অসম চৰকাৰ

GOVERNMENT OF ASSAM

DEPARTMENT OF IRRIGATION

State Irrigation Plan

(2022-27)

অসম চৰকাৰ
GOVERNMENT OF ASSAM

Foreword

It gives me immense pleasure to introduce the State Irrigation Plan, Assam (2022-2027), a forward-looking initiative aimed at ensuring water security and prosperity for our Annadata (cultivators) and rural communities. This comprehensive plan represents our commitment to building a sustainable, equitable and efficient irrigation system that supports agricultural growth, promotes water conservation and mitigates the impacts of climate change.

The State Irrigation Plan, 2022-2027 is founded on the principles of inclusivity, sustainability and innovation. It embodies our dedication to adopting cutting-edge technologies, leveraging global best practices and engaging local stakeholders to create a resilient and dynamic irrigation ecosystem. Our goal is to provide farmers with reliable and sustainable irrigation facilities that are vital for enhancing agricultural productivity and fostering rural prosperity.

This plan is not merely a technical framework; it is a visionary roadmap to transform Assam's agricultural landscape. It prioritizes key focus areas, such as the revival and modernization of existing irrigation systems, alongside the implementation of innovative and sustainable projects tailored to the state's diverse agro-climatic zones. By enhancing irrigation infrastructure, adopting water-efficient systems and integrating modern technologies— such as solar-powered pumps and advanced irrigation techniques— this plan seeks to address the growing needs of agriculture across Assam.

I am confident that the State Irrigation Plan will act as a catalyst for transforming the irrigation landscape in our state, driving economic growth and improving the quality of life for our people.

I would like to extend my heartfelt gratitude to all the stakeholders who have contributed to the development of this ambitious plan. Together, let us work hand in hand to ensure its successful implementation, turning our shared vision into a golden reality for Assam.

Ashok Singhal

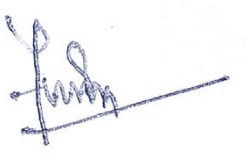
Shri Ashok Singhal
Minister, Irrigation Dept.
Govt. of Assam

CREDIT CITATION

We humbly acknowledge the immense support, fruitful suggestion and necessary guidance etc. of the Hon'ble Minister, Irrigation, Assam; the Secretary to the Government of Assam, Irrigation Department and other concerned officers for this endeavour to prepare the State Irrigation Plan, 2022-27 for the state of Assam.

Further, we also sincerely acknowledge that without the overall support, valuable contribution and guidance provided by the concerned District Level Sanctioning Committee (DLSC) chaired by the respective District Commissioners, officials of various stakeholder Departments/Organization such as - Central Ground Water Board; Agriculture Department of Assam; Water Resources Department, Assam; Soil Conservation Department, Assam; etc. it would not have been possible to prepare this State Irrigation Plan, 2022-27.

With a deep sense of appreciation, we extend our utmost sincere thanks and gratitude to all mentioned above and believe that this document shall provide a holistic approach to water management, thus safeguarding its agricultural productivity for future generations.



Chief Engineer
Irrigation, Assam

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सत्यमेव जयते

GOVERNMENT OF ASSAM

PREFACE

This State Irrigation Plan, 2022-27 for the State of Assam is prepared on the basis of 32 nos. of District Irrigation Plans duly approved by the concerned District Level Sanctioning Committee (DLSC) chaired by the respective District Commissioners of the Districts.

This is a comprehensive approach to enhance the Irrigation practices and substantial progress of agricultural output for the State of Assam for the period 2022-27.

With Thanks

Secretary to the Govt. of Assam
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Abbreviations

Abbreviations	Meaning
AIA	Annual Irrigated Area
AST	Area Sown more than once
BCM	Billion Cubic Metre
CAD	Command Area Development
CADP	Command Area Development Plan
CCA	Culturable Command Area
CI	Cropping Intensity
Cr	Crore
CU	Consumptive Use
DIP	District Irrigation Plan
DLSC	District Level Sanctioning Committee
DTW	Deep Tube Well
E	Evaporation
ET	Evapo- Transpiration
FIS	Flow Irrigation Scheme
FPC	Farmer Producer Company
FPO	Follow on Public Officer
GCA	Gross Cropped Area
GDP	Gross Domestic Product
GoA	Government of Assam
GoI	Government of India
GSDP	Gross State Domestic Product
GW	Ground Water
Ha	Hectare
IPC	Irrigation Potential Created
LIS	Lift Irrigation Scheme
LPCD	Litres per capita per day
MCM	Million Cubic Metre
MDTW	Medium Deep Tube Well
MSME	Micro, Small & Medium Enterprise
NHH No. of households	No. of households
NIA	Net Irrigated Area
NM	No. of members
NSA	Net Sown Area
PM KUSUM	Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan
SIP	State Irrigation Plan
STW	Shallow Tube Well
T	Transpiration
TGA	Total Geographical Area
UIP	Ultimate Irrigation Potential
WR	Water Requirement
WUEs	Water Use Efficient systems

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EXECUTIVE SUMMARY

State Irrigation Plan, Assam, 2022-27

The State of Assam, endowed with rich water resources through its vast river networks and aquifers,has historically relied on agriculture as the backbone of its economy. However, recurrent floods, dry spells, and erratic rainfall patterns hinder optimal agricultural productivity. The State Irrigation Plan (SIP) 2022-2027 aligns with the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) and aims to significantly expand Assam's irrigation coverage and enhance water management practices across its diverse agro-climatic zones.

Importance of the Plan

Water management is critical for Assam's agricultural sustainability, as irrigation serves as a lifeline for crop growth in a predominantly agrarian economy. As of 2022, Assam's net irrigated area covers only 21.54% of its total sown area (CCA), markedly lower than the national average of 49.92%. This SIP seeks to elevate Assam's irrigation coverage to 52 % by 2027 through both revival of existing schemes and the implementation of new, sustainable initiatives. The plan reflects Assam's commitment to achieving food security, increasing rural employment, and bolstering economic growth in a changingclimate.

Irrigation Potential in the State

The state of Assam has Net Sown area of 28.62 Lakh Ha. and Gross Cropped area of 40 Lakh Ha. respectively. Though the Irrigation Potential Created up to March, 2022 is shown as 10.59 Lakh-Ha in the Statistcial Handbook of Assam, 2022, but all the schemes as reflected in the said handbook donot exist at present. This SIP is prepared on the basis of IPC created up to March 2022 through existing schemes only. Therefore, the Annual Irrigated Area (AIA) created up to March'22 is 8.27 Lakh Ha asper State Irrigation Plan, 2022-27.

Financial Overview and Component Allocation

The total projected budget for SIP 2022-2027 is Rs.36,406.00 Crore allocated for implementation of new schemes and revival of existing schemes along with command area development.

The majority of the budget focuses on expanding irrigation infrastructure, enhancing water use efficiency, and supporting conjunctive use of both surface and groundwater resources.

The district wise allocation of budget for the targeted plan period 2022-27 is as under: -

Sl. No.	District	Estimated Cost (Rs. In Crore)
1	Baksa	123056
2	Barpeta	38752
3	Bongaigaon	23108
4	Cachar	233849
5	Charaideo	32550
6	Chirang	43355
7	Darrang	34425
8	Dhemaji	38270
9	Dhubri	25284
10	Dibrugarh	188519
11	Dima Hasao	28457
12	Goalpara	97590
13	Golaghat	66042
14	Hailakandi	19926
15	Jorhat	968668
16	Kamrup	101656
17	Kamrup(M)	80455
18	Karbi Anglong	328705
19	Karimganj	86624
20	Kokrajhar	84069
21	Lakhimpur	31084
22	Majuli	3480
23	Morigaon	77225
24	Nagaon	89170
25	Nalbari	95462
26	Sivasagar	62482
27	Sonitpur	111132
28	South Salmara Mankachar	16924
29	Tamulpur	117676
30	Tinsukia	102367
31	Udalguri	141725
32	West Karbi Anglong	148493
Total		**3640579**

District-wise Implementation and Strategic Focus

The SIP spans 32 districts, with individual District Irrigation Plans (DIPs) developed and approved at the district level to ensure locally relevant and customized solutions. These DIPs include a detailed projection of district-wise irrigation potential, along with a breakdown of proposed schemes.

For example, the Upper Brahmaputra Valley Zone, with its annual flooding issues, will receive focused investments in flood-resilient irrigation systems, while the Barak Valley Zone, which experiences periodic droughts, will benefit from enhanced groundwater extraction techniques and rainwater harvesting structures.

Monitoring, Evaluation, and Innovation

A comprehensive monitoring and evaluation (M&E) framework strengthen SIP 2022-2027, ensuring that project milestones are met, resources are optimally utilized, and corrective measures are taken as needed. The M&E system will track both quantitative outputs, such as area irrigated, and qualitative impacts, like changes in crop yield and water use efficiency.

To encourage innovation, the SIP advocates for solar-powered pump installations under PM KUSUM, with a target of 10,000 pumps across Assam. The adoption of drip and sprinkler irrigation systems ispromoted to enhance water conservation, and water user associations will be formed to ensure community participation in irrigation management.

Addressing Climate Challenges and Future Outlook

Assam is highly vulnerable to climate change, with rising temperatures and shifting rainfall patterns. The SIP incorporates climate adaptation strategies, such as the use of drought-tolerant crop varietiesand flood-resistant infrastructure. By improving water storage, expanding irrigation access, and increasing cropping intensity, the plan aims to make Assam's agriculture more resilient to climate variability.

The successful implementation of the SIP will rely on sustained financial and policy support from both state and central governments, as well as strong partnerships with local communities and agricultural stakeholders. Achieving these goals will enable Assam to not only meet its food security needs but also foster a more sustainable and prosperous rural economy.

Conclusion

The Assam State Irrigation Plan (2022-2027) offers a comprehensive framework to enhance irrigation coverage, promote sustainable practices, and build climatic balance. Through strategic investments,collaboration among key departments, and community involvement, Assam aims to create a robust agricultural system that will support its economy and improve the quality of life for its people. With dedicated implementation, the SIP will not only bolster food security but also pave the way for a moreprosperous and sustainable rural landscape in Assam.

Introduction

Assam is endowed with enormous water resources. The large perennial rivers and other water bodies with the rich aquifer speak about vastness of its water resource. Surface water is available in the forms of river, stream, lake, swamps, pond etc. A large percentage of water is used for agriculture annually. Irrigation requires large quantities of water to grow various crops and sustain livestock.

In an agrarian economy like India, agriculture utilizes the major share of country's exploitablewater 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 judicious 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 on 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 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 intra/international conflicts across shared water basins. Proper usage of water is important to manage crop yield and productivity. Farmers should follow water conservation strategies for sustainable agriculture. Agricultural water comes from surface water (rivers, streams, open canals, ponds, reservoirs and lakes), groundwater from wells and rainwater. Water is used in all traditional agriculture methods including the cultivation of rice, wheat, sugarcane, etc.

The economy of Assam is agriculture-based. Tea, rice, sugarcane, are the main agriculturalcrops grown in the state of Assam, with tea being is the largest agricultural industry.

Rice is the most dominant crop followed by vegetables, pulses, oilseeds, etc. The productivityof all these crops are to be increased to match the national average. Among the horticulture crops Banana, Citrus, Pineapple, Areca nut, Coconut are grown by the farmers. Apart from agricultural crops sericulture food plants also cover a sizeable area. Generally, Sali rice, Ginger, Turmeric, Sericulturefodder plants, sugarcane, etc. are also practiced in the state.

The state of Assam has Net Sown area of 28.62 Lakh Ha. and Gross Cropped area of 40 Lakh Ha. respectively. Annual Irrigated Area (AIA) up to March'22 is 8.27 Lakh Ha.

The economy of Assam is largely rural and agrarian inhabited by 35.37 million people with Gross State Domestic Product (GSDP) at current prices during 2023 is estimated as 5.67 lakh crores(Cr.) with per capita income of Rs. 1,18,504 against Rs. 1,70,620 per capita income in India (2023). The state has agrarian economy, which contributes 25% to the net domestic product of the state and provides livelihood support to about 70% of the population. Thus, the agricultural GDP of the state isestimated to be 1.42 Lakh Cr. During the last 15 years, Assam's GDP grew at an average annual

growth rate of 5.4%. (Source: 1st Report of The Agriculture Commission and Interim Recommendations (2022-23))

Despite being endowed with diverse soil and climatic conditions, Assam suffers vagaries of nature, especially unseasonal floods and dry spells that regularly wreaks havoc on crop land. In addition, chronic flood and river bank erosion affect large portions of the Brahmaputra & Barak Valley, resulting in loss of agricultural land and crop loss. On the other hand, the agriculture sector in the hilldistricts of Karbi Anglong and Dima Hasao is suffering from various weaknesses like low infrastructural facilities, low productivity due to extensive Jhum cultivation, non-availability of markets, etc. The pattern of cultivation, agricultural infrastructure development and access to markets in these two hilly terrainsare special areas of concern.

History of Irrigation in Assam:

Subsequent to the devastating flood in 1954, the necessity of setting up ofa dedicated department dealing with water resources in the State was strongly felt. All Irrigation activity in Assam was undertaken by Agriculture Department until 1968. It was only in 1970 that the Brahmaputra Flood Control Commission as well as Flood Control & Irrigation Department was formed. At that time this Flood Control and Irrigation Department was entrusted with the Flood Control works in the Barak Valley and irrigation works in the entire State including survey, investigation, planning, designing and execution of irrigation schemes and their operation and maintenance. Subsequently, this department was renamed as Public Works (Flood Control & Irrigation) Department, Assam and the flood control works of Brahmaputra Valley was entrusted to the department. With the introduction of High Yielding Variety crops, the demand of irrigation started gaining momentum and finally in 1974, the present Irrigation Department was born by bifurcating the Public Works (Flood Control & Irrigation) Department and amalgamating the engineering wing of the Agriculture Department along with the Irrigation schemes constructed by the Agriculture Department to deal exclusively with the irrigation development of the State.

Assam's Irrigation at a Glance

Irrigation is the process of applying water to the crops artificially to fulfill their water requirements. The Department executes the works of Irrigation schemes, operates and also maintains them.

The major activities of the department are:

- To increase Agricultural production of the State by ensuring timely and adequate irrigationwater to the fields to cultivate variety of crops.
- To increase irrigation intensity by ensuring water throughout the year and thereby encouraging multiple cropping.
- Utilization of irrigation potential by equitable distribution of water through command area development.
- Rendering assistance to form Water User's Association.
- Collection of Irrigation service charge from the beneficiaries, etc.

The erstwhile planning commission, GoI adopted the following classification of Irrigation Schemes:-

a) Major irrigation Scheme

- Major irrigation schemes are those schemes which have a Culturable Command Area(CCA) of more than 10,000 hectares.

b) Medium irrigation Schemes

- Medium Irrigation Schemes are those which have a Culturable Command Area of2,000-10,000 hectares.

c) Minor Schemes

- Minor irrigation schemes are those schemes which have a Culturable Command Area up to2000 hectares.

Irrigation system practiced by the Department at present are:–

a) Flow Irrigation Scheme (FIS)

- By constructing diversion structures like weir, barrages across the river or perennial streams for diverting river/stream water to its command area through canal system.

b) Lift Irrigation Scheme (LIS)

- By installing electrical operated pumps and motors in the river bank pump houses or on thefloating barges to lift the water from the river or water body to irrigate the command area through water distribution system.

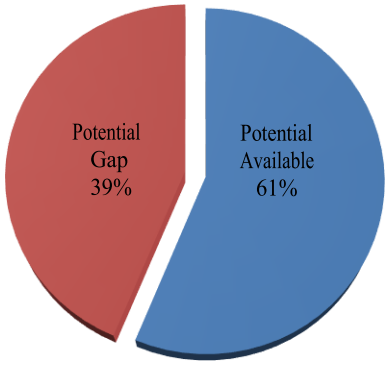
c) Tube Well Scheme

- By installing electrical or solar operated submersible pumps in the Deep Tube Well(DTW)/Medium Deep Tube Well (MDTW)/Shallow Tube Well (STW) to draw ground water for irrigating cropped land, where FIS or LIS is not feasible.

Irrigation Potential Created at a Glance

(as in March' 2022)

No. of Schemes	Potential Created (AIA) (in Lakh Ha.)	Potential Available (in Lakh Ha.)
3305 nos.	8.27	5.03



- **Irrigation Potential Created = 8.27Lakh Ha.**
- **Irrigation Potential Available = 5.03 Lakh Ha.**
- **Gap in Irrigation Potential (IPC-IPA) = 3.24 Lakh Ha**

IRRIGATION STATUS OF ASSAM COMPARED WITH INDIA AVERAGE

1. The Net Irrigated Area as a %age of Total Area under Agriculture (NIA/Net Sown Area) in the State in 2022 is 21.54 % compared to India average (as on 2017-18) of 49.92%. Top States in terms of the same are --- 1. Punjab (99.95%), 2. Haryana (92.72%), 3. UP (86.64%), 4. MP (69.49%), 5. Bihar (59.23%).

2. The Total Irrigated Area as a %age of Total Area under Agriculture (AIA/Gross Cropped Area) in the State in 2022 is 20.67 % compared to India average (as on 2017-18) of 50.05%. Top States in terms of the same are --- 1. Punjab (98.48 %), 2. Haryana (91.57%), 3. UP (80.39%), 4. Bihar (71.95%), 5. W. Bengal (65.17%).

This comparison shows the picture of Irrigation sector in Assam, a lot of work and investment have to be made in Irrigation sector in the State.

In the Plan period 2022-27, it is targeted to bring the Irrigated Area in the State to nearabout 52 %.

Necessity of SIP:

Water has unique characteristics that determine both its allocation and use as a resource in 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. Irrigation helps improve food security, reduce dependence on monsoons, improve agricultural productivity and create rural job opportunities. Therefore, achievement of these objectives is dependent on adequate allocations of water to agriculture. Improved allocation of irrigation water is required within the agriculture sectors in order to achieve greater efficiency in the use of irrigation water and existingirrigation infrastructure. Reallocation is also required in order to reduce water logging 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).

In terms of irrigation, enough scope is available in the State to catch up states like Punjab, Haryana, and Gujarat by substantial margin. Focused efforts would be needed. Besides, regional variation would also require special focus in terms of creating irrigation facilities. 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.

Also, as per first report of the Agriculture Commission and Interim Recommendations (2022-2023), the commission recommended the following in connection with Irrigation in the State:-

- Increase irrigation potential by 1Mha (3000 Crore) financial aid from GoI.
- Install solar powered pumps, 50 in each block (10,000) under PM KUSUM Yojana (30% GoI,30% GoA and 40% by Bank Loan with 3% interest subvention each by GoI and GoA. Rest paid by the farmers/FPOs/FPCs), state's share (100 Crore).

- The Commission also suggested to increase cropping intensity to 165% by 2027 and 175% by2030.

(Source: 1st report of the Agriculture Commission and interim recommendations 2022-2023)

Therefore, five year (2022-27) District Irrigation Plans (DIPs) for 32 nos. of districts are prepared and are approved by District Level Sanctioning Committee (DLSC) headed by the respective District Commissioners.

From the District Irrigation Plans, the State Irrigation Plan (SIP) is prepared and is approved by the Technical Committee formed vide Govt. order no. E-271932/13, dtd: 13-10-2023.

SIP (2022-2027) AT A GLANCE

Sl. No.	Baseline as on 31st. March 2022 (In Lakh Ha.)		Targeted Irrigation Potential from Revival / New Schemes				Targeted Command Area Development		Total targeted Irrigation Potential as on March'27		Estimated Cost for Revival/ New Schemes (Rs. In Crore)	Total Estimated Cost (New + Revival + CAD) (Rs. in Crore) (Col. 9+12)
			2022-27				NIA (In Lakh Ha.)	Estimated Cost for Command Area Development (Rs.in Crore)	(Baseline + Targeted 22-27)			
			From Revival / New Scheme	No. of Schemes	(In Lakh Ha.)				(In Lakh Ha.)			
	NIA	AIA			NIA	AIA			NIA	AIA		
1	2	3	4	5	6	7	8	9	10	11	12	13
1	6.16	8.27	Revival	1,604	1.56	1.69	0.04	171.00	7.76	9.96	3,705.00	3,876.00
2			New Scheme	7,313	6.95	10.68	0.21	486.00	7.16	10.68	32,701.00	33,187.00
TOTAL	**6.16**	**8.27**		**8,917**	**8.51**	**12.37**	**0.25**	**657.00**	**14.92**	**20.64**	**36,406.00**	**37,063.00**

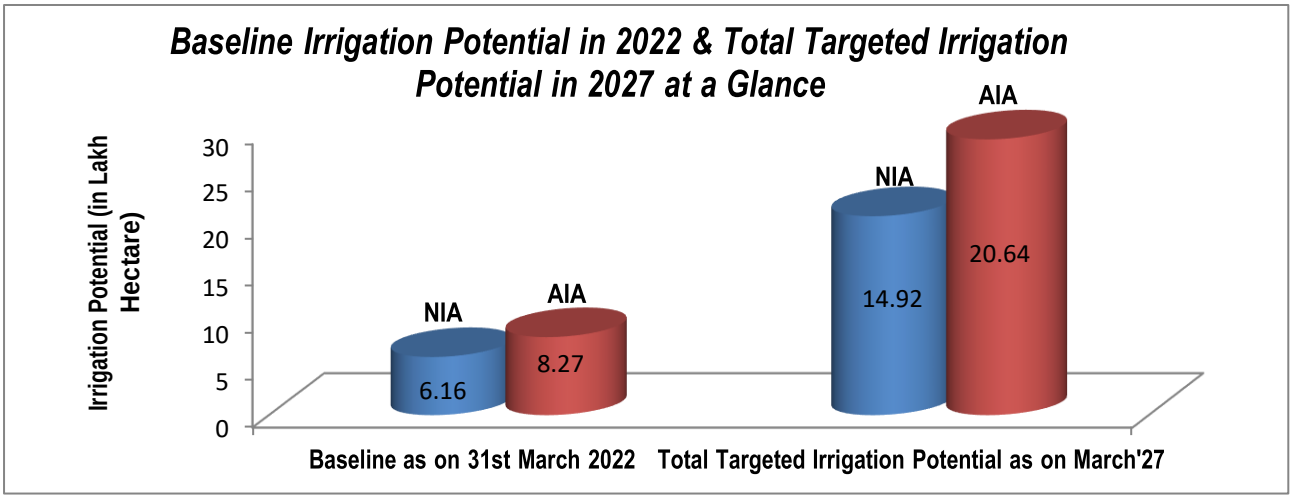


Fig. (i) – Comparative Diagram between Baseline Irrigation Potential as on March'2022 and Total Targeted Potential as on March'2027

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IRRIGATION STATUS OF ASSAM COMPARED WITH INDIA AVERAGE

Particulars	Top States of India (2021)	India Average (2021) as on 2017-18	Assam Current (2022)	Assam Target (2027)
Net Irrigated Area as a % age of Total Area under Agriculture (NIA/Net Sown Area)	1) Punjab (99.95 %) 2) Haryana (92.72%) 3) UP (86.64%) 4) MP (69.49%) 5) Bihar (59.23%)	NIA/NAS 69478000/ 139181000 = **49.92 %**	616362/ 2861779 = **21.54%**	1492000/ 2861779 = **52.13%**
Total Irrigated Area as a %age of Total Area under Agriculture (AIA/Gross Cropped Area)	1) Punjab (98.48 %) 2) Haryana (91.57%) 3) UP (80.39%) 4) Bihar (71.95%) 5) W. Bengal (65.17%)	GIA/TCA 100084000/ 199988000 = **50.05 %**	826900/ 4000460 **= 20.67 %**	2064000/ 4000460 = **51.59%**

Source of information: Land use statistics at a glance 2008-18, published on july 2021 by GoI

State Profile

1.1. State Profile

Assam is situated in the North-East region of India between 90^{o} to 96^{o} East longitude and 24^{o} to 28^{o} North latitude, bordering seven states namely - Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and West Bengal and two countries viz.- Bhutan and Bangladesh. The geographical area of the state is 78,438 sq.km. of which 98.4 percent area is rural. Assam shares
about 2.4% of the country's landmass, providing shelter to 2.6% of India's population as per Census, 2011. For administration and revenue purposes, the state has presently 32 districts. The land and water mass of the state is divided into two valleys namely - Brahmaputra Valley and Barak Valley with an area of 56,194 sq.km and 22,244 sq.km respectively. Both major and small rivers including numerous rivoulets originating from hills and mountains surrounding the state flows through the heartland of Assam creating rich surface water resources for the state.

Table 1.1: State Profile

Sl. No.	Name of the District	District Code	District Headquarter
1	Baksa	324	Mushalpur
2	Barpeta	303	Barpeta
3	Bongaigaon	319	Bongaigaon
4	Cachar	316	Silchar
5	Charaideo	311	Sonari
6	Chirang	320	Kajalgaon
7	Darrang	325	Mangaldai
8	Dhemaji	308	Dhemaji
9	Dhubri	301	Dhubri
10	Dibrugarh	310	Dibrugarh
11	Dima-Hasao	315	Haflong
12	Goalpara	302	Goalpara
13	Golaghat	313	Golaghat
14	Hailakandi	318	Hailakandi
15	Jorhat	312	Jorhat
16	Kamrup	321	Amingaon
17	Kamrup (M)	322	Guwahati
18	Karbi-Anglong	314	Diphu
19	Karimganj	317	Karimganj

Sl. No.	Name of the District	District Code	District Headquarter
20	Kokrajhar	300	Kokrajhar
21	Lakhimpur	307	North Lakhimpur
22	Morigaon	304	Morigaon
23	Majuli	312	Garamur
24	Nagaon	305	Nagaon
25	Nalbari	323	Nalbari
26	Sivasagar	311	Sivasagar
27	Sonitpur	306	Tezpur
28	South Salmara Mankachar	135	Hatsinghimari
29	Tinsukia	309	Tinsukia
30	Tamulpur		Tamulpur
31	Udalguri	326	Udalguri
32	West Karbi-Anglong		Hamren

Source: Census of India, 2011

1.2. Demography of the State:

Assam is a state of heterogeneous population with socio-cultural and ethnic diversity. According to the Census of India, 2011 the population of Assam was 312.05 lakh of which 159.39 lakh were male and 152.66 lakh were female. The projected population (released by Census of India) of Assam in 2022 is found as 353.78 lakh of which 180.06 lakh are male and 173.71 lakh are female. The decadal growth rate of the state population during 2001-2011 was 17.07% against 17.68% growth for the country as a whole. Out of total population in the state, 86% population lived in rural areas and 14% population in urban areas. The percentage of rural populatio n of the state was higher than all India average (69%). However, the urban population in the state had increased from 12.9% in 2001 to 14% in 2011. The density of population of Assam in 2011 was 398 person per sq.km. as compared to 340 persons in 2001. The sex ratio (number of female per thousand male) of Assam had increased to 958 in 2011 from 935 in 2001. Compared to overall sex ratio of the state, the child sex ratio (age group 0-6 years) had gradually declined from 975 in 1991 to 967 in 2001 and further to 962 in 2011. On the other hand, sex ratio at birth in Assam as per 2011 census was 957.

(Source: Directorate of Economics and Statistics)

Table 1.2 : Demography of the State

Sl. No.	Name of the District	Total NHH*	Total NM*	Male (M)	Female (F)	Children (0-6 yrs)
1	Baksa	191701	950075	481330	468745	122872
2	Barpeta	342008	1693622	730159	690167	273296
3	Bongaigaon	150018	738804	375818	362986	116392
4	Cachar	339297	1553510	794232	759278	239321
5	Charaideo	85612	458615	217043	186271	55301
6	Chirang	97395	455932	231613	224319	68911
7	Darrang	185697	928500	475273	453227	156408
8	Dhemaji	129869	686133	351249	334884	104247
9	Dhubri	335263	1609393	825566	783837	299949
10	Dibrugarh	276867	1326335	598063	574738	153534
11	Dima-Hasao	42252	214102	110802	103300	32414
12	Goalpara	198454	1008183	513292	494891	171657
13	Golaghat	206798	1066888	474590	457505	134793
14	Hailakandi	13185	65942	270570	256532	132194
15	Jorhat	218999	1019679	508127	487587	5785
16	Kamrup	303865	1484028	761526	723202	196804
17	Kamrup (M)	293112	1253938	647585	606353	125386
18	Karbi-Anglong	178162	958822	491478	467344	152031
19	Karimganj	247714	1228686	625864	602822	211960
20	Kokrajhar	181081	887142	452905	434237	131397
21	Lakhimpur	204307	1042137	529674	512463	156739
22	Majuli	39737	167304	85566	81738	22062
23	Morigaon	0.00	788417	801486	387674	0.00
24	Nagaon	559340	2823768	1439112	1384656	459936
25	Nalbari	155248	771639	396006	375633	95333
26	Sivasagar	155030	709650	363161	346489	80521
27	Sonitpur	392919	1924110	983904	940206	277862
28	South Salmara Mankachar	131169	588183	298326	289857	122490
29	Tamulpur	77241	389150	197577	191573	0
30	Tinsukia	228223	1141336	581755	559581	163385
31	Udalguri	161491	799206	405022	394184	110210
32	West Karbi-Anglong	N/A	300320	153763	146557	50830
Total		**6122054**	**31033549**	**16172437**	**15082836**	**4424020**

* NHH – No. of households, * NM – No. of members

Source – Census of India, 2011

1.3. Agro Ecology, Climate, Hydrology and Topography of Assam

The state of Assam is divided into two valleys namely- Brahmaputra valley and Barak valley. A significant geographical aspect of Assam is that it contains three of six physiographic divisions of India – The Northern Himalayas (Eastern Hills), The Northern Plains (Brahmaputra plain), and the DeccanPlateau (Karbi Anglong).

Assam has been broadly divided into six agro-climatic zones on the basis of patterns of rainfall, terrain, soil type and climatic conditions. They are –

1. North Bank Plains Zone,
2. Upper Brahmaputra Valley Zone,
3. Central Brahmaputra Valley Zone,
4. Lower Brahmaputra Valley Zone,
5. Barak Valley Zone and
6. Hills Zone.

Figure below presents a map of Assam with these six agro-climatic zones.

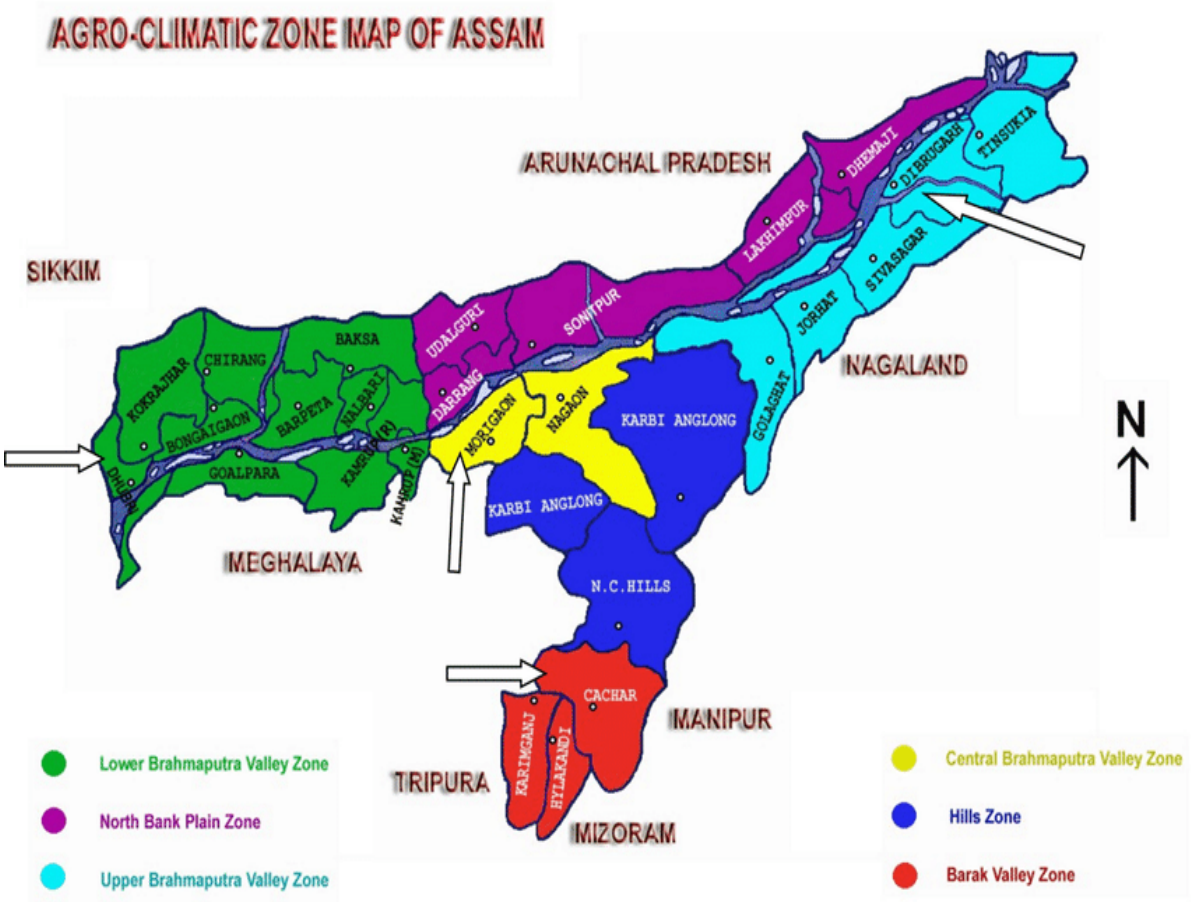

Fig.1- Agro-Climatic Zone Map of Assam.

