Government of the People's Republic of Bangladesh
Ministry of Agriculture

Minor Irrigation Survey Report 2019-20

Bangladesh Agricultural Development Corporation (BADC)
Digitalization of Survey and Monitoring for Development of Minor Irrigation Project
January-2021

Government of the People's Republic of Bangladesh
Ministry of Agriculture

Minor Irrigation Survey Report 2019-20
(Rabi Season)

Survey Conducted by

Bangladesh Agricultural Development Corporation (BADC)
Department of Agriculture Extension (DAE)
Barind Multipurpose Development Authority (BMDA)

Report Prepared by

BANGLADESH AGRICULTURAL DEVELOPMENT CORPORATION
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Dr. Muhammad Abdur Razzaque, MP
Minister
Ministry of Agriculture
Government of the People's
Republic of Bangladesh

MESSAGE

I am very glad to know that Bangladesh Agricultural Development Corporation (BADC) is going to publish an informative report on the Survey of Minor Irrigation Census for the year 2019-20.

Bangladesh Agricultural Development Corporation is mandated to provide three major inputs-supports of high yielding seeds, high quality non- nitrogenous fertilizer and increasing supply of irrigation equipments and technology to farmers' communities. Irrigation is one of the major activities of BADC. Currently, more than 95% of the irrigated land of the country is covered by minor irrigation.

This glorious achievement has been earned due to farmers' friendly irrigation policy of the Father of the Nation Bangabandhu Sheikh Mujibur Rahman since 1972. Under the dynamic leadership of our Hon'ble Prime Minister Sheikh Hasina, the present government is also following the policy of the Father of the Nation. Now, the government has been focusing on using surface water instead of groundwater for irrigation, mechanized cultivation, commercial agriculture, export oriented agriculture and minimize production cost providing agricultural inputs to farmers at subsidized rate.

I hope that this report will furnish the planners, policy makers, researchers and administrators necessary information in formulation of effective planning.

I extend my sincere thanks to everyone, whose immense contributions have made possible to publish this report.

Joy Bangla, Joy Bangabandhu
Long live Bangladesh.

(Dr. Muhammad Abdur Razzaque, MP)

Matia Chowdhury, MP
Chairman
Parliamentary Standing Committee
Ministry of Agriculture

MESSAGE

Bangladesh Agricultural Development Corporation (BADC) is going to publish "Minor Irrigation Survey Report 2019-20". This report comprises survey of irrigation equipments, irrigated area, groundwater status, mode of irrigation and benefited farmers during the Rabi season.

The government of Bangabandhu Sheikh Mujibur Rahman emphasized the highest priority to agricultural development both in terms of policy formulation and institutional set-up. In course of time now Bangladesh Agricultural Development Corporation is one of them. It was establish to provide supply & services of all agricultural inputs like fertilizer, seed, insecticides and irrigation facilities to the farmers. The Government of Sheikh Hasina has ensured supply & services of all agricultural inputs. As a result under the leadership of Hon'ble Prime Minister Sheikh Hasina, Bangladesh has emerged a development role model in agriculture for many other countries.

Agriculture is the main source of food, nutrition and employment of the country. This sector employs 40.60% of total labour forces and contributes 14.10% of the country's GDP. About 95% of the irrigated land of the country is covered by minor irrigation. It is playing a significant role for increase food grain production in Rabi season. This report reflected a total of 27.18% irrigated area use by surface water, while 72.82% area use groundwater.

The dependence of groundwater for minor irrigation development is a major concern. Withdrawal of groundwater by DTW and STW in Rabi season insecure availability of water in northern part of the country. So Government has taken initiative to implement water management tools like AWD, construction of Buried pipe line, Dug well, Drip & Sprinkler irrigation system, Excavation of canals etc. Besides this Government has introduce Integrated Minor Irrigation Policy 2017, Water act 2018, Agriculture Policy 2018, Groundwater Management Act 2018 for appropriate water management.

The findings of the report will help the Government to formulate policy decisions for effective minor irrigation planning which would play a key role in the production of food grains. I hope that this report will furnish the planners, policy makers, researchers and administrators necessary information in formulation of effective planning.

On the eve of the birth centenary of Bangabandhu Sheikh Mujibur Rahman, the Founding Father of the Nation, I convey my sincere thanks to those farmers whose contributions and untiring effort have made it possible to publish this report.

Joi Bangla. Joi Bangabandhu
May Bangladesh Live Forever

Matia Chowdhury
Matia Chowdhury, MP

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Message

I am very happy to know that Bangladesh Agricultural Development Corporation (BADC) is going to publish "Minor Irrigation Survey Report 2019-20". This report comprises irrigated area, operated irrigation equipments, farmers involvement in irrigation activities as well as trend of surface and groundwater irrigation.

BADC has been providing minor irrigation facilities to the farmers since 1961. At present, country's irrigation coverage is about 56.27 lac hectares in Rabi season. Minor irrigation covers 95.69% while major irrigation 4.31% only. BADC is involved in minor irrigation activities which include usage of water through LLP, rubber dam, floating pump, solar pump, dug well, DTW and STW etc. Besides BADC has implemented modern drip and sprinkler irrigation, fertigation in polyshed for crop production and installation of buried pipe line in the farmer's field.

I believe, the findings of the report will help the Government in formulation of policy and decisions for effective minor irrigation sub-sector, which will play a key role in achieving production of agricultural produces double by 2030. I also hope that this report will furnish the planners, researchers and administrators with necessary irrigation related data.

I like to extend my thanks to concerned officials of BADC, BMDA and DAE who contributed in preparing and publishing the report.

Md. Mesbahul Islam

Md. Sayedul Islam
Chairman, BADC

FOREWORD

It gives me great pleasure to know that Digitalization of Survey and Monitoring for Development of Minor Irrigation Project is going to publish "Minor Irrigation Survey Report 2019-20" as a part of the project work. It is an informative report on survey of irrigation equipment, irrigated area and benefited farmers of Rabi Season 2019-20. I expect that the report will meet the requirement of some basic information on Deep Tube Wells, Shallow Tube Wells, Low Lift Pumps, Artesian Wells, Dug Wells, Solar Pumps, Rubber Dams, manually operated pumps, Traditional and Gravity flow methods.

I am confident that this report will provide necessary information to public and private sector in the development and expansion of Minor irrigation to boost up food grain production.

I believe the findings of the report will help the Government in effective policy, decisions making for minor irrigation sub-sector which plays a key role in agricultural production. I also hope that this report will furnish the planners, researchers and administrators in effective planning of agricultural development.

I sincerely congratulate all concerned colleagues working in BADC, BMDA and DAE for their efforts in collection and compiling the report. Officials working in Digitalization of Survey and Monitoring for Development of Minor Irrigation Project deserve special thanks in this respect.

Md. Sayedul Islam

PREFACE

Bangladesh Agricultural Development Corporation (BADC) has been successfully working on collecting and monitoring the irrigation data and information since 1999. Primary data about operation and installation of irrigation equipment necessary for both planning and research work could be found from Minor Irrigation Survey Report 2019-20.

Minor irrigation survey has been being performed by three organizations jointly and the report is published on the basis of the information collected by BADC, BMDA and DAE since Rabi season 2004-05.

I believe that the findings of the report will help the Government in formulation of decisions for effective irrigation planning. I also hope that this report will furnish the planners, researchers and administrators necessary irrigation related data for effective planning in minor irrigation sub-sector.

I would like to extend my sincere thanks to all my colleagues both in the field and at project office for their efforts to publish the report. I am especially grateful to Dr. Radheshyam Sarkar, Deputy Director, DAE, Md. Moniruzzaman Monir, Executive Engineer, BMDA for their sincere efforts in composing this report.

I am very much grateful to Chief Engineers of irrigation wing and also Member Director (MI), BADC for their valuable suggestions for preparing and publication of this report.

Special thanks to Mr. Md. Sayedul Islam, Chairman, BADC, Md. Asadullah, Director General DAE and Shyam Kishore Roy, Executive Director, BMDA for their participation and valuable suggestions to make this effort successful.

Mohammad Zafar Ullah
Project Director
Digitalization of Survey and Monitoring for Development of Minor Irrigation Project, BADC.

LIST OF ACRONYMS

Agril.	-	Agricultural
ATIA	-	Agricultural Institutions Technical Assistance
AWD	-	Alternate Wetting and Drying
AWLR	-	Automatic Water Level Recorder
BADC	-	Bangladesh Agricultural Development Corporation
BMDA	-	Barind Multipurpose Development Authority
BPDB	-	Bangladesh Power Development Board
BRDB	-	Bangladesh Rural Development Board
BWDB	-	Bangladesh Water Development Board
CEGIS	-	Center for Environmental and Geographic Information Services
DAE	-	Department of Agriculture Extension
DTW	-	Deep Tube well
EPADC	-	East Pakistan Agricultural Development Corporation
FY	-	Financial Year
GBM	-	Ganges-Brahmaputra-Meghna
GIS	-	Geographical Information System
HYV	-	High Yielding Variety
ha	-	Hectare
IDA	-	International Development Agency
KSS	-	Krishak Somabay Samity
LGED	-	Local Government Engineering Department
LLP	-	Low Lift Pump
MI	-	Minor Irrigation
MOA	-	Ministry of Agriculture
PVC	-	Polyvinyl Chloride

EXECUTIVE SUMMARY

The main objective of this report was the survey on current agricultural practices by irrigation in **Rabi** season. In **2019-20** Irrigation Season total irrigated area is 5627598 hectares of which **4098256 (72.82%)** hectares are through utilization of groundwater and **1529342 (27.18%)** hectares through utilization of surface water. Currently, Net Cultivable Area in Bangladesh is about **8577278** ha where Total Irrigated Area is 5627598 ha, which is about **65.61%** of Net Cultivable Area. Increased groundwater accessibility resulting from the expansion of deep and shallow tube wells helped Bangladesh to attain near self-sufficiency in rice. Available evidence suggests that the policy focus so far has been largely on "resource development", and not on "resource management". This has resulted in serious problems, most notably excessive drawdown (declined static water level) in intensively irrigated areas and the deterioration of groundwater quality. Increasing energy prices are also threatening the sustainability of irrigation in Bangladesh.

The forefront challenge, therefore, is to take the necessary corrective measures before the problem becomes either insolvable or too costly to remediate. So, attention must be given to the development and management of surface water resources to lessen pressure on groundwater. In addition to supply-side solutions, water demand will also need to be curtailed by increasing water use efficiency through the adoption of water conserving management practices, for example reduced tillage and raised bed planting, improve irrigation water management technology and the right choice of appropriate crops. Decreasing water availability both in terms of quantity and quality suggested that the unchecked expansion of dry season **boro** rice cultivation is probably not a long-term option for Bangladesh. Therefore cropping patterns need to be rationalized considering water availability and the sustainability of aquifers.

In the absence of proper institutional arrangements, evaluation of strategic options and monitoring national policies implementation for the public water sector will remain a challenge. At present, seven different agencies are responsible for the management of groundwater resources. In addition to technical solutions, needs a strong linkages and improved communications between different organizations involved in the management of groundwater resources. This report has prepared on the basis of the data/information collected through the survey conducted by three organizations BADC, DAE and BMDA in the **Rabi** season of **2019-20**. The survey has been conducted on **Boro, Wheat, Potato, Maize, Fruits and Vegetables** which has been irrigated by minor irrigation equipment.

