Gram	517	4653	900	30000	36	432	1200	35000	553	5806.5	1050	32500
	Green Gram	128	1024	800	30000	45	495	1100	35000	173	1643.5	950	32500
	Lentil	312	3432	1100		41	492	1200		353	4059.5	1150	
	Pea	131	1441	1100		15	195	1300		146	1752	1200	
	Khesari Dal	44	0				0			44	0		
	Gram	92	0			24	0			116	0		
Rabi Oil seed	Rape & Mustard	1280	8640	675	11625	310	3371.25	1087.5	20625	1590	14007.9	881	16125
	Groudnut	8	0			7	0			15	0		
	Nizer	15	82.5	550		4	28	700		19	118.75	625	
	Linseed	9	72	800		5	45	900		14	119	850	
	Sunhemp	12	0			4	0			16	0		
	Sesamum	110	880	800		0	0			110	880	800	
Summer Cereal	Summer Paddy	1023	16112.25	1575	15000	1757	102784.5	5850	46250	2780	103193.6	3712	30625
Summer Pulse	Blackgram	69	621	900		27	297	1100		96	960	1000	
	Greengram	43	387	900		15	165	1100		58	580	1000	
Horticulture & Plantation Crops		288	5760	2000	11250	470	14288	3040	18750	758	19101.6	2520	15000
	Onion	44	1980	4500	41250	75	5625	7500	63750	119	7140	6000	52500
	Vegetables	225	6075	2700	35750	946	0	0	0	1171	31617	2700	35750
	Spices	105	7341.6	6992	55300	174	0	0	0	279	19507.68	6992	55300
	Plantation	148	26640	18000	107000	218	50140	23000	130000	366	75030	20500	118500

Total		9975				7407				17382			
2.2 Production and Productivity of major crops of BARPETA BLOCK													
Season	Crop Sown	Rainfed				Irrigated				Total			
		Area (Ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (Ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)
Kharif Cereals	Sali Paddy	4785	86130	1800	18750	220	11880	5400	37500	5005	98010	3600	28125
	Bao	428	7704	1800	16000		0			428	7704	1800	16000
Kharif Course cereals	Maize	270	3240	1200	22500	0	0	0	0	270	3240	1200	22500
Kharif Pulses	Blackgram	215	1720	800	15000	0	0	0	0	215	1720	800	15000
	Greengram	18	198	1100	15000	0	0		0	18	198	1100	15000
	Arahar	35	350	1000	18750	0	0	0	0	35	350	1000	18750
Kharif Oil seed	Sesamum	130	1040	800	15000		0			130	1040	800	11250
	Ground nut	112	3920	3500	37500		0			112	3920	3500	37500
Kharif Fibre Crop	Jute	1162	20916	1800	22500		0			1162	20916	1800	22500
Rabi/Cereals	Boro Paddy	0	0	0	0	140	7560	5400	37500	140	7560	5400	37500
	Early Ahu (Transp)	210	4410	2100	0	150	8100	5400	37500	360	12510	3750	37500
	Wheat	72	648	900	18750	26	0	0	0	98	648	900	18750
Rabi Course cereals	Maize	560	6720	1200	22500	0	0	0	0	560	6720	1200	22500
Rabi pulses		3000	30000	1000		0	0			3000	30000	1100	
Rabi Oil seed	*Mustard*	3102	23265	750	11500	194	2134	1100	22500	3296	25399	925	17112

Summer Cereals	Summer Paddy	1625	29250	1800	18750	4000	136000	3400	37500	5625	165250	2600	28125
Horticulture & Plantation Crop		3280	59040	1800	11250	285	8550	3000	18750	3565	67590	2400	15000
	Total	19004				5015				24019			
2.2 Production and Productivity of major crops BAJALI BLOCK													
Season	Crop Sown	Rainfed				Irrigated				Total			
		Area (Ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)
Kharif Cereals	Paddy	12822	304137.84	2372	18000	0	0	0		12822	304137.84	2372	18000
Kharif Course cereals	Maize	105	3223.5	3070	7500	0	0			105	3223.5	3070	7500
Kharif Pulses	Blackgram		0			0	0			0	0		
	Greengram		0			0	0			0	0		
	Arahar	146	1460	1000	2500	0	0			146	1460	1000	2500
Kharfi Oil seed	Sesamum	128	1024	800	3000	0	0			128	1024	800	3000
Kharif Fibre Crop	Jute	390	8307	2130	30000	0	0			390	8307	2130	30000
Rabi Cereals		200	4400	2200		1179	63666	5400	0	1379	52402	3800	
Rabi Course cereals	Maize	250	7675	3070		113	3469.1	3070	7500	363	11144.1	3070	7500
Rabi Pulses	Lentil	391	3225.75	825	2500	0	0			391	3225.75	825	2500