(Source: researchgate.net)

Table 1.3(a) : Agro Ecology, Climate, Hydrology and Topography (District wise)

Sl. No.	Name of the District	Agro Ecology Zone Type	Type of Terrain	District Area (Ha)	Normal Annual Rainfall (mm)	Average Monthly Rainfall (mm)	No of Rainy Days per Year	Maximum Rainfall Intensity (mm)		
								Upto 15 mm	Beyond 15 but upto 30 Min	Beyond 30 but upto 60 Min
1	Baksa	Lower Brahmaputra Valley Zone	Plain Topography in addition to few hilly areas witha gentle slope towards the South	246256	3574.6	297.88	122	-	-	-
2	Barpeta	Lower Brahmaputra Valley Zone	Plain topography witha gentle slope towards the south	228200	2287	190.58	-	-	-	-
3	Bongaigaon	Lower Brahmaputra Valley Zone	Plain Hilly area & Chor area	109300	3219	268.25	135	11	43	91
4	Cachar	Barak Valley Zone	Tertiary hill ranges surrounding the district and flat alluvial plain inmiddle	377610	3192	266	136	-	-	-
5	Charaideo	Upper Brahmaputra Valley Zone	Moderately undulating	106915	2400	200	-	-	-	-
6	Chirang	Lower Brahmapu tra Valley Zone (AS4)	Plain Topography with a gentle slope towards the South	192300	2971.6	171.60				
7	Darrang	Lower Brahmaputra Valley Zone	Plain Topography in addition to few hilly areas witha gentle slope towards the South	158500	2120	176.66	-	-	-	-
8	Dhemaji	Upper Brahmaputra Valley Zone	Plain Topography	323700	2600-3200	378.2				

Sl. No.	Name of the District	Agro Ecology Zone Type	Type of Terrain	District Area (Ha)	Normal Annual Rainfall (mm)	Average Monthly Rainfall (mm)	No of Rainy Days per Year	Maximum Rainfall Intensity (mm)		
								Upto 15 mm	Beyond 15 but upto 30 Min	Beyond 30 but upto 60 Min
9	Dhubri	Lower Brahmaputra Valley Zone (AS-4)	Plain Topography with a gentle slope towards the South	217600	3263.8	271.98	-	-	-	-
10	Dibrugarh	AES I,AES II,AES III	Humid Alluvial Flood prone	338100	2076	173	135	-	-	-
11	Dima-Hasao	Purvanchal (Eastern range) warm to hot humid Eco sub region	The district is predominantly hilly due to the prominence of the Borail Range and theShillong Plateau in the easterly and westerly zones respectively.	488800	1519.1	126.6	-	-	-	-
12	Goalpara	Lower Brahmaputra Valley Zone (AS-4)	Flat Plain,Char Land,Low Forest Hills	182400	2169	197	98	-	-	-
13	Golaghat	Upper Brahmaputra Valley Zone	Plain Topography	350200	1990.5	77.77	105	-	-	-
14	Hailakandi	BarakValley Zone	Hills & Plain	132700	1145.79	2388.54	121	-	3974.1	-
15	Jorhat	Upper south Brahmaputra valley zone	Brahmaputra Plain,Marshy land and low altitude structural hills in the extreme south	160588	1204.5	602.2	130	21.9	42.2	45
16	Kamrup	Lower Brahmaputra Valley Zone (AS-4)	Plain to semi hilly terrain	3105	1796.2	149.68	-	-	-	-
17	Kamrup (M)	Plain to semi-hilly terrain	Lower Brahmaputra Valley	1528	2152	1752	96.5	-	-	-

Sl. No.	Name of the District	Agro Ecology Zone Type	Type of Terrain	District Area (Ha)	Normal Annual Rainfall (mm)	Average Monthly Rainfall (mm)	No of Rainy Days per Year	Maximum Rainfall Intensity (mm)		
								Upto 15 mm	Beyond 15 but upto 30 Min	Beyond 30 but upto 60 Min
18	Karbi-Anglong	Purvanchal (Eastern range) warm to hot humid Eco sub region, Hills zone of Assam AES-1	Dense tropical forest covered hills and plains	1043396	1205.2	100.44	-	-	-	-
19	Karimganj	Data not provided	Moderately undulating	180900	4067	278.19	107	-	-	-
20	Kokrajhar	LowerBrahmaputra ValleyZone(AS-4)	PlainTopography with hill land hillocks and Foot Hill Areas	329600	1320	270	146	17	29	84
21	Lakhimpur	North bank plain zone (AS-1)	Plain topography witha gentle slope towards the south	227700	2882.3	594	125	914.72	571.7	800.38
22	Majuli	Upper Brahmaputra Valley Zone	Plain Topography	124512	2150	179	-	-	-	-
23	Morigaon	Central Brahmaputra Valley Zone (CBVZ)	Alluvial Plain	155000	1245.75	263	104	-	-	-
24	Nagaon	Middle Brahmaputra ValleyZone	Vast Plainlands dotted with fewer hilly terrains	397200	1880	156.67	135-171	-	-	-
25	Nalbari	Humid	Moderately Undulating	104644	2158	124.7	104	-	-	-
26	Sivasagar	Humid	Moderately Undulating	266800	2158	124.7	-	-	-	-

Sl. No.	Name of the District	Agro Ecology Zone Type	Type of Terrain	District Area (Ha)	Normal Annual Rainfall (mm)	Average Monthly Rainfall (mm)	No of Rainy Days per Year	Maximum Rainfall Intensity (mm)		
								Upto 15 mm	Beyond 15 but upto 30 Min	Beyond 30 but upto 60 Min
27	Sonitpur	North bank plain zone	Foothills of Himalaya,Central Belt of Old Alluvium, Low lying riverine belt	532400	2317.7	184.6	122-134	7.5	12.5	20
28	South Salmara Mankachar	Lower Brahmaputra Valley Zone (AS-4)	Mostly plains with patches of small hillocks	56593	2916.0	167.00	145	165.00	21.00	21.00
29	Tamulpur	Brahmaputra plain, hot humid ecosystem with alluvium derived soil and growing period 240-270 days	Not provided	144362	2093.7	174.47	122	-	-	-
30	Tinsukia	Upper Brahmaputra valley zone	Plain topography witha gentle slope	379550	2143.3	178.61	-	-	-	-
31	Udalguri	North Bank Plain Zone	Wide range with gentle slope from Foot hills,Medium land, Low land, Deep water and Riverine situation havinga large water bodies in form of River and its tributaries, Beels, Swampsin addition to large number ofTanks and Ponds	198568	1971.7	164.30	78	-	-	-

Sl. No.	Name of the District	Agro Ecology Zone Type	Type of Terrain	District Area (Ha)	Normal Annual Rainfall (mm)	Average Monthly Rainfall (mm)	No of Rainy Days per Year	Maximum Rainfall Intensity (mm)		
								Upto 15 mm	Beyond 15 but upto 30 Min	Beyond 30 but upto 60 Min
32	West Karbi-Anglong	Hills zone of& AES-1	Hilly Terrain and Plain	303500	2416.0	195.56	96	-	-	-

Source: Agriculture Contingency Plan

The climate of Assam is typically 'Tropical Monsoon Rainforest Climate', with high levels of humidity and heavy rainfall. People here enjoy a moderate climate all throughout the year, with warm summers and mild winters.
Spring (March–April) and Autumn (September–October) are usually pleasant with moderate rainfall and temperature.

Table 1.3 (b): District wise Season wise Average Weekly Temperature of Assam

Sl. No.	District	Average Weekly Temperature ˚C (Degree Centigrade)								
		Period								
		Summer (April-May)			Winter (October-March)			Rainy (June-September)		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
1	Baksa	19.00	28.00	23.50	11.00	28.00	19.50	27.00	38.00	32.50
2	Barpeta	18.00	29.00	23.50	13.00	24.00	18.50	26.00	37.00	31.50
3	Bongaigaon	20.12	33.10	26.61	12.04	20.93	16.65	19.21	28.63	23.92
4	Cachar	21.45	31.95	26.70	17.13	29.67	23.40	24.43	33.13	28.76
5	Charaideo	21.36	28.65	25.00	16.06	25.25	20.66	25.30	31.05	28.11
6	Chirang	172.2	36.9	27.05	9.83	31.53	20.68	23.025	36.675	29.85
7	Darrang	28.00	38.00	33.00	15.00	25.00	20.00	26.00	37.00	31.50
8	Dhemaji	23.00	30.00	26.50	12.20	24.00	18.10	25.50	30.50	28.00
9	Dhubri	18.65	34.85	25.70	22.22	27.79	20.43	23.35	35.55	27.90
10	Dibrugarh	19.10	29.70	25.80	10.20	30.50	25.80	24.10	32.00	28.50
11	Dima-Hasao	19.50	29.00	24.00	10.23	24.38	17.30	22.91	29.30	26.10
12	Goalpara	22.00	33.00	28.00	7.00	28.00	26.00	20.00	32.00	28.00
13	Golaghat	21.10	28.35	24.60	13.70	25.00	18.50	25.12	32.64	29.24
14	Hailakandi	21.10	33.30	27.20	11.10	32.20	21.65	22.20	33.80	28.00
15	Jorhat	20.79	32.00	26.40	11.00	25.00	18.00	23.00	33.05	30.00
16	Kamrup	18.80	31.10	24.90	11.10	29.40	20.30	26.00	38.00	32.00
17	Kamrup (M)	18.65	34.85	25.70	13.07	27.79	20.43	23.35	35.55	27.90
18	Karbi-Anglong	18.30	31.10	25.50	8.30	25.50	16.90	26.11	32.22	29.17
19	Karimganj	21.00	33.00	27.00	12.00	33.00	24.00	23.00	34.00	28.00
20	Kokrajhar	26.10	36.70	33.10	12.60	20.90	16.60	25.80	31.70	28.50
21	Lakhimpur	26.00	36. 00	31.00	10.00	24.00	17.00	26.00	36.00	31.00

Sl. No.	District	Average Weekly Temperature ˚C (Degree Centigrade)								
		Period								
		Summer (April-May)			Winter (October-March)			Rainy (June-September)		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
22	Majuli	18.60	31.70	25.70	10.40	32.60	21.02	24.30	33.70	28.80
23	Morigaon	18.00	31.00	24.50	11.00	30.00	20.50	28.00	38.00	33.00
24	Nagaon	21.20	35.00	28.10	11.20	26.20	18.70	22.00	36.00	29.00
25	Nalbari	22.00	31.00	27.00	11.00	23.00	16.20	23.00	32.00	27.00
26	Sivasagar	22.00	31.00	27.00	11.00	23.00	16.20	23.00	32.00	27.00
27	Sonitpur	19.50	32.50	26.00	10.50	25.70	18.10	25.00	35.00	30.00
28	South Salmara Mankachar	18.65	34.85	25.7	13.07	27.79	20.43	23.35	35.55	27.9
29	Tamulpur	19.00	33.00	26.00	12.00	28.00	20.00	28.00	35.00	31.50
30	Tinsukia	17.00	30.00	23.60	9.50	31.70	20.60	23.80	33.00	28.40
31	Udalguri	22.20	29.40	25.80	13.30	23.90	18.60	26.10	38.00	28.90
32	West Karbi-Anglong	21.45	32.53	26.99	13.24	26.96	20.10	24.56	33.56	29.06

1.4 Soil Profile

The soils of Assam are very rich in nitrogen content and organic matter. The alluvial soils of the Brahmaputra and the Barak valley are highly fertile and are highly suitable for raising of crop varieties round the year such as cereals, pulses, oilseeds, plantation crops, etc. The well-drained, deep, acidic alluvial soils of upper Assam with good proportion of phosphoric content are very suitable for the plantation crops. New alluvial soils occurring in the char lands (riverine areas of the Brahmaputra rive r formed either in the heart of the river or on its banks) are most suitable for growing oilseeds, pulses and Rabi crops. The alluvium of the plains offers excellent opportunity for cultivating rice and vegetables.The soil available in the upper reaches of the hill slopes are highly suitable for horticulture and plantation crops.

Brahmaputra Valley – The most predominant soil type found in the sub-basin is the red loamy soil and alluvial soil. Other important soil types are – sandy, loamy, clayey soils, their combinations and laterite soil. The culturable area of the sub-basin is about 12.15 M-Ha. which is 6.2% of the culturable area of the country.

Here's a detailed description of the Soil Profile of the Brahmaputra Valley -

1. **Alluvial Soils**: Dominantly, the soils in the Brahmaputra Valley are alluvial, deposited by the Brahmaputra River and its tributaries. These soils are young and fertile, frequently replenished by annual floods, which enhance their nutrient content, making them highly productive for agriculture.

2. **Texture Variability**: The soil texture in this region varies from sandy to silty to clayey loam. This variation allows for a diverse range of crops to be cultivated, from rice in the more clayey and loamy areas, which require more water, to vegetables and fruits in sandier soils, which provide better drainage.

3. **Slightly Alkaline to Neutral pH**: Unlike the acidic soils of the Barak Valley, the Brahmaputra Valley soils are generally slightly alkaline to neutral. This pH range is conducive to most agricultural crops and requires less amendment than more acidic soils.

4. **Rich in Nutrients**: Due to the constant deposition of river sediments during floods, these soilsare rich in macro and micronutrients. Key nutrients include phosphorus, potassium, and a range of trace minerals beneficial for crop growth.

5. **Organic Matter Content**: The organic matter content in the Brahmaputra Valley soils is moderate, contributed by the decomposition of plant and animal residues. The organic content can vary depending on the location and the extent of flooding, which can wash away topsoil in some areas while depositing new layers in others.

6. **Issues with Erosion and Flooding**: While the annual floods replenish soil nutrients, they also pose challenges such as soil erosion and occasional excessive waterlogging, which can adversely affect crop yields. Effective soil conservation and water management strategies are crucial to counter these effects.

7. **Suitability for Multiple Cropping**: The soil profile, coupled with the valley's ample water supply, makes it ideal for multiple cropping systems. Farmers in the Brahmaputra Valley typically grow a variety of crops throughout the year, maximizing the use of the fertile soils.

The Brahmaputra Valley's soils are thus central to the agricultural prosperity of Assam, supporting a broad spectrum of crops and sustaining the livelihoods of a significant portion of the state's population. However, managing the dual challenges of flooding and erosion is crucial for the sustainable use of these rich alluvial soils.

Barak Valley – The Barak valley consists of three administrative districts namely - Cachar, Karimganj and Hailakandi. The soil of the district is clayey loam, alluvial and red alluvial. The soil is highly porous and therefore, lacks moisture retention capacity and is susceptible to erosion. The water level in the district is very low. The Barak Valley in Assam, while predominantly known for its fertile plains along the Barak River, also features hilly terrains that influence the region's soil profile and land use.

Detailed description of the Soil Profile of Barak Valley:

Plains:

- **Texture and Fertility:** The plains are covered with alluvial soils, which are soft and fine- textured, composed of sandy loam, silty loam, and clay loam. These soils are highly fertile due to the rich nutrients and organic matter deposited by the Barak River and its tributaries.

- **Water Retention:** These soils retain water well, making them ideal for water-intensive cropslike rice. The good water retention also supports the cultivation of tea, fruits, and vegetables.
- **pH Levels:** The soils are slightly acidic to neutral, suitable for a wide range of crops.
- **Erosion Risks:** Soil erosion is minimal due to the flat terrain, though riverine activities may sometimes affect soil stability.

Hills:

- **Texture and Fertility:** The soil in the hilly regions is generally rougher, with a mix of loam and clay, and often contains stones and gravel. These soils are less fertile because they drain water quickly, and nutrients are often washed away by rain.
- **Water Retention:** The hilly soils have poorer water retention due to their sloped nature, making them less ideal for crops like paddy but good for plantation crops such as tea, which prefer well-drained soils.
- **pH Levels:** These soils are more acidic than those in the plains, a condition exacerbated bythe high organic acid from decomposing vegetation and less nutrient retention.
- **Erosion Risks:** Erosion is a significant concern in the hills, especially during heavy rains. The steep slopes increase runoff, leading to loss of topsoil.

1.4.1 Soil Erosion Status

Soil erosion is a serious problem in Assam. The highly productive and fertile soils of Assam are now facing the serious problem of soil erosion like other parts of the country. Riverbank erosion during high flood period in the valley is a regular annual feature. The extent of loss to the bank erosion varies from year to year depending on the severity of floods in the state. The catchment of the Brahmaputra is characterized by very steep hill slopes with coarse soil texture and unstable land mass. This causeshigh instantaneous run-off and heavy siltation in the tributaries as well as in the channels of the mainriver. It is also frightening that the mighty river is drifting its course towards southern bank and causing sedimentation in the north bank. Excessive water flow, sloppy nature of cultivated land, cutting & clearing of Jungle from the catchments of rivers & canal, flash flood & its meandering nature are some of the major cause of soil erosion in various districts of the State. Karimganj, Morigaon, Goalpara, Nalbari and Charaideo are some of the most affected districts of the State.

1.5 Land-Use

Land utilization in a given region is one of the most important factors as the production and productivity of different crops mainly depend upon the availability of land or the distribution of land among different crops. Due to increase in developmental activities in recent years, more and more land is being used for industrial, housing, transport and recreation purposes. This has resulted in an increase in the area used up by non-agricultural uses. Land-use pattern in Assam indicates that out of

the total geographical area of 78.438 lakh hectares, the Gross Cropped Area **(GCA) of Assam is40 lakh hectares**.

Table 1.4 Land Use Pattern

SL. NO.	DISTRICT	TGA (Ha)	GCA (Ha)	NSA (Ha)	AST (Ha)	CI (%)	AREA UNDER FOREST (Ha)	AREA UNDER WASTE LAND (CUTURABLE) (Ha)	AREA UNDER OTHER USES (Ha)
1	*2*	*3*	*4*	*6*	*7*	*8*	*9*	*10*	*11*
1	Baksa	246256	139398	90097	49301	121	48540	17849	89770
2	Barpeta	228200	189130	135707	53423	139	189	6503	85801
3	Bongaigaon	109300	96535	61744	34791	148	14028	2022	31506
4	Cachar	377610	186225	125000	61225	149	161425	29738	61447
5	Charaideo	106915	54295	50019	4276	111	20375	20235	34486
6	Chirang	192300	75703	59510	16193	383	71253	3542	8201
7	Darrang	158500	116727	92830	23897	181	7927	3508	54235
8	Dhemaji	323700	150890	104764	46126	144	53224	15161	150551
9	Dhubri	217600	211592	116701	94894	181	2142	16982	81776
10	Dibrugarh	338100	188692	127313	61379	146	28442	7084	175202
11	Dima Hasao	488800	55522	42219	13303	134	67277	0	0
12	Goalpara	182400	124160	72377	51783	172	36459	7455	66109
13	Golaghat	350200	214533	157099	57434	137	157642	7814	27645
14	Hailakandi	132700	59450	44147	11410	136	57600	7254	23699
15	Jorhat	160588	127778	96803	10397	132	25247	4256	130790
16	Kamrup	318850	168772	100273	68499	114	87424	8968	63527
17	Kamrup (M)	87150	22212	15845	6367	138.37	29590	452	26035
18	Karbi Anglong	813139	161101	134082	24207	1135	365332	48804	136619
19	Karimganj	180900	82561	72957	9604	113	48120	1259	58564
20	Kokrajhar	329600	191608	179955	11653	106	76420	1948	71277
21	Lakhimpur	227700	205901	132711	73190	155	22792	6476	65720
22	Majuli	124512	50632	36778	13854	138	0	2028	85706
23	Morigaon	155100	120975	73554	47421	155	8561	15792	57193
24	Nagaon	397200	314452	219230	95222	143	77580	10323	90067
25	Nalbari	104644	100916	67656	33260	149	0	1377	35611
26	Sivasagar	159883	91488	87871	3617	104	10090	1593	60329
27	Sonitpur	56428	21842	15058	6784	145	0	0	0
28	South Salmara Mankachar	56593	38782	21037	17745	178	325	1048	32813

SL. NO.	DISTRICT	TGA (Ha)	GCA (Ha)	NSA (Ha)	AST (Ha)	CI (%)	AREA UNDER FOREST (Ha)	AREA UNDER WASTE LAND (CUTURABLE) (Ha)	AREA UNDER OTHER USES (Ha)
29	Tamulpur	144362	62081	51549	18661	126	11243	3212	1607
30	Tinsukia	379000	145066	130705	14361	111	126468	3677	118150
31	Udalguri	182810	163257	84468	71571	177	26403	341	
32	West Karbi Anglong	255651	68184	61720	5824	130	89394	32052	72485
Total		**7586691**	**4000460**	**2861779**	**1111672**	**5096**	**1731512**	**288753**	**2012812**

Source: Statistical Handbook, Assam-2022, Social Forestry.

1.6 Agriculture Status and Opportunities

Agriculture in Assam exhibits most of the characteristics of under-developed / backward agriculture - high dependence on agriculture for livelihood, widespread practice of traditional farming techniques, low usage of modern farm inputs, inadequate agricultural infrastructure, low levels of productivity and incomes in the sector and so on. About 75% of the State's population is directly or indirectly dependent on agriculture while about 69% of the workforce is actually engaged in agricultural activities. About 86% of the farmers belong to small and marginal groups while the average operational holding size is a low 1.10 hectares. Hence, agriculture and its allied activities play an important role in the socio -economic development of Assam and provides livelihood to a significant proportion of the population of the State. Agriculture, being the main source of livelihood of the rural population is the mainstay of the State's economy.

1.7 Irrigation in Assam

There is a considerable potential for agricultural growth in the State by increasing cropping intensity, raising crop yield and diversifying into pulses and oilseeds through irrigation. During Kharif season, uncertainty in crop production occurs due to onslaught of natural calamities like flood, storm etc. and uneven rainfall distribution. Rabi crops do not get priority in all areas and also less practiced by the farmers. Therefore, assured Irrigation along with motivation of farmers in the State is most essential.

Challenges for Development of Irrigation in Assam –

- Uneven topography of the State.
- Change of river course in respect of Surface Flow and Surface Lift Irrigation Schemes.
- Motivation of cultivators to adopt multiple cropping system in their crop field where assured irrigation is available with high yielding variety crops (HYV)
- Farmers with small landholdings

Approach towards maximum utilization of existing irrigation facilities –

For maximum utilization of existing irrigation facilities, both Irrigation & Agriculture Deptt. can formulate strategies for :

- Motivating farmers for optimum utilization of irrigation water.
- Motivating farmers to adopt the practice of multiple cropping, as well as crop rotation.
- Adopting right crops for right soil.
- Adopting low water consuming crops.

Challenges of Irrigation in Assam –

- To ensure availability of sufficient fund for upkeepment of the schemes.
- To protect the schemes from onslaught of natural calamities like flood, storm etc.
- To make provision for uninterrupted power supply for adequate hours to the electricallyoperated schemes (Surface Lift and Ground Water Lift) during crop season
- To make fund available for immediate repair of damaged canals, transformer, HT line and mechanical components at the peak period of irrigation.

State Water Profile

2.1 Assam's Water Profile

Water is a natural resource, a fundamental need of the living being and an invaluable national wealth. Planning, development and management of water resources need to be governed by national perspectives. Under the Constitution, water resource is primarily a 'State Subject', with legislation and administration substantially framed within the context of next boundaries. In the developmental planning of any State, water is decisive and multifaceted component. The geology has endowed the State with many hills and rivers. These have tremendous influence on the soil quality, drainage pattern, land-use, vegetation pattern, population pattern, culture etc. The State can be divided into three distinctive parts- the first one being long and narrow, is the Brahmaputra valley or Assam valley. The river Brahmaputra flowsfrom east to west for about 640 km within the state and has a crucial role in land formation, hydrology, ecology, demography, culture and economy of the valley and the state. The Barak, and another large river of the state, has created the Barak Valley in the southern end of the state. The Barail range and Karbi Plateau separate these two river system.

Surface Water

Apart from the rain water received, the State is endowed with number of perennial rivers and lakes locally known as beels. The State is drained by a dense network of two river systems - the Brahmaputra and the Barak. These rivers have large number of tributaries joining them from both the banks. There are about 20 important tributaries in the north bank and 13 in the south bank of the Brahmaputra River whereas thereare 11 important tributaries of the Barak River forming the drainage network in Assam. The vast potential surface water resource of the State is not yet properly utilized. In the last few decades, the rate of Consumption of water in the agricultural sector, industrial sector and in the urban centers has increasedsignificantly. The discharges of untreated domestic wastewater, industrial wastewater, runoff from the agricultural fields and the urban sewage water posing threat to the water bodies of the State.

(a) River Systems

Brahmaputra and Barak river systems are central to the State's water economy. The former is among the largest on earth in terms of discharge and sediment and is intrinsic to the socio-cultural life in Assam. It is Assam's lifeline, nurturing its topography and culture and sustaining major urban centers, including Guwahati, on its banks. The details of the two river systems follow.

(i) Brahmaputra River System

The Brahmaputra is one of the largest rivers in the world by discharge. The Brahmaputra basin covers an area of 580000 sq. km of which 194413 sq.km. falls in India in the States of Arunachal Pradesh, Assam,Nagaland, Meghalaya, Sikkim and West Bengal. Brahmaputra is a perennial river, fed by snow as well as by rain. It rolls down the plains of Assam east to west for a distance of 640 km up to Bangladesh border.Through its course, the river receives innumerable tributaries (about 33) coming out of the northern, northeastern and the southern hill ranges. The mighty river with a well-knit network of tributaries drains an area of 56,480 sq. km of the State accounting for 72% of its total geographical area. Most of the right bank tributaries of Brahmaputra are snow as well rain-fed and are perennial. Although the left bank tributaries

are mainly rain-fed, they still are perennial in nature. It is the fourth largest river in the world in terms of average water discharge at the mouth with a flow of 19,830 cumec. The river carries 82% of the annual flow during the rainy season (May through October).

(ii) Barak River System

Barak is the second largest river system in North East India as well as in Assam. The river, with a total length of 900 km from source to mouth, drains an area of 52,000 sq. km. in India and traverses a distance of 532 km up to the Indo-Bangla border. Like Brahmaputra, the Barak is also a perennial river of Assam.The important north bank tributaries of Barak River are Jiri, Sini, Madhura, Jatinga and Larang, while the important south bank tributaries include Sonai, Ghagra, Katakhal, Dhaleswan, Singla and Longai. The flows of the rivers in Assam decrease considerably during the dry season. They maintain peak flow in rainy months.

(b) Wetlands & Water Bodies

The valley of the river Brahmaputra, with its innumerable fresh water lakes (locally called beel), or ox bow lakes (era suti), marshy tracts and seasonally flooded plains and hundreds of riverine sandbars and islands was till recently an ideal wetland eco-system. However, the advent of water hyacinth has spelt doom.

Likewise, raising of embankments along the banks of almost the entire length of the river and many of itstributaries has cut off the periodic flushing out of the wetlands by the monsoon flood. The third and the final onslaught on the wetlands has taken place with the arrival of the human settlers in the sand-bars and the minor riverine islands, mostly in lower Assam. This has turned the wetlands into agricultural zones rich in rice and vegetables but rendered those denuded of biodiversity. It is imperative that these wetlands areconserved. If properly managed, the wetlands could be a source of immense wealth for Assam.

During the 1st census of water bodies, 24,24,540 nos. of water bodies have been enumerated inthe country. In Assam the number of water bodies is enumerated as 1,72,492 and is among the top fivestates in the number of water bodies having 7.1% of country's water bodies. In Assam, 97.69% (1,68,520 nos.) are ponds ,0.13% (225 nos.) are tanks, 0.057% (100 nos.) are reservoirs whereas remaining 2.11% (3,647 nos.) are water conservation schemes/check dams/percolation tanks, lakes and other water bodies.

Some of the important wetlands under this category are Deepor beel in Kamrup district, Dhir beel in Dhubri district, Tamaranga beel and Dalani beel in Bongaigaon.

(Source: i) 1st Census of water bodies
ii) SIP 2016/NABCON)

Ground Water

Along with huge surface water resources, the state has Annual Extractable Ground Water (GW) resource of 20.93 BCM. The Total Annual Groundwater Recharge of the State has been estimated as 27.26 BCM. Hence, current annual gross GW extraction for all use is 2.63 BCM. Out of 245 assessment units, 244 have been categorized as 'Safe' and one assessment unit of Kamrup (Metro) Urban is in 'Semi Critical' condition. There is no saline area in the state. As per 2022 assessment, the Total Annual Ground WaterRecharge for the State is 26.53 BCM in 2022, Annual Extractable Ground Water Resources is 21.40 BCM and Total Ground Water Extraction is 2.65 BCM.

(All GW data source: Draft Report on Dynamic Ground Water Resources of India, 2023).

2.1.1 Agricultural Crops & Production in Assam

Assam accounts for a fairly significant share of the country's farm acreage and output of many crops. Notable are paddy, rapeseed and mustard, jute and tea, potato, banana, papaya, areca nut and turmeric. Tea is the pride of Assam and not only is it the largest producer of tea in the county, it also accounts forabout 14% of the world's tea output. Assam has also emerged as an important producer in the country in many crops such as sweet potato, banana, papaya, chillies, turmeric, cabbage, cauliflower, brinjal, lemon, orange and pineapple even though less than one per cent of the cropped area in Assam is being used for cultivating each of them. There is, thus, tremendous scope for pushing the acreage under these crops and, in general, vegetables, fruits and spice crops. All of these are high-value crops widely considered to have enormous potential for Commercialization.

Assam, having diverse and unique agro-climatic conditions, is naturally rich in horticultural production and enjoys a conducive environ for growing a wide variety of horticultural crops like differenttypes of fruits, vegetables, flowers, spices, nut crops, tuber crops, medicinal and aromatic plants, mushrooms, etc. In fact, Assam is already one among 14 global biodiversity hotspots. The state has enough options for farming as well as making investments in horticulture sector. Moreover, the sector also has the capacity of offering enough opportunities for employment generation of unemployed youths of the state.

The District wise Area wise irrigation status of Assam is provided below-

Table 2.1: District Wise Irrigation Status of Assam (Upto 2022)

Sl. No.	District	Kharif (Area in ha.)			Rabi (Area in ha.)			Summer Crop (Area In ha.)			Horticulture & Plantation crop (Area in ha.)			Total (Area in ha.)		
		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
1	Baksa	32431	87147	119578	7235	28311	35546	2347	2543	4890	734	18340	19074	42747	136341	179088
2	Barpeta	5000	71958	76958	1569	40674	42243	53553	-	53553	14870	21870	36740	74992	134502	209494
3	Bongaigaon	13237	39368	52605	8138	11345	19483	_	_	_	7285	17162	24447	28660	67875	96535
4	Cachar	9742	116016	125758	9950	32017	41967	250	313	5603	-	18500	18500	19692	166533	186225
5	Charaideo	1745	33454	35199	37	703	965	4958	102	102	88	2877	2965	6828	37136	43862
6	Chirang	27270	11640	38910	4570	21130	25700	6411	6911	13322	7541	6202	13743	45792	45883	91675
7	Darrang	13537	42582	56119	12924	20261	33185	9691	6182	15873	41667	68446	110113	77819	137471	215290
8	Dhemaji	3834	89116	92950	236	33194	33430	1106	3851	4957	3374	7200	10574	8550	133361	141911
9	Dhubri	0	106766	106766	46812	36326	83138	0	0	0	19933	7175	27108	53987	163996	217012
10	Dibrugarh	0	74448	74448	530	6615	6969	98	880	298	3675	8529	12204	4303	90472	94775
11	Dima Hasao	0	1000	1000	0	1613	1613	8357	0	8357	0	2801	2801	8357	5414	13771
12	Goalpara	12500	51153	63653	6072	16408	22480	8200	0	8200	13224	11814	25038	39996	79375	119371
13	Golaghat	6000	99458	105458	704	21553	22257	8540	3397	11937	10800	17405	28205	15122	141813	156935

Source: District Agriculture Office.