INTRODUCTION

For proper utilization of valuable water in irrigation, it is necessary to collect related information regarding irrigation systems from the field, prepare data base, GIS maps & report for future use. Necessity of irrigation related information increases day by day for demand based planning in irrigation sub-sector to enhance irrigated area for ensuring sustainable food grain production in the country.

Minor irrigation consists of mechanized, semi-mechanized and non-mechanized systems of irrigation. Low lift pumps, shallow tube wells and deep tube wells are under mechanized irrigation system; manually operated pumps such as hand tube wells, treadle pumps, artesian wells etc, and gravity flow systems are under semi-mechanized irrigation system. Traditional systems such as doans, swing baskets etc come under non-mechanized irrigation systems.

BADC started irrigation activities through utilization of 1555 nos. of Low lift pumps. Later on in 1967-68, Deep Tube Wells were installed for irrigation purposes where surface water was not available. Similarly in 1973-74 Shallow Tube wells were installed for the same purposes. Besides these methods, irrigation activities in some area of the country are performed through Manual & Artesian Well, Traditional Method, and Gravity Flow Method. The summary of irrigation through utilization of surface and groundwater by different modes is shown in Table-1.

Table-1: Summary of Surface water and Groundwater Irrigation by Different Modes during Rabi Season 2019-20

Sl. No.	Mode of irrigation	No. of Equipment	Area Irrigated (ha)	% of Surface water	% of Total Irrigated Area (ha)	Area Irrigated per Equipment (ha)
A.	**Surface water Irrigation by:**					
1	Low lift pump	199914	1269661	83.02%	22.56%	6.35
2	Gravity flow		242356	15.85%	4.31%	
3	Traditional method		6825	0.45%	0.12%	
4	Solar Pump	2355	10500	0.69%	0.19%	
	Sub Total	**202269**	**1529342**	**100.00%**	**27.18%**	
B.	**Groundwater Irrigation by:**			**% of Ground water**		
1	Deep tube well	37007	1084245	26.46%	19.27%	29.30
2	Shallow tube well	1398706	3001120	73.23%	53.33%	2.15
3	Manual & Artesian well		7852	0.19%	0.14%	
4	Solar Pump	890	4024	0.10%	0.07%	
5	Dug Well	439	1015	0.02%	0.02%	
	Sub Total	**1437042**	**4098256**	**100.00%**	**72.82%**	
	GRAND TOTAL	**1639311**	**5627598**		**100.00%**	

From **Table-1**, it is revealed that during the **Rabi Season 2019-2020**, total **1639311** numbers of irrigation equipment's are used for irrigation in the country which is **0.97%** higher than that of **2018-19 Rabi** season in which **1585413** nos. of irrigation equipment's were operated. On the other hand, irrigated area was **5587482** hectares in **Rabi** season **2019-2020** which is **0.72 %** higher than that of **2018-2019 Rabi** season irrigated area was **5587482** hectares. Out of total **5627598** hectares irrigated area, **5355026** hectares irrigated by DTW, STW & LLP and **272572** hectares irrigated by Manual/Artesian well, traditional method, gravity flow, solar pump and dug well. Out of total **5627598** hectares irrigated area **4098256** hectares through utilization of groundwater i.e. **72.82%** of total irrigated area and **1529342** hectares through utilization of surface water i.e. **27.18%** of total irrigated area. The historical development of different types of irrigation equipment's in Bangladesh is shown in **Figure-1.**

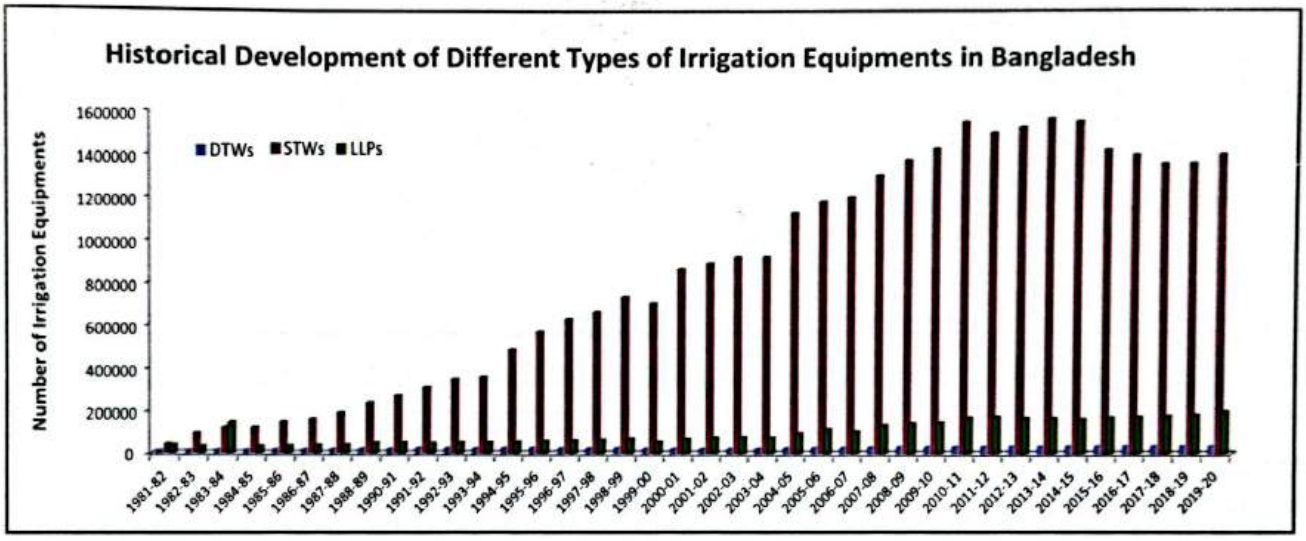

Figure 1: Historical Development of Different Types of Pumps in Bangladesh

With the introduction of high yielding rice varieties in 1980-90s that responded favorably to irrigation and fertilizer, and which are suitable for boro rice, demand for reliable irrigation. Since aquifer conditions were favorable in most parts of the Teesta, Brahmaputra-Jamuna and Ganges river floodplain, the attention was diverted to the development of groundwater resources. The installation of deep tube wells (DTWs) started in the late 1960s, but gained momentum in late 1980s. Within 1992, about 25,500 DTWs were installed throughout the country by BADC. Currently, **37007** DTWs are working in Bangladesh to provide water for irrigation purposes.

The expansion of DTWs was followed by the development of Shallow Tube Wells (STWs) with discharge capacities of 10-20 lit/ sec. However, despite visible benefits of groundwater irrigation, STWs were not initially adopted due to restrictions on tube well spacing and embargo on the import of all types of diesel engines. After devastating floods of 1988 and subsequent cyclones in the early 1990s it is realizing that the need for agricultural machinery to kick-off farming economies back into action.

The government lifted all restrictions and embargos on the import of irrigation equipment. Consequently, local markets were flooded with inexpensive and easy to operate irrigation pumps and small engines (<12 HP), mainly imported from India and China.

The groundwater and surface water irrigated area are shown in Figure-2.

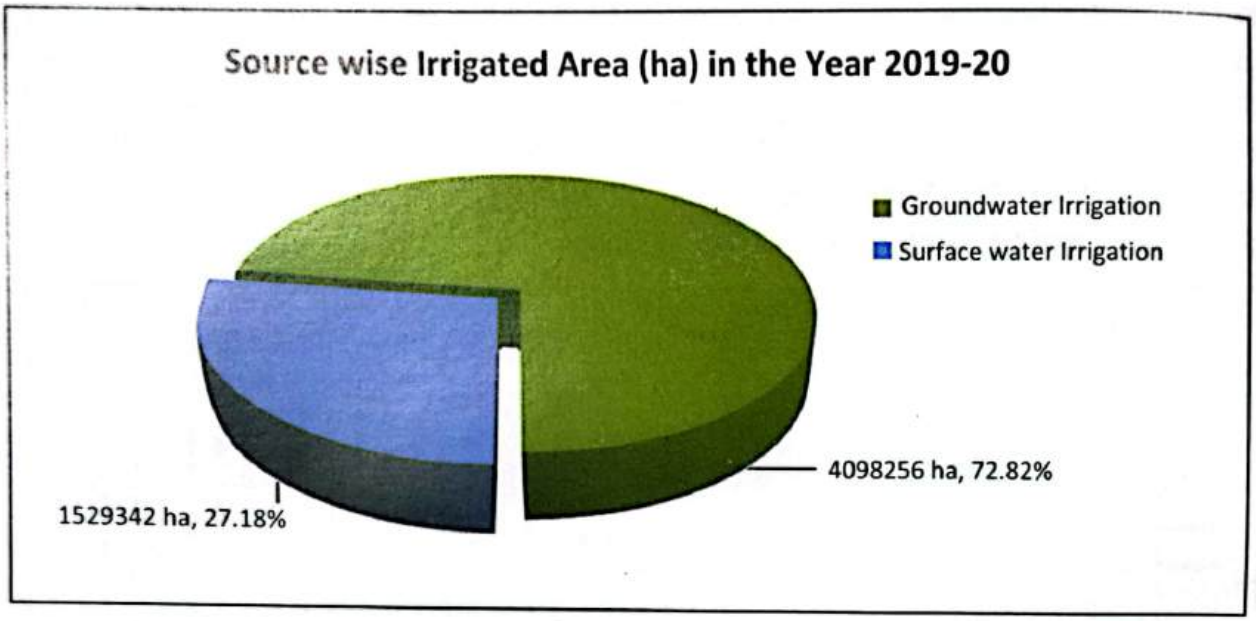

Figure 2: Irrigated Area (ha) of Surface water & Groundwater during Rabi Season 2019-20

Area Covered By Different Irrigation Mode during **Rabi** season **2019-20** are shown in the **Table-2** and graphical presentation shown in **Figure 3.**

Table 2: Total Area (ha) Covered by Different Irrigation Mode during Rabi Season 2019-20

Different Mode of Irrigation	Irrigation Year 2019-20	
	Irrigated Area (ha)	% of Total Area
Deep Tube Well	1084245	19.27%
Shallow Tube Well	3001120	53.33%
Low Lift Pump	1269661	22.56%
Gravity Flow	242356	4.31%
Solar Pump	14524	0.26%
Manual & Artesian well	7852	0.14%
Traditional Method	6825	0.12%
Dug Well	1015	0.02%
Total	**5627598**	**100.00%**