	Pea	580	4785	825	2500	0	0			580	4785	825	2500
Rabi Oil seed		2226	13801.2	620	5500	0	0			2226	13801.2	620	5500
Summer Cereal	Summer Paddy	408	8976	2200		0	0	0	0	408	12007.44	2943	21000
Summer Pulses	Black Gram	271	2235.75	825	2500	0	0			271	2235.75	825	2500
	Green Gram	88	726	825	2500	0	0			88	726	825	2500
Horticulture & Plantation Crop	Vegetables (Kharif)		0			300	15771	5257	50856	300	15771	5257	50856
	Vegetables (Rabi)	300	4200	1400		1159	175078.54	15106	45500	1459	220396.54	15106	45500
	Banana	572	82225	14375	90800	0	0			572	82225	14375	90800
	Papaya	20	3333.8	16669	98000	0	0			20	3333.8	16669	98000
	Assam Lemon	30	6750	22500	22500	0	0			30	6750	22500	22500
Total		18927				2751				21678			

2.2 Production and Productivity of major crops BHAWANIPUR BLOCK

Season	Crop Sown	Rainfed				Irrigated				Total			
		Area (Ha)	Production (qtl/ha)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)	Area (ha)	Production (qtl/yr)	Productivity (kg/ha)	Cost of cultivation (Rs/ha)
Kharif Cereals	Sali Paddy	13350	307050	2300	18750	0	0	0	0	13350	307050	2300	18750
Kharif Course cereals	Maize	312	9846.72	3156	22000	0	0	0	0	312	9846.72	3156	22000
Kharif Pulses	Blackgram	200	1800	900	0	0	0	0	0	200	1800	900	0
	Greengram	0	0	0	0	0	0	0	0	0	0	0	0
	Arahar	50	500	1000	0	0	0	0	0	50	500	1000	0

Kharif Oil seed	Sesamum	50	350	700	0	0	0	0	0	50	350	700	0
Kharif Fibre Crop	Jute	1035	24840	2400	22500	0	0	0	0	1035	24840	2400	22500
Rabi Cereals	Boro Paddy	0	0	0	0	0	0	0	0	0	0	0	0
	Early Ahu (Transp)	200	4400	2200	0	0	0	0	0	200	4400	2200	0
	Wheat	0	0	0	0	0	0	0	0	0	0	0	0
Rabi Course cereals	Maize	250	10000	4000	0	0	0	0	0	250	10000	4000	0
Rabi Oil seed	Mustard	1950	14625	750	7500	0	0	0	0	1950	14625	750	7500
Rabi Pulses	Lentil	275	2002	728	7500	0	0	0	0	275	2002	728	7500
	Pea	330	3960	1200		475	28500	6000		805	1200		
Summer Cereal	Summer Paddy	450	9900	2200	0	4562	246348	5400	22485	5012	190456	3800	22485
Horticulture & Plantation crops		925	0	0	0	0	0	0	0	925	0	0	0
	Total	19377				5037				24414			

Annexure III : Existing types of Irrigation

3.4 Existing Type of Irrigation of Rupshi Block																		
Particulars	Department	Surface Irrigation (1)					Ground Water (2)						Other sources including Tradirional WHS (3)	Treated effuent discharge from STP	Water extraction devices/Lift			Total	
		Canal Based		Tanks/Ponds/Reservoirs			Tube well		Open wells		Bore well				Electricity Pump (4)	Diesel Pump (5)	Others (6)	Irrigation Sources (1+2+3)	Water Extracting units (4+5+6)
		Govt. Canal	Community/ Pvt. Canal	Community Ponds including small	Individual / Pvt. Pond	Govt. Reservoir/ Dams	Govt.	Pvt.	Cmmunity/ Govt	Pvt.	Govt.	Pvt.							
No. of Project	Agri	0	0	0	0	0	0	0	0	0	0	542	0	0	600	950	0	542	1550
	Irri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	542	0	0	600	950	0	542	1550
Command Area(ha)	Agri	0	0	0	0	0	0	0	0	0	0	1084	0	0	1200	1900	0	1084	3100
	Irri	0	0	0	0	0	0	0	0	0	0		0	0					
	Total	0	0	0	0	0	0	0	0	0	0	1084	0	0	1200	1900	0	1084	3100
3.4 Existing Type of Irrigation of Gobardhana Block																			
Particulars	Department	Surface Irrigation (1)					Ground Water (2)						Other sources including Tradirional WHS (3)	Treated effuent discharge from STP	Water extraction devices/Lift			Total	
		Canal Based		Tanks/Ponds/Reservoirs			Tube well		Open wells		Bore well				Electricity Pump (4)	Diesel Pump (5)	Others (6)	Irrigation Sources (1+2+3)	Water Extracting units (4+5+6)
		Govt. Canal	Community/ Pvt. Canal	Community Ponds including small	Individual / Pvt. Pond	Govt. Reservoir/ Dams	Govt.	Pvt.	Cmmunity/ Govt	Pvt.	Govt.	Pvt.							
	Agri	0	0	0	0	0	1127	1000	0	0	0	0	0	0	125	76	0	2127	201