Sl.	District	Kharif (Area in ha.)	Rabi (Area in ha.)	Summer Crop (Area In ha.)	Horticulture & Plantation crop (Area in ha.)	Total (Area in ha.)

No.		Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
14	Hailakandi	2793	37152	39945	1112	6200	7312	50	1543	1593	0	0	0	3955	48415	52370
15	Jorhat	1169	500	1669	1260	13550	14425	-	6450	6450	2579	13328	15550	9820	126347	136167
16	Kamrup	18068	55999	74066	16727	29042	45769	16886	3577	20463	9961	18512	28473	61642	107130	168772
17	Kamrup(M)	1540	9001	10540	256	1830	1830	6321	-	-	1031	1337	2358	1660	33870	35538
18	Karbi Anglong	971	80873	81846	1095	52354	53450	786	6641	67200	294	16243	16537	3146	215883	219029
19	Karimganj	1000	60434	61434	520	3575	4095	0	7431	7341	1260	2880	4140	1260	2880	4140
20	Kokrajhar	12000	54580	66580	2527	7011	9538	6500	15410	21910	4166	21570	25736	41867	138088	179955
21	Lakhimpur	1011	110936	111947	460	33979	34439	7200	9710	16910	1890	10864	12754	10561	122150	132711
22	Majuli	1850	14682	16532	3930	26445	30375	20	830	850	2130	4040	6170	7930	33089	41019
23	Morigaon	11412	26627	38039	15875	10770	26646	11802	17703	29504	0	297108	443254	103509	2168046	2735662
24	Nagaon	13142	115309	128451	5818	53299	59117	75486		75486	6001	21850	27851	100447	190458	290905
25	Nalbari	1419	32766	34185	1105	10341	11446	1265	5765	7030	750	14245	14995	4539	63117	67656
26	Sivasagar	2500	69283	71738	700	5802	6502	1886	2510	4396	9865	16578	36421	14951	88673	103624
27	Sonitpur	5000	71958	76958	1569	40674	42243	53553	-	53553	14870	21870	36740	74992	134502	209494
28	South Salmara Mankachar	1212	4754	5966	3358	13974	17332	2805	6995	9845	2535	2422	4957	9955	28145	38100
29	Tamulpur	4001	28503	32504	1743	6817	8560	14625	52	14677	3944	4954	8269	24313	40326	64639
30	Tinsukia	1200	34119	35319	2801	29695	32496	-	-	-	2702	10122	12823	6703	73935	80638
31	Udalguri	25305	40164	65469	29693	6953	36646	6410	4195	10605	9192	10240	19432	72179	67468	139647
32	West Karbi Anglong	19550	51995	71545	8245	21600	34761	250	958	1208	11980	11145	23125	40025	85698	130639
Total		250437	1723740	1974135	197571	644061	845958	316151	176511	476203	208341	707628	1071107	1020299	5108398	6596649

Source: District Agriculture Office

2.2. Production and Productivity of Major Crops

Production of all agricultural crops including food grains is directly related to area coverage and availabilityof irrigation. In Assam, the soil, topography, rainfall and climate in general are conducive for agriculturalactivity, especially for their cultivation of paddy. Assam has logged a good progress in rice production in the last few years and had gradually improved its overall production.

Table 2.2 - Production and Productivity of Major Crops

Sl. No.	Name of District	Rainfed		Irrigated		Total	
		Area (Ha.)	Production (Qnty./Yr.) MT	Area (Ha.)	Production (Qnty./Yr.) MT	Area (Ha.)	Production (Qnty./Yr.) MT
1	Baksa	54194	131727	4973	313885	59167	445612
2	Barpeta	134502	543147	74992	538937	209494	1082084
3	Bongaigaon	96112	409329	12872	43067	108984	452396
4	Cachar	148033	490897	19692	185517	167725	676414
5	Charaideo	37361	155567	1870	7840	39231	163406
6	Chirang	45883	123987	45792	204168	91675	328155
7	Darrang	67560	322577	38152	183107	105712	505684
8	Dhemaji	48899	6919101	9783	6919101	58682	6919101
9	Dhubri	163025	2109352	53987	1682866	217012	3792218
10	Dibrugarh	93319	538469	2424	53314	95743	591783
11	Dima Hasao	5414	7691	8357	0	13771	72138
12	Goalpara	79375	217752	39996	90148	119371	320940
13	Golaghat	141813	651441	26044	249369	167857	900810
14	Hailakandi	20228	48776	2696	4591	22930	705637
15	Jorhat	126347	601954	5542	23425	131889	625379
16	Kamrup (M)	17334	94371	1946	7869	19279	102240
17	Kamrup	107130	287561	61642	181662	168771	469223
18	Karbi Anglong	219554	1176893	87821.6	470759	307375.6	1647652
19	Karimganj	60434	159244	1000	2635	61434	161879
20	kokrajhar	98028	265326	49252	133606	147280	398932
21	Lakhimpur	180651	668769	10561	63281	191212	3810013
22	Majuli	33089	33089	7930	7931	41019	41019
23	Morigaon	117304	495066	46276	581057	163580	1076123
24	Nagaon	190458	727493	100447	511158	290905	1238651
25	Nalbari	31434	93979	25017	74591	56451	168570
26	Sivasagar	94692	452387	12165	184970	106857	637357
27	Sonitpur	134502	486393	74992	245585	165609	1370405
28	South Salmara Mankachar	33095	180236	8088	165635	41183	345871
29	Tamulpur	40326	154924	24313	103961	64639	258885
30	Tinsukia	73935	99978	6703	7848	80638	285026
31	Udalguri	109157	928477	109424	1253464	218581	2181941
32	West Karbi Anglong	80090	329683	44804	202712	124894	532395

Source: District Agriculture Office, District Agriculture Contingency Plan and des.assam.gov.in

2.3. Irrigation Based Classification

The economy of Assam is predominantly agriculture based. The total geographical area of the State is **78,438 km²**. 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 global warming, ecological imbalance and erratic monsoon, the rainfall is not taking place at right time to help 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. The total gross irrigated area of Assam is **1237657 Ha** and the net irrigated area was found to be **822215 Ha**.

Table 2.3: District wise Irrigation Based Classification

Sl. No.	District	Irrigated (Area in Ha.)		Rainfed (Area in Ha.)	
		Gross Irrigated Area	Net Irrigated Area	Partially Irrigated / Protective Irrigation	Un-Irrigated or Totally Rainfed
1	*2*	*3*	*4*	*5*	*6*
1	Baksa	10859	9583	–	41922
2	Barpeta	74992	54628	–	134502
3	Bongaigaon	28660	17164	–	67875
4	Cachar	29508	19692	_	105303
5	Charaideo	6828	3869	–	37136
6	Chirang	48382	27270	10823	80713
7	Darrang	38608	14667	–	102060
8	Dhemaji	8550	5491	–	99273
9	Dhubri	53987	40553	540	163996
10	Dibrugarh	23335	12964	_	114349
11	Dima Hasao	8357	5954	_	5414
12	Goalpara	39996	19367	_	79375
13	Golaghat	26044	15122	_	141813
14	Hailakandi	4671	3442	1229	49891
15	Jorhat	14545	8078	N/A	126347
16	Kamrup	61642	42468	4078	107130
17	Kamrup(M)	22212	15845	_	5269
18	Karbi-Anglong	249640	183125	_	111885
19	Karimganj	4250	2260	4250	60434
20	Kokrajhar	58931	41867	0	137141
21	Lakhimpur	16369	10561	5898	122150
22	Majuli	7930	5500	1589	32500
23	Morigaon	14567	9356	–	53106
24	Nagaon	100447	81304	_	190458
25	Nalbari	67656	28188	_	37420
26	Sivasagar	5970	4274	–	87294
27	Sonitpur	74174	42157	–	122972

Sl. No.	District	Irrigated (Area in Ha.)		Rainfed (Area in Ha.)	
		Gross Irrigated Area	Net Irrigated Area	Partially Irrigated / Protective Irrigation	Un-Irrigated or Totally Rainfed
1	*2*	*3*	*4*	*5*	*6*
28	South Salmara-Mankachar	7420	5082	108	37549
29	Tamulpur	24313	12422	–	50897
30	Tinsukia	6102	4619	–	92258
31	Udalguri	58687	46949	–	123538
32	West Karbi-Anglong	40025	28394	_	85698
Total		**1237657**	**822215**	**28515**	**2807668**

Source : District Agriculture offices.

Water Availability in Assam

3.1 Overview of Water Resources in Assam

3.1.1 Rainfall

Bulk of the water in the State, both surface and groundwater is obtained from rainfall. Assam experiences the predominant influence of the south-west tropical monsoon which reigns from April to October with occasional winter showers. The low clouds of the southwest monsoon after being intercepted by the North Cachar Hill range and Naga Patkai range, cause heavy rainfall in the southern part of Assam and also intercepted by eastern Himalayan range, resulting precipitation in the Brahmaputra valley; their intensity increasing towards the foothills of the Himalayas. The approach of the monsoon begins during April and May and starts its full play of heavy showers from June. The water availability in various districts of Assam is shown in the Table-3.1(a).

Table 3.1(a): District-wise, Crop season wise Water Availability of Assam.

(BCM/Ha)

Sl. No.	District	Sources	Kharif	Rabi	Summer	Total
1	Baksa	Surface Water	0.26629	0.00171	0.00452	0.01379
		Ground Water				
2	Barpeta	Surface Water	0.00013	0.00025	0.00132	0.00170
		Ground Water	0.00015	0.00029	0.00154	0.00198
3	Bongaigaon	Surface Water	0.223	0.0045	0.014	0.0408
		Ground Water	0.0053	0.0029	0.004	0.0122
4	Cachar	Surface Water	0.00623	0.00045	0.00095	0.00763
		Ground Water	0.00014	0.00028	0.00017	0.00059
5	Charaideo	Surface Water	0.00043	0.00014	0.00126	0.00183
		Ground Water	0.00031	0.00017	0.00158	0.00206
6	Chirang	Surface Water	0.000068	0.00001	0.00053	0.00061
		Ground Water	0.000059	0.00012	0.00063	0.00081
7	Darrang	Surface Water	0.00018	0.000097	0	0.00028
		Ground Water	0.00018	0.000088	0	0.00027
8	Dhemaji	Surface Water	0.252	0.133	0.222	0.607
		Ground Water	0.7	0.4	0.8	0.19
9	Dhubri	Surface Water	0.01251	0.01106	0.01114	0.03471
		Ground Water	0.06143	0.01023	0.03384	0.10547
10	Dibrugarh	Surface Water	0.38564	0.098	0.0315	0.51514
		Ground Water	0.0905	0.03	0.09027	0.21077

Sl. No.	District	Sources	Kharif	Rabi	Summer	Total
11	Dima Hasao	Surface Water	0.0973	0	0	0.0973
		Ground Water	0.08596	0	0	0.08596
12	Goalpara	Surface Water	0.140879	0.06049	0.120612	0.321981
		Ground Water	0.03	0.011	0.03	0.071
13	Golaghat	Surface Water	1.54	0.382	0	1.93
		Ground Water	0.885	0.271	0	1.156
14	Hailakandi	Surface Water	0.00145	0.00223	0.00089	0.00457
		Ground Water	0.000056	0.000080	0.00003	0.00017
15	Jorhat	Surface Water	0.0386	0.0186	Nil	0.0522
		Ground Water	0.1251	0.1087	Nil	0.0792
16	Kamrup	Surface Water	0.033	0.042	0.03	0.105
		Ground Water	0.008	0.009	0.006	0.023
17	Kamrup(M)	Surface Water	0.0002	0.00175	0.012	0.01395
		Ground Water	0.00025	0.00195	0.01329	0.01550
18	Karbi-Anglong	Surface Water	1.7244	0.252	1.7244	3.7008
		Ground Water	0.0161	0.0129	0.0161	0.0451
20	Karimganj	Surface Water	0.00012	0.0009	0	0.001021
		Ground Water	0.00027	0.000044	0.00022	0.00054
21	Kokrajhar	Surface Water	6.379	2.364	6.33	9.376
		Ground Water	3.223	5.932	3.025	12.18
22	Lakhimpur	Surface Water	0.00264	0.002029	0.000791	0.005455
		Ground Water	0.003212	0.002473	0.000963	0.006648
23	Majuli	Surface Water	0.00065	0.000063	0.000125	0.000838
		Ground Water	0.00312	0.00141	0.00202	0.00665
24	Marigaon	Surface Water	0.000016	0.000276	0	0.000436
		Ground Water	0.002444	0.003574	0	0.006018
25	Nagaon	Surface Water	0.00566	0.00256	0.00608	0.0143
		Ground Water	0.002	0.0066	0.01	0.0186
26	Nalbari	Surface Water	8.2984	1.0189	2.5472	11.8645
		Ground Water	0.0104	0.018	0.0013	0.01
27	Sivasagar	Surface Water	0.000115	0.000214	0.001251	0.001501
		Ground Water	0.000174	0.0002695	0.001453	0.001785
28	Sonitpur	Surface Water	0.000127	0.000252	0.001322	0.0017004
		Ground Water	0.000148	0.000294	0.001539	0.00198
29	South Salmara-Mankachar	Surface Water	2.087579	0.256481	0.640939	2.985
		Ground Water	0.2511	0.0503	0.1256	0.427
30	Tamulpur	Surface Water				
		Ground Water				
31	Tinsukia	Surface Water	0.000625	0.0010625	0	0.001688
		Ground Water	0.0001466	0.000249	0	0.0003956

Sl. No.	District	Sources	Kharif	Rabi	Summer	Total
32	Udalguri	Surface Water	0.000000244	0.0000000974	0	0.0000003409
		Ground Water	0.00000000729	0.00000000292	0	0.00000001012
32	West Karbi Anglong	Surface Water	0	0	0	0.5061
		Ground Water	0.372	0.056	0.372	0.8

Source: Irrigation Department, CGWB & North Eastern Region.

In terms of volume, since a rainfall of 1 mm would translate into 1 litre of rainwater every square meter of 10,000 litres per hectare, a rainfall of 1906 mm would translate into 1906 litres of rain water every square meter or 19.06 million litres per hectare or 1.906 hectare meter (one hectare meter of water is equal to 10 million litres or 1.906 hectare meter /0.1906 square km is equal to 19.06 million litres). Thus, for the State as a whole with the total geographical area of 78,438 square kilometers (or 78,43,800 hectares) which would be the catchment area, the gross volume of water through the average annual rainfall would be 19.06 million litres X 78,43,800. Even if 20% of the above precipitation is discounted towards evaporation, runoff and transpiration, there would still be enough water coming through rainfall providedthere is no heterogeneous or skewed rainfall distribution. Thus, the amount of rainfall in Assam is adequate for suitable runoff, accumulation and ground water recharge, compared to many other States of India.

3.1.2 Ground Water Resources

Ground water plays a key role in meeting the water needs of various user-sectors in India. Therehas been a growing dependability on ground water as a sustainable resource. In India, more than 90% of the rural population and nearly 30% of the urban population depend on groundwater for drinking purpose. Ground water is replenished naturally by surface water from precipitation, streams and rivers. However, unplanned urbanization coupled with rapid population growth has started exerting tremendous pressureboth on the surface and sub-surface water resources. Unprecedented population growth affects the hydrological cycle resulting in less sub-surface infiltration rate and higher volume of surface water runoff. Assam is one of the rich States of the country in terms of the ground water development potentiality. The entire Brahmaputra valley, covering more than 70% of the total geographical area of the State, containsprolific aquifer system with water table lying within 5 m of land surface. The Barak valley also has a good potential for development of ground water. The present stage of ground water development, even in the Brahmaputra valley which is the most populous part of the State, is nothing but in a nascent stage. Hydro geologically, Assam can be divided into three units-consolidated formation, semi-consolidated formationand unconsolidated formation. More than 75% of the State is underlain by unconsolidated formation comprising of clay, silt, sand, gravel, pebble and boulders.

Table 3.1 (b): Ground Water Scenario of Assam

Dynamic Ground Water Resources of Assam	
Total Annual Groundwater Recharge	27.26 BCM
Annual Extractable Groundwater Resources	20.93 BCM
Annual Ground Water Extraction for all uses	2.63 BCM
Net Ground Water Availability for future use	18.27 BCM
Stage of Ground Water Extraction	12.54 %
Semi Critical	Kamrup (Metro)
Saline area in the state	Nil

(Source: DYNAMIC GROUND WATER RESOURCES OF INDIA, 2022 ; C.G.W.B & North Easter Region)

Besides, high concentration of iron above the permissible limit of 1.0 mgA has been found in some parts of the state, namely Cachar, Darrang, Dhemaji, Dhubri, Goalpara, Golaghat, Hailakandi, Jorhat, Kamrup, Karbi Anglong. Karimganj, Kokrajhar, Lakhimpur, Morigaon, Nagaon, Nalbari, Sibsagar, Sonitpur as per data available with Central Ground Water Board, Assam.

The annual rechargeable ground water resource is contributed by two major sources -rainfall and other sources that include canal seepage return flow from irrigation, seepage from water bodies and artificial recharge due to water conservation structures. The overall contribution of rainfall to country's annual rechargeable ground water resource is nearly about 67% and the share of other sources taken together is nearly about 33%. Southwest monsoon being the most prevalent contributor of rainfall in thecountry, about 73% of country's Annual Rechargeable Ground Water Recharge takes place during the Kharif period of cultivation. In general, the irrigation sector remains the main consumer of ground water.*(Source: DYNAMIC GROUND WATER RESOURCES OF INDIA, 2022 & C.G.W.B)*

3.1.3. 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. Emphasis is to be given for deriving the potential benefit 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 headwork 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 canals/tanks, Diversion channels, Rain water harvesting structures and Ground water extraction structures such as bore wells. The Status of Ground Water Availability for all the districts of Assam is shown below –

Table 3.1(c): Status of Ground Water Availability

Sl. No.	District	District wise Ground Water Availability Status					
		Status of Block as per Central Ground Water Notification			Ground Water (MCM)		
		Critical	Semi Critical	Safe	Draft	Recharge	Gap
1	Baksa	---	---	Safe	452.44	1479.111	-1044.67
2	Barpeta	---	---	Safe	282.657	1017.1899	-734.532
3	Bongaigaon	---	---	Safe	577.66	1430.21	-852.54
4	Cachar	---	---	Safe	39.21	966.99	-927.78
5	Charaideo	---	---	Safe	10.17	552.52	-449.35
6	Chirang	---	---	Safe	24.97	1011.66	-986.69
7	Darrang	---	---	Safe	51.61	1754.32	-1702.71
8	Dhemaji	---	---	Safe	140.65	1355.22	-1214.57
9	Dhubri	---	---	Safe	281.82	1063.369	-781.552
10	Dibrugarh	---	---	Safe	266.76	1889.11	-1622.35
11	Dima Hasao	---	---	Safe	5.7138	629.264	-623.551
12	Goalpara	---	---	Safe	123.91	730.015	-606.10
13	Golaghat	---	---	Safe	58.91	1261.9	-1202.98
14	Hailakandi	---	---	Safe	201.19	342.79	-141.60
15	Jorhat	---	---	Safe	732.31	1019.03	-286.72
16	Kamrup	---	---	Safe	715.97	1847.29	-1131.32
17	Kamrup (M)	---	---	Safe	715.97	1847.29	-1132.29
18	Karbi-Anglong	---	---	Safe	29.78	1363.24	-1333.45
19	Karimganj	---	---	Safe	28.36	472.87	-444.51
20	Kokrajhar	---	---	Safe	80.52	1590.36	-1,509.84
21	Lakhimpur	---	---	Safe	45.81	1262.55	-1216.73
22	Majuli	---	---	Safe	171.09	1128.33	-957.24
23	Morigaon	---	---	Safe	281.89	767.85	-485.96
24	Nagaon	---	---	Safe	719.32	1844.61	-1125.29
25	Nalbari	---	---	Safe	204.68	499.8	-295.12
26	Sivasagar	---	---	Safe	187.04	1316.33	-1129.29
27	Sonitpur	---	---	Safe	10.47	1786.67	-1776.2
28	South Salmara-Mankachar	---	---	Safe	52.20	427.00	-374.80
29	Tinsukia	---	---	Safe	166.97	1590.36	-1423.39
30	Tamulpur	---	---	---			
31	Udalguri	---	---	Safe	82.09	637.38	-555.29
32	West Karbi Anglong	---	---	Safe	382.00	1115.89	-733.89

Source: Dynamic Ground Water Resources of India, 2022 ; CGWB & North Eastern Region.

3.2 Status of Command Area

The Command Area Development (CAD) programme was initiated in 1974-75 with a view to bridging the gap between the potential created and its utilization and optimizing agricultural productivity through better management of land and water use in the command areas served by selected majo r and medium irrigation projects. The status of command area development in the State is shown in Table 3.2.

Table 3.2: Status of Command Area (In Hectare)

SL. NO.	DISTRICT	INFORMATION OF CANAL COMMAND			INFORMATION ON THE OTHER SERVICES COMMAND			TOTAL AREA	
		TOTAL AREA	DEVELOPED AREA	UNDEVELOPED AREA	TOTAL AREA	DEVELOPED AREA	UNDEVELOPED AREA	DEVELOPED AREA	UNDEVELOPED AREA
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1	Baksa	50147	12535	37612	0	0	0	12535	37612
2	Barpeta	28355	24068	4287	1536	1452	84	25604	4371
3	Bongaigaon	1730	850	880	0	0	0	850	880
4	Cachar	14617	9742	4875	9950	9950	0	19692	4875
5	Charaideo	1975	790	1185	1520	1520	0	2310	1185
6	Chirang	40905	27270	13635	0	0	0	27270	13635
7	Darrang	4433	1950	2483	3666	1511	2155	5616	4638
8	Dhemaji	84629	8463	76166	0	0	0	8463	76166
9	Dhubri	4022	2308	1714	483	483	0	2791	1714
10	Dibrugarh	7072	1061	6011	4670	3623	1047	5731	7058
11	Dima Hasao	3599	773	2826	0	0	0	773	2826
12	Goalpara	8822	2755	6067	2835	659	2026	5590	8093
13	Golaghat	6143	4443	1700	3332	3282	50	7775	1750
14	Hailakandi	475	475	0	0	0	0	475	0
15	Jorhat	1835	1835		580	2206		2415	0
16	Kamrup	65879	54870	11009	30890	15564	5539	85760	16548
17	Kamrup (M)	3895	1794	2101	5396	2182	3214	7190	5315
18	Karbi Anglong	63409	31711	31698	3255	1075	2180	34966	33878
19	Karimganj	3870	1890	1980	2260	1844	430	4150	2410
20	Kokrajhar	31915	24885	7030	2930	2330	600	27815	7630
21	Lakhimpur	4150	216	3934	6411	6411		6627	3934
22	Majuli	385	0	385	10730	6258	4172	10730	4557
23	Morigaon	8686	1593	7093	2047	517	1530	3640	8623
24	Nagao	66555	37951	28304	5213	2065	3148	43164	31452
25	Nalbari	67656	1650	66006	0	0	0	1650	66006

SL. NO.	DISTRICT	INFORMATION OF CANAL COMMAND			INFORMATION ON THE OTHER SERVICES COMMAND			TOTAL AREA	
		TOTAL AREA	DEVELOPED AREA	UNDEVELOPED AREA	TOTAL AREA	DEVELOPED AREA	UNDEVELOPED AREA	DEVELOPED AREA	UNDEVELOPED AREA
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
26	Sivasagar	2939	163	2776	2955	1593	1442	3118	4218
27	Sonitpur	11171	1074	10097	0	0	0	1074	10097
28	South Salmara ManKachar	13207	1725	11482	400	400	0	2125	11482
29	Tamulpur	43249	22681	20568	0	0	0	22681	20568
30	Tinsukia	2481	570	1911	5708	3387	2321	6278	4232
31	Udalguri	170487	61132	109355			0	61132	109355
32	West Karbi Anglong	55128	46945	8183	0	0	0	46945	8183
Total		**873820**	**390168**	**483353**	**106767**	**68312**	**29938**	**496935**	**513291**

The Irrigation Department is the nodal authority of the Government of Assam responsible for harnessing water resources by constructing Weirs/Headworks and networks of water carrier system/canal. The ultimate irrigation potential in Assam has been assessed as 27.00 lakh hectares by the Irrigation Department of the State. This potential is planned to be covered in a phased manner by harnessing the rich surface water and ground water resources of the State. Irrigation Department executes and maintains Major schemes (potential above 10,000 hectare), Medium schemes (potential from 2,000 hectare 10,000 hectares) and Minor surface water schemes (potential below 2,000 hectares). It is planned to provide irrigation facilities to 17 lakh hectares of cropped area through Minor Irrigation schemes and remaining 10 lakh hectares through Major and Medium Irrigation projects out of the ultimate irrigation potential. The area to be covered by Minor Irrigation schemes (17 lakh hectares) is further categorized as 10 lakh hectare from ground water resources and remaining 7 lakh hectares from surface water resources.

3.3 Existing Type of Irrigation

In Assam, a lot of work to be done in Irrigation sector although there are number of Major, Medium and Minor Irrigation Projects already taken up. There is a general misconception that since Assam is a heavy rainfall state, there is hardly any need for irrigation. Although the state usually receives good rainfall almost every year spreading over eight months (March to October), it is not evenly distributed over timeand space. Sometimes, monsoon is delayed or terminates early. The erratic nature of rainfall results in flood and drought, which adversely affects agricultural productivity. Also, there are certain specific areaswhich fall under rain-shadow belt. Agriculture in Assam, thus, seems to be a gamble in monsoon. Apartfrom these, the most discouraging aspect of irrigation development in the state is the decreasing trend of utilization of created potential from the irrigation schemes.

In surface irrigation category, canal based irrigation is a prominent source of irrigation in the state while in ground water category, the major source of irrigation is tube wells. Existing Irrigation Projects inAssam are shown in **Table-3.3(a) & Table 3.3(b).**

Table 3.3(a): Existing Type of Irrigation (In Numbers)

SL. NO.	DISTRICT	SURFACE IRRIGATION		GROUND WATER			WATER EXTRACTION DEVICES/LIFT				GRAND TOTAL
		CANAL BASED		TUBE WELLS (Govt.)	OPEN WELLS	BORE WELLS (Govt.)	ELECTRICITY PUMP	DIESEL PUMP	SOLAR	TOTAL	
		GOVT. CANAL	COMMUNITY / PVT CANAL								
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1	Baksa	103	0	15	0	0	20	0	58	78	118
2	Barpeta	180	0	431	0	46	330	0	226	556	657
3	Bongaigaon	9	0	225	0	2	37	56	27	120	236
4	Cachar	61	0	1007	0	1	10	0	0	10	1078
5	Charaideo	2	0	215	0	0	6	0	0	6	223
6	Chirang	88		75	0	0	1	0	0	0	163
7	Darrang	37	0	313	0	0	152	0	161	313	350
8	Dhemaji	18	0	315	0	0	222	0	83	305	328
9	Dhubri	30	0	64	0	6	125	0	61	186	100
10	Dibrugarh	29	0	303	0	147	268	9	202	479	479
11	Dima Hasao	38	0	0	0	0	0	0	0	0	38
12	Goalpara	44	0	101	0	0	63	0	55	118	145
13	Golaghat	18	0	147	0	0	103	0	65	168	165
14	Hailakandi	19	0	270	0	0	381	1446	69	1896	289
15	Jorhat	53	0	238	0	0	270	16	208	494	291
16	Kamrup	112	1	1103		433	260	0	0	260	1641

SL. NO.	DISTRICT	SURFACE IRRIGATION		GROUND WATER			WATER EXTRACTION DEVICES/LIFT				GRAND TOTAL
		CANAL BASED		TUBE WELLS (Govt.)	OPEN WELLS	BORE WELLS (Govt.)	ELECTRICITY PUMP	DIESEL PUMP	SOLAR	TOTAL	
		GOVT. CANAL	COMMUNITY / PVT CANAL								
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
17	Kamrup (M)	23	-	101	-	-	51	-	48	99	124
18	Karbi Anglong	154	0	328	0	0	16	0	0	18	442
19	Karimganj	43	0	565	0	0	420	0	155	574	608
20	Kokrajhar	156	0	291	0	0	147	0	144	291	447
21	Lakhimpur	26	0	543	0	0	391	0	152	543	569
22	Majuli	5	0	1235	0	0	91	1065	79	1235	1240
23	Morigaon	62	0	422	0	0	342	0	143	485	484
24	Nagao	53	0	458	0	129	273	0	128	401	511
25	Nalbari	21	0	737	0	0	693	0	115	808	758
26	Sivasagar	24	0	322	0	0	33	1	0	34	346
27	Sonitpur	23	0	853	0	853	435	0	419	854	879
28	South Salmara ManKachar	7		105			5075	14950	830	20855	112
29	Tamulpur	67	0	62	0	0	0	0	0	0	129
30	Tinsukia	9	0	0	0	854	574	89	191	1004	863
31	Udalguri	271	5598	38		11	3			3	5916
32	West Karbi Anglong	181	0	150	0	0	116	0	0	0	177
Total		**1966**	**5599**	**11032**	**0**	**2482**	**10908**	**17632**	**3619**	**32193**	**19906**

Table 3.3(b): Existing Type of Irrigation (Command Area In Ha)

SL. NO.	DISTRICT	SURFACE IRRIGATION		GROUND WATER			GRAND TOTAL
		CANAL BASED					
		GOVT. CANAL	COMMUNITY / PVT. CANAL	TUBE WELLS (Govt.)	OPEN WELLS	BORE WELLS (Govt.)	
1	*2*	*3*	*4*	*5*	*6*	*7*	*12*
1	Baksa	13551	0	160	0	0	13711
2	Barpeta	15042	0	2212	0	446	17700
3	Bongaigaon	484	0	1161	0	20	1665
4	Cachar	15020	0	4006	0	30	19026
5	Charaideo	141	0	1520	0	0	3495
6	Chirang	26767	0	248	0	0	27270
7	Darrang	34540	0	1252	0	0	35792
8	Dhemaji	1582	0	1260	0	0	2842
9	Dhubri	2316	0	841	0	0	3157
10	Dibrugarh	7072	0	2270	0	2400	11742
11	Dima Hasao	9470	0	0	0	0	9470
12	Goalpara	5338	0	881	0	0	6219
13	Golaghat	6475	0	4002	0	0	10447
14	Hailakandi	235	0	270	0	0	505
15	Jorhat	3606	0	34448	0	0	9258
16	Kamrup	14853	0	4122		900	19875
17	Kamrup (M)	9672	-	434	-	-	10106
18	Karbi Anglong	36486	0	1710	0	0	38338
19	Karimganj	3870	0	2260	0	0	6130
20	Kokrajhar	23400	0	1164	0	0	24564
21	Lakhimpur	4150	0	6411	0	0	10561
22	Majuli	736	0	8520	0	0	9256
23	Morigaon	6847	0	2660	0	0	9507
24	Nagaon	47153	0	2133	0	1928	49286
25	Nalbari	1060	0	4658	0	0	5718
26	Sivasagar	163	0	1593	0	0	1756
27	Sonitpur	30298	0	3412	0	0	33710
28	South Salmara ManKachar	295		420			715
29	Tamulpur	21883	0	798	0	0	22681
30	Tinsukia	2481	0	0	0	5708	8189
31	Udalguri	74370		770		390	75595
32	West Karbi Anglong	46345	0	600	0	0	46945
Total		**465701**	**0**	**96196**	**0**	**11822**	**545231**

Water Requirement / Demand

The earlier Chapters dealt with the general profile, water profile and water availability in the State of Assam. This Chapter now deals with the current (2022) and projected (2027) demand for water from various sectors. The demand has been worked out on the basis of the data collected from different departments which has already been presented in previous Chapters. For practical considerations, the unit for volume of water has been chosen as Million Cubic Meters (MCM) instead of Billion Cubic Meters (BCM). MCM would denote the volume of water that would fill up an imaginary cube with edges one meter in length (about 1000 litres) and then multiplied a million times. With conversion, one MCM of water would also be equal to 100 hectare meters.