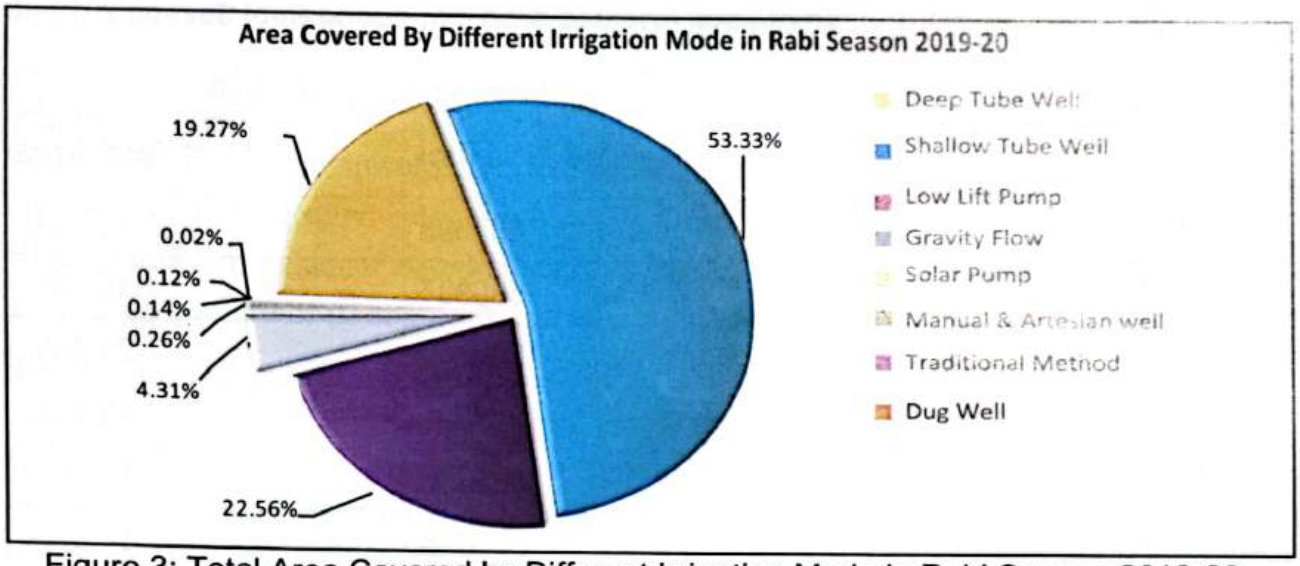

Figure 3: Total Area Covered by Different Irrigation Mode in Rabi Season 2019-20

Distribution of irrigation equipment's used during Rabi season 2019-20 are shown in bellow-

Table 3: Division wise distribution of irrigation equipment's (DTW, STW, LLP) use during Rabi Season 2019-20

Name of Division	Nos. of Irrigation equipment's in the Year 2019-20				
	DTW	STW	LLP	Solar	Dug Well
Dhaka	2564	176309	25204	258	12
Mymensingh	4295	156791	11727	73	15
Rajshahi	17092	297593	11527	280	310
Rangpur	8121	399184	1927	593	75
Chittagong	2055	67515	44494	235	9
Khulna	2658	276100	36359	361	7
Sylhet	221	25105	42742	108	7
Barisal	1	109	25934	1337	4
Total	**37007**	**1398706**	**199914**	**3245**	**439**

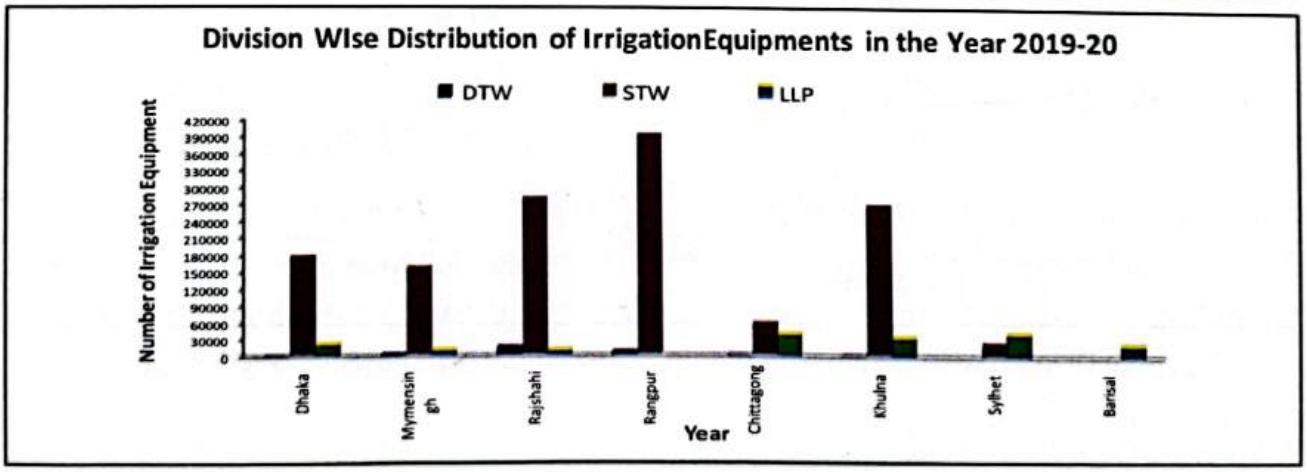

Figure 4: Division wise Distribution of Irrigation Equipment's in the Year 2019-20

Table 4: Division wise distribution of Total Irrigated Area (ha) during Rabi Season 2019-20

Name of Division	Irrigation Year 2019-20	
	Irrigated Area (ha)	% of Total Area
Dhaka	681698	12.11%
Mymensingh	598937	10.64%
Rajshahi	1223770	21.75%
Rangpur	1040091	18.48%
Chittagong	663256	11.79%
Khulna	808828	14.37%
Sylhet	427533	7.60%
Barisal	183485	3.26%
Total	**5627598**	**100.00%**

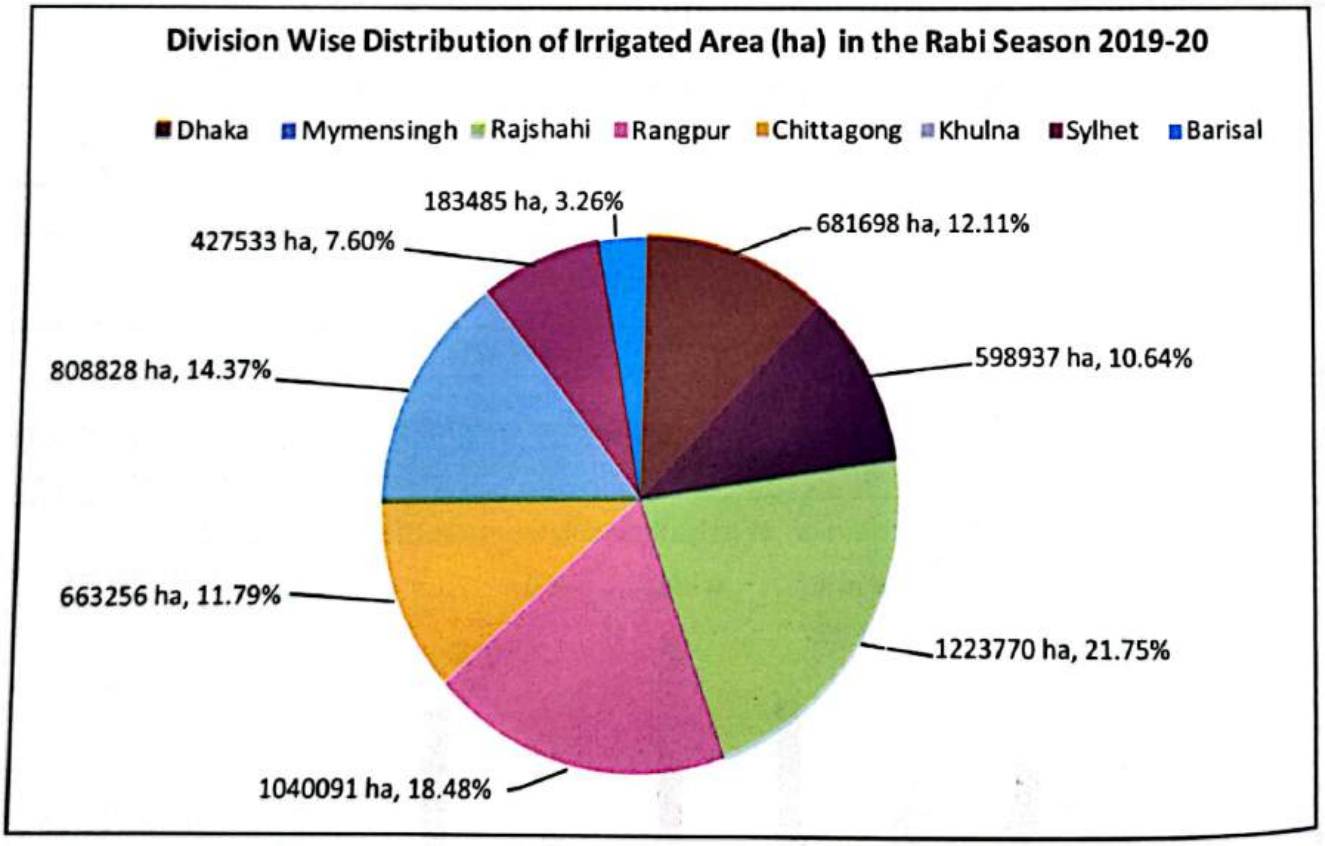

Figure 5: Division wise Distribution of Irrigated Area (ha) in Rabi Season 2019-20

GROUNDWATER IRRIGATION

About 75.41% of the total groundwater is used in four divisions in the North-Central and North-Western hydrological zones *i.e.* Dhaka, Mymensingh, Rajshahi and Rangpur. In the North West, groundwater irrigation is likely to continue until the limits of land or sustainable groundwater withdrawals are reached. Dry season groundwater irrigation over a seven month period depends on adequate recharge in the five-month monsoon period. If recharge is not more or at least equivalent to discharge, round the year irrigation will accelerate groundwater depletion resulting in an excessive decline in water levels. On the other hand, it is found that groundwater recharge is higher in the North-west than the South and North-east, respectively, a function of increased groundwater extraction in the former zones.

Farmers of these regions have already started switching to more profitable and less water-intensive crops such as maize, wheat. About **76.89%** of the pumps within Bangladesh are run by diesel engines. The remaining **23.09%** use electricity. Diesel pumps usually have higher costs and lower water extraction capacity than electric. But despite subsidies on electricity, diesel pumps are preferred by farmers due to low capital costs and mobility ease within small and fragmented farm lands. Increasing power cuts and the generally poor electricity network in many rural areas comprise other potential reasons for farmers' diesel pump preferences. In addition to irrigate their own lands, the owners of STWs also provide irrigation services to their neighbors for a fixed seasonal fee in cash or through payment by producing crops.

Groundwater irrigation requires large amounts of energy to lift water from underlying aquifers. In the **Rabi** season 2019-20 about **35,081** DTWs are electrified; the rest **1926** are diesel operated. Out of the **1.39 million** STWs in Bangladesh, only **0.32 million** are electrified whereas the remaining **1077607** are diesel operated. In the North-west, diesel operated STWs are used primarily for irrigating **Boro** rice, and partially for supplementary irrigation to **Aman** and **Aus** rice and other crops.