No. of Project	Irri	1	0	0	0	0			0	0	0	0	0	0	0	0	0	1	0
	Total	1	0	0	0	0	1127	1000	0	0	0	0	0	0	125	76	0	2128	201
Command Area(ha)	Agri	0	0	0	0	0	2254	200	0	0	0	0	0	0	250	152	0	2454	402
	Irri	160	0	0	0	0			0	0	0	0	0	0	0	0	0	160	0
	Total	160	0	0	0	0	2254	200	0	0	0	0	0	0	250	152	0	2614	402

3.4 Existing Type of Irrigation of Chakchaka Block

Particulars	Department	Surface Irrigation (1)					Ground Water (2)						Other sources including Traditional WHS (3)	Treated effluent discharge from STP	Water extraction devices/Lift			Total	
		Canal Based		Tanks/Ponds/Reservoirs			Tube well		Open wells		Bore well				Electricity Pump (4)	Diesel Pump (5)	Others (6)	Irrigation Sources (1+2+3)	Water Extracting units (4+5+6)
		Govt. Canal	Community/ Pvt. Canal	Community Ponds including small	Individual / Pvt. Pond	Govt. Reservoir/ Dams	Govt.	Pvt.	Cmmunity/ Govt	Pvt.	Govt.	Pvt.							
No. of Project	Agri		1	0	155	0	267	75	0	0	0	0	0	0	100	221	0	498	321
	Irri	6		0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
	Total	6	1	0	155	0	267	75	0	0	0	0	0	0	100	221	0	504	321
Command Area(ha)	Agri		300	0	310	0	534	10	0	0	0	0	0	0	200	442	0	1154	642
	Irri	1807							0	0	0	0	0	0				1807	0
	Total	1807	300	0	310	0	534	10	0	0	0	0	0	0	200	442	0	2961	642

3.4 Existing Type of Irrigation of Mondia Block

Particulars	Department	Surface Irrigation (1)		Ground Water (2)			Other sources includ	Treated effluent	Water extraction devices/Lift			Total	
		Canal Based	Tanks/Ponds/Reservoirs	Tube well	Open wells	Bore well			Electr	Diesel		Irrigation	Water Extra

		Govt. Canal	Community/ Pvt. Canal	Community Ponds including small	Individual / Pvt. Pond	Govt. Reservoir/ Dams	Govt.	Pvt.	Cmmunity/ Govt	Pvt.	Govt.	Pvt.	ing Tradirional WHS (3)	discharge from STP	icity Pump (4)	Pump (5)	Others (6)	Sources (1+2+3)	cting units (4+5+6)
No. of Project	Agri	0	0	0	0	0	2889	0	0	0	0	0	0	0	656	760	0	3789	1416
	Irri	5	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	8	3
	Total	5	0	0	0	0	2892	0	0	0	0	0	0	0	659	760	0	3797	1419
Command Area(ha)	Agri	0	0	0	0	0	5784	0	0	0	0	0	0	0	1240	1520	0	7584	2760
	Irri	992	0	0	0	0	78	0	0	0	0	0	0	0	78		0	1070	78
	Total	992	0	0	0	0	5862	0	0	0	0	0	0	0	1318	1520	0	8654	2838

3.4 Existing Type of Irrigation of Pakabetbari Block

Particulars	Department	Surface Irrigation (1)					Ground Water (2)						Other sources including Tradirional WHS (3)	Treated effuent discharge from STP	Water extraction devices/Lift			Total	
		Canal Based		Tanks/Ponds/Reservoirs			Tube well		Open wells		Bore well				Electricity Pump (4)	Diesel Pump (5)	Others (6)	Irrigation Sources (1+2+3)	Water Extracting units (4+5+6)
		Govt. Canal	Community/ Pvt. Canal	Community Ponds including small	Individual / Pvt. Pond	Govt. Reservoir/ Dams	Govt.	Pvt.	Cmmunity/ Govt	Pvt.	Govt.	Pvt.							
No. of Project	Agri	0	0	0	0	0	0	0	0	0	2760	180	0	0	310	975	55	2940	1340
	Irri	2	0	0	0	0	0	0	0	0	3		0	0	3	0	0	5	3
	Total	2	0	0	0	0	0	0	0	0	2763	180	0	0	313	975	55	2945	1343
Command Area(ha)	Agri		0	0	0	0	0	0	0	0	4015	495	0	0	455	1755	110	4510	2320
	Irri	1400	0	0	0	0	0	0	0	0	90		0	0	90	0	0	1490	90
	Total	1400	0	0	0	0	0	0	0	0	4105	495	0	0	545	1755	110	6000	2410