4.1 Domestic Water Demand of the State

This includes the water requirement by the households for the purposes such as drinking, cooking, bathing, lawn sprinkling, gardening, sanitary purposes, etc. The amount of domestic water consumption per person shall vary according to the living conditions. The total domestic water demand shall be equal to the total population multiplied by the desirable level of per capita domestic consumption. It has been assumed that per capita daily water requirement of people residing in urban areas of the State is **135 LPCD (litres per capita per day)** and for population in rural areas, the daily per capita water requirement is **115 litres**.

4.1.1 Domestic Water Demand

Table 4.1 indicates the district-wise projection of water demand in the year 2027 for which the actual decadal growth rate of each district in 2011 Census has been reckoned. In the hilly catchment of the upstream of Assam plains, natural springs and dug wells are generally the preferred means of fulfilling the needs of freshwater for the present population. In hilly areas most of the drinking water isharnessed from springs, streams, rivers, ponds and natural water bodies. In valleys, major portion of the domestic water is harnessed from ground water, predominantly through shallow tube wells and dug wells. Although there is abundant surface water in Assam, ground water continues to play a significant role in meeting the water demands of most communities in the State, especially those in the rural areas, with tube wells and dug wells as the most common means to access water.

Table 4.1: District wise Domestic Water Demand

SL. NO.	DISTRICT	POPULATION IN 2011	WATER DEMAND IN 2022	PROJECTED POPULATION IN 2027	PROJECTED WATER DEMAND IN 2027 (MCM)
1	*2*	*3*	*4*	*5*	*6*
1	Baksa	530674	32.26	735459	44.71
2	Barpeta	1672084	101.63	2255566	110.40
3	Bongaigaon	715433	35.25	789088	38.88
4	Cachar	1912327	9.90	2105090	10.90
5	Charaideo	407532	16.28	469603	16.56
6	Chirang	542456	30.06	644717	31.77
7	Darrang	884010	35.85	1221973	60.21
8	Dhemaji	657462	39.69	851835	41.95
9	Dhubri	1609393	100.62	2292498	112.94
10	Dibrugarh	1326335	66.40	8931814	120.60
11	Dima Hasao	214102	12.98	286048	14.09
12	Goalpara	939120	58.67	1326627	65.38
13	Golaghat	1066888	54.00	1294787	58.65
14	Hailakandi	659296	39.40	800715	0.0035
15	Jorhat	741003	1413868	42.17	51.60
16	Kamrup	1484028	41.12	1693573	53.50
17	Kamrup (M)	203618	5.92	237236	6.91
18	Karbi Anglong	571295	30.60	763521	37.72
19	Karimganj	1228686	54.25	1691628	59.13
20	Kokrajhar	887142	51.32	1082313	55.79
21	Lakhimpur	1176459	27.91	1280923	30.38
22	Majuli	167304	8.77	198422	9.76
23	Morigaon	788417	35.40	1115216	40.71
24	Nagaon	2823768	139.13	3951408	194.75
25	Nalbari	771639	24.24	854906	26.83
26	Sivasagar	692435	36.60	693264	38.15
27	Sonitpur	1794211	84.70	2183263	106.00
28	South Salmara ManKachar	588183	746110	817809	31.44
29	Tamulpur	77241	3.60	123585	7.40
30	Tinsukia	1063186	26.18	1555474	31.18
31	Udalguri	799206	119.30	926187	125.04
32	West Karbi Anglong	300836	16.20	337227	17.50

4.2 Crop Water Requirement

Water requirement of a crop denotes the total quantity and the way in which crop requires water, from the time it is sown 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, 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. Water is needed mainly to meet the demands of evaporation (E), transpiration (T) and metabolic needs of the plants, which is together known as consumptive use (CU). Since water used in the metabolic activities of plant is negligible, being only less than one percent of quantity of water passing through the plant, evaporation (E) and transpiration (T),

i.e. ET is directly considered as equal to consumptive use (CU). In addition to ET, water requirement(WR) includes losses during the application of irrigation water to field (percolation, seepage and runoff) and water required for special operation such as land preparation, transplanting, leaching, etc.

WR = CU+ application losses + water needed for special operations

Water requirement (WR) is, therefore, **demand** and the supply would consist of contribution from irrigation (IR), effective rainfall (ER) and soil profile contribution including that from shallow water tables (S)

WR= IR+ ER + S

Under field conditions, it is difficult to determine evaporation and transpiration separately. They areestimated together as evapo-transpiration (ET). It is, thus clear that

Irrigation Water Need = Crop water need - Available rain fall.

Water requirement of crop is the quantity of water regardless of source, needed for normal cropgrowth and yield in a period of time at a place and may be supplied by precipitation or irrigation or both. The crop water need always refers to a crop grown under optimal conditions, i.e. a uniform crop, actively growing, completely shading the ground, free of diseases, and favorable soil conditions (including fertility and water). The crop, thus, reaches its full production potential under the given environment. The crop water need mainly depends on:

- The climate-in a sunny and hot climate, crops need more water per day than in a cloudy andcool climate;
- The crop type-crops like maize or sugarcane need more water than crops like millet or sorghum;
- The growth stage of the crop -fully grown crops need more water than crops that have justbeen planted.

Broadly, the crops can be categorized into 3 groups - crops whose water requirement is low, crops with mid level water requirement and crops where the water requirement is very high.

(a) Low Water Requirement Plants

Plants that require low levels of water are often called drought-tolerant. Drought-tolerant plants can thrive in hot, dry conditions with very little water. They include both perennials and annuals. Most drought tolerant plants only have to be hand-watered when they are planted and while they are establishing themselves. After that, they can be left to the natural cycle of the elements.

(b) Mid-Level Water Requirement Crops

Most plants land in this range when it comes to water requirements. These plants do not need to be watered every day, but they need to be watered when the soil has been dry for over a week or two. Sometimes these plants are classified as plants lying in the "occasional water zone". Rice, wheat, pulses and oilseeds are mainly covered under this category in Assam.

(c) High Water Requirement Plants

Some plants require large amounts of water. The soil for these plants should always be kept moist. Standing water is not a concern for these plants, so you don't have to worry about root rot. Perennials are especially good for wet areas because they do not have to be replanted year after year, which can be difficult in marshy areas. Most annual flowering plants also do well in constantly moist soil. Somewater-thirsty crops are (litres/kg of crop) Cotton (7000-29000 litres), Rice (3000-5000 litres), Sugarcane (1500-3000), Soya (2000 litres), etc. The crop water requirement of the state is shown in Table 4.2 below.

Table 4.2: Crop Water Requirement

SL. NO.	DISTRICT	AREA SOWN (Ha)	IRRIGATED AREA (Ha)	CROP WATER DEMAND (MCM)	WATER POTENTIAL REQUIRED (MCM)	EXISTING WATER POTENTIAL (MCM)	WATER POTENTIAL TO BE CREATED (MCM)
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	Baksa	84186	8239	540.60	540.60	53.00	487.80
2	Barpeta	135707	74992	726.85	532.08	194.77	337.31
3	Bongaigaon	71108	6665	456.67	456.67	234.67	221.99
4	Cachar	186225	12450	16650	3738.36	2405.22	1333.14
5	Charaideo	43138	6828	431.38	431.38	68.28	363.11
6	Chirang	51400	27270	653.87	567.73	169.47	379.89
7	Darrang	92830	14667	1167.44	1167.44	389.57	777.88
8	Dhemaji	104764	5491	628.54	625.24	3.29	621.95
9	Dhubri	135839	53987	1343	1438.46	309.57	1002.45
10	Dibrugarh	127313	11846	566.08	566.08	21.57	567.71
11	Dima Hasao	42219	8357	126.65	101.58	25.07	76.51
12	Goalpara	72377	26772	1115	568	316.00	252.00
13	Golaghat	157099	15122	916	729	754.00	25.00
14	Hailakandi	67532	4409	4650	784	32.05	721.90

SL. NO.	DISTRICT	AREA SOWN (Ha)	IRRIGATED AREA (Ha)	CROP WATER DEMAND (MCM)	WATER POTENTIAL REQUIRED (MCM)	EXISTING WATER POTENTIAL (MCM)	WATER POTENTIAL TO BE CREATED (MCM)
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
15	Jorhat	13528	7413	135.28	1328.09	74.13	61.15
16	Kamrup	186512	53367	1197.90	1197.90	342.70	855.10
17	Kamrup (M)	26256	9330	236.18	183.51	52.68	130.83
18	Karbi Anglong	361525	249640	1808	1808	1248.00	559.43
19	Karimganj	72957	9540	932.06	932.06	57.85	877.11
20	Kokrajhar	179955	58931	850	392.37	178.69	213.68
21	Lakhimpur	132711	10561	89.29	89.29	13.66	75.63
22	Majuli	20091	1952	200.91	200.91	19.52	181.39
23	Morigaon	67751	26815	677.51	677.51	268.14	409.36
24	Nagaon	219230	100447	785.44	785.44	359.88	425.56
25	Nalbari	103231	18734	663.01	663.01	120.32	542.69
26	Sivasagar	94295	5622	942.95	942.95	56.22	886.73
27	Sonitpur	151867	42157	279.80	279.80	147.28	132.52
28	South Salmara ManKachar	38782	7420	142.57	142.57	31.35	111.21
29	Tamulpur	62081	22681	398.73	253.06	145.67	156.03
30	Tinsukia	130705	5762	248.77	248.77	17.19	231.58
31	Udalguri	170487	58687	170.49	111.80	89.93	27.87
32	West Karbi Anglong	59448	40025	353.50	353.50	158.00	195.50
Total		**3463149**	**1006179**	**40084.46**	**22837.2**	**8357.74**	**13242.0**

4.2.1 Technical Concepts

An understanding of the following technical aspects would give a better perspective:

(a) "Base Period"

It represents the whole period of cultivation from the time when irrigation water is first provided for ground preparation to the time when it is provided last just before the harvesting.

(b) "Duty"

"Duty' represents the irrigating capacity of a unit of water. Duty of a water simply expresses the number of hectares of land that can be irrigated for the full growth of the given crop by supplying 1 cumec water (cubic meter per second, as a unit of rate of flow of water) continuously during the entire **"base period"** of that crop. It is the relationship between the area of the crop irrigated and the quantity of the irrigation water required during the entire crop period.

(c) "Delta"

Delta is the total quantity of water required for any crop during its base period for its full-fledged nourishment when expressed in depth of water (.e. in 'cm' or in "inches'). The total quantity ofwater (volume of water) is divided by the total irrigated area to obtain Delta of crop of the irrigated area. **Thus, Delta is the total depth of water required by a crop during the entire period when the said crop is in the field** (denoted by symbol Δ).

(d) "Consumptive Water Requirement"

Consumptive water requirement is the amount of water potentially required to meet the evapo- transpiration needs of the plant so that the plant does not suffer in its growth through short supply of water. It is, thus, 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.

(e) "Net Irrigation Requirement"

Net irrigation requirement is the depth of irrigation water, exclusive of precipitation, stored moisture, or groundwater that is required consumptively for crop production as also for other purposes such as leaching, etc.

(f) "Effective Rainfall"

Effective rainfall is the precipitation falling during the growing period of the crop that is available to meet the evapo-transpiration requirement of crops. It does not include precipitation lost through deep percolation below the root zone or through surface runoff.

(g) "Irrigation Efficiency"

Irrigation efficiency is the percentage of applied irrigation water stored in the soil and available for Consumptive use by the crop.

(h) "Irrigation Water Requirement"

The net irrigation water requirement divided by the irrigation efficiency is termed as irrigation water requirement.

4.3 Crop Water Demand in Assam

As is known, cereals are cultivated on major part of the gross cropped area in the State and,hence, the crop water requirement for major cereals like Paddy, Maize, Wheat, Rabi Pulses, etc. as estimated by State Agricultural University has been taken. The district wise crop water demand as also the total water potential to be created is shown in Table - 4.3.

Table 4.3 District-wise Crop Water Demand in Assam

SL. NO.	DISTRICT	AREA SOWN (Ha)	IRRIGATED AREA (Ha)	CROP WATER DEMAND (MCM)	WATER POTENTIAL REQUIRED (MCM)	EXISTING WATER POTENTIAL (MCM)	WATER POTENTIAL TO BE CREATED (MCM)
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	Baksa	84186	8239	540.60	540.60	53.00	487.80
2	Barpeta	135707	74992	726.85	532.08	194.77	337.31
3	Bongaigaon	71108	6665	456.67	456.67	234.67	221.99
4	Cachar	186225	12450	16650.00	3738.36	2405.22	1333.14
5	Charaideo	43138	6828	431.38	431.38	68.28	363.11
6	Chirang	51400	27270	653.87	567.73	169.47	379.89
7	Darrang	92830	14667	1167.44	1167.44	389.57	777.88
8	Dhemaji	104764	5491	628.54	625.24	3.29	621.95
9	Dhubri	135839	53987	1343.00	1438.46	309.57	1002.45
10	Dibrugarh	127313	11846	566.08	566.08	21.57	567.71
11	Dima Hasao	42219	8357	126.65	101.58	25.07	76.51
12	Goalpara	72377	26772	1115.00	568.00	316.00	252.00
13	Golaghat	157099	15122	916.00	729.00	754.00	25.00
14	Hailakandi	67532	4409	4650.00	784.00	32.05	721.90
15	Jorhat	13528	7413	135.28	1328.09	74.13	61.15
16	Kamrup	186512	53366	1197.90	1197.90	342.70	855.10
17	Kamrup (M)	26256	9330	236.18	183.51	52.68	130.83
18	Karbi Anglong	361525	249640	1808.00	1808.00	1248.00	559.43
19	Karimganj	72957	9540	932.06	932.06	57.85	877.11
20	Kokrajhar	179955	58931	850.00	392.37	178.69	213.68
21	Lakhimpur	132711	10561	89.29	89.29	13.66	75.63
22	Majuli	20091	1952	200.91	200.91	19.52	181.39
23	Morigaon	67751	26815	677.51	677.51	268.14	409.36
24	Nagao	219230	100447	785.44	785.44	359.88	425.56
25	Nalbari	103231	18734	663.01	663.01	120.32	542.69
26	Sivasagar	94295	5622	942.95	942.95	56.22	886.73
27	Sonitpur	151867	42157	279.80	279.80	147.28	132.52
28	South Salmara ManKachar	38782	7420	142.57	142.57	31.35	111.21
29	Tamulpur	62081	22681	398.73	253.06	145.67	156.03
30	Tinsukia	130705	5762	248.77	248.77	17.19	231.58
31	Udalguri	170487	58687	170.49	111.80	89.93	27.87
32	West Karbi Anglong	59448	40025	353.50	353.50	158.00	195.50
Total		**3463149**	**1006179**	**40084.47**	**22837.2**	**8357.74**	**13242**

4.4 Livestock Water Requirement

The water demand for the livestock of the State is determined by multiplying the total livestock population with the per capita water requirement (litres/day/Number) for each category of the population. With the existing estimated population, the total projected livestock population in 2027 has been worked out based on the average growth rate. Once that has been estimated, the district-wise livestock water demand for the State has been assessed in **Table 4.4(a) and Table 4.4(b)**. 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 the water demand by the livestock in 2027.

Table 4.4(a): Livestock Water Demand

Sl. no.	District	Annual Growth Rate of Livestock				
		Category				
		Cattle	Buffalo	Sheep	Goat	Pig
1	Baksa	0.86%	-0.43%	-5.00%	5.00%	2.14%
2	Barpeta	0.86%	-0.43%	-5.00%	4.00%	0.71%
3	Bongaigaon	1.50%	0.00%	1.30%	1.30%	1.50%
4	Cachar	0%	-10%	55%	0%	0%
5	Charaideo	0.81%	0.21%	0.00%	1.10%	1.55%
6	Chirang	0.86%	-0.43%	-5%	-4.29%	4%
7	Darrang	0.86%	-0.43%	-5.00%	4.00%	0.71%
8	Dhemaji	1.76%	-3.28%	27.10%	-2.80%	10.79%
9	Dhubri	2.45%	0.00%	46.43%	42.81%	-18.22%
10	Dibrugarh	-4.40%	0.018%	-8.00%	-5.50%	-93.00%
11	Dima Hasao	0.80%	0.40%	0.20%	2.00%	1.20%
12	Goalpara	0.64%	2.39%	-0.86%	1.00%	0.98%
13	Golaghat	6.85%	15.57%	0.00%	-2.28%	0.71%
14	Hailakandi	-1.3%	-0.3%	-5.7%	-1.3%	-3.6%
15	Jorhat	0.83%	1.06%	14.13%	10.14%	-12.03%
16	Kamrup	0.58%	-2.58%	9.28%	8.56%	-3.64%
17	Kamrup(M)	6%	-3%	-35%	-30%	28%
18	Karbi-Anglong	0.01%	0.01%	0.01%	0.06%	0.09%
19	Karimganj	6%	6%	5%	5%	2%
20	Kokrajhar	0.75%	-1.33%	-0.50%	0.33%	0.71%
21	Lakhimpur	0.86%	-0.43%	-5.00%	4.00%	0.71%
22	Majuli	+01%	-0.001%	-5.13%	-4.29%	4.04%
23	Morigaon	9%	-16%	-6%	0%	5%
24	Nagaon	0.86%	-0.43%	-5.00%	4.00%	0.71%
25	Nalbari	-1.3%*	0.30%	-5.7%*	1.30%	- 3.6%*

Sl. no.	District	Annual Growth Rate of Livestock				
		Category				
		Cattle	Buffalo	Sheep	Goat	Pig
26	Sivasagar	0.60%	0.73%	0.00%	3.00%	0.45%
27	Sonitpur	0.86%	-0.43%	-5.00%	4.00%	0.71%
28	South Salmara Mankachar	6%	0%	-35%	-30%	28%
29	Tamulpur	0.86%	-0.43%	-5.00%	4.00%	2.14%
30	Tinsukia	3.2	0.00%	0.00%	0.00%	1.8
31	Udalguri	2.6%	0%	0%	0%	8.8%
32	West Karbi Anglong	0.84%	-2.53%	-5.00%	4.00%	1.01%

Source: Livestock Census, 2019.

Table 4.4(b): Livestock Water Requirement

Sl. No.	District	Total No of Livestock	Present Water Demand (MCM)	Water Demand In 2027 (MCM)	Existing Water Potential (MCM)	Water Potential To Be Created (MCM)
1	Baksa	68342	0.204	0.216	0.204	0.012
2	Barpeta	744035	0.86	0.955	0.86	0.095
3	Bongaigaon	460253	7.17	7.64	7.23	0.467
4	Cachar	1278767	12.44	12.627	7.464	5.163
5	Charaideo	1274555	18.61	19.74	17.65	0.96
6	Chirang	329200	5.42	5.42004	5.42003	0.00001
7	Darrang	963497	7.62	8.01	7.62	0.381
8	Dhemaji	173574	3.16	3.31	3.16	0.148
9	Dhubri	2137965	11.65	11.83	11.65	0.181
10	Dibrugarh	753968	9.56	14.24	17.86	3.61
11	Dima Hasao	732250	16.36	17.68	16.36	1.32
12	Goalpara	522572	8.43	15.43	8.43	7.0
13	Golaghat	1524123	5.77	6.34	5.77	0.577
14	Hailakandi	282046	0.323	0.283	0.323	0.044
15	Jorhat	313521	0.475	0.552	0.475	0.047
16	Kamrup	795653	5.768	6.592	5.768	0.824
17	Kamrup(M)	121360	0.82	0.86	0.82	0.05
18	Karbi-Anglong	272242	4.70	4.933	4.791	0.141
19	Karimganj	1140767	8.56	8.59	8.56	0.03
20	Kokrajhar	525411	3.6	6.3	3.6	2.7
21	Lakhimpur	2164956	0.047	0.225	0.0047	0.057
22	Majuli	184763	0.21	0.23	0.21	0.02
23	Morigaon	481800	15.01	16	15.01	0.99
24	Nagaon	3509833	51.24	66	51.24	14.76
25	Nalbari	859273	5.87	5.9	5.87	0.038

Sl. No.	District	Total No of Livestock	Present Water Demand (MCM)	Water Demand In 2027 (MCM)	Existing Water Potential (MCM)	Water Potential To Be Created (MCM)
26	Sivasagar	2170653	30.06	31.7	30.06	1.64
27	Sonitpur	3661435	83.8	116.6	83.8	32.6
28	South Salmara Mankachar	473069	2.73	2.7635	2.7268	0.0367
29	Tamulpur	158648	0.179	0.198	0.179	0.024
30	Tinsukia	257847	4.67	5.26	4.67	0.59
31	Udalguri	1579425	11.30	11.47	11.30	0.17
32	West Karbi-Anglong	340100	0.79	0.865	0.79	0.075

4.5 Industrial Water Demand

Assam is not an industrially developed State and its position in industrial scenario of the country is not very prominent. As per the Statistical Handbook, Assam 2022, there are 5196 factories in Assam and the number of registered MSME units are 94287. These industries primarily relate to tea,coal, fertilizer, jute, petroleum, wheat flour, cement, small food processing units, furniture making units, etc.

Based on the available information collected during the preparation of DIPs in each of the 32Districts in Assam, the total requirement of water by the industries has been assessed. Out of the 32Districts only 11 districts has the demand of water for industrial purpose which are shown below in Table 4.5.

Total industrial demand of water for the state is 321.079262 MCM.

Table 4.5 : Industrial Water Demand

Sl. No.	District	Demand of Water (MCM)
1	Dhubri	0.632
2	Goalpara	1.25
3	Kamrup	78.8
4	Kamrup(M)	21.67
5	Morigaon	0.28
6	Nalbari	0.0814
7	Sivasagar	0.333
8	Sonitpur	200.41
9	South Salmara Mankachar	0.172
10	Tamulpur	5.1
11	Tinsukia	12.35
12	Udalguri	135
TOTAL		**321.0792**

4.6 Water Demand for Power Generation

The State has no N-power plants that otherwise are known to be requiring a huge quantity of water per MW of power generation. As per the data available with the Assam Power Generation Corporation Ltd., there are two running hydro-power projects -Karbi Langpi Hydro Electric Project (comprising two Units with an installed capacity of 100 MW) in Karbi Anglong District and Myntriang Small Hydro Electric Project (comprising two Units with a plant capacity of 3 MW). There are some running Thermal Power Stations (TPS) in the State where the water requirement is huge. They are- Lakwa TPS in Sivasagar District (120 MW), Namrup TPS in Dibrugarh District (133 MW), Chandrapur TPS (Revival; 60 MW) in Kamrup Rural District and Bongaigaon TPS in Kokrajhar District (240 MW).Thus, the running 4 TPS have a combined installed capacity of 553 MW of power. Besides, there arealso some upcoming TPS such as 2 more Units (250x2 MW) of Bongaigaon TPS and Margherita Thermal Power Project (660 MW) in Tinsukia District. Thus, the combined installed capacity the 2 additions as above that are likely to be ready within the next 3-4 years would have 1160 MW of power. The overall installed capacity would thus be 1713 MW by the year 2020 or so. Water is one of the key input requirements for thermal power generation as it is required for process cooling in the condenser, ash disposal, removal of heat generated in plant auxiliaries and various other plant consumptive uses. The raw water is generally drawn from fresh water source such as river, lake, canal, reservoir, barrage, etc. Treated sewage water may also be used as source of raw water for the power plants located adjacent to the cities. Plant water consumption is governed by a number of factors such as quality ofraw water, type of condenser cooling system, quality of coal, ash utilization, type of ash disposal system, waste water management aspects, etc. At the current level of plant technology and efficiency levels of resource usage in power plants, the average consumptive water requirement for coal-based plants with cooling towers is assumed to be 4 m3/h per MW (96 m3/day per MW). Assuming that a power plant effectively runs for 325 days in a year, the annual requirement of water for generating 1 MW of power in a typical thermal power plant would be 31200 m3 (0.031 MCM). Based on the abovenorm, the existing consumptive water requirement in Assam for the TPS is 17.14 MCM.
(Source : SIP 2016 by NABCON.)

The Water Demand for Present Power Generation from DIPs of 2022-27 is shown in Table-4.6

Table 4.6: Water Demand for Power Generation

Sl. No.	District	Power Requirement (MW)	Water Demand (BCM)	Water Demand In 2027(BCM)	Existing Water Potential (BCM)	Water Potential To Be Created (BCM)
1	Kokrajhar	750	0.0000146	0.0000176	0.0000126	0.000005

4.7 Aggregate State Level Water Demand

The total water demand of the district for all sectors described earlier has been assessed as the aggregation of share each sector. The current water demand has been indicated in Table **4.7(a)** and the projected water demand has been depicted in **Table 4.7(b).**

Table 4.7(a) : PRESENT WATER DEMAND FOR VARIOUS SECTORS

SL. NO.	DISTRICT	COMPONENTS					TOTAL (MCM)
		DOMESTIC	CROP	LIVESTOCK	INDUSTRIAL	POWER GENERATION	
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	Baksa	32.26	660.00	0.20	0	0	692.46
2	Barpeta	101.63	726.85	0.86	0	0	829.34
3	Bongaigaon	35.25	456.67	7.17	0	0	499.10
4	Cachar	9.90	3738.36	12.44	0	0	3760.70
5	Charaideo	16.28	68.28	18.61	0	0	103.17
6	Chirang	19.59	653.87	5.02	0	0	678.48
7	Darrang	53.68	1167.44	14.07	0	0	1235.17
8	Dhemaji	39.69	628.54	3.16	0	0	671.39
9	Dhubri	100.62	1438.46	11.65	0.63	0	1551.36
10	Dibrugarh	58.00	566.08	9.56	21.00	0	655.00
11	Dima Hasao	12.98	126.65	16.36	0	0	156.00
12	Goalpara	58.67	1115.00	8.43	1.25	0	1183.35
13	Golaghat	53.67	915.87	5.77	0	0	975.30
14	Hailakandi	39.4	4650		0	0	
15	Jorhat	29.78	35.60	24.72	0	0	65.07
16	Kamrup	49.02	1088.99	5.92	71.60	0	1215.53
17	Kamrup (M)	6.91	236.18	0.87	18.60	0	262.56
18	Karbi Anglong	30.60	1807.63	4.70	0	0	1842.93
19	Karimganj	54.25	932.06	8.56	0	0	994.87
20	Kokrajhar	51.33	850.00	4.30	0	0.0146	905.64
21	Lakhimpur	27.91	17.85	0.047	0	0	45.81
22	Majuli	10.46	131.70	0.21	0	0	142.37
23	Morigaon	33.57	451.91	15.01	0.28	0	500.77
24	Nagaon	139.13	785.44	51.25	0	0	975.82
25	Nalbari	24.24	663.01	5.87	0.081	0	693.21
26	Sivasagar	36.60	942.95	30.06	0.256	0	1009.00
27	Sonitpur	88.00	280.00	83.80	66.25	0	523.53
28	South Salmara ManKachar	28.68	142.57	2.73	0.17227	0	174.15
29	Tamulpur	25.10	398.73	0.179	5.10	0	429.11
30	Tinsukia	37.75	17.19	4.67	12.96	0	72.58
31	Udalguri	119.30	170.50	11.30	135.00	0	436.10
32	West Karbi Anglong	16.20	353.50	0.79	0	0	370.49

Table 4.7(b): PROJECTED WATER DEMAND FOR VARIOUS SECTORS (2027)

SL. NO.	DISTRICT	COMPONENTS					TOTAL (MCM)
		DOMESTIC	CROP	LIVESTOCK	INDUSTRIAL	POWER GENERATION	
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	Baksa	44.71	660.11	0.215	0	0	705.04
2	Barpeta	110.40	726.85	0.955	0	0	838.21
3	Bongaigaon	38.88	456.67	7.64	0	0	503.19
4	Cachar	10.90	3738.36	12.627	0	0	3761.89
5	Charaideo	16.56	431.38	19.74	0	0	467.68
6	Chirang	23.29	653.87	5.13	0	0	682.29
7	Darrang	59.65	1167.44	14.07	0	0	1241.16
8	Dhemaji	41.95	621.95	3.31	0	0	667.21
9	Dhubri	112.94	1438.46	11.83164	0.632862	0	1563.86
10	Dibrugarh	120.60	567.71	14.24	36	0	738.55
11	Dima Hasao	14.09	126.65	17.68	0	0	158.42
12	Goalpara	65.38	1145.00	15.43	1.55	0	1227.36
13	Golaghat	58.6	1005.58	6.06	0	0	1070.24
14	Hailakandi	41.3814	4650	0.323	*0*	0	4691.70
15	Jorhat	32.51	1292.53	25.21	0	0	1350.25
16	Kamrup	56.02	1866.40	5.92	71.60	0	1999.94
17	Kamrup (M)	7.91	360.00	0.87	18.60	0	387.38
18	Karbi Anglong	37.72	1807.63	4.9331	0	0	1850.28
19	Karimganj	59.13	932.06	8.59	0	0	999.78
20	Kokrajhar	55.80	850.00	7.5	0	0.0176	913.32
21	Lakhimpur	30.39	89.29	0.225	0	0	119.91
22	Majuli	15.89	181.39	0.23	0	0	197.51
23	Morigaon	38.60	941.89	16	0.33	0	996.82
24	Nagao	194.75	785.44	66	0	0	1046.19
25	Nalbari	26.83	663.01	5.9	0.081	0	695.82
26	Sivasagar	38.15	1037.26	31.7	0.333	0	1107.44
27	Sonitpur	106.00	279.80	116.6	266.66	0	769.06
28	South Salmara ManKachar	31.44	142.57	2.763549	0.17265	0	176.94
29	Tamulpur	28.66	398.73	0.198	6.50	0	434.09
30	Tinsukia	44.60	231.58	5.26	13.22	0	294.66
31	Udalguri	125.04	170.49	11.47	135.00	0	442.00
32	West Karbi Anglong	17.50	353.50	0.865	0	0	371.87

4.8 Water Budget

Water budget reflects the relationship between input and output of water through a region. Thus, it shows the gap between water availability and requirement. The negative gap indicates that there are sufficient water resources for irrigation, domestic and the industrial uses. The District-wise position is given in Table-4.8. lt is seen from this Table that Assam has adequate availability of water to fulfill the demand by creating efficient technologies of irrigation through various schemes.

Table 4.8: District wise Water Budget of Assam

SL. NO.	DISTRICT	EXISTING WATER AVAILABILITY (BCM)			WATER DEMAND (BCM)		WATER GAP	
		SURFACE WATER	GROUND WATER	TOTAL	PRESENT	PROJECTED (2027)	PRESENT	PROJECTED (2027)
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1	Baksa	0.0991	0.0424	0.1416	0.69246	0.705035	0.5508	0.5634
2	Barpeta	1.44862	0.95236	2.4009846	0.82934	0.838215	-1.57164	-1.56276
3	Bongaigaon	0.0408	0.576	0.6168	0.4991	0.5032	-0.1177	-0.1136
4	Cachar	15.278	1.02	16.298	3.76	3.716889	-12.537	-12.536
5	Charaideo	0.5772	0.4814	1.0586	0.1031	0.4676	-0.9554	-0.5909
6	Chirang	0.6329	0.0309	0.6638	0.58634	0.6829	-0.07746	0.0191
7	Darrang	2.778	2.76	5.538	1.2351	1.2411	-4.302	-4.296
8	Dhemaji	0.69	1.00539	1.69539	0.671397	0.67721	-1.023993	-1.021585
9	Dhubri	6.482	1.06336	7.54536	1.55136	1.563865	-5.994	-5.981
10	Dibrugarh	0.5154	0.2107	0.7262	0.655	0.738	-0.07124	-0.0118
11	Dima Hasao	0.0973	0.5663	0.6636	0.156	0.15842	-0.05076	-0.5052
12	Goalpara	0.321981	0.59522	0.917201	1.18335	1.22736	0.266149	0.310159
13	Golaghat	1.93	1.156	3.08	0.97	1.07024	-2.11	-2.01
14	Hailakandi	4.56895	0.16589	4.73484	4.689723	4.6917044	-0.045117	-0.043136
15	Jorhat	0.0572	0.0495	0.1067	0.12369	1.35025	0.01699	1.24355

SL. NO.	DISTRICT	EXISTING WATER AVAILABILITY (BCM)			WATER DEMAND (BCM)		WATER GAP	
		SURFACE WATER	GROUND WATER	TOTAL	PRESENT	PROJECTED (2027)	PRESENT	PROJECTED (2027)
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
16	Kamrup	1.98409	1.2425	3.22659	1.21553	1.99994	-2.01106	-1.2266
17	Kamrup (M)	0.47001	0.3101	0.7801	0.26256	0.38738	-0.5175	-0.39272
18	Karbi Anglong	11.641	3.4046	119.8146	12.81	18.50283	-107.005	-101.3118
19	Karimganj	1.7486	0.425	2.1736	0.69321	0.99978	-1.48039	-1.17382
20	Kokrajhar	9376	1348.95	10,724.95	905.64	0.91332	-9,819.31	-9,811.63
21	Lakhimpur	0.0644	1.198	1.262	0.0458	0.12	-1.216	-1.142
22	Majuli	0.023	0.019	0.042	0.064	0.19751	0.022	0.15551
23	Morigaon	2.046	1.54	3.586	0.758	0.996	-2.828	-2.59
24	Nagaon	1.646	1.86	3.506	0.97582	1.04619	-2.53018	-2.45981
25	Nalbari	0.0527	0.0978	0.1505	0.69321	0.69583	0.54271	0.54532
26	Sivasagar	1.2235	1.3163	2.5398	1.0098	1.1074	-1.53	-1.432
27	Sonitpur	0.045664	1.10567	1.151334	0.52353	0.76906	-0.6278	-0.3823
28	South Salmara ManKachar	2.985	0.427	3.412	0.174149	0.176942	-3.23785	-3.23506
29	Tamulpur				0.429	0.434		
30	Tinsukia	0.16	0.378	0.538	0.0725	0.294	-0.4655	-0.244
31	Udalguri	0.34953	0.63738	0.98691	0.43610	0.44200	-0.55081	-0.54481
32	West Karbi Anglong	1.663	NA	1.663	1.83	0.371865	0	0

Source: Central Ground Water Board & North Eastern Region.