As the genetic and agronomic scope for yield increase in rice is limited, increasing irrigation costs will reduce farmers' net incomes, further threatening the economic foundations upon which ***boro*** rice production is based. The following are pictures of some deep tube wells and shallow tube wells:

Figure 6: Electrically Operated Deep Tube Well and Buried Pipe Line

Figure 7: BMDA DTW in Taraganj, Rangpur

Figure 8: BMDA Solar Energised Dug Well in Shapahar Upazila, Naogaon

Figure 9: Solar Scheme, Shaniajan, Hatibandha, Lalmonirhat

Figure 10: Honourable Minister of MOA Visited Polyshade, Godkhali, Jessore

Figure 11: Solar Operated Dug Well, Godkhali, Jessore

During the **Rabi** season **2019-2020,** DTWs and STWs covered throughout the country were **1084245** and **3001120** hectares. In the previous **Rabi** season **2018-2019**, total **1395166** nos. of DTWs and STWs were in operation and **4070607** hectares land were irrigated. Deep Tube Well contributed **19.27%** and Shallow Tube Well is contributed **53.33%** of the total area irrigated during **Rabi** season **2019-2020**. Division wise Irrigation by DTWs STWs is shown in **Table-5** along with graphical representation in **Figure 12.**

Table-5: Area Irrigated by DTWs and STWs in eight divisions of Bangladesh in Rabi season 2019-20

Name of Division	Irrigation Year 2019-2020		
	Area Irrigated (ha) by DTW	Area Irrigated (ha) by STW	Total Irrigated Area (ha)
Dhaka	64901	385128	450029
Mymensingh	148836	324478	473314
Rajshahi	518267	631765	1150032
Rangpur	216345	790917	1007262
Chittagong	63141	217932	281073
Khulna	64919	557240	622159
Sylhet	7816	93393	101209
Barisal	20	267	287
Total	**1084245**	**3001120**	**4085365**

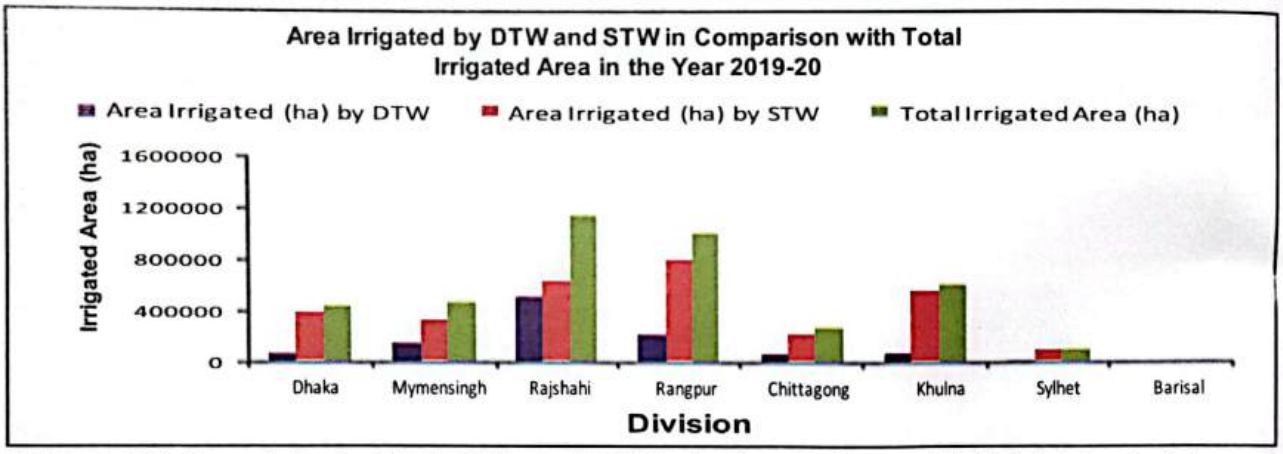

Figure 12: Area irrigated by DTWs and STWs in Comparison with Total Irrigated Area in Rabi season 2019-20

Figure 13: Honourable Secretrary of MOA Visited Polyshade, Godkhali, Jessore

Figure 14: Submerged Weir, B. Baria

Figure 15: Floating Pump in Comilla

MANUAL & ARTESIAN WELL

Manual irrigation systems are easy to handle, require no technical equipment and are therefore generally cheap. But these types of pumps need high labor inputs. A common and very simple technique for manual irrigation is Treadle pump, Diaphragm Pump, and Hand Pump etc. for groundwater based irrigation.

Figure 16: MANUAL & ARTESIAN WELL

Artesian well

A **water table** higher than the well ensures water pressure will consistently force water into the well. An **artesian aquifer** is an underground layer which holds **groundwater** under pressure. This causes the water level in the well to rise to a point where the pressure is equal to the weight of water putting it under pressure. Water may even reach the ground surface if the natural pressure is high enough, in which case the well is called a **flowing artesian well**. An aquifer is a **geologic** layer which can hold water such as sand and gravel, **limestone,** or **sandstone,** through which water flows and is stored. An **artesian aquifer** is trapped between rocks or clay which causes the pressure. Water returns to the aquifers when the **water table** at its recharge zone is at a higher **elevation** than the head of the **well.**

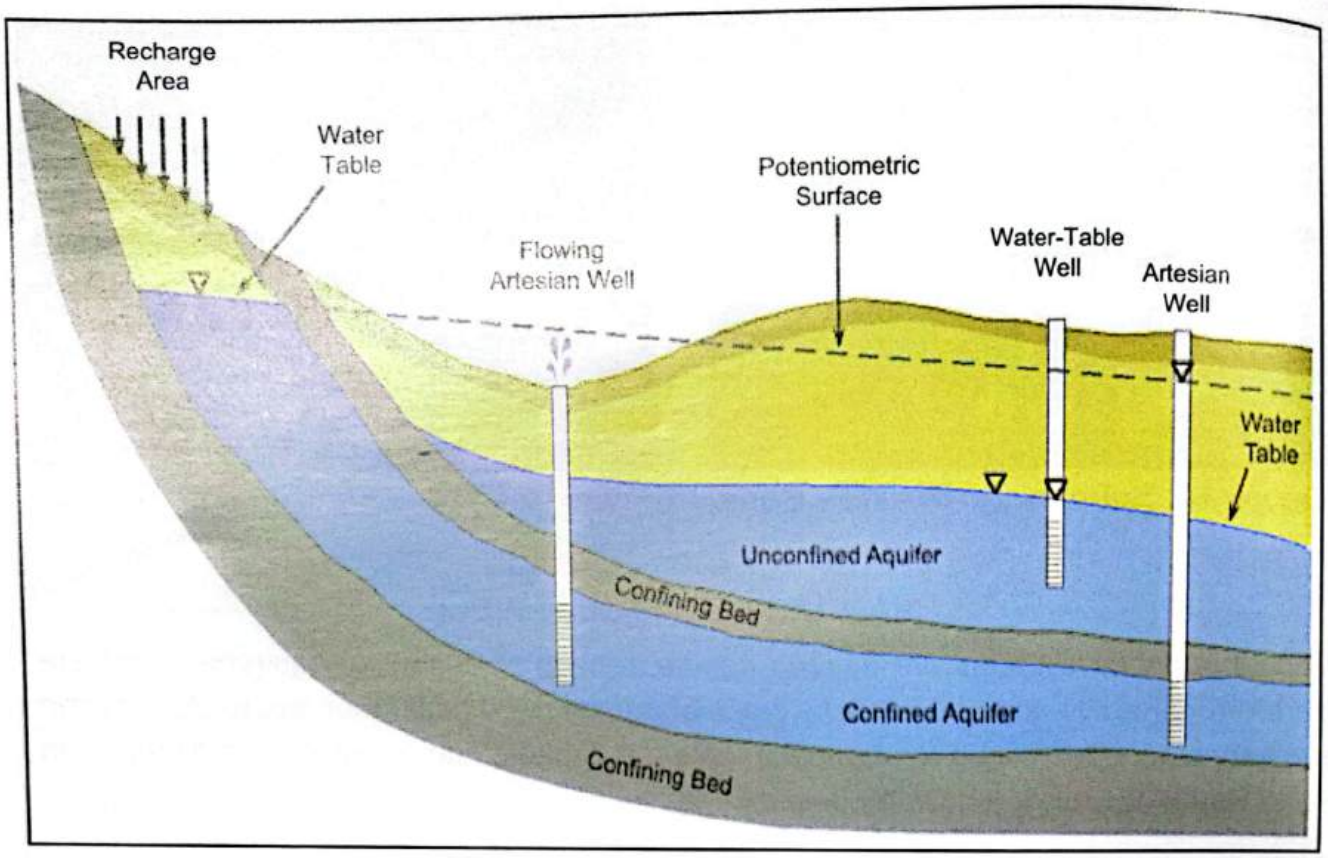

Figure 17: An Artesian Well Diagram of Artesian Aquifer.

Division wise irrigated area by Manual and Artesian well method in Rabi season 2019-20 are shown in the Table-6.

Table 6: Irrigated Area by Manual Method & Artesian Well in 2019-20.

Sl. No.	Division	Irrigated Area (ha)	% of Total
1	Dhaka	1577	20.08%
2	Mymensingh	344	4.38%
3	Rajshahi	40	0.51%
4	Rangpur	170	2.17%
5	Chittagong	950	12.10%
6	Khulna	831	10.58%
7	Sylhet	3314	42.21%
8	Barisal	626	7.97%
	Total	**7852**	**100.00%**