3.4 Existing Type of Irrigation of Sarukhetri Block																			
Particulars	Department	Surface Irrigation (1)					Ground Water (2)						Other sources including Traditional WHS (3)	Treated effluent discharge from STP	Water extraction devices/Lift			Total	
		Canal Based		Tanks/Ponds/Reservoirs			Tube well		Open wells		Bore well				Electricity Pump (4)	Diesel Pump (5)	Others (6)	Irrigation Sources (1+2+3)	Water Extracting units (4+5+6)
		Govt. Canal	Community/ Pvt. Canal	Community Ponds including small	Individual / Pvt. Pond	Govt. Reservoir/ Dams	Govt.	Pvt.	Cmmunity/ Govt	Pvt.	Govt.	Pvt.							
No. of Project	Agri	0	0	0	0	0	0	0	0	0	0	0	0	0	613	916	0		1529
	Irri	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	3	3
	Total	0	0	0	0	0	0	0	0	0	3	0	0	0	616	916	0	3	1532
Command Area(ha)	Agri	0	0	0	0	0	0	0	0	0	90	0	0	0	1226	1832	0		3058
	Irri	0	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0	90	90
	Total	0	0	0	0	0	0	0	0	0	90	0	0	0	1316	1832	0	90	3148
3.4 Existing Type of Irrigation of Gumafulbari Block																			
Particulars	Department	Surface Irrigation (1)					Ground Water (2)						Other sources including Traditional WHS (3)	Treated effluent discharge from STP	Water extraction devices/Lift			Total	
		Canal Based		Tanks/Ponds/Reservoirs			Tube well		Open wells		Bore well				Electricity Pump (4)	Diesel Pump (5)	Others (6)	Irrigation Sources (1+2+3)	Water Extracting units (4+5+6)
		Govt. Canal	Community/ Pvt. Canal	Community Ponds including small	Individual / Pvt. Pond	Govt. Reservoir/ Dams	Govt.	Pvt.	Cmmunity/ Govt	Pvt.	Govt.	Pvt.							
No. of Project	Agri	0	0	0	0	0	3701	2804	0	0	0	0	0	0	90	65	0	6505	155
	Irri	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Total	1	0	0	0	0	3701	2804	0	0	0	0	0	0	90	65	0	6506	155

Command Area(ha)	Agri	0	0	0	0	0	2502	2108	0	0	0	0	0	0	160	130	0	4610	290
	Irri	120	0	0	0	0			0	0	0	0	0	0	0	0	0	120	0
	Total	120	0	0	0	0	2502	2108	0	0	0	0	0	0	160	130	0	4730	290

3.4 Existing Type of Irrigation of Chenga Block

Particulars	Department	Surface Irrigation (1)					Ground Water (2)						Other sources including Tradirional WHS (3)	Treated effuent discharge from STP	Water extraction devices/Lift			Total	
		Canal Based		Tanks/Ponds/Reservoirs			Tube well		Open wells		Bore well				Electricity Pump (4)	Diesel Pump (5)	Others (6)	Irrigation Sources (1+2+3)	Water Extracting units (4+5+6)
		Govt. Canal	Community/ Pvt. Canal	Community Ponds including small	Individual / Pvt. Pond	Govt. Reservoir/ Dams	Govt.	Pvt.	Cmmunity/ Govt	Pvt.	Govt.	Pvt.							
No. of Project	Agri	0	0	0	0	0	0	532	0	0	579	272	0	0	350	450	0	1383	800
	Irri	0	0	0	0	0	0		0	0	11		0	0	11	0	0	11	11
	Total	0	0	0	0	0	0	532	0	0	590	272	0	0	361	450	0	1394	811
Command Area(ha)	Agri	0	0	0	0	0	0	550	0	0	700	300	0	0	402	870	0	1550	1272
	Irri	0	0	0	0	0	0		0	0	330	0	0	0	380		0	330	380
	Total	0	0	0	0	0	0	550	0	0	1030	300	0	0	782	870	0	1880	1652

3.4 Existing Type of Irrigation of Barpeta Block

Particulars	Department	Surface Irrigation (1)		Ground Water (2)			Other sources includ	Treated effuent	Water extraction devices/Lift			Total	
		Canal Based	Tanks/Ponds/Reservoirs	Tube well	Open wells	Bore well			Electr	Diesel		Irrigation	Water Extra