Strategic Action Plan

In due cognizance of the criticality of irrigated agriculture in ensuring adequate production, which results both in food security and economic growth, the Irrigation department is playing a vital role in the development of irrigation potential of Assam by harnessing the rich surface and ground water resources of the State. Its mainobjectives / roles include increasing agricultural production of the State by providing assured irrigation supply to the field in close coordination with Agriculture Department to assure food security, providing assured irrigation during all seasons to the cultivators, creation of irrigation potential through irrigation schemes, utilizing the created irrigation potential by equitable distribution of water through command area development and water management, creation of additional potential through Major, Medium and Minor Irrigation schemes, etc.

Accordingly, the State's Strategic Action Plan would logically base itself in the similar action plans prepared for each of the 32 districts as a part of the respective approved District Irrigation Plans (DIPs). The strategic action plan for the State thus reflects an effective aggregation of various schemes proposed in eachDistrict and its blocks based on the ground need of the concerned areas and villages.

The State's strategic action plan has been formulated for a period of five years with focus on coveringthe un-irrigated areas. Due emphasis is given on better and more effective use of the available water resources of the State for better irrigation efficiency.

5.1. Command Area Development Plan

The primary goal of the Command Area Development Plan (CADP) is to augment the efficiencyof irrigation systems which is achieved by reducing water wastage and ensuring a more uniform distribution of water across the command area. Command area development aims in bridging the gap between potential created and their utilization. By ensuring optimal irrigation, the CADP aims to significantly enhance agricultural productivity. This increase in yield can drastically improve the economic prospects of farming communities. The ultimate goal of the CADP is to foster socio-economic development by improving farm productivity and income. The CADP seeks to uplift farming communities and contribute to overall national economic growth. Therefore, systematic development of commands of irrigation projects should be taken up in order to fully utilize the irrigation potential created.

The districts where Command Area Development Plan is taken by taking up new schemes are Charaideo, Hailakandi, Kamrup, Lakhimpur, Majuli, Nagaon & Sonitpur. The details of the Command Area Development Plan for the above districts are tabulated below.

Table 5.1 : District wise Command Area Development Plan

District	*Type of Scheme*	Activity			Targeted Command Area for New Scheme (In Ha.)	Targeted Command Area for Revived Scheme (In Ha.)	Total Targeted Command Area (New + Revival) (In Ha.)	Estimated Cost (Rs. In Lakh)		
		New Scheme	Revival	Total				New Scheme	Revival	Total
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
Lakhimpur	FIS	6	3	9	1088	440	1528	3450	220	3670
Nagaon		0	79	79	0	588	27788	0	1303	1303
Kamrup		4	0	4	4150	0	4150	900	0	900
Lakhimpur	LIS	14	4	18	830	500	1362	3700	156	3856
Nagaon		0	12	12	0	2665	3313	0	15037	15037
Majuli		0	3	3	0	178	180	0	107	107
Kamrup		43	0	43	6778	0	6778	19591	0	19591
Lakhimpur	DTW	0	6	6	0	150	150	0	170	170
Nagaon		0	14	14	0	160	197	0	74	74
Kamrup		3	0	3	140	0	140	40	0	40
Lakhimpur	MDTW	280	1	281	3190	20	3210	11484	5	11489
Lakhimpur	Others	69	0	69	5936	0	5936	9472	0	9472
Total		**419**	**122**	**541**	**22112**	**4701**	**26813**	**48637**	**17072**	**65708**

The aggregate financial outlay projected under the strategic action plan for Command Area Development for New and Revival of existing schemes **2022-27** for the State of Assam is Rs. **657** Crore withtotal targeted potential of **26,813 Ha** (NIA).

Table 5.2: Total District wise State Plan Projection for 5 Years (2022-27)

Sl. No.	District	Activity (in Nos.)			Targetted potential for New Scheme(in Ha.)		Targetted potential for Revived Scheme (in Ha.)		Total targetted potential (in Ha.)		Estimated Cost (Rs. in Lakh)		
		New Scheme	Revival	Total	NIA	AIA	NIA	AIA	NIA Col (6+8)	AIA Col (7+9)	NEW SCHEME	REVIVAL	TOTAL
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Baksa	220	52	272	34554	40340	5190	7222	39744	47562	112020	11037	123057
2	Barpeta	237	45	282	11814	18586	8130	11840	19944	30426	27071	11681	38752
3	Bongaigaon	142	10	152	10137	16598	499	765	10636	17363	22133	975	23108
4	Cachar	214	52	266	46363	64364.15	8490	8480	54853	72844.15	226431	7418	233849
5	Charaideo	140	10	150	10244	15366	1453	1884	11697	17250	31818	732	32550
6	Chirang	145	19	164	22708	30943	1849	2602	24557	33545	40641	2713	43354
7	Darrang	17	12	29	14111	19235	8925	12535	23036	31770	27080	7345	34425
8	Dhemaji	95	2	97	10294	12518	95	142.5	10389	12660.5	38160	110	38270
9	Dhubri	512	28	540	9731	16787	2004	3080	11735	19867	22555	2729	25284
10	Dibrugarh	388	16	404	65983	114078.6	938	1471.5	66921	115550.1	187212	1307	188519
11	Dima Hasao	141	81	222	4757	6704	1887.4	2646.4	6644.4	9350.4	17021	11436	28457
12	Goalpara	580	82	662	30185	59943	5538	10607	35723	70550	78133	19457	97590
13	Golaghat	114	16	130	19559	32464	2623	4249	22182	36713	59939	6103	66042
14	Hailakandi	59	23	82	5210	8015	2799	3732	8009	11747	18750	1176	19926
15	Jorhat	183	28	211	41811	64997	2264	3514	44075	68511	964666	4002	968668
16	Kamrup	478	33	511	34389	56004.5	5782	7833	40171	63837.5	91417	10239	101656
17	Kamrup(M)	15	0	15	14302	21562	0	0	14302	21562	80455	0	80455
18	Karbi Anglong	216	271	487	10864	15294	27009.4	0	37873.4	15294	216937	111768	328705
19	Karimganj	119	46	165	9097	27367	6602	9400	15699	36767	79445	7179	86624
20	Kokrajhar	118	86	204	17647	26466.35	11216	15276	28863	41742.35	40365	43704	84069
21	Lakhimpur	479	14	493	12656	25538	1110	1840	13766	27378	30533	551	31084
22	Majuli	10	25	35	1130	2340	1978	3956	3108	6296	2150	1330	3480
23	Morigaon	246	65	311	21025	31463	4840	6895	25865	38358	75328	1897	77225
24	Nagaon	307	77	384	31295	49938	10014	13293.8	41309	63231.8	62067	27103	89170
25	Nalbari	711	18	729	27468	27852	720	720	28188	28572	94192	1270	95462
26	Sivasagar	388	27	415	22700	34050	3309	0	26009	34050	58663	3819	62482
27	Sonitpur	303	134	437	23448.383	32635.573	5619	7809	29067.383	40444.573	104290	6842	111132

Sl. No.	District	Activity (in Nos.)			Targetted potential for New Scheme (in Ha.)		Targetted potential for Revived Scheme (in Ha.)		Total targetted potential (in Ha.)		Estimated Cost (Rs. in Lakh)		
		New Scheme	Revival	Total	NIA	AIA	NIA	AIA	NIA Col (6+8)	AIA Col (7+9)	NEW SCHEME	REVIVAL	TOTAL
1	2	3	4	5	6	7	8	9	10	11	12	13	14
28	South Salmara Mankachar	100	14	114	4103	6596.8	595	952	4698	7548.8	13194	3730	16924
29	Tamulpur	87	15	102	28462.2	40390.278	7906	8348	36368.2	48738.278	112368	5308	117676
30	Tinsukia	169	15	184	35601	53767.5	919	1445.4	36520	55212.9	100672	1695	102367
31	Udalguri	205	179	384	38049	70405	2907	6230	40956	76635	129594	12131	141725
32	West Karbi Anglong	175	109	284	25129.8	25559.8	12919	10058	38048.8	35617.8	104755	43738	148493
Total		**7313**	**1604**	**8917**	**694827**	**1068169**	**156130**	**168827**	**850957**	**1236995**	**3270055**	**370525**	**3640580**

The aggregate financial outlay projected under the strategic plan for **2022-27** for the State ofAssam is Rs. **36,406** Crore with total targeted potential of **12,36,995** Ha (AIA). Out of this, **7,313** nos. of **Newschemes** are planned with targeted potential of **10,68,169**Ha (AIA) at an estimated cost of Rs. **32,701 Crore**and by **Revival** of **1,604** nos. of existing schemes with targeted potential of **1,68,827 Ha** (AIA) at an estimatedcost of Rs. **3,705 Crore.** This outlay reflects the District wise aggregation of the outlays arrived in the respective DIPs of all the 32 Districts of Assam.

Key Focus Areas

Assam is witnessing noticeable shifts in its climate patterns, characterized by an increase in ambient temperature along with significant variations in rainfall intensities and patterns. These changes necessitate a strategic and adaptive approach to water management and irrigation practices across the state, where the **Irrigation Department** plays a crucial role as a driving force.

This chapter deals with the foundational elements established in earlier sections of the **State Irrigation Plan (SIP) for 2022-2027**. It specifically focuses on the deployment of Water Use Efficient systems (WUEs), such as drip irrigation, sprinklers, and rain guns, which are crucial for enhancing irrigation efficiency and ensuring the sustainable management of water resources. The **Irrigation Department** will lead efforts in integrating advanced irrigation technologies, strategic planning, and fostering community-centric initiatives. This will lay the groundwork for a resilient irrigation sector capable of thriving in the face of climatic uncertainties.

This holistic approach, driven by the **Irrigation Department**, is vital for reinforcing Assam's irrigation infrastructure against the looming challenges posed by climate change, safeguarding the state's water resources, and preserving its natural resources for future generations. This chapter endeavors to ensure sustainable water management practices that align with the evolving environmental conditions of Assam.

6.1. Participatory Irrigation Management

Participatory Irrigation Management (PIM) represents a transformative approach in irrigation governance, enabling water users, particularly farmers, to play an active role in managing and maintaining irrigation infrastructure. This approach not only involves but also empowers stakeholders which is essential for tailoring irrigation practices to local environmental and agricultural needs, thus enhancing the efficacy of water management strategies.

6.1.1. Benefits of Participatory Management:

- **Sustainability:** Farmer involvement in irrigation management promotes a sense of ownership and responsibility, leading to better care and longevity of infrastructure.
- **Efficiency**: Local knowledge is invaluable for identifying the most effective irrigation methods and swiftly addressing issues which can significantly improve system efficiency and water distribution.
- **Adaptability**: Farmers are typically the first to notice shifts in water availability and can promptly adjust irrigation practices.
- **Community Empowerment**: Empowering local communities creates a cooperative environment where knowledge and resources are shared, enhancing the collective capability to manage water resources effectively.

6.1.2. Implementation Strategies:

- **Establishing and Strengthening WUAs:** Robust Water Users Associations are crucial for effective PIM. These should be legally recognized and empowered to manage water distribution and irrigation maintenance decisively.

- **Capacity Building and Training:** Conducting regular training programs for WUAs and local farmers on modern irrigation technologies, efficient water management practices, maintenance of infrastructure, and climate resilience strategies. These sessions could include practical demonstrations and workshops led by experts in the field.
- **Regular Monitoring and Feedback Mechanisms:** Implementing systems for continuous monitoring of irrigation practices and infrastructure condition. Establishing a structured process for collecting and utilizing feedback from WUAs to ensure that management strategies remain aligned with local needs and conditions.
- **Financial and Technical Support:** Providing WUAs with necessary financial resources and technical assistance. This support could encompass grants for infrastructure improvements, subsidies for technology upgrades, and access to consultants for technical guidance.

6.2. Integration of Water Use Efficient systems

The irrigation sector in Assam is at a crucial juncture, faced with the dual challenges of enhancing productivity and managing resources sustainably in the face of changing climate conditions. The integration of Water Use Efficient systems (WUEs) such as drip irrigation, sprinklers, and rain guns with high-yielding seeds &selecting less water consumptive crops presents a transformative opportunity for the region. These systems notonly aim to optimize water usage—critical in areas experiencing water scarcity—but also enhance irrigation efficiency through precision techniques.

By implementing technologies that use water more efficiently, the region can reduce its dependence onunpredictable monsoon rains and groundwater sources, which are often overexploited. This shift not only supports sustainable irrigation practices but also contributes to the overall water management strategy of the state, preserving vital resources for future generations.

Drip Irrigation:

Incorporating drip irrigation into Assam's State Irrigation Plan (SIP) aligns with the strategic initiatives toenhance water conservation and improve irrigation productivity across the state. Drip irrigation, recognized for itsprecise delivery of water directly to the plant roots, offers a sustainable solution to the challenges posed by erratic weather patterns and varying water availability in Assam. Drip irrigation significantly enhances water efficiency by minimizing losses due to evaporation and runoff, a crucial benefit for Assam given its susceptibility to both floods and droughts.

Implementing drip irrigation across Assam involves overcoming several challenges, particularly the initialfinancial outlay, technical expertise, training to farmers and the maintenance and protection of the complex system from damage caused by agricultural activities and local wildlife.

Sprinkler Irrigation:

Sprinkler irrigation, known for its versatility and efficiency is an effective tool for addressing Assam's varied irrigation challenges. The sprinkler irrigation system is designed to suit the diverse irrigation landscape of Assam by utilizing local water resources and uniformly distributing the water across the fields thereby reducing soil erosion.Sprinklers can also help moderate microclimates within the irrigation environment, vital during Assam's intense heat spells, by aiding in temperature control through evapotranspiration.

The introduction of sprinkler systems across Assam's irrigation landscape entails overcoming certain challenges like providing Comprehensive training programs to local farmers and irrigation technicians to operateand maintain these advanced systems and Infrastructure Vulnerability.

Rain Gun Irrigation:

Rain gun irrigation, a high-pressure irrigation system that sprays water over large areas in a manner similar to rainfall, is renowned for its ability to cover large areas quickly and with substantial volumes of water. The dynamic spray action of rain guns facilitates deeper water penetration, which is beneficial for root development and reduces surface runoff, particularly in areas prone to soil erosion. It offers a practical solution particularly suited to Assam's diverse agricultural demands, including large-scale operations like tea plantations and expansive crop fields.

However, Implementing rain gun irrigation systems across Assam involves addressing certain challenges, particularly related to costs and technical expertise.

6.2.1. Future Prospects in SIP

Looking forward, the SIP plans to integrate advanced technological solutions such as IoT-enabled sensors for real-time soil and weather monitoring, & use of spatial technologies for detailed irrigation planning in collaboration with ASSAC/NESSAC. This will enhance the irrigation systems' responsiveness to changing environmental & climatic conditions.

The integration of advanced sensor technologies and automated systems into the sprinkler irrigation framework will enable real-time adjustments based on immediate weather changes and soil moisture levels.

The SIP also plans to integrate rain gun systems with advanced technological solutions such as real-time weather monitoring and automated adjustment capabilities to respond to changing environmental conditions, such as shifts in rainfall patterns or soil moisture levels.

In future the State Irrigation Plan would be prepared in alignment with the comprehensive State Water Policy. The above initiatives will support the state's goals for sustainable water usage and economic growth.

6.2.2. Current Adoption Levels and Targets for Future Implementation of Water Use Efficient systems in Assam

The State Irrigation Plan (SIP) for Assam reflects a growing recognition of the critical need to adopt Water Use Efficient systems (WUEs) like drip, sprinkler, and rain gun irrigation. While the current adoption levels of these systems provide a foundation, there is significant scope for expansion to meet the future water conservation and agricultural productivity goals of the state.

Recognizing the benefits of WUEs in achieving sustainable agriculture and water management goals, Assam's SIP outlines ambitious targets for the expansion of these systems over the next decade:

- **Expansion Goals**: The plan aims to increase the coverage of drip and sprinkler systems in future focusing on critical areas identified as high risk for water scarcity and those that are crucial for the state's food security.
- **Integration with Technology**: There is a target to integrate these irrigation systems with modern technologies in future such as IoT for real-time monitoring and management, enhancing efficiency and reducing waste.

To achieve these targets, Assam's SIP includes a multi-pronged approach:

- Developing policies that encourage the adoption of sustainable irrigation practices, including mandatory adoption in certain areas prone to drought.
- Building the necessary infrastructure to support the widespread use of WUEs, such as community water storage facilities, and improved supply chains for equipment and parts.
- Setting up robust mechanisms to track progress against these targets, identify bottlenecks, and adapt strategies as necessary to ensure the successful implementation of the SIP's goals.

6.3. Low-Cost Innovations and Capacity Building

To ensure sustainable and efficient irrigation practices in Assam, the State Irrigation Plan (SIP) emphasizes the importance of adopting low-cost innovations and building capacity among farmers. These affordable andaccessible technologies aim to improve irrigation coverage and water use efficiency, while empowering farmers with the skills and knowledge to manage and maintain irrigation systems effectively.

The implementation of low-cost, sustainable irrigation technologies in Assam has already provided practical solutions for farmers, particularly in remote or power-scarce areas. Several key innovations have been successfully introduced across various districts, including Solar-Powered Mobile Lift Irrigation Systems (LIS), Cart-Mounted Solar Operated Pumping Systems, and Electrically Operated Lift Irrigation Systems with Pontoon. Following the success of these systems, similar low-cost innovative schemes are now being planned for implementation in other districts. Additionally, new technologies such as Installation of Solar Operated Raingun Sprinkler Systems, Integrated Solar Powered Irrigation Systems, and check dam construction will be taken up in near future to further enhance irrigation efficiency across the state.

Solar-Powered Mobile Lift Irrigation Systems (LIS)

Solar-powered mobile LIS is an innovative and sustainable irrigation solution that has been successfully implemented in various districts. These systems utilize solar energy, eliminating the need for traditional electricity or fuel. The mobile units can be easily transported to various fields near water bodies, allowing farmers to irrigate different areas efficiently. The use of renewable solar energy reduces operational costs and promotes environmental sustainability. Given their success, more districts will see the rollout of solar-poweredLIS, benefiting off-grid farmers and reducing dependency on conventional energy sources.

Cart-Mounted Solar Operated Pumping Systems

Cart-mounted solar-operated pumping systems have also been implemented with great success. Theseportable units enable farmers to draw water from both surface and groundwater sources using solar power. Their mobility and ease of transport make them ideal for small-scale farms. By utilizing solar energy, these systems provide an affordable, sustainable irrigation solution, especially for areas with unreliable access to electricity. Based on the success seen in the districts where this system has been deployed, it is now planned for further expansion across additional regions of Assam.

Electrically Operated Lift Irrigation Systems with Pontoon

Electrically operated lift irrigation systems mounted on pontoons have proven effective in districts whereirrigation relies on rivers, lakes, or reservoirs. The floating design allows these systems to adapt to varying water

levels, ensuring a continuous water supply throughout the year. The integration of electricity, particularly when powered by renewable energy sources like solar or wind, has made these systems cost-efficient while providing reliable large-scale irrigation. With this success, similar systems will be introduced in other regions, especially those prone to fluctuating water levels due to seasonal monsoons.

Installation of Solar Operated Raingun Sprinkler Systems

Solar Operated Raingun Sprinkler Systems will be introduced across various districts in 2024-25. Thesesystems provide large-area irrigation by using solar energy to power high-pressure sprinklers, which simulaterainfall. The solar panels generate electricity to run the water pump, which delivers water through the raingunsprinklers. These sprinklers rotate to cover vast fields and can be adjusted for range and droplet size, making them highly efficient. Their mobility allows them to be transported easily to different fields, making them ideal for larger farms with scattered fields. The use of solar power ensures lower operational costs, making this system an affordable and environmentally friendly option for farmers.

Integrated Solar Powered Irrigation Systems

Integrated Solar Powered Irrigation Systems combine solar power with modern irrigation technologies such as drip and sprinkler systems. These systems are flexible, allowing them to be used in both small-scale and large-scale farming operations. Solar panels power the water pumps, which then distribute water through either drip lines (for targeted irrigation) or sprinklers (for even coverage). These systems can be automated with sensors to monitor soil moisture and weather conditions, optimizing water usage and reducing waste. By minimizing reliance on grid electricity or fuel, these systems offer an integrated approach to water and energymanagement, making irrigation more sustainable and cost-effective.

Check Dams

Check dams are small, cost-effective barriers constructed across streams or small rivers to slow the flow of water. These structures allow water to pool behind the dam, creating a reservoir that can be used for irrigation during dry periods. Additionally, check dams promote groundwater recharge by allowing water to seep into the soil and also control soil erosion by trapping the sediment. By providing a steady supply of water for irrigation,especially during periods of low rainfall, check dams enhance both surface and groundwater-based irrigationsystems, supporting long-term agricultural productivity in the region.

6.3.1. Strategies for Capacity Building Among Farmers

For the successful adoption and implementation of these low-cost innovations, it is crucial to focus on capacity building among farmers which focus on the following:

- **Training Programs and Workshops**: These programs and workshops aim to educate farmers on the installation, operation, and maintenance of the low-cost irrigation technologies to use these innovations effectively.
- **Incentivization for O&M**: Government-led programs can offer financial incentives, such as subsidies, grants, or tax breaks, to farmers who maintain their irrigation systems effectively. Additionally, farmer cooperatives orWater Users Associations (WUAs) can be empowered to take collective responsibility for O&M, ensuring thatthe entire community benefits from well-maintained irrigation infrastructure.

- **Technical Support Networks**: Establishing local technical support networks ensures that farmers have accessto assistance when needed like providing troubleshooting services, routine maintenance, and technical advice to ensure that irrigation systems continue to function optimally.

6.4. Climate Change Impacts on Water Availability and Demand Management in Assam

6.4.1 Impacts on Irrigation

Climate change has profound impacts on Assam's irrigation infrastructure and water resources. Extremeweather events, like heavy rainfall and prolonged dry spells, place added pressure on existing irrigation systems.Increased rainfall intensity leads to flooding, which can damage irrigation structures and result in waterlogged fields, while drought periods strain water availability, impacting crop yield. The integration of WUEs helps mitigate these effects by enabling more precise and efficient water distribution. Detention storage tanks and ponds capture excess water during heavy rainfall, ensuring that water is available for drip, sprinkler, and rain gun irrigation, which optimally utilizes water resources even in periods of scarcity.

6.4.2 Vulnerabilities Specific to Assam

Assam is particularly vulnerable to climate impacts due to its unique geographical features and hydrological challenges. Flooding from the Brahmaputra and Barak river systems is common, affecting agricultural lands andirrigation systems. The state's topography, with hilly regions and flood-prone areas, exacerbates soil erosion and water management challenges. Additionally, the reliance on monsoon rains for agriculture makes Assam highlysusceptible to rainfall variability. In this context, enhanced floodwater harvesting and watershed management are crucial to capturing and storing runoff during floods, which can then be used to support irrigation during dry spells, improving resilience against these vulnerabilities.

6.4.3 Integration of Water Use Efficient systems with Water Management Strategies

1. **Detention Storage Tanks and Ponds**: These storage systems capture excess rainwater during heavy downpours, which can be stored and later used for irrigation. By integrating this stored water with drip irrigation systems, Assam ensures that water reaches the crop roots directly, minimizing wastage. Sprinkler systems enable even water distribution, while rain guns provide quick irrigation, helping to mitigate drought impacts and improve water use efficiency during periods of scarcity.

2. **Floodwater Harvesting**: Floodwater harvesting captures excess runoff during intense rainfall events. This water can be stored in retention basins and released gradually, reducing the impact of floods on agricultural lands and infrastructure. When combined with WUEs, harvested floodwater can be utilized effectively forirrigation.

3. **Enhanced Watershed Management**: Maintaining healthy catchment areas ensures consistent water flow into rivers, streams, and groundwater reserves. By integrating WUE systems like drip irrigation with watershed resources, Assam can make efficient use of these water sources, reducing reliance on monsoon rains. Sprinkler systems aid in distributing water evenly across fields, and rain guns support large-scale irrigation, helping Assam manage water resources sustainably.

6.4.4 Policy Initiations and Strategic Interventions

To address these climate-related vulnerabilities, Assam has undertaken several policy initiations aimed at enhancing water use efficiency and supporting sustainable irrigation practices. The SIP incorporates a framework for real-time data collection and monitoring, providing up-to-date information on rainfall, soil moisture, and waterusage, which helps optimize irrigation decisions based on current conditions.

Assam is also focusing on pilot projects for conjunctive water use, which coordinate the utilization of both surface and groundwater. This approach balances immediate irrigation needs with long-term groundwater conservation. The state has recognized the importance of agro forestry and soil conservation techniques, afforestation which not only prevent soil erosion but also enhance water retention. By combining these techniques with WUEs, Assam aims to create a climate-resilient agricultural system.

Therefore the integration of WUEs with these targeted water management strategies provides a robust framework for effective resource management. By addressing vulnerabilities specific to the region and incorporating strategic policy initiatives, ensure that irrigation demands are met even during periods of water scarcity or excess, paving the way for sustainable agricultural development in the face of climate change.

6.5. Strategic Pilot Projects and Inter-Departmental Collaboration

The implementation of strategic pilot projects that integrate various sectors such as soil conservation, fisheries, agriculture, and rural development is a key focus of Assam's State Irrigation Plan (SIP). These collaborative efforts aim to develop holistic water management solutions that ensure sustainable agricultural practices, improved water use efficiency, and enhanced climate resilience.

6.5.1. Strategic Pilot Projects

The pilot projects under the SIP are designed to integrate multiple sectors, recognizing that water management is not just an irrigation issue but one that affects the entire agricultural and rural development ecosystem. The following projects exemplify this integrated approach:

- **Soil Conservation and Water Management**: Techniques like contour bunding, terracing, and afforestation are implemented in areas prone to soil erosion, ensuring that irrigation systems function optimally and soil quality is maintained. These efforts support the sustainability of agricultural productivity by preserving the nutrient-rich topsoil essential for crop growth.
- **Fisheries Integration**: In regions where water bodies are also used for fisheries, the pilot projects aim to create dual-purpose systems that serve both irrigation and fish farming. Fish ponds are designed to double as water storage systems, allowing for water to be drawn for irrigation during dry periods which also provides a supplementary source of income for rural communities engaged in aquaculture.
- **Agriculture and Crop Diversification**: Agricultural integration into water management projects ensuresthat the crops grown are water-efficient and climate-resilient. These projects promote crop diversification, encouraging farmers to cultivate drought-resistant and less water-intensive crops.

- **Rural Development and Community Participation**: Rural development initiatives not only empowers Water Users Associations (WUAs) and local communities but also emphasizes capacity building and training, ensuring that rural communities play an active role in water management and conservation efforts.

6.5.2. Role of Inter-Departmental Collaborations in Enhancing the Effectiveness of Irrigation Systems

Inter-departmental collaboration is crucial in the successful implementation and scaling of these pilot projects. The integration of expertise from different departments allows for a comprehensive approach to water management that addresses various challenges and opportunities within the agricultural ecosystem:

- **Department of Agriculture**: Plays a key role in advising on crop diversification, the adoption of climate-resilient crop varieties, and optimizing irrigation schedules to meet the specific water needs of different crops.
- **Soil Conservation Department**: Works closely with the irrigation department to implement soil conservation techniques that prevent erosion and improve water retention, ensuring that irrigation systems function effectively and sustainably.
- **Department of Fisheries**: Collaborates on projects that integrate aquaculture with irrigation systems, promoting water use efficiency while also boosting rural livelihoods through fish farming.
- **Panchayat and Rural Development (P&RD)**: Focuses on community engagement, capacity building, and mobilization of local resources for the maintenance and management of water resources and irrigation systems.
- **Environmental and Forest Departments**: Contribute by supporting afforestation and watershed management efforts, which are essential for maintaining the hydrological cycle and ensuring a steady supply of water for irrigation.

This inter-departmental collaboration ensures that each project benefits from a multifaceted approach, combining technical expertise, local knowledge, and community participation. It also enhances the resilience of the irrigation infrastructure, making it more adaptable to the challenges posed by climate change.

6.6. Climate Resilient Approaches in Irrigation

As Assam faces increasing vulnerability to climate change, adopting climate-resilient approaches in irrigation is essential to ensure sustainable water use and enhance agricultural productivity. Integrating strategies such as afforestation and catchment treatment plans which involves managing entire catchment areas or watersheds to maximize their water retention and improve the flow of water into rivers, lakes, and irrigation systems helps create a resilient system that can adapt to erratic rainfall patterns, droughts, and other climate -inducedchallenges.

By integrating these climate-resilient practices into Assam's State Irrigation Plan, the state can enhance its ability to cope with climate-induced risks, ensuring sustainable water management and supporting the agricultural sector's long-term productivity. These approaches help create a resilient, adaptable irrigation system that can meet the needs of Assam's farmers, even in the face of climate change challenges.