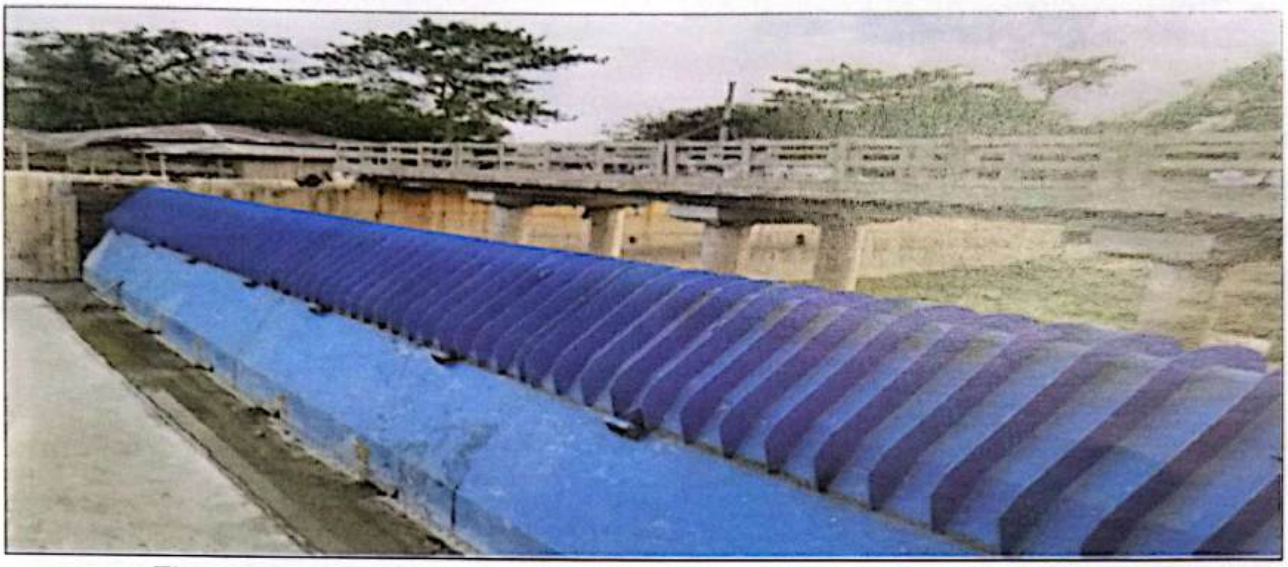

Figure 18: Harbang Hydraulic Elevator Dam, Chakaria, Cox'sbazar

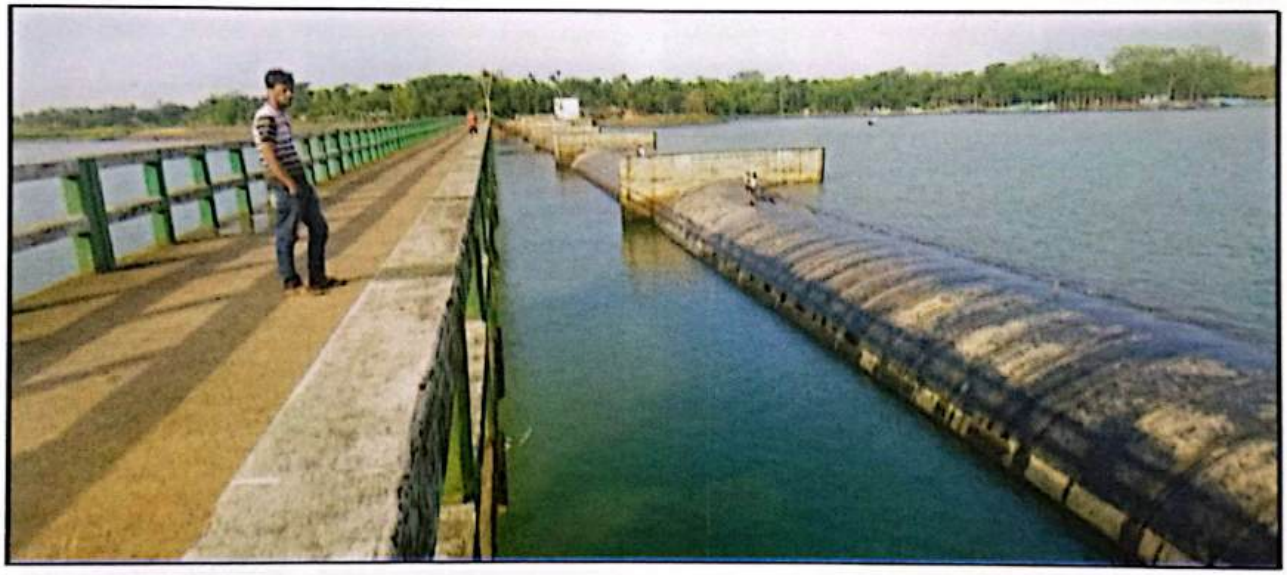

Figure 19: Michhakhali Rubber Dam, Bishambharpur, Sunamganj

Figure 20: Sorai Khal Rubber Dam, Lohagara, Chattogram

Figure 21: 2.0 Cusec Solar LLP Scheme, Shaniajan, Hatibandha, Lalmonirhat

Figure 22: Submerged Weir, B. Baria

Figure 23: Intake Point Sluice Gate, B. Baria

Figure 24: LLP Scheme in Re-excavated Khal

Figure 25: Sprinkler Irrigation, Kashimpur, Gazipur

Low Lift Pumps (LLP):

In **2019-20**, about **199914** nos. of LLP was operated for irrigation purpose and 1269661 hectares area irrigated which is **22.56%** of total irrigated area. Out of 199914 LLPs, BADC operated **8281** nos. of LLPs under various projects through which 200487 hectares of land was irrigated. Division wise no. of LLPs and irrigated area in Rabi season **2019-20** are shown in **Table-7.**

Figure 26: 5-cusec solar pump-Nalitabari-Sherpur

Figure 27: Portable Solar LLP at Char Area, Rangpur.

Traditional Irrigation Equipment:

Bangladesh was dependent on traditional means of irrigation, up to 1950s, when irrigation was applied by swing basket, shewty, doan etc. Swing basket or shewty is capable of lifting water up to 3 feet approximately and doans up to 5 feet. After introducing modern irrigation technology, the use of traditional method irrigation is decreasing day by day. During Rabi Season **2019-20, 6825** hectares of land has been irrigated by traditional method. Division wise irrigated area (ha) by Traditional Method in the Boro Season is shown in the **Table-7.**

Figure 28: Don

Figure 29: Swing Basket

Figure 30: Traditional Irrigation Method

Gravitational Flow:

In some part of the country irrigation carried out by gravity flow through major irrigation projects. This type of irrigation projects mainly implemented and operated by BWDB. Some of the irrigated areas under gravity flow also covered by BADC, LGED and private sector. It has been observed that during **2019-2020** irrigation seasons, **242356** hectares of land were irrigated by gravity flow method. Division wise irrigated area (ha) by Gravity Flow is shown in the **Table-7.**

Figure 31: 12.5 Floating pump, Nikli-Kishoreganj

Figure 32: Floating pump, Boaljhuri, Haziganj, Chadpur

Table-7: Area irrigated by Surface water in eight divisions of Bangladesh in Rabi season 2019-20

Name of Division	Irrigated Area (ha) by LLP	Irrigated Area (ha) by Traditional Method	Irrigated Area (ha) by Gravity Flow	Irrigated Area (ha) by Solar	Total Irrigated Area (ha)
Dhaka	211346	15903	1698	563	229510
Mymensingh	105044	19272	591	164	125071
Rajshahi	70120	1500	100	652	72372
Rangpur	19210	10278	295	1333	31116
Chittagong	304563	73859	1721	533	380676
Khulna	137314	46026	850	817	185007
Sylhet	247772	73618	1106	250	322746
Barisal	174292	1900	464	2953	179609
Total	**1269661**	**242356**	**6825**	**7262**	**1526104**

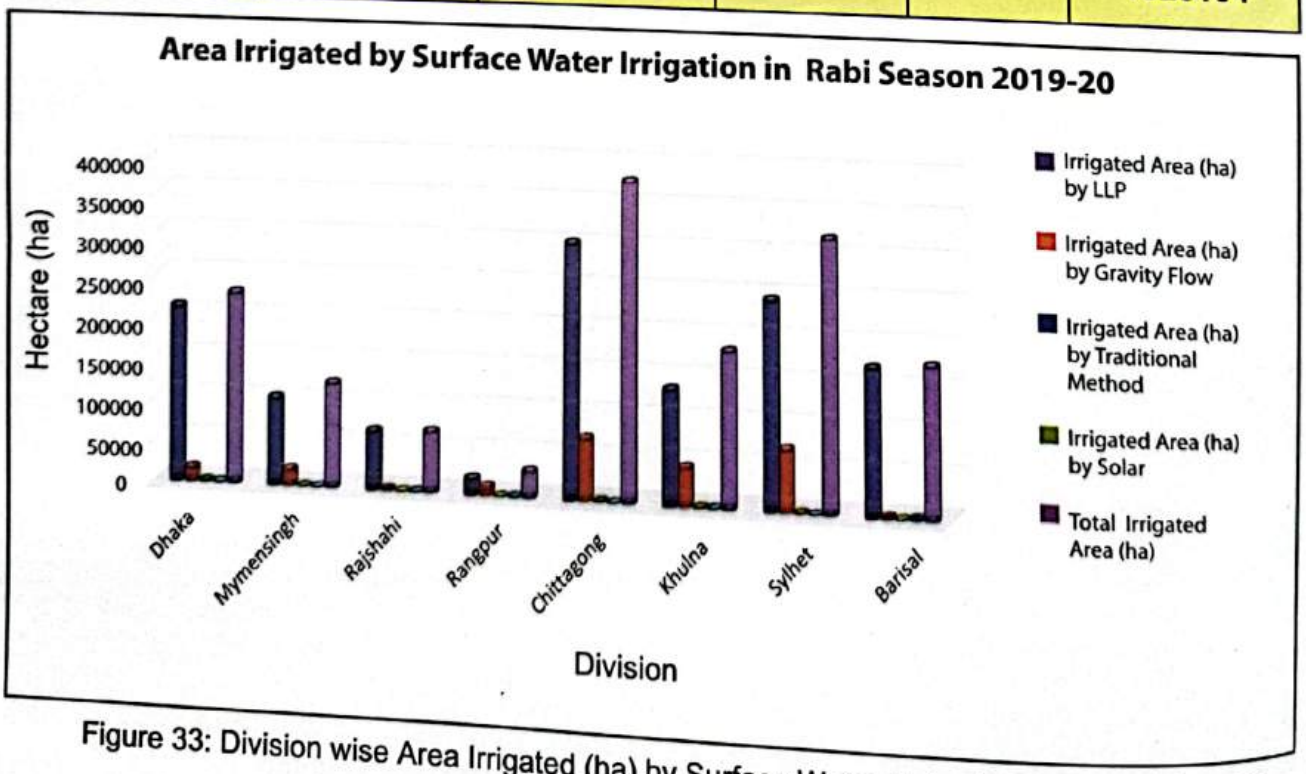

Figure 33: Division wise Area Irrigated (ha) by Surface Water during Rabi Season 2019-20

TREND OF MINOR IRRIGATION

A. Operational Equipment and Irrigated Area

The trend of operational irrigation equipment and irrigated area from **1961-62 to 2019-20** is shown in **Table-8 and Table-9.**

Table-8: Trend of Minor Irrigation Equipment 1961-62 to 2019-20:

Boro Season	Boro Season Annual Operating(Nos.)			Equipment Annual Change in Percentage(%)		
	DTW	STW	LLP	DTW	STW	LLP
1961-62			1555			0.00
1962-63			2024			30.16
1963-64			2477			22.38
1964-65			2239			-9.61
1965-66			3420			52.75
1966-67			3990			16.67
1967-68	102		6558	0.00		64.36
1968-69	380		10852	272.55		65.48
1969-70	980		17846	157.89		64.45
1970-71	796		24483	-18.78		37.19
1971-72	906		24243	13.82		-0.98
1972-73	1237		32917	36.53		35.78
1973-74	1494	998	35243	20.78	0.00	7.07
1974-75	2699	1029	35534	80.66	3.11	0.83
1975-76	3828	2162	36382	41.83	110.11	2.39
1976-77	4461	3045	28361	16.54	40.84	-22.05
1977-78	7453	6447	36730	67.07	111.72	29.51
1978-79	9329	8379	35895	25.17	29.97	-2.27
1979-80	9795	11280	37389	5.00	34.62	4.16
1980-81	10131	20931	35951	3.43	85.56	-3.85
1981-82	11491	42955	41153	13.42	105.22	14.47
1982-83	13800	93100	35500	20.09	116.74	-13.74
1983-84	15500	120300	36000	12.32	29.22	1.41
1984-85	16900	147000	37000	9.03	22.19	2.78
1985-86	17900	146900	37500	5.92	-0.07	1.35
1986-87	18700	160300	40600	4.47	9.12	8.27
1987-88	20300	188700	42300	8.56	17.72	4.19
1988-89	22400	235900	50800	10.34	25.01	20.09
1989-90	22600	260000	51000	0.89	10.22	0.39
1990-91	21500	270300	51600	-4.87	3.96	1.18
1991-92	25500	309300	50300	18.60	14.43	-2.52
1992-93	25700	348900	52200	0.78	12.80	3.78