		Govt. Canal	Community/ Pvt. Canal	Community Ponds including small	Individual / Pvt. Pond	Govt. Reservoir/ Dams	Govt.	Pvt.	Cmmunity/ Govt	Pvt.	Govt.	Pvt.	ing Tradirional WHS (3)	discharge from STP	icity Pump (4)	Pump (5)	Others (6)	Sources (1+2+3)	cting units (4+5+6)
No. of Project	Agri	0	0	0	0	0	2603	850	0	0	516	108	0	0	350	481	53	4077	884
	Irri	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
	Total	4	0	0	0	0	2603	850	0	0	516	108	0	0	350	481	53	4081	884
Command Area(ha)	Agri	0	0	0	0	0	950	120	0	0	1032	216	0	0	390	962	53	2318	1405
	Irri	1538	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1538	0
	Total	1538	0	0	0	0	950	120	0	0	1032	216	0	0	390	962	53	3856	1405

3.4 Existing Type of Irrigation of Bajali Block

Particulars	Department	Surface Irrigation (1)					Ground Water (2)						Other sources including Tradirional WHS (3)	Treated effuent discharge from STP	Water extraction devices/Lift			Total	
		Canal Based		Tanks/Ponds/Reservoirs			Tube well		Open wells		Bore well				Electricity Pump (4)	Diesel Pump (5)	Others (6)	Irrigation Sources (1+2+3)	Water Extracting units (4+5+6)
		Govt. Canal	Community/ Pvt. Canal	Community Ponds including small	Individual / Pvt. Pond	Govt. Reservoir/ Dams	Govt.	Pvt.	Cmmunity/ Govt	Pvt.	Govt.	Pvt.							
No. of Project	Agri	0	0	0	0	0	0	0	0	0	0	1782	0	0	213	222	0	1782	435
	Irri	30	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	33	3
	Total	30	0	0	0	0	3	0	0	0	0	1782	0	0	216	222	0	1815	438
Command Area(ha)	Agri	0	0	0	0	0		0	0	0	0	1782	0	0	213	222	0	1782	435
	Irri	10767	0	0	0	0	90	0	0	0	0		0	0	90		0	10857	90

	Total	10767	0	0	0	0	90	0	0	0	0	1782	0	0	303	222	0	12639	525

3.4 Existing Type of Irrigation of Bhabanipur Block

Particulars	Department	Surface Irrigation (1)					Ground Water (2)						Other sources including Traditional WHS (3)	Treated effluent discharge from STP	Water extraction devices/Lift			Total	
		Canal Based		Tanks/Ponds/Reservoirs			Tube well		Open wells		Bore well				Electricity Pump (4)	Diesel Pump (5)	Others (6)	Irrigation Sources (1+2+3)	Water Extracting units (4+5+6)
		Govt. Canal	Community/ Pvt. Canal	Community Ponds including small	Individual / Pvt. Pond	Govt. Reservoir/ Dams	Govt.	Pvt.	Cmmunity/ Govt	Pvt.	Govt.	Pvt.							
No. of Project	Agri	0	0	0	0	0	2750	350	0	0	0	0	0	0	350	50	0	3100	400
	Irri	14	0	0	0	0	2	0	0	0	0	0	0	0	54		0	16	54
	Total	14	0	0	0	0	2752	350	0	0	0	0	0	0	404	50	0	3116	454
Command Area(ha)	Agri	0	0	0	0	0	2750	350	0	0	0	0	0	0	350	50	0	3100	400
	Irri	8277	0	0	0	0	70	0	0	0	0	0	0	0	0	0	0	8347	0
	Total	8277	0	0	0	0	2820	350	0	0	0	0	0	0	350	50	0	11447	400

Annexure IV : Department wise strategic action plan

1. Agriculture Department

Blockwise Strategic Action Plan for irrigation in Barpeta District under PMKSY

Period: 5 Years

Sl. No.	Name of the Blocks/Sub Districts	Concerned Ministry/ Department	Component	Activity	Total Number as per Block Plan	Command Area/Irrigation Potential (Ha)	Unit cost in Rs	Period of Implementation (5 years)	Estimated Cost (Rs. in Lakh)
1	2	3	4	5	6	7	8	9	10
1	Bajali	MoA&FW	HKKP	Diesel STW	3293	0	47976.00		0.00
			HKKP	El STW	1736	0	26000.00		0.00
			HKKP	LLP	180	0	45000.00		0.00
			HKKP	Field Channel	45km	0	100000.00		0.00
			HKKP	WHTank	17 nos	0	100000.00		0.00
			HKKP	CheckDam/RRWB	19 nos	0	100000.00		0.00
		Total for Block				**0**			**0.00**
2	Bhabanipur	MoA&FW	HKKP	Diesel STW	2950	0	47976.00		0.00
			HKKP	El STW	650	0	26000.00		0.00
			HKKP	LLP	330	0	45000.00		0.00
			HKKP	Field Channel	41km		100000.00		0.00
			HKKP	WHTank	25	0	100000.00		0.00