Annexure - I (A)

SUMMARY STATEMENT OF IRRIGATION SCHEMES/POTENTIAL CREATED UPTO MARCH, 2022 UNDER IRRIGATION DEPARTMENT, ASSAM

Name of District	Category of Schemes																				
	FIS			LIS			DTW			MDTW			TW PMKSY HKKP			TW Hybrid			STW		
	No. of Schemes	Total Expenditure Rs. In Lakh	Potential Created in Ha (NIA)	No. of Schemes	Total Expenditure Rs. In Lakh	Potential Created in Ha (NIA)	No. of Schemes	Total Expenditure Rs. In Lakh	Potential Created in Ha (NIA)	No. of Schemes	Total Expenditure Rs. In Lakh	Potential Created in Ha (NIA)	No. of Schemes	Total Expenditure Rs. In Lakh	Potential Created in Ha (NIA)	No. of Schemes	Total Expenditure Rs. In Lakh	Potential Created in Ha (NIA)	No. of Schemes	Total Expenditure Rs. In Lakh	Potential Created in Ha (NIA)
Baksa	7	592	0	0	0	0	4	18	175	3	64	34		0	0	0	0	0	1	15	15
Barpeta	25	8475	18892	30	4206	7576	13	375	730	6	68	38		926	1520	2	60	120	1	1	4
Bongaigaon	4	211	175	6	19	1044	9	109	705	1	0	10		1008	700	0	0	0	5	459	530
Cachar	51	11531	7844	24	4995	4316	2	23	60	0	0	0		1543	0	1	16	22	0	0	0
Charaideo	4	408	141	10	556	1834	11	495	630	2	141	50		939	800	2	45	24	1	4	16
Chirang	104	37322	18725	3	454	255	0	0	0	0	0	0		316	240	0	0	0	0	0	0
Darrang	21	16989	8015	2	853	710	17	656	8677	6	145	38		1379	1252	0	0	0	1	68	30
Dhemaji	3	638	420	3	552	850	12	240	462	0	0	0		1491	1200	2	47	24	6	332	944
Dhubri	1	0	0	14	1051	1778	10	291	235	1	9	10		487	400	0	0	0	0	0	0
Dibrugarh	0	0	0	18	3496	6226	35	2849	2475	29	1169	1941		4339	1172	3	178	177	0	0	0
Dima Hasao	103	12394	9498	4	1711	1536	0	0	0	0	0	0		0	0	0	0	0	0	0	0
Goalpara	21	6761	6195	12	1962	2000	48	524	655	1	56	20		294	200	0	0	0	1	4	70
Golaghat	7	2380	1520	7	54	650	23	1422	2610	7	335	220		383	300	0	0	0	0	0	0
Hailakandi	16	3212	1355	8	597	1051	0	0	0	0	0	0		762	400	0	0	0	0	0	0
Jorhat	12	2003	2170	12	709	1175	48	1382	5064	4	88	190		2988	1700	0	0	0	0	0	0
Kamrup	29	14701	12192	31	6513	6183	31	1077	1370	22	1030	750		2204	2300	5	94	68	0	0	0
Kamrup(M)	14	5538	4528	7	3793	3105	0	0	0	1	52	20		479	396	0	0	0	0	0	0
Karbi Anglong	357	94317	41782	31	1468	2010	68	2829	955	0	0	0	1	1660	1704	0	0	0	465	774	732
Karimganj	20	5235	5857	5	48	270	3	25	64	0	0	0		3171	2200	0	0	0	0	0	0
Kokrajhar	114	31560	32802	11	1416	1483	11	844	630	6	229	70		1521	1184	0	0	0	0	0	0
Lakhimpur	10	1777	1230	4	1044	1306	32	375	3337	8	191	70		2367	2040	0	0	0	0	0	0
Majuli	2	333	700	8	168	385	0	0	0	9	607	435		662	564	2	61	72	22	602	3039
Morigaon	1	90	105	60	4398	7145	9	309	315	15	418	150		2050	1560	0	0	0	1	8	105
Nagaon	15	8674	32577	65	6169	24189	34	1184	1245	18	470	250		2133	1970	0	0	0	0	0	0
Nalbari	0	0	0	0	0	0	10	1236	610	22	1446	440		3542	2400	63	184	156	663	3725	2556
Sivasagar	3	334	700	10	807	3016	15	816	1480	0	0	0		741	1100	0	0	0	0	0	0
Sonitpur	28	6096	30239	11	2341	3520	27	2977	2237	18	1010	950		2648	3160	0	0	0	0	0	0
South Salmara Mankachar	9	3816	475	10	257	55	24	371	140	0	0	0		455	400	0	0	0	11	81	0
Tamulpur	136	41051	21883	0	0	0	3	78	160	12	357	150		0	0	0	0	0	1	780	488
Tinsukia	4	521	500	8	554	1830	23	742	1649	8	181	572		2278	2400	0	0	0	2	13	266
Udalguri	259	124952	69464	1	0	65	0	179	120	5	0	35		0	0	0	0	0	0	0	0
West Karbi Anglong	172	0	0	5	4846	5	14	357	5	0	0	0		376	150	0	0	0	10	12	49
Total	1552	441913	329984	420	55037	85568	536	21783	36795	204	8065	6443	1	43138	33412	80	684	663	1191	6877	8844

Annexure-I (B)

Present Status of Irrigation Schemes under Irrigation Department, Assam as on 2022.

Status of Schemes	Category of Schemes	Total nos of Schemes	Potential Created (in Ha.)		Potential available (in Ha.)		
			NIA	AIA	Kharif	Rabi	Total
Fully Operative Schemes	FIS	546	219407	284492	164134	78917	243051
	LIS	72	15585	20290	7923	2879	10802
	DTW	223	11737	16611	8124	4851	12974
	MDTW	192	6783	14523	5518	3485	9002
	Others	371	26543	38189	20973	15441	36415
Sub Total		**1404**	**280055**	**374105**	**206672**	**105573**	**312244**
Partially Operative Schemes	FIS	586	165943	222544	118906	27417	146323
	LIS	210	50799	69359	14875	8019	22894
	DTW	150	11389	16682	5264	3265	8529
	MDTW	24	1547	2416	639	425	1064
	Others	64	13257	22067	6791	4858	11649
Sub Total		**1034**	**242935**	**333068**	**146475**	**43984**	**190459**
Inoperative but Repairable	FIS	136	22842	30144	0	0	0
	LIS	106	21655	25527	0	0	0
	DTW	133	10243	13116	0	0	0
	MDTW	20	1033	1755	0	0	0
	Others	13	1384	1603	0	0	0
Sub Total		**408**	**57157**	**72145**	**0**	**0**	**0**
Defunct Schemes	FIS	146	15696	18196	0	0	0
	LIS	68	11125	14837	0	0	0
	DTW	8	95	130	0	0	0
	MDTW	86	2399	3810	0	0	0
	Others	14	1532	1873	0	0	0
Sub Total		**322**	**30847**	**38846**	**0**	**0**	**0**
Abandoned Schemes	FIS	27	1564	2455	0	0	0
	LIS	53	3236	5515	0	0	0
	DTW	35	498	660	0	0	0
	MDTW	9	20	30	0	0	0
	Others	13	50	75	0	0	0
Sub Total		**137**	**5368**	**8735**	**0**	**0**	**0**
Total		**3305**	**616362**	**826900**	**353147**	**149557**	**502703**

Annexure-II (A)

Strategic Action Plan for Revival of Existing Irrigation Schemes of Assam for 5 years (2022-27)

Category of Schemes	Nos of Schemes	Irrigation potential for scheme proposed for REVIVAL																Estimated cost (Rs. in Lakh)
		Original potential (in Ha.)				Present potential available (in Ha.)				Targeted potential (in Ha.)				Total Targeted potential after Revival (in Ha.)				
		NIA	Rabi	Kharif	Total (AIA)	NIA	Rabi	Kharif	Total (AIA)	NIA	Rabi	Kharif	Total (AIA)	NIA	Rabi	Kharif	Total (AIA)	
FIS	880	283137	96193	217002	313195	158061	51682	134651	186333	105086	34068	69053	103121	263147	85750	203704	289454	279980
LIS	313	72924	35249	53167	88416	14416	8230	10219	18449	38540	18467	28004	46471	52957	26696	38223	64919	66764
DTW	250	13891	8266	10902	19168	4658	2692	3242	5934	8135	5284	6822	12106	12793	7976	10064	18040	21437
MDTW	25	1329	728	1321	2049	196	99	196	295	698	498	691	1189	894	597	887	1484	998
OTHERS	136	8375	7125	5099	12224	4705	4108	2176	6284	3670	3156	2784	5940	8375	7265	4959	12224	1347
GRAND TOTAL	**1604**	**379656**	**147561**	**287492**	**435052**	**182036**	**66811**	**150484**	**217295**	**156129**	**61473**	**107354**	**168827**	**338166**	**128284**	**257837**	**386121**	**370526**

Annexure-II (B)

Strategic Action Plan for New Proposed Irrigation Schemes of Assam for 5 years (2022-27)

Category of Schemes	Number of Schemes	Targeted potential for New scheme(in Ha.)					Estimated cost (Rs. in Lakh)
		NIA	Rabi	Kharif	Pre-Kharif	Total (AIA)	
FIS	787	182967.8	74239.26	175762.9	19504.68	269506.8	784495.925
LIS	540	93578.5	38019.45	86824.8	14771	139615.3	469090.163
DTW	1964	133431.2	61698.91	122334.4	17333.9	201367.2	1236435.47
MDTW	1907	93889	42106.64	91630.06	14988	148724.7	331505.92
TW	1970	185309.4	97593.27	176737.3	25731.8	300062.4	434097.597
OTHERS	145	5651.5	3385.8	5095.4	411	8892.2	14429
GRAND TOTAL	**7313**	**694827**	**317043**	**658385**	**92740**	**1068169**	**3270054**

Annexure-III (A)

Strategic Action Plan for Revival of Existing Command Area Development under Irrigation Department, Assam for 5 years (2022-27)

Sl. No.	Category of Schemes	Name of District	COMMAND AREA PROPOSED FOR REVIVAL		TOTAL TARGETED COMMAND AREA (In Ha)	ESTIMATED COST (Rs. In Lakh)	Total Estimated Cost Category wise (Rs. In Lakh)
			PRESENT COMMAND AREA AVAILABLE (In Ha)	TARGETED COMMAND AREA (In Ha)			
1	FIS	Lakhimpur	0	440	440	220	1523
2		Nagaon	27200	588	27788	1303	
3	LIS	Lakhimpur	32	500	532	156	15300
4		Majuli	2	178	180	107	
5		Nagaon	648	2665	3313	15037	
6	DTW	Lakhimpur	0	150	150	170	244
7		Nagaon	37	160	197	74	
8	MDTW	Lakhimpur	0	20	20	5	5
Total			**27919**	**4701**	**32620**	**17072**	**17072**

Annexure-III (B)

Strategic Action Plan for New Command Area Development under Irrigation Department, Assam for 5 years (2022-27)

Sl. No.	Category of Schemes	Name of District	COMMAND AREA PROPOSED FOR NEWSCHEME		Total Estimated Cost Category wise(Rs. In Lakh)
			TARGETED COMMAND AREAFOR THE NEW SCHEME (In Ha)	ESTIMATED COST (Rs. In Lakh)	
1	FIS	Kamrup	4150	900	4350
2		Lakhimpur	1088	3450	
3	LIS	Kamrup	6778	19591	23291
4		Lakhimpur	830	3700	
5	DTW	Kamrup	140	40	40
6	MDTW	Lakhimpur	3190	11484	11484
7	Others	Lakhimpur	5936	9472	9472
Total			**22112**	**48637**	**48637**

Annexure- IV (A)

YEARWISE BREAKUP PLAN FOR CREATION OF IRRIGATION POTENTIAL THROUGH NEW SCHEMES (ALREADY CREATED FOR 2022-24 & TO BE CREATED FOR 2024-27)

District	2022-23			2023-24			2024-25			2025-26			2026-27		
	NO OF SCHEMES	POTENTIAL CREATED	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL CREATED	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TOBE CREATED	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TOBE CREATED	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TOBE CREATED	AMOUNT IN LAKHS
Baksa	1	3497	889.34	8	440	1654.5	77	14119	39207	66	12102	33606	44	8068	22404
Barpeta	5	1890	1021.63	6	143	251.22	83	6505	9475	71	5576	8121	47	3717	5414
Bongaigaon	0	0	0	2	29	31.23	50	5809	7747	43	4979	6640	28	3320	4426
Cachar	7	5990	2302.64	3	621	1097.02	75	22527	79251	64	19309	67929	43	12874	45286
Charaideo	4	721	196.25	2	30	60	49	5378	11136	42	4610	9545	28	3073	6364
Chirang	3	1692	769.83	1	150	210	51	10830	14224	44	9283	12192	28	6189	8129
Darrang	1	3795	3895.05	0	14	0	6	6732	9478	5	5771	8124	3	3846	5416
Dhemaji	2	1992	53.42	2	17	53.42	33	4381	13356	29	3755	11448	18	2504	7632
Dhubri	1	102	15.62	2	44	46.84	179	5875	7894	154	5036	6767	102	3358	4510
Dibrugarh	17	2160	1386.44	11	656	1250.21	136	39928	65524	116	34224	56164	78	22815	37442
Dima Hasao	0	0	0	0	0	0	49	2346	5957	42	2011	5106	29	1342	3405
Goalpara	1	624	46.85	5	92	183.68	203	20980	27347	174	17983	23440	116	11989	15626
Golaghat	5	838	401.5	7	266	641.5	40	11362	20979	34	9739	17982	23	6494	11987
Hailakandi	1	1216	1602.61	0	0	0	21	2805	6563	18	2405	5625	11	1602	3749
Jorhat	6	543	573.42	2	100	189.04	64	22749	337633	55	19499	289400	37	12999	192933
Kamrup	12	1960	2134.95	17	4629	3584.6	167	19602	31996	143	16801	27425	96	11202	18283
Kamrup (M)	0	0	0	1	36	39.04	5	7547	28159	5	6469	24137	2	4312	16090
Karbi Anglong	0	0	0	0	0	0	76	5353	75928	65	4588	65081	42	3059	43386
Karimganj	6	1622	522.77	6	442	645.46	42	9578	27806	36	8210	23834	23	5474	15888
Kokrajhar	1	780	96.5	0	0	0	41	9263	14128	35	7940	12110	24	5293	8072
Lakhimpur	1	48	15.61	3	100	172.5	168	8938	10687	144	7661	9160	95	5108	6106
Majuli	9	634	381.47	0	0	0	4	819	753	2	702	644	2	468	430
Morigaon	5	1513	920	2	38	336.71	86	11012	26365	74	9439	22598	49	6293	15066
Nagaon	6	1400	1046.98	7	224	302.46	107	17478	21723	92	14981	18620	62	9988	12414
Nalbari	14	763	698.52	30	1000	1957.12	249	9748	32967	213	8356	28258	142	5570	18838
Sivasagar	1	70	22.25	1	10	30	136	11918	20532	116	10215	17599	78	6809	11733
Sonitpur	3	183	90	9	540	2505.92	106	11422	36502	91	9791	31287	61	6527	20857
South Salmara Mankachar	1	595	513.02	0	0	0	35	2309	4618	30	1979	3958	20	1319	2639
Tamulpur	0	0	0	0	0	0	30	14137	39329	26	12117	33710	18	8077	22474
Tinsukia	3	3116	47.85	5	122	210	59	18819	35235	51	16130	30202	34	10754	20134
Udalguri	1	5910	56779.13	3	406	628.62	72	24642	45358	62	21122	38878	40	14080	25919
West Karbi Anglong	0	0	0	0	0	0	61	8946	36664	53	7668	31427	34	5112	20950
TOTAL	117	43654	76424	135	10149	16081	2560	373857	1144521	2195	320451	981017	1457	213635	654002

N.B.:Since two years has already been elapsed, therefore potential already created during 2022-23 & 2023-24 is considered in this annexure

Annexure- IV (B)

YEARWISE BREAKUP PLAN FOR CREATION OF IRRIGATION POTENTIAL THROUGH REVIVAL OF SCHEMES (ALREADY CREATED FOR 2022-24 & TO BE CREATED FOR 2024-27)

District	2022-23			2023-24			2024-25			2025-26			2026-27		
	NO OF SCHEMES	POTENTIAL CREATED	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL CREATED	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TO BE CREATED	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TO BE CREATED	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TO BE CREATED	AMOUNT IN LAKHS
Baksa	0	0	0	0	0	0	18	1817	3863	16	1557	3311	10	1037	2207
Barpeta	0	0	0	0	0	0	16	2846	4088	14	2439	3504	8	1625	2337
Bongaigaon	0	0	0	0	0	0	4	175	341	3	150	293	1	99	194
Cachar	0	0	0	0	0	0	18	2972	2596	16	2547	2225	10	1697	1484
Charaideo	0	0	0	0	0	0	4	509	256	3	436	220	1	290	146
Chirang	0	0	0	1	150	210	7	647	950	6	555	814	3	370	542
Darrang	0	0	0	0	0	0	4	3124	2571	4	2678	2204	2	1784	1468
Dhemaji	0	0	0	0	0	0	1	33	39	1	62	71	0	0	0
Dhubri	0	0	0	0	0	0	10	701	955	8	601	819	6	402	546
Dibrugarh	0	0	0	0	0	0	5	328	457	5	281	392	3	188	262
Dima Hasao	0	0	0	0	0	0	27	660	4003	24	566	3431	18	378	2286
Goalpara	0	0	0	8	0	0	29	1938	6810	25	1661	5837	16	1108	3891
Golaghat	0	0	0	0	0	0	6	918	2136	5	787	1831	2	525	1221
Hailakandi	0	0	0	0	0	0	8	980	412	7	840	353	5	559	234
Jorhat	0	0	0	0	0	0	10	792	1401	8	679	1201	6	454	800
Kamrup	0	0	0	3	3154	1020	12	2024	3584	10	1735	3072	6	1156	2047
Kamrup (M)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Karbi Anglong	0	0	0	0	0	0	95	9453	39119	81	8103	33530	54	5402	22354
Karimganj	0	0	0	0	0	0	16	2311	2513	14	1981	2154	9	1320	1435
Kokrajhar	1	70	96.5	0	0	0	30	3926	15296	26	3365	13111	17	2242	8742
Lakhimpur	0	0	0	0	0	0	5	389	193	4	333	165	3	221	110
Majuli	0	0	0	0	0	0	9	692	466	8	593	399	4	396	265
Morigaon	0	0	0	0	0	0	23	1694	664	20	1452	569	12	969	379
Nagaon	0	0	0	0	0	0	27	3505	9486	23	3004	8131	15	2003	5421
Nalbari	0	0	0	0	0	0	6	252	445	5	216	381	4	144	253
Sivasagar	0	0	0	0	0	0	9	1158	1337	8	993	1146	6	662	763
Sonitpur	0	0	0	0	0	0	47	1967	2395	40	1686	2053	27	1123	1368
South Salmara Mankachar	0	0	0	0	0	0	5	208	1306	4	179	1119	3	118	745
Tamulpur	0	0	0	0	0	0	5	2767	1858	5	2372	1592	2	1581	1062
Tinsukia	0	0	0	0	0	0	5	322	593	5	276	509	2	183	338
Udalguri	0	0	0	0	0	0	63	1017	4246	54	872	3639	35	582	2426
West Karbi Anglong	0	0	0	0	0	0	38	4522	15308	33	3876	13121	22	2583	8748
TOTAL	1	70	96.5	12	3304	1230	562	54647	129687	485	46875	111197	312	31201	74074

N.B.: Since two years has already been elapsed, therefore potential already created during 2022-23 & 2023-24 is considered in this annexure

Annexure- IV

YEARWISE BREAKUP PLAN FOR CREATION OF IRRIGATION POTENTIAL THROUGH NEW & REVIVAL OF SCHEMES (ALREADY CREATED FOR 2022-24 & TO BE CREATED FOR 2024-27)

District	2022-23			2023-24			2024-25			2025-26			2026-27		
	NO OF SCHEMES	POTENTIAL CREATED	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL CREATED	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TO BE CREATED	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TO BE CREATED	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TO BE CREATED	AMOUNT IN LAKHS
Baksa	1	3497	889.34	8	440	1654.5	95	15936	43070	82	13659	36917	54	9105	24611
Barpeta	5	1890	1021.63	6	143	251.22	99	9351	13563	85	8015	11625	55	5342	7751
Bongaigaon	0	0	0	2	29	31.23	54	5984	8088	46	5129	6933	29	3419	4620
Cachar	7	5990	2302.64	3	621	1097.02	93	25499	81847	80	21856	70154	53	14571	46770
Charaideo	4	721	196.25	2	30	60	53	5887	11392	45	5046	9765	29	3363	6510
Chirang	3	1692	769.83	2	300	420	58	11477	15174	50	9838	13006	31	6559	8671
Darrang	1	3795	3895.05	0	14	0	10	9856	12049	9	8449	10328	5	5630	6884
Dhemaji	2	1992	53.42	2	17	53.42	34	4414	13395	30	3817	11519	18	2504	7632
Dhubri	1	102	15.62	2	44	46.84	189	6576	8849	162	5637	7586	108	3760	5056
Dibrugarh	17	2160	1386.44	11	656	1250.21	141	40256	65981	121	34505	56556	81	23003	37704
Dima Hasao	0	0	0	0	0	0	76	3006	9960	66	2577	8537	47	1720	5691
Goalpara	1	624	46.85	13	92	183.68	232	22918	34157	199	19644	29277	132	13097	19517
Golaghat	5	838	401.5	7	266	641.5	46	12280	23115	39	10526	19813	25	7019	13208
Hailakandi	1	1216	1602.61	0	0	0	29	3785	6975	25	3245	5978	16	2161	3983
Jorhat	6	543	573.42	2	100	189.04	74	23541	339034	63	20178	290601	43	13453	193733
Kamrup	12	1960	2134.95	20	7783	4604.6	179	21626	35580	153	18536	30497	102	12358	20330
Kamrup (M)	0	0	0	1	36	39.04	5	7547	28159	5	6469	24137	2	4312	16090
Karbi Anglong	0	0	0	0	0	0	171	14806	115047	146	12691	98611	96	8461	65740
Karimganj	6	1622	522.77	6	442	645.46	58	11889	30319	50	10191	25988	32	6794	17323
Kokrajhar	2	850	193	0	0	0	71	13189	29424	61	11305	25221	41	7535	16814
Lakhimpur	1	48	15.61	3	100	172.5	173	9327	10880	148	7994	9325	98	5329	6216
Majuli	9	634	381.47	0	0	0	13	1511	1219	10	1295	1043	6	864	695
Morigaon	5	1513	920	2	38	336.71	109	12706	27029	94	10891	23167	61	7262	15445
Nagaon	6	1400	1046.98	7	224	302.46	134	20983	31209	115	17985	26751	77	11991	17835
Nalbari	14	763	698.52	30	1000	1957.12	255	10000	33412	218	8572	28639	146	5714	19091
Sivasagar	1	70	22.25	1	10	30	145	13076	21869	124	11208	18745	84	7471	12496
Sonitpur	3	183	90	9	540	2505.92	153	13389	38897	131	11477	33340	88	7650	22225
South Salmara Mankachar	1	595	513.02	0	0	0	40	2517	5924	34	2158	5077	23	1437	3384
Tamulpur	0	0	0	0	0	0	35	16904	41187	31	14489	35302	20	9658	23536
Tinsukia	3	3116	47.85	5	122	210	64	19141	35828	56	16406	30711	36	10937	20472
Udalguri	1	5910	56779.13	3	406	628.62	135	25659	49604	116	21994	42517	75	14662	28345
West Karbi Anglong	0	0	0	0	0	0	99	13468	51972	86	11544	44548	56	7695	29698
TOTAL	118	43724	76520	147	13453	17311	3122	428504	1274208	2680	367326	1092214	1769	244836	728076

N.B.:Since two years has already been elapsed, therefore potential already created during 2022-23 & 2023-24 is considered in this annexure

Annexure- V (A)

YEARWISE BREAKUP PLAN FOR CREATION OF IRRIGATION POTENTIAL THROUGH NEW SCHEMES (2022-27)

SL. NO.	DISTRICT	2022-23			2023-24			2024-25			2025-26			2026-27		
		NO OF SCHEMES	POTENTIAL TO BE CREATED (In Ha)	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TO BE CREATED (In Ha)	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TO BE CREATED (In Ha)	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TO BE CREATED (In Ha)	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TO BE CREATED (In Ha)	AMOUNT IN LAKHS
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
1	Baksa	11	1728	5601	22	3455	11202	77	12094	39207	66	10366	33606	44	6911	22404
2	Barpeta	12	591	1354	24	1181	2707	83	4135	9475	71	3544	8121	47	2363	5414
3	Bongaigaon	7	507	1107	14	1014	2213	50	3548	7747	43	3041	6640	28	2027	4426
4	Cachar	11	2318	11322	21	4636	22643	75	16227	79251	64	13909	67929	43	9273	45286
5	Charaideo	7	512	1591	14	1024	3182	49	3585	11136	42	3073	9545	28	2050	6364
6	Chirang	7	1135	2032	15	2271	4064	51	7948	14224	44	6812	12192	28	4542	8129
7	Darrang	1	706	1354	2	1411	2708	6	4939	9478	5	4233	8124	3	2822	5416
8	Dhemaji	5	515	1908	10	1029	3816	33	3603	13356	29	3088	11448	18	2059	7632
9	Dhubri	26	487	1128	51	973	2256	179	3406	7894	154	2919	6767	102	1946	4510
10	Dibrugarh	19	3299	9361	39	6598	18721	136	23094	65524	116	19795	56164	78	13197	37442
11	Dima Hasao	7	238	851	14	476	1702	49	1665	5957	42	1427	5106	29	951	3405
12	Goalpara	29	1509	3907	58	3019	7813	203	10565	27347	174	9056	23440	116	6036	15626
13	Golaghat	6	978	2997	11	1956	5994	40	6846	20979	34	5868	17982	23	3911	11987
14	Hailakandi	3	261	938	6	521	1875	21	1824	6563	18	1563	5625	11	1041	3749
15	Jorhat	9	2091	48233	18	4181	96467	64	14634	337633	55	12543	289400	37	8362	192933
16	Kamrup	24	1719	4571	48	3439	9142	167	12036	31996	143	10317	27425	96	6878	18283
17	Kamrup (M)	1	715	4023	2	1430	8046	5	5006	28159	5	4291	24137	2	2860	16090
18	Karbi Anglong	11	543	10847	22	1086	21694	76	3802	75928	65	3259	65081	42	2174	43386
19	Karimganj	6	455	3972	12	910	7945	42	3184	27806	36	2729	23834	23	1819	15888
20	Kokrajhar	6	882	2018	12	1765	4037	41	6176	14128	35	5294	12110	24	3530	8072
21	Lakhimpur	24	633	1527	48	1266	3053	168	4430	10687	144	3797	9160	95	2530	6106
22	Majuli	1	57	108	1	113	215	4	396	753	2	339	644	2	225	430
23	Morigaon	12	1051	3766	25	2103	7533	86	7359	26365	74	6308	22598	49	4204	15066
24	Nagaon	15	1565	3103	31	3130	6207	107	10953	21723	92	9389	18620	62	6258	12414
25	Nalbari	36	1373	4710	71	2747	9419	249	9614	32967	213	8240	28258	142	5494	18838
26	Sivasagar	19	1135	2933	39	2270	5866	136	7945	20532	116	6810	17599	78	4540	11733
27	Sonitpur	15	1172	5215	30	2345	10429	106	8207	36502	91	7034	31287	61	4690	20857
28	South Salmara Mankachar	5	205	660	10	410	1319	35	1436	4618	30	1231	3958	20	821	2639
29	Tamulpur	4	1423	5618	9	2846	11237	30	9962	39329	26	8539	33710	18	5692	22474
30	Tinsukia	8	1780	5034	17	3560	10067	59	12460	35235	51	10680	30202	34	7121	20134
31	Udalguri	10	1902	6480	21	3805	12959	72	13317	45358	62	11415	38878	40	7610	25919
32	West Karbi Anglong	9	1257	5238	18	2513	10476	61	8796	36664	53	7539	31427	34	5025	20950
	TOTAL	**366**	**34742**	**163507**	**735**	**69483**	**327007**	**2560**	**243192**	**1144521**	**2195**	**208448**	**981017**	**1457**	**138962**	**654002**

N.B.: For 2022-23 & 2023-24, potential already created is considered as suggested by the vetting committee

Annexure-V (B)

YEARWISE BREAKUP PLAN FOR CREATION OF IRRIGATION POTENTIAL THROUGH REVIVAL OF SCHEMES (2022-27)

SL. NO.	DISTRICT	2022-23			2023-24			2024-25			2025-26			2026-27		
		NO OF SCHEMES	POTENTIAL TO BE CREATED (In Ha)	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TO BE CREATED (In Ha)	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TO BE CREATED (In Ha)	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TO BE CREATED (In Ha)	AMOUNT IN LAKHS	NO OF SCHEMES	POTENTIAL TO BE CREATED (In Ha)	AMOUNT IN LAKHS
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
1	Baksa	3	260	552	5	519	1104	18	1817	3863	16	1557	3311	10	1037	2207
2	Barpeta	2	407	584	5	813	1168	16	2846	4088	14	2439	3504	8	1625	2337
3	Bongaigaon	1	25	49	1	50	98	4	175	341	3	150	293	1	99	194
4	Cachar	3	425	371	5	849	742	18	2972	2596	16	2547	2225	10	1697	1484
5	Charaideo	1	73	37	1	145	73	4	509	256	3	436	220	1	290	146
6	Chirang	1	92	136	2	185	271	7	647	950	6	555	814	3	370	542
7	Darrang	1	446	367	1	893	735	4	3124	2571	4	2678	2204	2	1784	1468
8	Dhemaji	0	0	0	0	0	0	1	33	39	1	62	71	0	0	0
9	Dhubri	1	100	136	3	200	273	10	701	955	8	601	819	6	402	546
10	Dibrugarh	1	47	65	2	94	131	5	328	457	5	281	392	3	188	262
11	Dima Hasao	4	94	572	8	189	1144	27	660	4003	24	566	3431	18	378	2286
12	Goalpara	4	277	973	8	554	1946	29	1938	6810	25	1661	5837	16	1108	3891
13	Golaghat	1	131	305	2	262	610	6	918	2136	5	787	1831	2	525	1221
14	Hailakandi	1	140	59	2	280	118	8	980	412	7	840	353	5	559	234
15	Jorhat	1	113	200	3	226	400	10	792	1401	8	679	1201	6	454	800
16	Kamrup	2	289	512	3	578	1024	12	2024	3584	10	1735	3072	6	1156	2047
17	Kamrup (M)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	Karbi Anglong	14	1350	5588	27	2701	11177	95	9453	39119	81	8103	33530	54	5402	22354
19	Karimganj	2	330	359	5	660	718	16	2311	2513	14	1981	2154	9	1320	1435
20	Kokrajhar	4	561	2185	9	1122	4370	30	3926	15296	26	3365	13111	17	2242	8742
21	Lakhimpur	1	56	28	1	111	55	5	389	193	4	333	165	3	221	110
22	Majuli	1	99	67	3	198	133	9	692	466	8	593	399	4	396	265
23	Morigaon	3	242	95	7	484	190	23	1694	664	20	1452	569	12	969	379
24	Nagaon	4	501	1355	8	1001	2710	27	3505	9486	23	3004	8131	15	2003	5421
25	Nalbari	1	36	64	2	72	127	6	252	445	5	216	381	4	144	253
26	Sivasagar	1	165	191	3	331	382	9	1158	1337	8	993	1146	6	662	763
27	Sonitpur	7	281	342	13	562	684	47	1967	2395	40	1686	2053	27	1123	1368
28	South Salmara Mankachar	1	30	187	1	60	373	5	208	1306	4	179	1119	3	118	745
29	Tamulpur	1	395	265	2	791	531	5	2767	1858	5	2372	1592	2	1581	1062
30	Tinsukia	1	46	85	2	92	170	5	322	593	5	276	509	2	183	338
31	Udalguri	9	145	607	18	291	1213	63	1017	4246	54	872	3639	35	582	2426
32	West Karbi Anglong	5	646	2187	11	1292	4374	38	4522	15308	33	3876	13121	22	2583	8748
TOTAL		**82**	**7802**	**18523**	**163**	**15605**	**37044**	**562**	**54647**	**129687**	**485**	**46875**	**111197**	**312**	**31201**	**74074**

N.B.: For 2022-23 & 2023-24, potential already created is considered as suggested by the vetting committee

Annexure- V

YEARWISE BREAKUP PLAN FOR CREATION OF IRRIGATION POTENTIAL THROUGH NEW & REVIVAL OF SCHEMES (2022-27)