Boro Season	Boro Season Annual Operating(Nos.)			Equipment Annual Change in Percentage(%)		
	DTW	STW	LLP	DTW	STW	LLP
1993-94	24500	359200	52600	-4.67	2.95	0.77
1994-95	26700	488900	57100	8.98	36.11	8.56
1995-96	27300	571200	60600	2.25	16.83	6.13
1996-97	25200	629800	62900	-7.69	10.26	3.80
1997-98	25300	664700	66300	0.40	5.54	5.41
1998-99	26700	736100	72900	5.53	10.74	9.95
1999-00	23530	707570	58050	-11.87	-3.88	-20.37
2000-01	23180	865210	71310	-1.49	22.28	22.84
2001-02	23000	893360	77000	-0.78	3.25	7.98
2002-03	23430	924020	79870	1.87	3.43	3.73
2003-04	24720	925150	77790	5.51	0.12	-2.60
2004-05	27180	1128990	99250	9.95	22.03	27.59
2005-06	28280	1182520	119130	4.05	4.74	20.03
2006-07	29170	1202720	107290	3.15	1.71	-9.94
2007-08	31300	1304970	138630	7.30	8.50	29.21
2008-09	32170	1374580	146790	2.78	5.33	5.89
2009-10	32910	1425140	150610	2.30	3.68	2.60
2010-11	33670	1549150	173670	2.31	8.70	15.31
2011-12	34050	1498390	177220	1.13	-3.28	2.04
2012-13	35320	1523610	170570	3.73	1.68	-3.75
2013-14	36034	1563791	171041	2.02	2.64	0.28
2014-15	36566	1549711	167175	1.48	-0.90	-2.26
2015-16	36979	1417008	173179	1.16	-9.36	3.46
2016-17	37175	1398960	176478	0.53	-1.27	1.90
2017-18	37538	1355852	181469	0.98	-3.08	2.83
2018-19	37634	1357532	187188	0.26	0.12	3.15
2019-20	37007	1398706	199914	-1.67	3.03	6.80

Note: Data from 1961-62 to 1981-82 Taken from Year wise Progress Report of BADC, data from 1982-83 to 1999-2000 taken from Census of Irrigation in Bangladesh by ATIA Project and data from 2000-01 to 2019-20 taken from Minor Irrigation Survey Report of BADC.

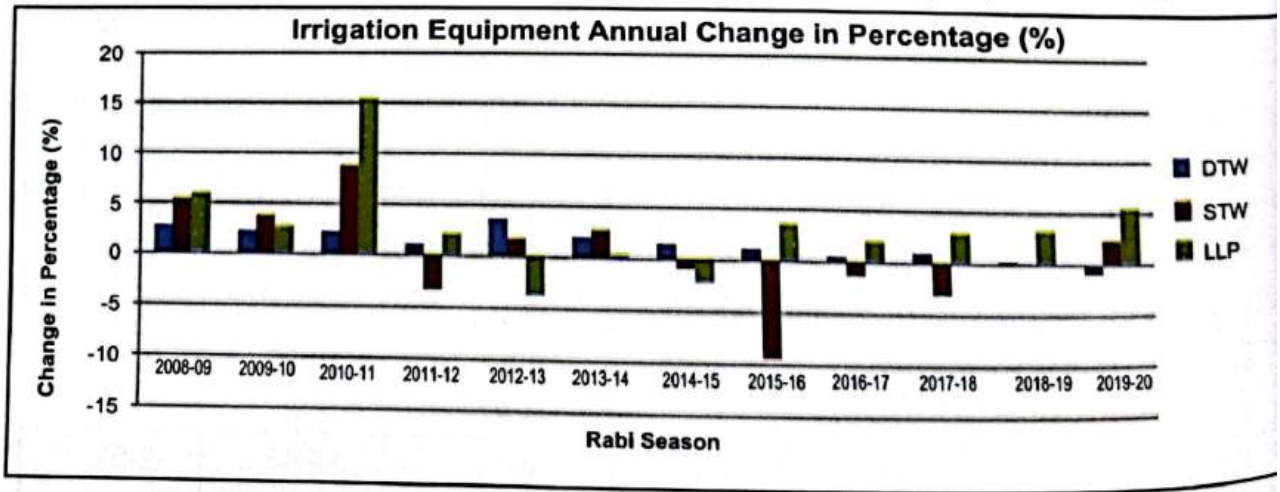

Figure 34:Trend of Minor Irrigation Equipment Change in Percentage of Last Eleven Rabi Seasons (2008 to 2020)

Table 9: Trend of Irrigated Area by Different Minor Irrigation Mode (1961-62 to 2019-20):

(Area in Hectare)

Irrigation Season	DTW	STW	LLP	Manual & Artesian Well	Traditional Method	Gravity Flow Method	Solar Pump	Dug Well	Total
1961 -62			29927.9						
1962 -63			5386 3.6						
1963 -64			63461.9						
1964 -65			53547.4						
1965 -66			70247.8						
1966 -67			91135.6						
1967 -68	1667		130373						
1968 -69	6510		180620						
1969 -70	13004		273227						
1970 -71	12984		373230						
1971 -72	11874		369745						
1972-73	15287		508715						
1973 -74	24881	1806	565477						
1974 -75	47716	2726	576963						
1975 -76	62246	5220	603425						
1976 -77	66477	7168	519479						
1977 -78	137034	27929	708959						
1978 -79	204186	35827	820470						
1979 -80	235748	55400	894775						
1980 -81	259557	99029	912099						
1981 -82	323152	202180	1089873						
1982 -83	234000	371000	337000	16000	405000	160000			1523000
1983 -84	263000	480000	342000	16000	372000	136000			1610000
1984 -85	287000	586000	351000	16000	384000	147000			1772000
1985 -86	304000	586000	356000	16000	314000	163000			1739000
1986 -87	318000	639000	386000	16000	326000	155000			1840000
1987 -88	345000	753000	402000	16000	433000	115000			2064000
1988 -89	380000	941000	482000	16000	391000	170000			2380000
1989 -90	384000	1037000	484000	16000	478000	176000			2575000
1990 -91	365000	1078000	513000	18000	498000	316000			2645000
1991 -92	434000	1234000	500000	19000	316000	251000			2674000
1992 -93	437000	1392000	496000	22000	323000	291000			2829000
1993 -94	389000	1388000	458000	29000	348000	326000			2767000
1994 -95	502000	1638000	538000	25000	250000	352000			3107000
1995 -96	540000	2004000	568000	51000	207000	355000			3752000
1996 -97	475000	2159000	570000	38000	186000	333000			3762000
1997 -98	465000	2182000	622000	64000	201000	285000			3833000
1998 -99	507000	2522000	628000	101000	232000	358000			4349000
1999 -00	529640	2122510	581800	18650	76520	227400			3556520
2000 -01	538260	2295660	603280	6530	71730	250850			3766310
2001 -02	530290	2355030	628750	7460	36900	286010			3849770
2002 -03	587930	2409410	664020	11710	32510	309650			4018240
2003 -04	589490	2429130	630670	13340	25570	355670			4043860
2004 -05	654190	3159900	838380	1250	24250	109380			4787340
2005 -06	700660	3120610	803170	2110	261 30	107040			4759720
2006 -07	725260	3196120	810020	2250	12150	137060			4882870
2007 -08	785680	3197180	903870	5210	19040	138800			5049780
2008 -09	790115	3245143	957035	15448	43965	75145			5126 851
2009 -10	773323	3336652	964902	17412	40186	85151			5217626
2010 -11	719206	3505287	1009981	6381	3814	19071			5263740
2011 -12	758963	3418147	1084594	11858	28326	20447			5322335
2012 -13	934342	3242440	1035736	34560	28320	97707			5373105
2013 -14	876803	3278838	1083535	33778	28318	101060			5402332
2014 -15	962039	3235184	1106705	27718	20232	96274			5448152
2015 -16	1194177	2954949	1164603	29718	18336	128564			5490347
2016 -17	1063486	3079001	1187823	27518	14553	154885			5527266
2017 -18	1072539	2981646	1220879	26856	12769	241925			5556614
2018 -19	1076141	2994466	1248616	8780	8065	238871	11960	583	5587482
2019 -20	1084245	3001120	1269661	7852	6825	242356	14524	1015	5627598

Note: Data from 1961-62 to 1981-82 Taken from Year wise Progress Report of BADC, data from 1982-83 to 1999-2000 taken from Census of Irrigation in Bangladesh by ATIA Project and data from 2000-01 to 2019-20 taken from Irrigation Equipment Survey Report of BADC.

B. Comparative Study of Area Coverage per Equipment (DTW, STW, LLP)

A comparative study of area coverage per equipment (DTW, STW & LLP) is given below in the Table-10.

Table 10: Comparative study of area coverage per equipment (DTW, STW & LLP)

Irrigation season	Irrigated Area ('000 ha)			Operational Equipment ('000 No.)			Area Coverage per Equipment		
	DTW	STW	LLP	DTW	STW	LLP	DTW	STW	LLP
1982-83	234	371	337	13.8	93.1	35.5	16.96	3.98	9.49
1983-84	263	480	342	15.5	120.3	36	16.97	3.99	9.50
1984-85	287	586	351	16.9	147	37	16.98	3.99	9.49
1985-86	304	586	356	17.9	146.9	37.5	16.98	3.99	9.49
1986-87	318	639	386	18.7	160.3	40.6	17.01	3.99	9.51
1987-88	345	753	402	20.3	188.7	42.3	17.00	3.99	9.50
1988-89	380	941	482	22.4	235.9	50.8	16.96	3.99	9.49
1989-90	384	1037	484	22.6	260	51	16.99	3.99	9.49
1990-91	365	1078	513	21.5	270.3	51.6	16.98	3.99	9.94
1991-92	434	1234	500	25.5	309.3	50.3	17.02	3.99	9.94
1992-93	437	1392	496	25.7	348.9	52.2	17.00	3.99	9.50
1994-95	502	1638	538	26.7	488.9	57.1	18.80	3.35	9.42
1995-96	540	2004	568	27.3	571.2	60.6	19.78	3.51	9.37
1996-97	475	2159	570	25.2	629.8	62.9	18.85	3.43	9.06
1997-98	465	2182	622	25.3	664.7	66.3	18.38	3.28	9.38
1998-99	507	2522	628	26.7	736.1	72.9	18.99	3.43	8.61
1999-00	529.64	2122.51	581.80	23.53	707.57	58.05	22.51	3.00	10.02
2000-01	538.26	2295.66	603.28	23.18	865.21	71.31	23.22	2.65	8.46
2001-02	530.29	2355.03	628.75	23.00	893.36	77.00	23.06	2.64	8.17
2002-03	587.93	2409.41	664.02	23.43	924.02	79.87	25.09	2.61	8.31
2003-04	589.49	2429.13	630.67	24.72	925.15	77.79	23.85	2.63	8.11
2004-05	654.19	3159.90	838.38	27.18	1128.99	99.25	24.07	2.80	8.45
2005-06	700.66	3120.61	803.17	28.28	1182.52	119.13	24.78	2.64	6.74
2006-07	725.26	3196.12	810.02	29.17	1202.72	107.29	24.86	2.66	7.55
2007-08	785.68	3197.18	903.87	31.30	1304.97	138.63	25.10	2.45	6.52
2008-09	790.12	3245.14	957.04	32.17	1374.55	146.79	24.56	2.36	6.52
2009-10	773.323	3336.65	964.90	32.91	1425.14	150.61	23.5	2.34	6.41
2010-11	719.206	3505.287	1009.981	336.70	15491.49	1736.69	21.36	2.26	5.82
2011-12	758.963	3418.147	1084.594	340.45	14983.86	1772.16	22.23	2.28	6.12
2012-13	934.342	3242.440	1035.736	353.22	15236.09	1705.69	26.45	2.13	6.07
2013-14	876.803	3278.838	1083.535	360.34	15367.91	1710.41	24.33	2.10	6.33
2014-15	962.039	3235.184	1106.705	365.66	15497.11	1671.75	26.30	2.08	6.62
2015-16	1194.177	2954.949	1164.603	369.79	14170.08	173179	32.29	2.08	6.72
2016-17	1063.486	3079.001	1187.823	371.75	13989.60	1764.78	28.60	2.20	6.73
2017-18	1072.539	2981.646	1220.879	375.38	13558.52	1814.69	28.57	2.19	6.72
2018-19	1076.141	2994.466	1248.616	376.34	13575.32	1871.88	28.59	2.21	6.67
2019-20	1084.245	3001.120	1269.661	370.07	13987.06	1999.14	29.30	2.15	6.35