			HKKP	CheckDam/RRWB	20	0	100000.00		0.00
		Total for Block				**0**			**0.00**
3	Chakchaka	MoA&FW	HKKP	Diesel STW	2470	4940	47976.00		2370.01
			HKKP	El STW	2834	2834	26000.00		736.84
			HKKP	LLP	0	0	45000.00		0.00
			HKKP	Field Channel	50km	0	100000.00		0.00
			HKKP	WHTank	52	520	100000.00		520.00
			HKKP	CheckDam/RRWB	5	500	100000.00		500.00
		Total for Block				**8794**			**4126.85**
4	Rupshi	MoA&FW	HKKP	Diesel STW	1460	2920	47976.00		1400.90
			HKKP	El STW	5667	5667	26000.00		1473.42
			HKKP	Field Channel	158km	0	100000.00		0.00
			HKKP	WHTank	136	13600	100000.00		13600.00
		Total for Block				**22187**			**16474.32**
5	Sarukhetri	MoA&FW	HKKP	Diesel STW	2095	4190	47976.00		2010.19
			HKKP	El STW	4848	4848	26000.00		1260.48
			HKKP	LLP	335	670	45000.00		301.50
		Total for Block				**9708**			**3572.17**
6	Pakabetbari	MoA&FW	HKKP	Diesel STW	4172	8344	47976.00		4003.12
			HKKP	LLP	328	656	45000.00		295.20
			HKKP	CheckDam/RRWB	7	700	100000.00		700.00

		Total for Block				**9700**			**4998.32**
7	Gumafulbari	MoA&FW	HKKP	Diesel STW	1500	3000	47976.00		1439.28
			HKKP	El STW	1582	3164	26000.00		822.64
			HKKP	LLP	980	1960	45000.00		882.00
			HKKP	Field Channel	3KM	30	100000.00		30.00
			HKKP	CheckDam/RRWB	11	1100	100000.00		1100.00
		Total for Block				**9254**			**4273.92**
8	Mandia	MoA&FW	HKKP	Diesel STW	0	0	47976.00		0.00
				Field Channel	4kM	0	100000.00		0.00
			HKKP	LLP (RLI)	15111	30222	45000.00		13599.90
		Total for Block				**30222**			**13599.90**
9	Gobardhona	MoA&FW	HKKP	Diesel STW	0	0	47976.00		0.00
			HKKP	LLP	2009	4018	45000.00		1808.10
			HKKP	Field Channel	50	0	100000.00		0.00
			HKKP	WHTank	200	2000	100000.00		2000.00
			HKKP	CheckDam/RRWB	20	2000	100000.00		2000.00
		Total for Block				**8018**			**5808.10**
10	Chenga	MoA&FW	HKKP	Diesel STW	5285	10570	47976.00		5071.06
			HKKP	El STW	3860	3860	26000.00		1003.60
			HKKP	LLP	665	1330	45000.00		598.50
			HKKP	Field Channel	12	120	100000.00		120.00

		Total for Block				**15880**			**6793.16**
11	**Barpeta**	MoA&FW	HKKP	Diesel STW	1858	3716	47976.00		1782.79
			HKKP	El STW	2080	2080	26000.00		540.80
			HKKP	LLP	605	1210	45000.00		544.50
			HKKP	Field Channel	153	1530	100000.00		1530.00
			HKKP	WHTank	144	1440	100000.00		1440.00
	Total for Block					**9976**			**4055.30**
	Total for Barpeta District for FYP					**123739**			**63702.0486**

2.Soil Conservation Department

Sl. No.	Name of the Block	Concerned Ministry/ Department	Component	Activities	Total No./ Capacity (Cum)	Command Area/ Irrigation Potential (Ha)	Period of Implementation (5 yr)	Estimated Cost (in Rs.)
1	Barpeta	DoLR-MoRD	PMKSY	Soil Conservation Activities	108	1,767.70	1st/2nd /3rd/4th yr.	26825000.00
2	Bhabanipur	DoLR-MoRD	PMKSY		143	3,927.30	1st/2nd /3rd/4th yr.	56141850.00
3	Chakchaka	DoLR-MoRD	PMKSY		222	4,298.53	1st/2nd /3rd/4th yr.	60224000.00
4	Rupshi	DoLR-MoRD	PMKSY		172	3,063.70	1st/2nd /3rd/4th yr.	44980800.00
5	Sarukhetri	DoLR-MoRD	PMKSY		14	132.50	1st/2nd /3rd/4th yr.	2134000.00
6	Paka Betbar	DoLR-MoRD	PMKSY		59	1,508.70	1st/2nd /3rd/4th yr.	12345000.00
7	Gumafulbari	DoLR-MoRD	PMKSY		92	2,438.10	1st/2nd /3rd/4th yr.	17390000.00
8	Mandia	DoLR-MoRD	PMKSY		156	2,998.98	1st/2nd /3rd/4th yr.	35141540.00
9	Gobordhana	DoLR-MoRD	PMKSY		47	1,568.00	1st/2nd /3rd/4th yr.	20860300.00
10	Chenga	DoLR-MoRD	PMKSY		20	945.00	1st/2nd /3rd/4th yr.	12093600.00
11	Bajali	DoLR-MoRD	PMKSY		114	4,685.91	1st/2nd /3rd/4th yr.	56756600.00
Total for Barpeta District					**1,147**	**27,334.42**		**344892690.00**