SL. NO.	DISTRICT	2022-23			2023-24			2024-25			2025-26			2026-27			TOTAL		
		NO. OF SCHEMES	POTENTIAL TO BE CREATED (In Ha)	AMOUNT IN LAKHS	NO. OF SCHEMES	POTENTIAL TO BE CREATED (In Ha)	AMOUNT IN LAKHS	NO. OF SCHEMES	POTENTIAL TO BE CREATED (In Ha)	AMOUNT IN LAKHS	NO. OF SCHEMES	POTENTIAL TO BE CREATED (In Ha)	AMOUNT IN LAKHS	NO. OF SCHEMES	POTENTIAL TO BE CREATED (In Ha)	AMOUNT IN LAKHS	NO. OF SCHEMES	POTENTIAL TO BE CREATED (In Ha)	AMOUNT IN LAKHS
1	Baksa	14	1988	6153	27	3974	12306	95	13911	43070	82	11923	36917	54	7948	24611	272	39744	123057
2	Barpeta	14	998	1938	29	1994	3875	99	6981	13563	85	5983	11625	55	3988	7751	282	19944	38752
3	Bongaigaon	8	532	1156	15	1064	2311	54	3723	8088	46	3191	6933	29	2126	4620	152	10636	23108
4	Cachar	14	2743	11693	26	5485	23385	93	19199	81847	80	16456	70154	53	10970	46770	266	54853	233849
5	Charaideo	8	585	1628	15	1169	3255	53	4094	11392	45	3509	9765	29	2340	6510	150	11697	32550
6	Chirang	8	1227	2168	17	2456	4335	58	8595	15174	50	7367	13006	31	4912	8671	164	24557	43354
7	Darrang	2	1152	1721	3	2304	3443	10	8063	12049	9	6911	10328	5	4606	6884	29	23036	34425
8	Dhemaji	5	515	1908	10	1029	3816	34	3636	13395	30	3150	11519	18	2059	7632	97	10389	38270
9	Dhubri	27	587	1264	54	1173	2529	189	4107	8849	162	3520	7586	108	2348	5056	540	11735	25284
10	Dibrugarh	20	3346	9426	41	6692	18852	141	23422	65981	121	20076	56556	81	13385	37704	404	66921	188519
11	Dima Hasao	11	332	1423	22	665	2846	76	2325	9960	66	1993	8537	47	1329	5691	222	6644	28457
12	Goalpara	33	1786	4880	66	3573	9759	232	12503	34157	199	10717	29277	132	7144	19517	662	35723	97590
13	Golaghat	7	1109	3302	13	2218	6604	46	7764	23115	39	6655	19813	25	4436	13208	130	22182	66042
14	Hailakandi	4	401	997	8	801	1993	29	2804	6975	25	2403	5978	16	1600	3983	82	8009	19926
15	Jorhat	10	2204	48433	21	4407	96867	74	15426	339034	63	13222	290601	43	8816	193733	211	44075	968668
16	Kamrup	26	2008	5083	51	4017	10166	179	14060	35580	153	12052	30497	102	8034	20330	511	40171	101656
17	Kamrup (M)	1	715	4023	2	1430	8046	5	5006	28159	5	4291	24137	2	2860	16090	15	14302	80455
18	Karbi Anglong	25	1893	16435	49	3787	32871	171	13255	115047	146	11362	98611	96	7576	65740	487	37873	328704
19	Karimganj	8	785	4331	17	1570	8663	58	5495	30319	50	4710	25988	32	3139	17323	165	15699	86624
20	Kokrajhar	10	1443	4203	21	2887	8407	71	10102	29424	61	8659	25221	41	5772	16814	204	28863	84069
21	Lakhimpur	25	689	1555	49	1377	3108	173	4819	10880	148	4130	9325	98	2751	6216	493	13766	31084
22	Majuli	2	156	175	4	311	348	13	1088	1219	10	932	1043	6	621	695	35	3108	3480
23	Morigaon	15	1293	3861	32	2587	7723	109	9053	27029	94	7760	23167	61	5173	15445	311	25866	77225
24	Nagaon	19	2066	4458	39	4131	8917	134	14458	31209	115	12393	26751	77	8261	17835	384	41309	89170
25	Nalbari	37	1409	4774	73	2819	9546	255	9866	33412	218	8456	28639	146	5638	19091	729	28188	95462
26	Sivasagar	20	1300	3124	42	2601	6248	145	9103	21869	124	7803	18745	84	5202	12496	415	26009	62482
27	Sonitpur	22	1453	5557	43	2907	11113	153	10174	38897	131	8720	33340	88	5813	22225	437	29067	111132
28	South Salmara Mankachar	6	235	847	11	470	1692	40	1644	5924	34	1410	5077	23	939	3384	114	4698	16924
29	Tamulpur	5	1818	5883	11	3637	11768	35	12729	41187	31	10911	35302	20	7273	23536	102	36368	117676
30	Tinsukia	9	1826	5119	19	3652	10237	64	12782	35828	56	10956	30711	36	7304	20472	184	36520	102367
31	Udalguri	19	2047	7087	39	4096	14172	135	14334	49604	116	12287	42517	75	8192	28345	384	40956	141725
32	West Karbi Anglong	14	1903	7425	29	3805	14850	99	13318	51972	86	11415	44548	56	7608	29698	284	38049	148493
TOTAL		448	42544	182030	898	85088	364051	3122	297839	1274208	2680	255323	1092214	1769	170163	728076	8917	850957	3640579

N.B.: For 2022-23 & 2023-24, potential already created is considered as suggested by the vetting committee

Annexure-VI

FIRST CENSUS OF WATER BODIES

STATE WISE DISTRIBUTION OF WATER BODIES - RURAL

Sl.No.	District	No. of Districts	No. of Villages	Number of Water Bodies						
				Ponds	Tanks	Lakes	Reservoirs	Water Conservation Schemes/percolation tanks/check dams	Others	Total
(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	BAKSA	1	355	3919	6	0	0	0	5	3930
2	BARPETA	1	798	4463	4	1	0	0	33	4501
3	BONGAIGAON	1	496	4085	1	0	0	0	11	4097
4	CACHAR	1	988	6558	15	2	2	0	523	7100
5	CHARAIDEO	1	310	1950	8	0	0	0	15	1973
6	CHIRANG	1	405	2977	11	0	0	0	25	3013
7	DARRANG	1	451	1937	1	0	0	0	26	1964
8	DHEMAJI	1	792	6309	11	50	4	0	51	6425
9	DHUBRI	1	907	10166	5	33	0	0	174	10378
10	DIBRUGARH	1	1214	13792	6	5	17	0	131	13951
11	DIMA HASAO	1	75	451	0	0	0	0	1	452
12	GOALPARA	1	828	8774	16	12	3	0	100	8905
13	GOLAGHAT	1	1001	9179	4	64	5	0	188	9440
14	HAILAKANDI	1	324	4491	12	2	0	0	146	4651
15	HOJAI	1	398	2845	10	4	2	0	127	2988
16	JORHAT	1	435	2918	7	2	5	6	139	3077
17	KAMRUP	1	983	7351	3	0	0	0	100	7454
18	KAMRUP METRO	1	196	1504	0	0	0	0	15	1519
19	KARBI ANGLONG	1	559	1747	3	0	4	4	19	1777
20	KARBI ANGLONG WEST	1	85	393	1	0	3	0	28	425
21	KARIMGANJ	1	916	10425	24	8	4	0	22	10483
22	KOKRAJHAR	1	1009	10801	1	0	0	0	2	10804
23	LAKHIMPUR	1	1162	6478	9	0	4	0	254	6745
24	MAJULI	1	245	2549	10	0	3	0	30	2592
25	MORIGAON	1	612	7729	2	0	0	0	48	7779
26	NAGAON	1	983	5511	14	4	2	0	296	5827
27	NALBARI	1	441	3373	0	1	3	0	5	3382
28	SIVASAGAR	1	479	4114	7	0	2	4	123	4250
29	SONITPUR	1	864	5915	2	0	0	0	15	5932
30	SOUTH SALMARA MANKACHAR	1	137	1300	4	0	0	0	38	1342
31	TINSUKIA	1	866	4892	5	1	35	0	130	5063
32	UDALGURI	1	610	5515	5	3	0	0	75	5598
	Total	32	19924	164411	207	192	98	14	2895	167817

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

STATE WISE DISTRIBUTION OF WATER BODIES - URBAN

Sl.No.	District	No. of Districts	No. of Towns/ Cities	No. of Wards	Number of Water Bodies						
					Ponds	Tanks	Lakes	Reservoirs	Water Conservation Schemes/percolation tanks/check dams	Others	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	BAKSA	1	2	2	251	0	0	0	0	0	251
2	BARPETA	1	9	51	80	0	0	0	0	5	85
3	BONGAIGAON	1	5	32	50	0	0	0	0	0	50
4	CACHAR	1	19	58	101	0	0	0	0	13	114
5	CHARAIDEO	1	3	20	41	0	0	0	0	0	41
6	CHIRANG	1	3	7	29	0	0	0	0	0	29
7	DARRANG	1	3	19	42	0	0	0	0	0	42
8	DHEMAJI	1	4	10	21	0	0	0	0	0	21
9	DHUBRI	1	8	45	130	0	1	0	0	0	131
10	DIBRUGARH	1	9	38	85	1	0	0	0	0	86
11	DIMA HASAO	1	4	11	35	0	0	0	0	0	35
12	GOALPARA	1	11	32	93	1	0	0	0	8	102
13	GOLAGHAT	1	7	34	56	0	0	0	0	0	56
14	HAILAKANDI	1	3	27	198	1	0	0	0	0	199
15	HOJAI	1	9	34	58	0	0	0	0	8	66
16	JORHAT	1	11	55	60	1	0	0	0	0	61
17	KAMRUP	1	16	34	117	0	0	0	0	0	117
18	KAMRUP METRO	1	12	54	100	0	0	0	0	0	100
19	KARBI ANGLONG	1	6	36	53	0	0	0	0	0	53
20	KARBI ANGLONG WEST	1	2	12	15	0	0	0	0	0	15
21	KARIMGANJ	1	7	31	105	1	0	0	0	0	106
22	KOKRAJHAR	1	4	16	31	0	0	0	0	0	31
23	LAKHIMPUR	1	4	34	90	0	0	0	0	46	136
24	MORIGAON	1	6	13	24	0	0	0	0	0	24
25	NAGAON	1	8	54	75	0	0	0	0	6	81
26	NALBARI	1	11	25	32	0	0	0	0	0	32
27	SIVASAGAR	1	4	38	103	0	0	0	0	0	103
28	SONITPUR	1	6	41	66	0	0	0	0	1	67
29	SOUTH SALMARA MANKACHAR	1	1	1	8	0	0	0	0	0	8
30	TINSUKIA	1	13	58	77	0	0	0	0	6	83
31	UDALGURI	1	3	11	22	1	0	0	0	0	23
Total		**32**	**213**	**933**	**2248**	**6**	**1**	**0**	**0**	**93**	**2348**

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

STATE WISE DISTRIBUTION OF WATER BODIES - ALL

Sl.No.	District		Number of Water Bodies						
		No. of Districts	Ponds	Tanks	Lakes	Reservoirs	Water Conservation Schemes/percolat ion tanks/check	Others	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	BAKSA	1	4170	6	0	0	0	5	4181
2	BARPETA	1	4543	4	1	0	0	38	4586
3	BONGAIGAON	1	4135	1	0	0	0	11	4147
4	CACHAR	1	6659	15	2	2	0	536	7214
5	CHARAIDEO	1	1991	8	0	0	0	15	2014
6	CHIRANG	1	3006	11	0	0	0	25	3042
7	DARRANG	1	1979	1	0	0	0	26	2006
8	DHEMAJI	1	6330	11	50	4	0	51	6446
9	DHUBRI	1	10296	5	34	0	0	174	10509
10	DIBRUGARH	1	13877	7	5	17	0	131	14037
11	DIMA HASAO	1	486	0	0	0	0	1	487
12	GOALPARA	1	8867	17	12	3	0	108	9007
13	GOLAGHAT	1	9235	4	64	5	0	188	9496
14	HAILAKANDI	1	4689	13	2	0	0	146	4850
15	HOJAI	1	2903	10	4	2	0	135	3054
16	JORHAT	1	2978	8	2	5	6	139	3138
17	KAMRUP	1	7468	3	0	0	0	100	7571
18	KAMRUP METRO	1	1604	0	0	0	0	15	1619
19	KARBI ANGLONG	1	1800	3	0	4	4	19	1830
20	KARBI ANGLONG WEST	1	408	1	0	3	0	28	440
21	KARIMGANJ	1	10530	25	8	4	0	22	10589
22	KOKRAJHAR	1	10832	1	0	0	0	2	10835
23	LAKHIMPUR	1	6568	9	0	4	0	300	6881
24	MAJULI	1	2549	10	0	3	0	30	2592
25	MORIGAON	1	7753	2	0	0	0	48	7803
26	NAGAON	1	5586	14	4	2	0	302	5908
27	NALBARI	1	3405	0	1	3	0	5	3414
28	SIVASAGAR	1	4217	7	0	2	4	123	4353
29	SONITPUR	1	5981	2	0	0	0	16	5999
30	SOUTH SALMARA MANKACHAR	1	1308	4	0	0	0	38	1350
31	TINSUKIA	1	4969	5	1	35	0	136	5146
32	UDALGURI	1	5537	6	3	0	0	75	5621
Total		**32**	**166659**	**213**	**193**	**98**	**14**	**2988**	**170165**

Source: micensus.gov.in

Annexure-VI

STATE WISE DISTRIBUTION OF 'IN USE' WATER BODIES- ALL

Sl.No.	District	Number of Water Bodies						
		Ponds	Tanks	Lakes	Reservoirs	Water Conservation Schemes/percolation tanks/check dams	Others	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	BAKSA	4170	6	0	0	0	4	4180
2	BARPETA	4537	4	1	0	0	8	4550
3	BONGAIGAON	4135	1	0	0	0	8	4144
4	CACHAR	6647	15	2	2	0	180	6846
5	CHARAIDEO	1977	8	0	0	0	6	1991
6	CHIRANG	2994	11	0	0	0	8	3013
7	DARRANG	1927	1	0	0	0	11	1939
8	DHEMAJI	6324	11	50	4	0	24	6413
9	DHUBRI	10251	5	12	0	0	74	10342
10	DIBRUGARH	13831	6	0	9	0	75	13921
11	DIMA HASAO	486	0	0	0	0	0	486
12	GOALPARA	8795	17	12	3	0	60	8887
13	GOLAGHAT	9199	3	51	5	0	37	9295
14	HAILAKANDI	4679	13	2	0	0	79	4773
15	HOJAI	2899	10	3	2	0	36	2950
16	JORHAT	2894	6	2	2	6	75	2985
17	KAMRUP	7461	3	0	0	0	39	7503
18	KAMRUP METRO	1602	0	0	0	0	5	1607
19	KARBI ANGLONG	1795	3	0	4	4	17	1823
20	KARBI ANGLONG WEST	408	1	0	3	0	17	429
21	KARIMGANJ	10528	25	7	4	0	12	10576
22	KOKRAJHAR	10819	1	0	0	0	2	10822
23	LAKHIMPUR	6253	9	0	3	0	88	6353
24	MAJULI	2545	10	0	3	0	17	2575
25	MORIGAON	7743	2	0	0	0	15	7760
26	NAGAON	5575	14	4	2	0	39	5634
27	NALBARI	3402	0	1	3	0	4	3410
28	SIVASAGAR	4204	7	0	2	3	50	4266
29	SONITPUR	5928	2	0	0	0	9	5939
30	SOUTH SALMARA MANKACHAR	1273	4	0	0	0	3	1280
31	TINSUKIA	4738	5	1	31	0	62	4837
32	UDALGURI	5531	6	3	0	0	12	5552
Total		**165550**	**209**	**151**	**82**	**13**	**1076**	**167081**

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

STATE WISE DISTRIBUTION OF 'NOT IN USE' WATER BODIES - ALL

Sl.No.	District	Number of Water Bodies						
		Ponds	Tanks	Lakes	Reservoirs	Water Conservation Schemes/percolation tanks/check dams	Others	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	BAKSA	0	0	0	0	0	1	1
2	BARPETA	6	0	0	0	0	30	36
3	BONGAIGAON	0	0	0	0	0	3	3
4	CACHAR	12	0	0	0	0	356	368
5	CHARAIDEO	14	0	0	0	0	9	23
6	CHIRANG	12	0	0	0	0	17	29
7	DARRANG	52	0	0	0	0	15	67
8	DHEMAJI	6	0	0	0	0	27	33
9	DHUBRI	45	0	22	0	0	100	167
10	DIBRUGARH	46	1	5	8	0	56	116
11	DIMA HASAO	0	0	0	0	0	1	1
12	GOALPARA	72	0	0	0	0	48	120
13	GOLAGHAT	36	1	13	0	0	151	201
14	HAILAKANDI	10	0	0	0	0	67	77
15	HOJAI	4	0	1	0	0	99	104
16	JORHAT	84	2	0	3	0	64	153
17	KAMRUP	7	0	0	0	0	61	68
18	KAMRUP METRO	2	0	0	0	0	10	12
19	KARBI ANGLONG	5	0	0	0	0	2	7
20	KARBI ANGLONGWEST	0	0	0	0	0	11	11
21	KARIMGANJ	2	0	1	0	0	10	13
22	KOKRAJHAR	13	0	0	0	0	0	13
23	LAKHIMPUR	315	0	0	1	0	212	528
24	MAJULI	4	0	0	0	0	13	17
25	MORIGAON	10	0	0	0	0	33	43
26	NAGAON	11	0	0	0	0	263	274
27	NALBARI	3	0	0	0	0	1	4
28	SIVASAGAR	13	0	0	0	1	73	87
29	SONITPUR	53	0	0	0	0	7	60
30	SOUTH SALMARA MANKACHAR	35	0	0	0	0	35	70
31	TINSUKIA	231	0	0	4	0	74	309
32	UDALGURI	6	0	0	0	0	63	69
Total		**1109**	**4**	**42**	**16**	**1**	**1912**	**3084**

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

STATE WISE DISTRIBUTION OF WATER BODIES BY OWNERSHIP

Sl.No.	District	Public owned					Private owned			Total (col.3 to 10)
		State WRD/ State Irrigation	Co-operative	Panchayat	Municipal Authority	Other Govt. Agency	Individual	Group of Individuals	Other private body	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	BAKSA	323	0	0	2	19	3821	14	2	4181
2	BARPETA	220	0	1	4	67	4256	32	6	4586
3	BONGAIGAON	106	0	0	3	16	4017	5	0	4147
4	CACHAR	391	0	15	23	33	6740	8	4	7214
5	CHARAIDEO	117	0	0	1	1	1877	12	6	2014
6	CHIRANG	60	0	2	17	133	2720	104	6	3042
7	DARRANG	122	0	0	0	0	1882	1	1	2006
8	DHEMAJI	52	0	3	5	32	6259	82	13	6446
9	DHUBRI	455	1	50	4	43	9892	51	13	10509
10	DIBRUGARH	241	0	5	0	7	13744	2	38	14037
11	DIMA HASAO	0	0	0	1	0	485	1	0	487
12	GOALPARA	568	0	12	11	88	8289	37	2	9007
13	GOLAGHAT	242	1	9	1	42	9083	33	85	9496
14	HAILAKANDI	16	0	4	0	12	4806	11	1	4850
15	HOJAI	514	0	9	0	25	2497	1	8	3054
16	JORHAT	550	9	22	3	24	2490	13	27	3138
17	KAMRUP	285	0	1	1	0	7281	2	1	7571
18	KAMRUP METRO	192	0	0	0	1	1425	1	0	1619
19	KARBI ANGLONG	107	2	22	1	0	1649	1	48	1830
20	KARBI ANGLONG WEST	0	0	0	0	14	401	21	4	440
21	KARIMGANJ	79	0	10	2	46	10407	44	1	10589
22	KOKRAJHAR	179	0	3	3	53	10486	111	0	10835
23	LAKHIMPUR	52	0	0	1	10	6739	8	71	6881
24	MAJULI	0	0	1	0	5	2584	1	1	2592
25	MORIGAON	425	7	2	3	8	7326	32	0	7803
26	NAGAON	289	0	3	3	36	5550	25	2	5908
27	NALBARI	8	1	2	5	1	3392	1	4	3414
28	SIVASAGAR	206	6	5	1	17	4080	22	16	4353
29	SONITPUR	88	0	5	9	2	5885	3	7	5999
30	SOUTH SALMARA MANKACHAR	117	0	0	4	69	1144	16	0	1350
31	TINSUKIA	136	0	7	3	73	4877	27	23	5146
32	UDALGURI	605	0	6	1	31	4723	194	61	5621
Total		**6745**	**27**	**199**	**112**	**908**	**160807**	**916**	**451**	**170165**

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

STATE WISE DISTRIBUTION OF WATER BODIES IN USE/ NOT IN USE

Sl.No.	District	In use			Not in use			Total		
		Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	BAKSA	3929	251	4180	1	0	1	3930	251	4181
2	BARPETA	4470	80	4550	31	5	36	4501	85	4586
3	BONGAIGAON	4094	50	4144	3	0	3	4097	50	4147
4	CACHAR	6739	107	6846	361	7	368	7100	114	7214
5	CHARAIDEO	1950	41	1991	23	0	23	1973	41	2014
6	CHIRANG	2984	29	3013	29	0	29	3013	29	3042
7	DARRANG	1897	42	1939	67	0	67	1964	42	2006
8	DHEMAJI	6392	21	6413	33	0	33	6425	21	6446
9	DHUBRI	10218	124	10342	160	7	167	10378	131	10509
10	DIBRUGARH	13835	86	13921	116	0	116	13951	86	14037
11	DIMA HASAO	451	35	486	1	0	1	452	35	487
12	GOALPARA	8792	95	8887	113	7	120	8905	102	9007
13	GOLAGHAT	9242	53	9295	198	3	201	9440	56	9496
14	HAILAKANDI	4574	199	4773	77	0	77	4651	199	4850
15	HOJAI	2889	61	2950	99	5	104	2988	66	3054
16	JORHAT	2924	61	2985	153	0	153	3077	61	3138
17	KAMRUP	7389	114	7503	65	3	68	7454	117	7571
18	KAMRUP METRO	1508	99	1607	11	1	12	1519	100	1619
19	KARBI ANGLONG	1772	51	1823	5	2	7	1777	53	1830
20	KARBI ANGLONG WEST	414	15	429	11	0	11	425	15	440
21	KARIMGANJ	10470	106	10576	13	0	13	10483	106	10589
22	KOKRAJHAR	10792	30	10822	12	1	13	10804	31	10835
23	LAKHIMPUR	6260	93	6353	485	43	528	6745	136	6881
24	MAJULI	2575	0	2575	17	0	17	2592	0	2592
25	MORIGAON	7737	23	7760	42	1	43	7779	24	7803
26	NAGAON	5556	78	5634	271	3	274	5827	81	5908
27	NALBARI	3378	32	3410	4	0	4	3382	32	3414
28	SIVASAGAR	4163	103	4266	87	0	87	4250	103	4353
29	SONITPUR	5872	67	5939	60	0	60	5932	67	5999
30	SOUTH SALMARA MANKACHAR	1272	8	1280	70	0	70	1342	8	1350
31	TINSUKIA	4757	80	4837	306	3	309	5063	83	5146
32	UDALGURI	5529	23	5552	69	0	69	5598	23	5621
Total		**164824**	**2257**	**167081**	**2993**	**91**	**3084**	**167817**	**2348**	**170165**

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

NUMBER OF "IN USE" WATER BODIES BY TYPE OF USE - RURAL

Sl.No.	District	Number of in use water Bodies in the State/ UT	Type of use								
			Irrigation	Industrial	Pisciculture	Domestic/ Drinking	Recreation	Religious	Ground water Recharge	Others	Total (col. 4 to 11)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	BAKSA	3929	0	10	3896	22	0	0	0	1	3929
2	BARPETA	4470	0	113	4054	300	3	0	0	0	4470
3	BONGAIGAON	4094	0	38	3749	304	3	0	0	0	4094
4	CACHAR	6739	0	19	6059	660	0	1	0	0	6739
5	CHARAIDEO	1950	0	4	1910	36	0	0	0	0	1950
6	CHIRANG	2984	0	190	2404	382	6	0	2	0	2984
7	DARRANG	1897	0	4	1836	56	0	0	0	1	1897
8	DHEMAJI	6392	0	49	6204	135	0	4	0	0	6392
9	DHUBRI	10218	42	99	9597	465	12	3	0	0	10218
10	DIBRUGARH	13835	0	15	13539	220	0	60	0	1	13835
11	DIMA HASAO	451	0	0	108	343	0	0	0	0	451
12	GOALPARA	8792	0	53	8284	451	1	3	0	0	8792
13	GOLAGHAT	9242	0	13	8886	336	5	1	0	1	9242
14	HAILAKANDI	4574	0	3	4461	109	0	0	0	1	4574
15	HOJAI	2889	479	27	1034	1336	0	3	0	10	2889
16	JORHAT	2924	1	55	2631	231	2	2	0	2	2924
17	KAMRUP	7389	0	1	7254	134	0	0	0	0	7389
18	KAMRUP METRO	1508	0	0	1426	82	0	0	0	0	1508
19	KARBI ANGLONG	1772	0	2	1745	14	1	0	0	10	1772
20	KARBI ANGLONG WEST	414	0	31	330	52	1	0	0	0	414
21	KARIMGANJ	10470	0	84	8572	1807	5	2	0	0	10470
22	KOKRAJHAR	10792	0	88	10703	1	0	0	0	0	10792
23	LAKHIMPUR	6260	0	14	5475	765	3	1	0	2	6260
24	MAJULI	2575	0	3	2259	313	0	0	0	0	2575
25	MORIGAON	7737	0	26	7158	549	3	1	0	0	7737
26	NAGAON	5556	0	13	4475	1062	1	1	0	4	5556
27	NALBARI	3378	0	7	3271	46	0	1	0	53	3378
28	SIVASAGAR	4163	0	11	4091	60	0	1	0	0	4163
29	SONITPUR	5872	0	0	4165	604	2	1	0	1100	5872
30	SOUTH SALMARA MANKACHAR	1272	0	58	1078	133	3	0	0	0	1272
31	TINSUKIA	4757	9	74	4328	335	4	0	0	7	4757
32	UDALGURI	5529	0	76	4230	1187	4	4	2	26	5529
Total		**164824**	**531**	**1180**	**149212**	**12530**	**59**	**89**	**4**	**1219**	**164824**

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

NUMBER OF "IN USE" WATER BODIES BY TYPE OF USE - URBAN

Sl. No.	District	Number of in use water Bodies in the State/ UT	Type of use								
			Irrigation	Industrial	Pisciculture	Domestic/ Drinking	Recreation	Religious	Ground water Recharge	Others	Total (col. 4 to11)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	BAKSA	251	0	20	208	23	0	0	0	0	251
2	BARPETA	80	0	4	60	16	0	0	0	0	80
3	BONGAIGAON	50	0	0	50	0	0	0	0	0	50
4	CACHAR	107	0	0	107	0	0	0	0	0	107
5	CHARAIDEO	41	0	0	41	0	0	0	0	0	41
6	CHIRANG	29	0	0	29	0	0	0	0	0	29
7	DARRANG	42	0	0	42	0	0	0	0	0	42
8	DHEMAJI	21	0	0	21	0	0	0	0	0	21
9	DHUBRI	124	0	0	118	3	0	0	1	2	124
10	DIBRUGARH	86	0	0	86	0	0	0	0	0	86
11	DIMA HASAO	35	0	0	35	0	0	0	0	0	35
12	GOALPARA	95	1	1	91	2	0	0	0	0	95
13	GOLAGHAT	53	0	0	53	0	0	0	0	0	53
14	HAILAKANDI	199	0	0	196	3	0	0	0	0	199
15	HOJAI	61	0	0	61	0	0	0	0	0	61
16	JORHAT	61	0	0	58	3	0	0	0	0	61
17	KAMRUP	114	0	0	113	1	0	0	0	0	114
18	KAMRUP METRO	99	0	0	98	1	0	0	0	0	99
19	KARBI ANGLONG	51	0	0	51	0	0	0	0	0	51
20	KARBI ANGLONG WEST	15	0	0	15	0	0	0	0	0	15
21	KARIMGANJ	106	0	1	72	32	0	1	0	0	106
22	KOKRAJHAR	30	0	0	30	0	0	0	0	0	30
23	LAKHIMPUR	93	0	0	86	7	0	0	0	0	93
24	MORIGAON	23	0	0	23	0	0	0	0	0	23
25	NAGAON	78	0	0	78	0	0	0	0	0	78
26	NALBARI	32	0	0	32	0	0	0	0	0	32
27	SIVASAGAR	103	0	3	63	36	0	0	0	1	103
28	SONITPUR	67	0	0	45	22	0	0	0	0	67
29	SOUTH SALMARA MANKACHAR	8	0	0	8	0	0	0	0	0	8
30	TINSUKIA	80	0	0	80	0	0	0	0	0	80
31	UDALGURI	23	0	4	11	5	2	1	0	0	23
Total		**2257**	**1**	**33**	**2061**	**154**	**2**	**2**	**1**	**3**	**2257**

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

NUMBER OF "IN USE" WATER BODIES BY TYPE OF USE - ALL

Sl. No.	District	Number of in use water Bodies in the State/ UT	Type of use								
			Irrigation	Industrial	Pisciculture	Domestic/ Drinking	Recreation	Religious	Ground water Recharge	Others	Total (col. 4 to 11)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	BAKSA	4180	0	30	4104	45	0	0	0	1	4180
2	BARPETA	4550	0	117	4114	316	3	0	0	0	4550
3	BONGAIGAON	4144	0	38	3799	304	3	0	0	0	4144
4	CACHAR	6846	0	19	6166	660	0	1	0	0	6846
5	CHARAIDEO	1991	0	4	1951	36	0	0	0	0	1991
6	CHIRANG	3013	0	190	2433	382	6	0	2	0	3013
7	DARRANG	1939	0	4	1878	56	0	0	0	1	1939
8	DHEMAJI	6413	0	49	6225	135	0	4	0	0	6413
9	DHUBRI	10342	42	99	9715	468	12	3	1	2	10342
10	DIBRUGARH	13921	0	15	13625	220	0	60	0	1	13921
11	DIMA HASAO	486	0	0	143	343	0	0	0	0	486
12	GOALPARA	8887	1	54	8375	453	1	3	0	0	8887
13	GOLAGHAT	9295	0	13	8939	336	5	1	0	1	9295
14	HAILAKANDI	4773	0	3	4657	112	0	0	0	1	4773
15	HOJAI	2950	479	27	1095	1336	0	3	0	10	2950
16	JORHAT	2985	1	55	2689	234	2	2	0	2	2985
17	KAMRUP	7503	0	1	7367	135	0	0	0	0	7503
18	KAMRUP METRO	1607	0	0	1524	83	0	0	0	0	1607
19	KARBI ANGLONG	1823	0	2	1796	14	1	0	0	10	1823
20	KARBI ANGLONG WEST	429	0	31	345	52	1	0	0	0	429
21	KARIMGANJ	10576	0	85	8644	1839	5	3	0	0	10576
22	KOKRAJHAR	10822	0	88	10733	1	0	0	0	0	10822
23	LAKHIMPUR	6353	0	14	5561	772	3	1	0	2	6353
24	MAJULI	2575	0	3	2259	313	0	0	0	0	2575
25	MORIGAON	7760	0	26	7181	549	3	1	0	0	7760
26	NAGAON	5634	0	13	4553	1062	1	1	0	4	5634
27	NALBARI	3410	0	7	3303	46	0	1	0	53	3410
28	SIVASAGAR	4266	0	14	4154	96	0	1	0	1	4266
29	SONITPUR	5939	0	0	4210	626	2	1	0	1100	5939
30	SOUTH SALMARA MANKACHAR	1280	0	58	1086	133	3	0	0	0	1280
31	TINSUKIA	4837	9	74	4408	335	4	0	0	7	4837
32	UDALGURI	5552	0	80	4241	1192	6	5	2	26	5552
Total		167081	532	1213	151273	12684	61	91	5	1222	167081

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

NUMBER OF NOT IN USE WATER BODIES BY REASONS – RURAL

Sl. No.	District	REASONS FOR NOT IN USE							
		Dried up	Construction	Siltation	Destroyed beyond repair	Salinity	Due to industrial effluents	Others	Total (col. 3 to 9)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	BAKSA	1	0	0	0	0	0	0	1
2	BARPETA	31	0	0	0	0	0	0	31
3	BONGAIGAON	3	0	0	0	0	0	0	3
4	CACHAR	221	0	0	0	0	3	137	361
5	CHARAIDEO	22	0	0	0	0	0	1	23
6	CHIRANG	26	0	0	0	0	0	3	29
7	DARRANG	57	0	0	0	0	0	10	67
8	DHEMAJI	31	0	0	0	0	0	2	33
9	DHUBRI	121	2	0	1	0	0	36	160
10	DIBRUGARH	61	0	0	1	0	0	54	116
11	DIMA HASAO	1	0	0	0	0	0	0	1
12	GOALPARA	90	4	0	0	0	0	19	113
13	GOLAGHAT	156	3	0	0	0	1	38	198
14	HAILAKANDI	64	0	0	0	0	0	13	77
15	HOJAI	83	0	0	0	0	0	16	99
16	JORHAT	58	1	1	2	0	0	91	153
17	KAMRUP	63	0	0	0	0	0	2	65
18	KAMRUP METRO	11	0	0	0	0	0	0	11
19	KARBI ANGLONG	3	0	0	0	0	0	2	5
20	KARBI ANGLONG WEST	7	0	0	0	1	0	3	11
21	KARIMGANJ	8	0	0	0	0	0	5	13
22	KOKRAJHAR	4	0	0	0	0	0	8	12
23	LAKHIMPUR	479	4	0	0	0	0	2	485
24	MAJULI	13	0	0	0	0	0	4	17
25	MORIGAON	37	0	0	0	0	0	5	42
26	NAGAON	202	4	1	0	0	0	64	271
27	NALBARI	4	0	0	0	0	0	0	4
28	SIVASAGAR	86	0	0	0	0	0	1	87
29	SONITPUR	42	0	0	0	0	0	18	60
30	SOUTH SALMARA MANKACHAR	67	0	0	0	0	0	3	70
31	TINSUKIA	248	3	2	14	6	2	31	306
32	UDALGURI	69	0	0	0	0	0	0	69
Total		**2369**	**21**	**4**	**18**	**7**	**6**	**568**	**2993**