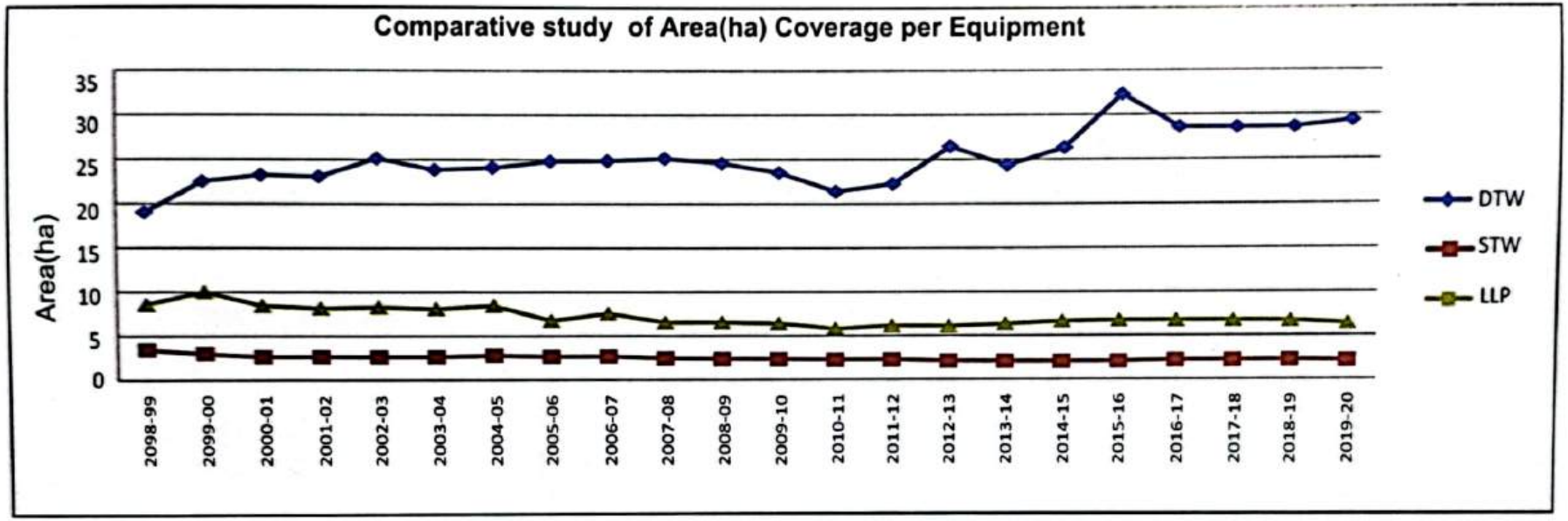

Figure 35: Area Coverage per Irrigation Equipment in Last Twenty Two Rabi Seasons (1998 to 2020)

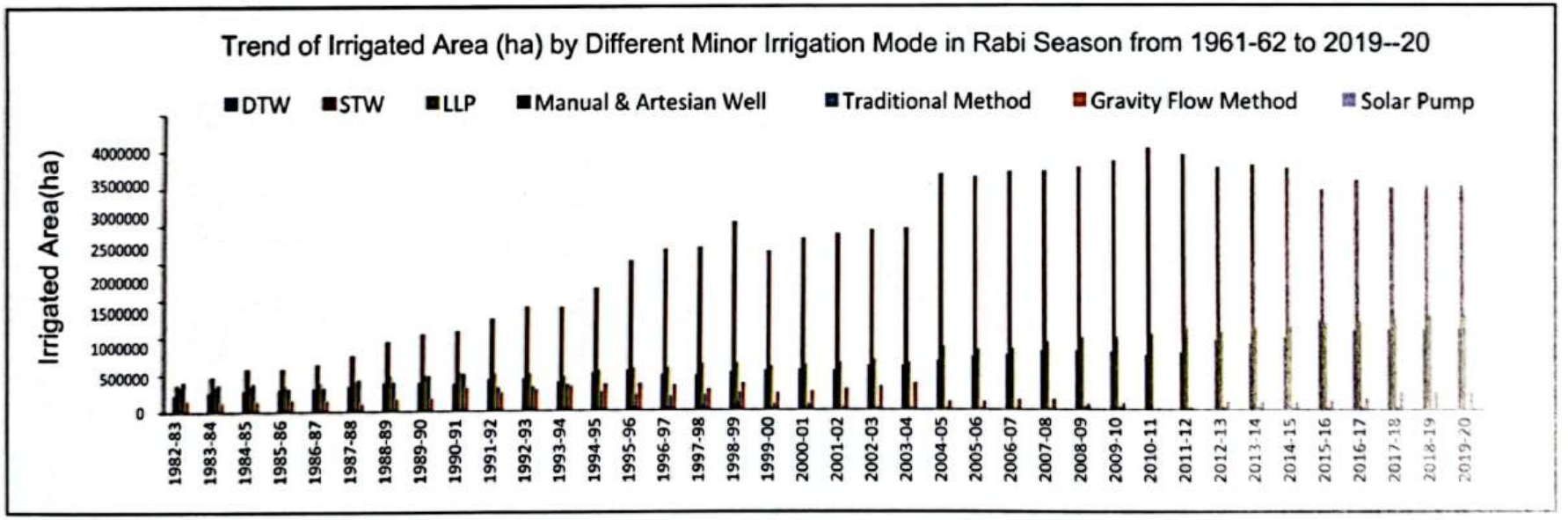

Figure 36: Trend of Irrigated Area (ha) during Rabi Season 1982-83 to 2019-20

POWER SOURCE IN IRRIGATION EQUIPMENT

During **2019-20 Rabi** season huge number of power operated irrigation equipment are used all over the country. Power operated equipment's are operated either by diesel or electricity. Recently solar energy is used for generating electricity to operate the small capacity irrigation pumps. Survey has been made to determine number of diesel or electricity operated various types of equipment's used all over the country. Different modes of irrigation equipment on the basis of Power Source are shown in the **Table-11** and graphical presentation in **Figure-37.**

Table 11: Division Wise Distribution of Irrigation Equipment on the basis of Power Source

Division	Electric		Diesel		Total	
	Number	Area (ha)	Number	Area (ha)	Number	Area (ha)
Dhaka	59672	295020	144663	367480	204340	662512
Mymensingh	53578	302722	119308	275963	172894	578701
Rajshahi	83354	749417	243138	472038	326710	1221885
Rangpur	102822	428857	307003	600280	409840	1029202
Chittagong	31236	272557	83063	314144	114309	586726
Khulna	34984	216514	280494	544593	315485	761121
Sylhet	7883	62201	60293	287279	68181	349492
Barisal	2492	23829	24889	156656	27385	180494
Total	**376021**	**2351117**	**1262851**	**3018433**	**1639144**	**5370133**

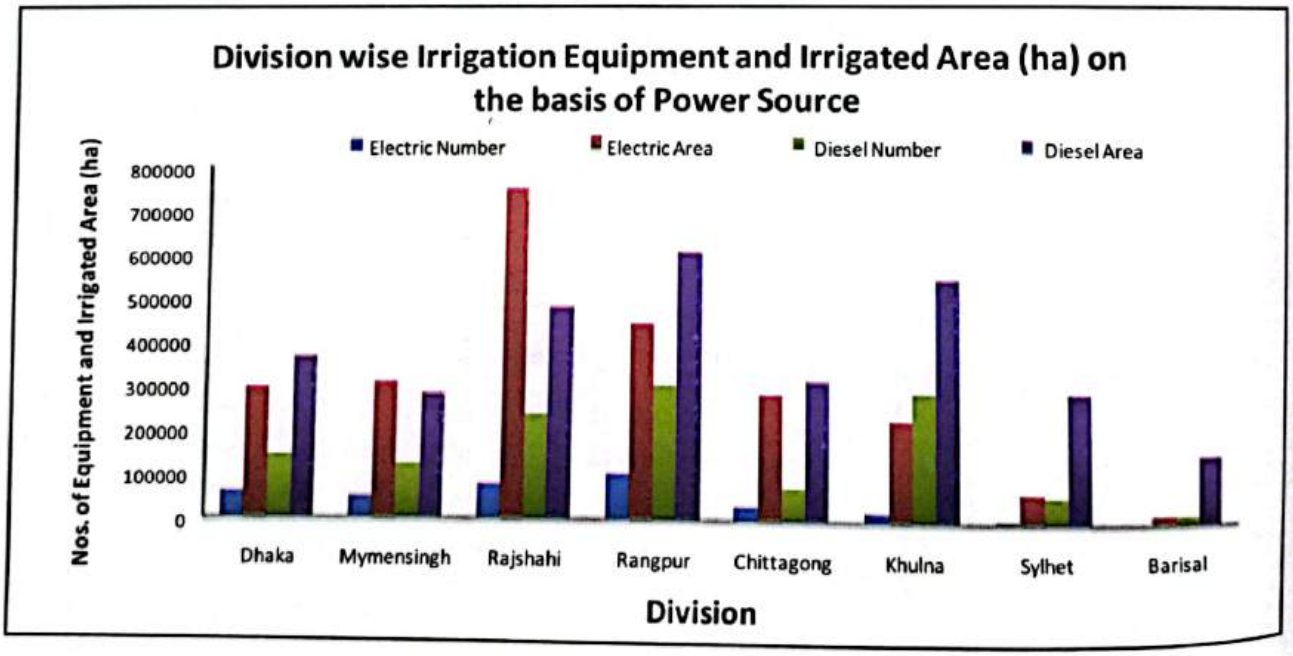

Figure 37: Bar Diagram showing Number of Electrically and Diesel Operated Different types of Equipment's and Irrigated Area (ha) during Rabi Season 2019-20