3. Irrigation Department

SI. No.	Name of Blocks/ Sub District	Concerned Ministry/Department	Component	Activity	Total No./ Capacity (Cum)	Command Area/ Irrigation Potential (Ha)	Period of Implementation (5/7 years)	Estimated Cost (In Lacs)
1	**Chenga**	MoWR	AIBP	Major Irrigation				
2		MoWR		Medium Irrigation				
3		MoWR		Surface Minor Irrigation				
4		MoWR	Har Khet Ko Pani	Lift Irrigation	1	120 .	5	290
5		MoWR		Ground Water Development	12	360	5	695
6		MoWR		RRR of Water bodies				
7		MoWR			Construction of Field Channels			
7.1		MoWR		Lined Field Channels				
7.2		MoWR		Unlined Field Channels				
8		MoWR		Micro irrigation				
			Component	Activity				

SI. No.	Name of Blocks/ Sub District	Concerned Ministry/Department			Total No./ Capacity (Cum)	Command Area/ Irrigation Potential (Ha)	Period of Implementation (5/7 years)	Estimated Cost (In Lacs)
1	**Paka Betbari**	MoWR	AIBP	Major Irrigation				
2		MoWR		Medium Irrigation				
3		MoWR		Surface Minor Irrigation	1	1200	5	444.45
4		MoWR	Har Khet Ko Pani	Lift Irrigation	1	200	5	125
5		MoWR		Ground Water Development	10	300	5	600
6		MoWR		RRR of Water bodies				
7		MoWR			Construction of Field Channels			
7.1		MoWR		Lined Field Channels				
7.2		MoWR		Unlined Field Channels				
8		MoWR		Micro irrigation				
SI. No.	Name of Blocks/ Sub District	Concerned Ministry/Department	Component	Activity	Total No./ Capacity (Cum)	Command Area/ Irrigation Potential (Ha)	Period of Implementation (5/7 years)	Estimated Cost (In Lacs)

1	**Chakchaka**	MoWR	AIBP	Major Irrigation				
2		MoWR		Medium Irrigation				
3		MoWR		Surface Minor Irrigation	1	300	5	371
4		MoWR	Har Khet Ko Pani	Lift Irrigation	1	300	5	750
5		MoWR		Ground Water Development	12	360	5	720
6		MoWR		RRR of Water bodies				
7		MoWR			Construction of Field Channels			
7.1		MoWR		Lined Field Channels				
7.2		MoWR		Unlined Field Channels				
8		MoWR		Micro irrigation				
SI. No.	Name of Blocks/ Sub District	Concerned Ministry/Department	Component	Activity	Total No./ Capacity (Cum)	Command Area/ Irrigation Potential (Ha)	Period of Implementation (5/7 years)	Estimated Cost (In Lacs)
1	**Mandia**	MoWR	AIBP	Major Irrigation				
2		MoWR		Medium Irrigation				

3		MoWR		Surface Minor Irrigation				
4		MoWR	Har Khet Ko Pani	Lift Irrigation	4	995	5	1310.76
5		MoWR		Ground Water Development	2	60	5	120
6		MoWR		RRR of Water bodies				
7		MoWR			Construction of Field Channels			
7.1		MoWR		Lined Field Channels				
7.2		MoWR		Unlined Field Channels				
8		MoWR		Micro irrigation				
SI. No.	Name of Blocks/ Sub District	Concerned Ministry/Department	Component	Activity	Total No./ Capacity (Cum)	Command Area/ Irrigation Potential (Ha)	Period of Implementation (5/7 years)	Estimated Cost (In Lacs)
1	**Gobardhana**	MoWR	AIBP	Major Irrigation				
2		MoWR		Medium Irrigation				
3		MoWR		Surface Minor Irrigation	1	100	5	250
4		MoWR	Har Khet Ko Pani	Lift Irrigation	2	280	5	320

5		MoWR		Ground Water Development				
6		MoWR		RRR of Water bodies				
7		MoWR			Construction of Field Channels			
7.1		MoWR		Lined Field Channels				
7.2		MoWR		Unlined Field Channels				
8		MoWR		Micro irrigation				
SI. No.	Name of Blocks/ Sub District	Concerned Ministry/Department	Component	Activity	Total No./ Capacity (Cum)	Command Area/ Irrigation Potential (Ha)	Period of Implementation (5/7 years)	Estimated Cost (In Lacs)
1	**Sarukhetri**	MoWR	AIBP	Major Irrigation				
2		MoWR		Medium Irrigation				
3		MoWR		Surface Minor Irrigation				
4		MoWR	Har Khet Ko Pani	Lift Irrigation				
5		MoWR		Ground Water Development	6	180	5	360