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

NUMBER OF NOT IN USE WATER BODIES BY REASONS - URBAN

Sl. No.	District	REASONS FOR NOT IN USE							
		Dried up	Construction	Siltation	Destroyed beyond repair	Salinity	Due to industrial effluents	Others	Total (col. 3 to 9)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	BARPETA	5	0	0	0	0	0	0	5
2	CACHAR	7	0	0	0	0	0	0	7
3	DHUBRI	5	0	1	0	0	0	1	7
4	GOALPARA	5	0	0	0	0	0	2	7
5	GOLAGHAT	3	0	0	0	0	0	0	3
6	HOJAI	0	0	0	0	0	0	5	5
7	KAMRUP	3	0	0	0	0	0	0	3
8	KAMRUP METRO	1	0	0	0	0	0	0	1
9	KARBI ANGLONG	2	0	0	0	0	0	0	2
10	KOKRAJHAR	1	0	0	0	0	0	0	1
11	LAKHIMPUR	22	0	0	0	0	0	21	43
12	MORIGAON	1	0	0	0	0	0	0	1
13	NAGAON	1	0	0	0	0	0	2	3
14	TINSUKIA	2	0	0	0	0	0	1	3
	Total	58	0	1	0	0	0	32	91

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

NUMBER OF NOT IN USE WATER BODIES BY REASONS –ALL

Sl. No.	District	REASONS FOR NOT IN USE							
		Dried up	Construction	Siltation	Destroyed beyond repair	Salinity	Due to industrial effluents	Others	Total (col. 3 to 9)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	BAKSA	1	0	0	0	0	0	0	1
2	BARPETA	36	0	0	0	0	0	0	36
3	BONGAIGAON	3	0	0	0	0	0	0	3
4	CACHAR	228	0	0	0	0	3	137	368
5	CHARAIDEO	22	0	0	0	0	0	1	23
6	CHIRANG	26	0	0	0	0	0	3	29
7	DARRANG	57	0	0	0	0	0	10	67
8	DHEMAJI	31	0	0	0	0	0	2	33
9	DHUBRI	126	2	1	1	0	0	37	167
10	DIBRUGARH	61	0	0	1	0	0	54	116
11	DIMA HASAO	1	0	0	0	0	0	0	1
12	GOALPARA	95	4	0	0	0	0	21	120
13	GOLAGHAT	159	3	0	0	0	1	38	201
14	HAILAKANDI	64	0	0	0	0	0	13	77
15	HOJAI	83	0	0	0	0	0	21	104
16	JORHAT	58	1	1	2	0	0	91	153
17	KAMRUP	66	0	0	0	0	0	2	68
18	KAMRUP METRO	12	0	0	0	0	0	0	12
19	KARBI ANGLONG	5	0	0	0	0	0	2	7
20	KARBI ANGLONG WEST	7	0	0	0	1	0	3	11
21	KARIMGANJ	8	0	0	0	0	0	5	13
22	KOKRAJHAR	5	0	0	0	0	0	8	13
23	LAKHIMPUR	501	4	0	0	0	0	23	528
24	MAJULI	13	0	0	0	0	0	4	17
25	MORIGAON	38	0	0	0	0	0	5	43
26	NAGAON	203	4	1	0	0	0	66	274
27	NALBARI	4	0	0	0	0	0	0	4
28	SIVASAGAR	86	0	0	0	0	0	1	87
29	SONITPUR	42	0	0	0	0	0	18	60
30	SOUTH SALMARA MANKACHAR	67	0	0	0	0	0	3	70
31	TINSUKIA	250	3	2	14	6	2	32	309
32	UDALGURI	69	0	0	0	0	0	0	69
Total		**2427**	**21**	**5**	**18**	**7**	**6**	**600**	**3084**

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

DISTRIBUTION OF WATER BODIES USED FOR IRRIGATION BY CCA CLASSES

Sl. No.	District	No. of Public Water bodies by CCA classes							No. of Private Water bodies by CCA classes						
		0 to 100 ha	100 to 500 ha	500 to 1000 ha	1000 to 2000 ha	2000 to 5000 ha	More than 5000 ha	Total (3 to 8)	0 to 20 ha	20 to 40 ha	40 to 100 ha	100 to 1000 ha	1000 to 2000 ha	More than 2000 ha	Total (10 to 15)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1	DHUBRI	6	0	0	0	0	0	6	36	0	0	0	0	0	36
2	GOALPARA	1	0	0	0	0	0	1	0	0	0	0	0	0	0
3	HOJAI	91	0	0	0	0	0	91	388	0	0	0	0	0	388
4	JORHAT	1	0	0	0	0	0	1	0	0	0	0	0	0	0
5	TINSUKIA	0	0	0	0	0	0	0	6	0	2	1	0	0	9
Total		99	0	0	0	0	0	99	430	0	2	1	0	0	433

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

DISTRIBUTION OF WATER BODIES USED FOR IRRIGATION BY IPC CLASSES

Sl. No.	District	No. of water bodies by IPC Classes (In hectares)													
		0 to 100 ha		100 to 500 ha		500 to 1000 ha		1000 to 2000 ha		2000 to 5000 ha		More than 5000 ha		Total	
		No.	IPC	No.	IPC	No.	IPC	No.	IPC	No.	IPC	No.	IPC	No.	IPC
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1	DHUBRI	42	85.50	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	42	85.50
2	GOALPARA	0	0.00	0	0.00	0	0.00	0	0.00	1	5000.0	0	0.00	1	5000.00
3	HOJAI	479	2585.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	479	2585.00
4	JORHAT	1	3.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	3.00
5	TINSUKIA	5	191.47	0	0.00	3	1729.00	0	0.00	0	0.00	1	10189.00	9	12109.47
Total		**527**	**2864.9**	**0**	**0.00**	**3**	**1729.00**	**0**	**0.00**	**1**	**5000.0**	**1**	**10189.00**	**532**	**19782.97**

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

DISTRBUTION OF MAN MADE WATER BODIES BY TYPE

Sl. No.	District	Rural					Urban				
		Earthen	Concrete	Masonry	Others	Total	Earthen	Concrete	Masonry	Others	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	BAKSA	3906	15	0	1	3922	224	0	0	0	224
2	BARPETA	4432	1	0	1	4434	74	0	0	0	74
3	BONGAIGAON	4055	19	1	0	4075	50	0	0	0	50
4	CACHAR	6615	48	4	4	6671	101	0	0	0	101
5	CHARAIDEO	1960	3	0	5	1968	41	0	0	0	41
6	CHIRANG	2804	1	0	1	2806	28	0	0	0	28
7	DARRANG	1928	1	0	0	1929	42	0	0	0	42
8	DHEMAJI	6294	16	0	8	6318	21	0	0	0	21
9	DHUBRI	10223	10	1	14	10248	127	0	0	0	127
10	DIBRUGARH	13749	10	0	3	13762	86	0	0	0	86
11	DIMA HASAO	449	2	0	0	451	35	0	0	0	35
12	GOALPARA	8676	32	15	67	8790	100	1	0	0	101
13	GOLAGHAT	9137	3	0	3	9143	55	0	0	0	55
14	HAILAKANDI	4626	9	1	4	4640	199	0	0	0	199
15	HOJAI	2892	41	2	2	2937	66	0	0	0	66
16	JORHAT	2860	13	2	6	2881	60	0	0	0	60
17	KAMRUP	7351	3	0	4	7358	117	0	0	0	117
18	KAMRUP METRO	1507	0	0	1	1508	100	0	0	0	100
19	KARBI ANGLONG	1755	1	0	0	1756	53	0	0	0	53
20	KARBI ANGLONG WEST	300	1	0	6	307	15	0	0	0	15
21	KARIMGANJ	10388	29	0	8	10425	106	0	0	0	106
22	KOKRAJHAR	10736	65	1	2	10804	31	0	0	0	31
23	LAKHIMPUR	6327	15	1	2	6345	127	1	0	1	129
24	MAJULI	2551	7	0	2	2560	0	0	0	0	0
25	MORIGAON	7685	6	0	0	7691	24	0	0	0	24
26	NAGAON	5412	118	6	1	5537	81	0	0	0	81
27	NALBARI	3369	8	0	4	3381	32	0	0	0	32
28	SIVASAGAR	4151	5	0	9	4165	101	0	0	0	101
29	SONITPUR	5909	17	0	5	5931	67	0	0	0	67
30	SOUTH SALMARA MANKACHAR	1249	4	0	1	1254	8	0	0	0	8
31	TINSUKIA	4883	6	0	12	4901	83	0	0	0	83
32	UDALGURI	5515	2	0	1	5518	1	0	0	0	1
Total		**163694**	**511**	**34**	**177**	**164416**	**2255**	**2**	**0**	**1**	**2258**

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

DISTRIBUTION OF WATER BODIES BY WATER SPREAD AREA - RURAL

Sl. No.	District	Water Spread area classes						
		Less than 0.5 hectare	0.5 hectare to 1.0 hectare	1 hectare to 5 hectares	5 hectare to 10 hectares	10 hectares to 50 hectares	More than 50 hectares	Total (3 to 8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	BAKSA	3926	4	0	0	0	0	3930
2	BARPETA	4212	284	5	0	0	0	4501
3	BONGAIGAON	4091	4	1	0	1	0	4097
4	CACHAR	6980	113	4	2	0	0	7099
5	CHARAIDEO	1967	6	0	0	0	0	1973
6	CHIRANG	2931	56	17	9	0	0	3013
7	DARRANG	1958	6	0	0	0	0	1964
8	DHEMAJI	6366	49	9	1	0	0	6425
9	DHUBRI	10080	62	152	82	0	0	10376
10	DIBRUGARH	13464	272	210	4	0	0	13950
11	DIMA HASAO	452	0	0	0	0	0	452
12	GOALPARA	8551	284	61	7	1	0	8904
13	GOLAGHAT	9358	40	36	4	2	0	9440
14	HAILAKANDI	4279	278	67	17	2	7	4650
15	HOJAI	2124	862	0	0	1	1	2988
16	JORHAT	2870	30	172	4	1	0	3077
17	KAMRUP	7216	231	5	2	0	0	7454
18	KAMRUP METRO	1518	1	0	0	0	0	1519
19	KARBI ANGLONG	1761	16	0	0	0	0	1777
20	KARBI ANGLONG WEST	415	7	3	0	0	0	425
21	KARIMGANJ	10050	401	27	2	0	1	10481
22	KOKRAJHAR	10405	394	4	1	0	0	10804
23	LAKHIMPUR	6654	90	1	0	0	0	6745
24	MAJULI	2580	9	0	2	1	0	2592
25	MORIGAON	7721	57	1	0	0	0	7779
26	NAGAON	5312	505	6	3	0	0	5826
27	NALBARI	3101	200	77	1	2	1	3382
28	SIVASAGAR	4161	86	3	0	0	0	4250
29	SONITPUR	5283	644	5	0	0	0	5932
30	SOUTH SALMARA MANKACHAR	1336	3	1	2	0	0	1342
31	TINSUKIA	5010	39	10	2	1	0	5062
32	UDALGURI	5592	6	0	0	0	0	5598
Total		**161724**	**5039**	**877**	**145**	**12**	**10**	**167807**

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

DISTRIBUTION OF WATER BODIES BY WATER SPREAD AREA - URBAN

Sl. No.	District	Water Spread area classes						
		Less than 0.5 hectare	0.5 hectare to 1.0 hectare	1 hectare to 5 hectares	5 hectare to 10 hectares	10 hectares to 50 hectares	More than 50 hectares	Total (3 to 8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	BAKSA	251	0	0	0	0	0	251
2	BARPETA	85	0	0	0	0	0	85
3	BONGAIGAON	50	0	0	0	0	0	50
4	CACHAR	114	0	0	0	0	0	114
5	CHARAIDEO	36	5	0	0	0	0	41
6	CHIRANG	22	4	3	0	0	0	29
7	DARRANG	42	0	0	0	0	0	42
8	DHEMAJI	21	0	0	0	0	0	21
9	DHUBRI	74	55	2	0	0	0	131
10	DIBRUGARH	23	63	0	0	0	0	86
11	DIMA HASAO	35	0	0	0	0	0	35
12	GOALPARA	102	0	0	0	0	0	102
13	GOLAGHAT	56	0	0	0	0	0	56
14	HAILAKANDI	194	2	0	0	0	0	196
15	HOJAI	63	3	0	0	0	0	66
16	JORHAT	43	18	0	0	0	0	61
17	KAMRUP	87	30	0	0	0	0	117
18	KAMRUP METRO	100	0	0	0	0	0	100
19	KARBI ANGLONG	23	30	0	0	0	0	53
20	KARBI ANGLONG WEST	15	0	0	0	0	0	15
21	KARIMGANJ	106	0	0	0	0	0	106
22	KOKRAJHAR	30	1	0	0	0	0	31
23	LAKHIMPUR	135	1	0	0	0	0	136
24	MORIGAON	24	0	0	0	0	0	24
25	NAGAON	81	0	0	0	0	0	81
26	NALBARI	32	0	0	0	0	0	32
27	SIVASAGAR	103	0	0	0	0	0	103
28	SONITPUR	66	1	0	0	0	0	67
29	SOUTH SALMARA MANKACHAR	8	0	0	0	0	0	8
30	TINSUKIA	83	0	0	0	0	0	83
31	UDALGURI	4	0	7	12	0	0	23
Total		**2108**	**213**	**12**	**12**	**0**	**0**	**2345**

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

DISTRIBUTION OF WATER BODIES BY WATER SPREAD AREA - URBAN

Sl. No.	District	Water Spread area classes						
		Less than 0.5 hectare	0.5 hectare to 1.0 hectare	1 hectare to 5 hectares	5 hectare to 10 hectares	10 hectares to 50 hectares	More than 50 hectares	Total (3 to 8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	BAKSA	4177	4	0	0	0	0	4181
2	BARPETA	4297	284	5	0	0	0	4586
3	BONGAIGAON	4141	4	1	0	1	0	4147
4	CACHAR	7094	113	4	2	0	0	7213
5	CHARAIDEO	2003	11	0	0	0	0	2014
6	CHIRANG	2953	60	20	9	0	0	3042
7	DARRANG	2000	6	0	0	0	0	2006
8	DHEMAJI	6387	49	9	1	0	0	6446
9	DHUBRI	10154	117	154	82	0	0	10507
10	DIBRUGARH	13487	335	210	4	0	0	14036
11	DIMA HASAO	487	0	0	0	0	0	487
12	GOALPARA	8653	284	61	7	1	0	9006
13	GOLAGHAT	9414	40	36	4	2	0	9496
14	HAILAKANDI	4473	280	67	17	2	7	4846
15	HOJAI	2187	865	0	0	1	1	3054
16	JORHAT	2913	48	172	4	1	0	3138
17	KAMRUP	7303	261	5	2	0	0	7571
18	KAMRUP METRO	1618	1	0	0	0	0	1619
19	KARBI ANGLONG	1784	46	0	0	0	0	1830
20	KARBI ANGLONG WEST	430	7	3	0	0	0	440
21	KARIMGANJ	10156	401	27	2	0	1	10587
22	KOKRAJHAR	10435	395	4	1	0	0	10835
23	LAKHIMPUR	6789	91	1	0	0	0	6881
24	MAJULI	2580	9	0	2	1	0	2592
25	MORIGAON	7745	57	1	0	0	0	7803
26	NAGAON	5393	505	6	3	0	0	5907
27	NALBARI	3133	200	77	1	2	1	3414
28	SIVASAGAR	4264	86	3	0	0	0	4353
29	SONITPUR	5349	645	5	0	0	0	5999
30	SOUTH SALMARA MANKACHAR	1344	3	1	2	0	0	1350
31	TINSUKIA	5093	39	10	2	1	0	5145
32	UDALGURI	5596	6	7	12	0	0	5621
Total		**163832**	**5252**	**889**	**157**	**12**	**10**	**170152**

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

DISTRIBUTION OF WATER BODIES BY PRESENT STORAGE CAPACITY - RURAL

Sl. No.	District	Storage Capacity classes					
		NA (0)	0 to 100 cubic mts	100 to 1000 cubic mts	1000 to 10000 cubic mts	More than 10000 cubic mts	Total (3 to 7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	BAKSA	5	3	2484	1436	2	3930
2	BARPETA	33	4	1021	2970	473	4501
3	BONGAIGAON	11	0	3508	575	3	4097
4	CACHAR	523	6	2017	4404	150	7100
5	CHARAIDEO	15	1	676	1281	0	1973
6	CHIRANG	25	6	2081	860	41	3013
7	DARRANG	26	1	1670	259	8	1964
8	DHEMAJI	51	13	4397	1956	8	6425
9	DHUBRI	174	3	6856	3283	62	10378
10	DIBRUGARH	131	318	9726	3738	38	13951
11	DIMA HASAO	1	0	102	349	0	452
12	GOALPARA	100	9	5272	3394	130	8905
13	GOLAGHAT	188	4	7607	1593	48	9440
14	HAILAKANDI	146	6	2743	1726	30	4651
15	HOJAI	127	2	135	2032	692	2988
16	JORHAT	145	7	1933	920	72	3077
17	KAMRUP	100	4	4694	2600	56	7454
18	KAMRUP METRO	15	0	1178	321	5	1519
19	KARBI ANGLONG	23	0	1212	491	51	1777
20	KARBI ANGLONG WEST	28	0	341	54	2	425
21	KARIMGANJ	22	18	3766	6282	395	10483
22	KOKRAJHAR	2	5	8115	2666	16	10804
23	LAKHIMPUR	254	2	3177	3211	101	6745
24	MAJULI	30	3	729	1830	0	2592
25	MORIGAON	48	2	3555	4164	10	7779
26	NAGAON	296	2	2042	2995	492	5827
27	NALBARI	5	8	812	2502	55	3382
28	SIVASAGAR	127	6	1558	2549	10	4250
29	SONITPUR	15	8	52	5036	821	5932
30	SOUTH SALMARA MANKACHAR	38	2	806	479	17	1342
31	TINSUKIA	130	28	4151	742	12	5063
32	UDALGURI	75	2	2123	3356	42	5598
Total		2909	473	90539	70054	3842	167817

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

DISTRIBUTION OF WATER BODIES BY PRESENT STORAGE CAPACITY - URBAN

Sl. No.	District	Storage Capacity classes					
		NA (0)	0 to 100 cubic mts	100 to 1000 cubic mts	1000 to 10000 cubic mts	More than 10000 cubic mts	Total (3 to 7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	BAKSA	0	0	86	163	2	251
2	BARPETA	5	0	29	51	0	85
3	BONGAIGAON	0	0	13	37	0	50
4	CACHAR	13	0	42	59	0	114
5	CHARAIDEO	0	0	6	27	8	41
6	CHIRANG	0	0	1	19	9	29
7	DARRANG	0	0	17	25	0	42
8	DHEMAJI	0	0	7	14	0	21
9	DHUBRI	0	0	20	109	2	131
10	DIBRUGARH	0	0	23	63	0	86
11	DIMA HASAO	0	0	8	27	0	35
12	GOALPARA	8	0	35	58	1	102
13	GOLAGHAT	0	0	16	40	0	56
14	HAILAKANDI	0	0	55	144	0	199
15	HOJAI	8	0	40	18	0	66
16	JORHAT	0	0	11	50	0	61
17	KAMRUP	0	0	46	67	4	117
18	KAMRUP METRO	0	0	48	52	0	100
19	KARBI ANGLONG	0	0	18	35	0	53
20	KARBI ANGLONG WEST	0	0	5	10	0	15
21	KARIMGANJ	0	5	30	69	2	106
22	KOKRAJHAR	0	0	16	15	0	31
23	LAKHIMPUR	46	0	62	28	0	136
24	MORIGAON	0	0	13	11	0	24
25	NAGAON	6	1	41	33	0	81
26	NALBARI	0	0	28	4	0	32
27	SIVASAGAR	0	0	19	83	1	103
28	SONITPUR	1	0	9	57	0	67
29	SOUTH SALMARA MANKACHAR	0	0	1	7	0	8
30	TINSUKIA	6	0	34	43	0	83
31	UDALGURI	0	9	12	2	0	23
Total		**93**	**15**	**791**	**1420**	**29**	**2348**

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

DISTRIBUTION OF WATER BODIES BY PRESENT STORAGE CAPACITY - ALL

Sl. No.	District	Storage Capacity classes					
		NA (0)	0 to 100 cubic mts	100 to 1000 cubic mts	1000 to 10000 cubic mts	More than 10000 cubic mts	Total (3 to 7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	BAKSA	5	3	2570	1599	4	4181
2	BARPETA	38	4	1050	3021	473	4586
3	BONGAIGAON	11	0	3521	612	3	4147
4	CACHAR	536	6	2059	4463	150	7214
5	CHARAIDEO	15	1	682	1308	8	2014
6	CHIRANG	25	6	2082	879	50	3042
7	DARRANG	26	1	1687	284	8	2006
8	DHEMAJI	51	13	4404	1970	8	6446
9	DHUBRI	174	3	6876	3392	64	10509
10	DIBRUGARH	131	318	9749	3801	38	14037
11	DIMA HASAO	1	0	110	376	0	487
12	GOALPARA	108	9	5307	3452	131	9007
13	GOLAGHAT	188	4	7623	1633	48	9496
14	HAILAKANDI	146	6	2798	1870	30	4850
15	HOJAI	135	2	175	2050	692	3054
16	JORHAT	145	7	1944	970	72	3138
17	KAMRUP	100	4	4740	2667	60	7571
18	KAMRUP METRO	15	0	1226	373	5	1619
19	KARBI ANGLONG	23	0	1230	526	51	1830
20	KARBI ANGLONG WEST	28	0	346	64	2	440
21	KARIMGANJ	22	23	3796	6351	397	10589
22	KOKRAJHAR	2	5	8131	2681	16	10835
23	LAKHIMPUR	300	2	3239	3239	101	6881
24	MAJULI	30	3	729	1830	0	2592
25	MORIGAON	48	2	3568	4175	10	7803
26	NAGAON	302	3	2083	3028	492	5908
27	NALBARI	5	8	840	2506	55	3414
28	SIVASAGAR	127	6	1577	2632	11	4353
29	SONITPUR	16	8	61	5093	821	5999
30	SOUTH SALMARA MANKACHAR	38	2	807	486	17	1350
31	TINSUKIA	136	28	4185	785	12	5146
32	UDALGURI	75	11	2135	3358	42	5621
Total		**3002**	**488**	**91330**	**71474**	**3871**	**170165**

Source: micensus.gov.in

Annexure-VI

FIRST CENSUS OF WATER BODIES

DISTRIBUTION OF IN USE RESERVOIRS/TANKS/PONDS/"OTHERS" WITH PRESENT STORAGE CAPACITY

Sl. No.	District	Ponds/Tanks		Lakes		Reservoirs		Others		Total	
		No.	Storage capacity	No.	Storage capacity	No.	Storage capacity	No.	Storage capacity	No. (3 + 5 +7 +9)	Storage capacity (4 + 6 + 8+10)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	BAKSA	4176	4643753	0	0	0	0	4	0	4180	4643753
2	BARPETA	4541	22883283	1	7100	0	0	8	0	4550	22890383
3	BONGAIGAON	4136	7356610	0	0	0	0	8	0	4144	7356610
4	CACHAR	6662	20470279	2	5800	2	8970	180	0	6846	20485049
5	CHARAIDEO	1985	5407588	0	0	0	0	6	0	1991	5407588
6	CHIRANG	3005	75943357	0	0	0	0	8	0	3013	75943357
7	DARRANG	1928	2027077	0	0	0	0	11	0	1939	2027077
8	DHEMAJI	6335	6130240	50	104321	4	2901	24	0	6413	6237462
9	DHUBRI	10256	367629375	12	939480	0	0	74	0	10342	368568855
10	DIBRUGARH	13837	14190325	0	0	9	1210300	75	0	13921	15400625
11	DIMA HASAO	486	1582913	0	0	0	0	0	0	486	1582913
12	GOALPARA	8812	71508196	12	241234	3	2577	60	0	8887	71752007
13	GOLAGHAT	9202	7375766	51	949963	5	3576	37	0	9295	8329305
14	HAILAKANDI	4692	7566745	2	2865	0	0	79	0	4773	7569610
15	HOJAI	2909	21448278	3	15650	2	14420	36	0	2950	21478348
16	JORHAT	2900	11554700	2	3500	2	810	81	0	2985	11559010
17	KAMRUP	7464	13517851	0	0	0	0	39	0	7503	13517851
18	KAMRUP METRO	1602	1949135	0	0	0	0	5	0	1607	1949135
19	KARBI ANGLONG	1798	104153466	0	0	4	11844	21	0	1823	104165310
20	KARBI ANGLONG WEST	409	305058	0	0	3	9300	17	0	429	314358
21	KARIMGANJ	10553	28979595	7	1300119	4	21705	12	0	10576	30301419
22	KOKRAJHAR	10820	13083881	0	0	0	0	2	0	10822	13083881
23	LAKHIMPUR	6262	14427901	0	0	3	6349	88	0	6353	14434250
24	MAJULI	2555	4243561	0	0	3	8640	17	0	2575	4252201
25	MORIGAON	7745	12643599	0	0	0	0	15	0	7760	12643599
26	NAGAON	5589	19796990	4	13381	2	10512	39	0	5634	19820883
27	NALBARI	3402	15655493	1	2400	3	10700	4	0	3410	15668593
28	SIVASAGAR	4211	9653427	0	0	2	7400	53	0	4266	9660827
29	SONITPUR	5930	35652560	0	0	0	0	9	0	5939	35652560
30	SOUTH SALMARA MANKACHAR	1277	2346701	0	0	0	0	3	0	1280	2346701
31	TINSUKIA	4743	3862546	1	3120	31	58271	62	0	4837	3923937
32	UDALGURI	5537	13308670	3	30480	0	0	12	0	5552	13339150
Total		**165759**	**941298919**	**151**	**3619413**	**82**	**1388275**	**1089**	**0**	**167081**	**946306607**

Source: micensus.gov.in

Annexure-VI
FIRST CENSUS OF WATER BODIES

DISTRIBUTION OF NOT IN USE RESERVOIRS/TANKS/PONDS/"OTHER" WITH PRESENT STORAGE CAPACITY

Sl. No.	District	Ponds/Tanks		Lakes		Reservoirs		Others		Total	
		No.	Storage capacity	No.	Storage capacity	No.	Storage capacity	No.	Storage capacity	No. (3 +5 +7 +9)	Storage capacity (4 + 6 + 8+10)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	BAKSA	0	0	0	0	0	0	1	0	1	0
2	BARPETA	6	8572	0	0	0	0	30	0	36	8572
3	BONGAIGAON	0	0	0	0	0	0	3	0	3	0
4	CACHAR	12	52566	0	0	0	0	356	0	368	52566
5	CHARAIDEO	14	25410	0	0	0	0	9	0	23	25410
6	CHIRANG	12	23725	0	0	0	0	17	0	29	23725
7	DARRANG	52	44024	0	0	0	0	15	0	67	44024
8	DHEMAJI	6	11800	0	0	0	0	27	0	33	11800
9	DHUBRI	45	242800	22	566300	0	0	100	0	167	809100
10	DIBRUGARH	47	55348	5	17912	8	25400	56	0	116	98660
11	DIMA HASAO	0	0	0	0	0	0	1	0	1	0
12	GOALPARA	72	288019	0	0	0	0	48	0	120	288019
13	GOLAGHAT	37	54108	13	136309	0	0	151	0	201	190417
14	HAILAKANDI	10	22558	0	0	0	0	67	0	77	22558
15	HOJAI	4	31689	1	6030	0	0	99	0	104	37719
16	JORHAT	86	847097	0	0	3	30000	64	0	153	877097
17	KAMRUP	7	17224	0	0	0	0	61	0	68	17224
18	KAMRUP METRO	2	9840	0	0	0	0	10	0	12	9840
19	KARBI ANGLONG	5	28960	0	0	0	0	2	0	7	28960
20	KARBI ANGLONG WEST	0	0	0	0	0	0	11	0	11	0
21	KARIMGANJ	2	4068	1	2006	0	0	10	0	13	6074
22	KOKRAJHAR	13	16078	0	0	0	0	0	0	13	16078
23	LAKHIMPUR	315	224262	0	0	1	1680	212	0	528	225942
24	MAJULI	4	4780	0	0	0	0	13	0	17	4780
25	MORIGAON	10	6073	0	0	0	0	33	0	43	6073
26	NAGAON	11	64598	0	0	0	0	263	0	274	64598
27	NALBARI	3	5050	0	0	0	0	1	0	4	5050
28	SIVASAGAR	13	53780	0	0	0	0	74	0	87	53780
29	SONITPUR	53	365400	0	0	0	0	7	0	60	365400
30	SOUTH SALMARA MANKACHAR	35	190848	0	0	0	0	35	0	70	190848
31	TINSUKIA	231	470181	0	0	4	2664	74	0	309	472845
32	UDALGURI	6	20880	0	0	0	0	63	0	69	20880
Total		**1113**	**3189738**	**42**	**728557**	**16**	**59744**	**1913**	**0**	**3084**	**3978039**

Source: micensus.gov.in

Conclusion

The State Irrigation Plan (SIP) for Assam, prepared for the 2022-27 period, represents a comprehensive approach to enhancing the irrigation infrastructure across the state's 32 districts.

For the current period, the District Irrigation Plans (DIPs), which have been approved by the District Level Sanctioning Committee chaired by respective District Commissioners, propose a substantial increase in financial commitment—totaling Rs. 36,406 crore. This investment is targeted to enhance the irrigated area significantly, projecting a rise from 8.27 Lakh Hectares to 12.37 Lakh hectares (AIA) by the end of 2027. The ambition extends further to elevate the overall irrigation potential to 20.64 Lakh hectares (AIA) post-2027.

This strategic outline incorporates inputs from various sources, including the IrrigationDepartment of Assam, Central Ground Water Board, and other relevant state and national data repositories. The SIP 2022-2027 also emphasizes the integration of climate-resilient measures. Various innovative irrigation systems, including drip irrigation, sprinkler irrigation, and rain gun systems havebeen proposed as key tools for improving irrigation efficiency by reducing water wastage and improving the crop yield.

The SIP also builds upon the success of past innovations like Solar-Powered Mobile Lift Irrigation Systems, Cart-Mounted Solar Operated Pumping Systems, and Electrically Operated Lift Irrigation Systems with Pontoon, which have proven effective in many districts. These systems havecontributed significantly to improving irrigation efficiency, particularly in power-scarce areas and districts with challenging terrain.
Moreover, a set of new low-cost innovations, such as Solar Operated Raingun Sprinkler Systems, Integrated Solar Powered Irrigation Systems, and check dams, have been planned for 2024-25 across multiple districts to ensure sustainable water management, enhance groundwater recharge, and provide reliable irrigation solutions.

The SIP emphasizes inter-departmental collaboration, drawing on the expertise and resources of various departments like Agriculture, Fisheries, and Rural Development to ensure a holistic approach to water management thereby contributing effectively to overall economic development and environmental sustainability.

Through these measures, Irrigation Department is prepared to meet future demands therebyimproving the livelihoods of its farming communities. By enhancing irrigation potential, integrating advanced technologies, and fostering community participation, the SIP lays the groundwork for a resilient irrigation infrastructure capable of thriving in the face of climatic uncertainties and evolving water demands thus safeguarding its agricultural productivity for future generations.

DISCLAIMER

The State Irrigation Plan, 2022-27 is a document compiled from the data/ information collected from 32 nos. of District Irrigation Plans approved by the concerned DLSC committee chaired by the respective District Commissioner. The document is designed and prepared by the Irrigation Department, Assam based on the data and informationavailable in the Department and from other sources.

The contents of this document are intended for information to its departmental users as well as to the general public and do not have any legal sanctity. Every effort is made to provide accurate and updated information in the SIP.

We do not assume any legal liability on the completeness, or usefulness of the contents in the document. The views expressed and the conclusion arrived at in this document, including financial incorporate inputs from Irrigation Department of Assam and variousrelevant sources like Central Ground Water Board (CGWB), 6th Minor Irrigation Census and 1st Census of Water Bodies 2017 in Assam, Agriculture Department, Assam, Soil Conservation Department, Assam and other relevant state and national data repositories.

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GOVERNMENT OF ASSAM

DEPARTMENT OF IRRIGATION

State Irrigation Plan

(2022-27)

© Published by :
Irrigation Department
Govt. of Assam

Design & Printed by
Urban Chanakya, Guwahati

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