6		MoWR		RRR of Water bodies				
7		MoWR			Construction of Field Channels			
7.1		MoWR		Lined Field Channels				
7.2		MoWR		Unlined Field Channels				
8		MoWR		Micro irrigation				
SI. No.	Name of Blocks/ Sub District	Concerned Ministry/Department	Component	Activity	Total No./ Capacity (Cum)	Command Area/ Irrigation Potential (Ha)	Period of Implementation (5/7 years)	Estimated Cost (In Lacs)
1	**Barpeta**	MoWR	AIBP	Major Irrigation				
2		MoWR		Medium Irrigation				
3		MoWR		Surface Minor Irrigation	4	1538	5	1050.481
4		MoWR	Har Khet Ko Pani	Lift Irrigation	4	780	5	753.67
5		MoWR		Ground Water Development	25	750	5	1590
6		MoWR		RRR of Water bodies				
7		MoWR			Construction of Field Channels			

7.1		MoWR		Lined Field Channels				
7.2		MoWR		Unlined Field Channels				
8		MoWR		Micro irrigation				
SI. No.	Name of Blocks/ Sub District	Concerned Ministry/Department	Component	Activity	Total No./ Capacity (Cum)	Command Area/ Irrigation Potential (Ha)	Period of Implementation (5/7 years)	Estimated Cost (In Lacs)
1	**Bhawanipur**	MoWR	AIBP	Major Irrigation				
2		MoWR		Medium Irrigation				
3		MoWR		Surface Minor Irrigation				
4		MoWR	Har Khet Ko Pani	Lift Irrigation	12	2140	7	2008.91
5		MoWR		Ground Water Development	37	1230	7	2985.00
6		MoWR		CAD works, ERM works existing	1	5870	7	7056.035
7		MoWR			Construction of Field Channels			
7.2		MoWR		Unlined Field Channels				

8		MoWR		Micro irrigation	264 nos.	660	5	330
SI. No.	Name of Blocks/ Sub District	Concerned Ministry/Department	Component	Activity	Total No./ Capacity (Cum)	Command Area/ Irrigation Potential (Ha)	Period of Implementation (5/7 years)	Estimated Cost (In Lacs)
1	**Bajali**	MoWR	AIBP	Major Irrigation				
2		MoWR		Medium Irrigation	1	3663.00	5	14936.00
3		MoWR		Surface Minor Irrigation	9	3805	5	2717.75
4		MoWR	Har Khet Ko Pani	Lift Irrigation	23	2039	5	828.76
5		MoWR		Ground Water Development	33	960	5	2400
6		MoWR		RRR of Water bodies				
7		MoWR			Construction of Field Channels			
7.1		MoWR		Lined Field Channels	12	300	5	600
7.2		MoWR		Unlined Field Channels				
8		MoWR		Micro irrigation				
			Component	Activity				

SI. No.	Name of Blocks/ Sub District	Concerned Ministry/Department			Total No./ Capacity (Cum)	Command Area/ Irrigation Potential (Ha)	Period of Implementation (5/7 years)	Estimated Cost (In Lacs)
1	**Rupshi**	MoWR	AIBP	Major Irrigation				
2		MoWR		Medium Irrigation				
3		MoWR		Surface Minor Irrigation				
4		MoWR	Har Khet Ko Pani	Lift Irrigation				
5		MoWR		Ground Water Development	6	180	5	360
6		MoWR		RRR of Water bodies				
7		MoWR			Construction of Field Channels			
7.1		MoWR		Lined Field Channels				
7.2		MoWR		Unlined Field Channels				
8		MoWR		Micro irrigation				
SI. No.	Name of Blocks/ Sub District	Concerned Ministry/Department	Component	Activity	Total No./ Capacity (Cum)	Command Area/ Irrigation Potential (Ha)	Period of Implementation (5/7 years)	Estimated Cost (In Lacs)

1	**Goma Fulbari**	MoWR	AIBP	Major Irrigation				
2		MoWR		Medium Irrigation				
3		MoWR		Surface Minor Irrigation				
4		MoWR	Har Khet Ko Pani	Lift Irrigation	1	120	5	100
5		MoWR		Ground Water Development				
6		MoWR		RRR of Water bodies				
7		MoWR			Construction of Field Channels			
7.1		MoWR		Lined Field Channels				
7.2		MoWR		Unlined Field Channels				
8		MoWR		Micro irrigation				