GIS MAP OF IRRIGATION SURVEY

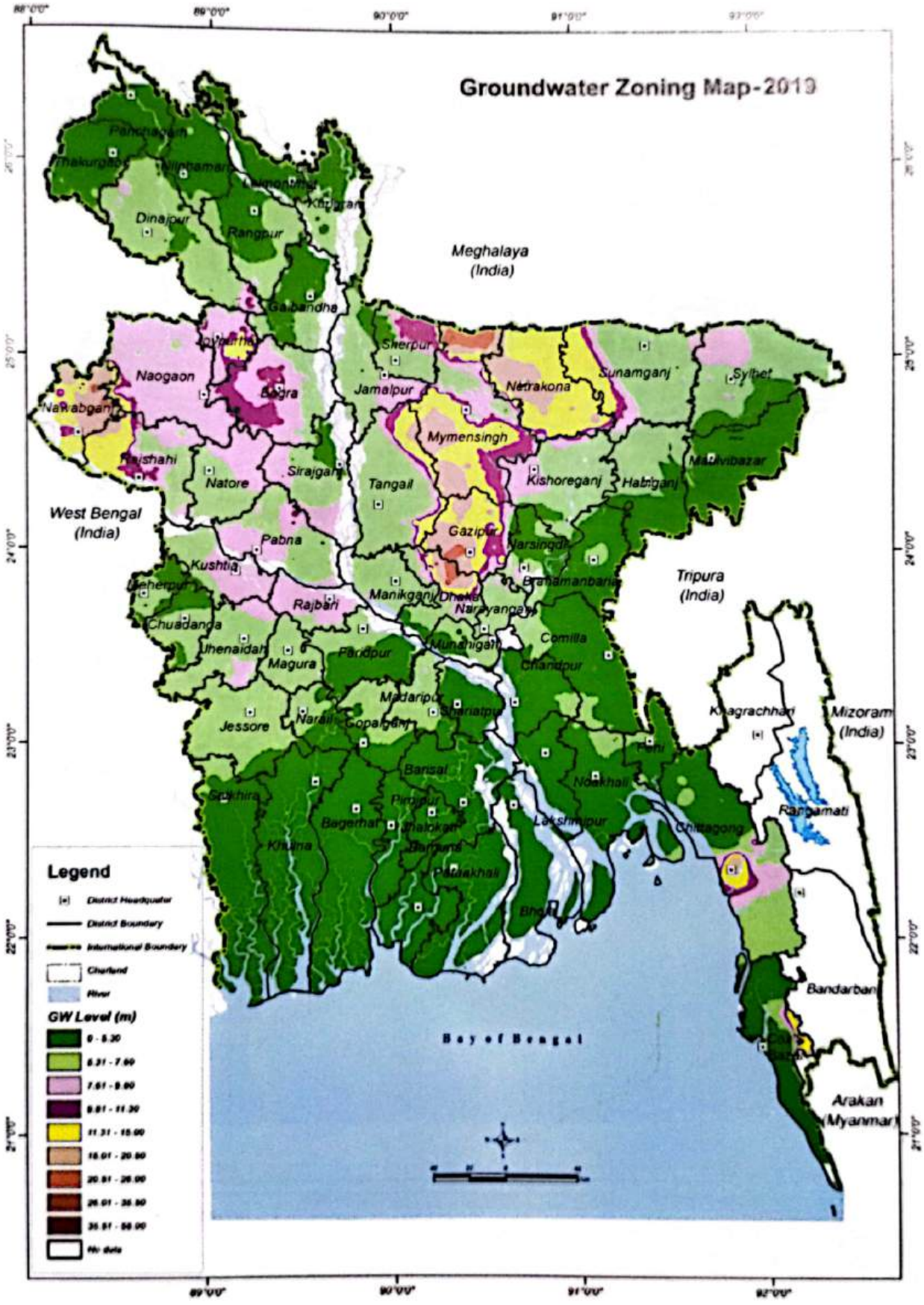

Figure 38: Groundwater Zoning Map 2019

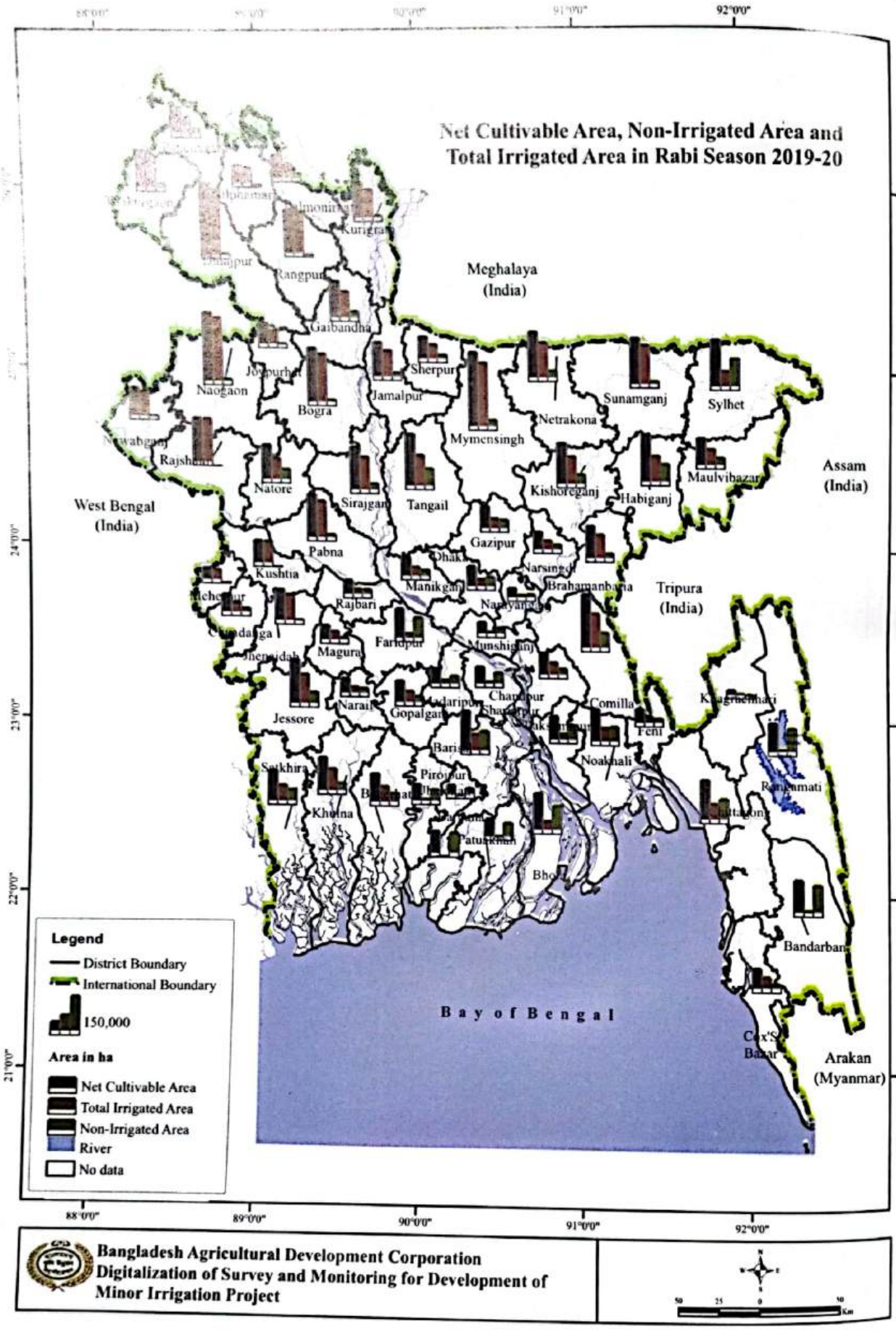

Figure 39: Net Cultivable Area

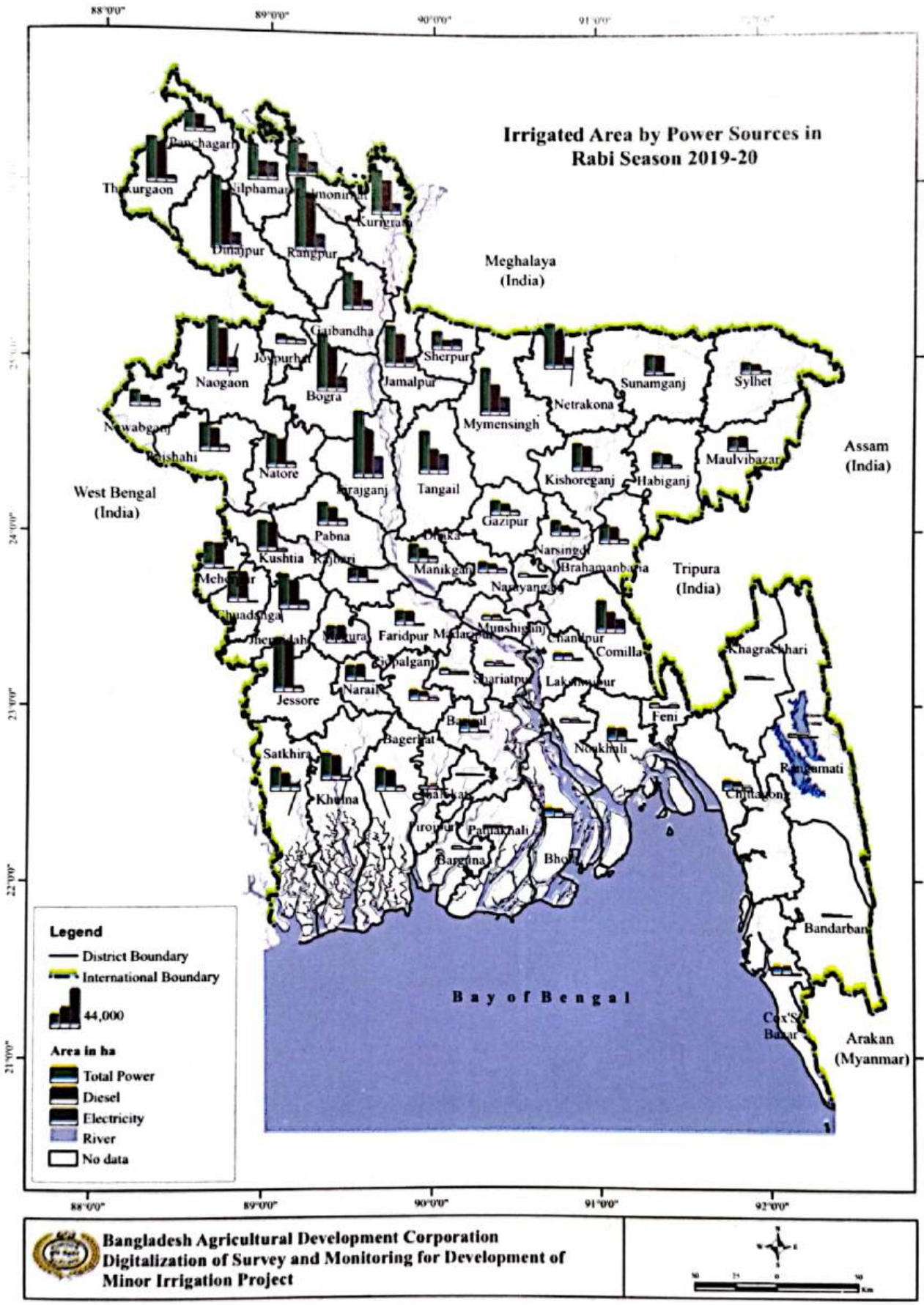

Figure 40: Irrigated Area By Power Source.

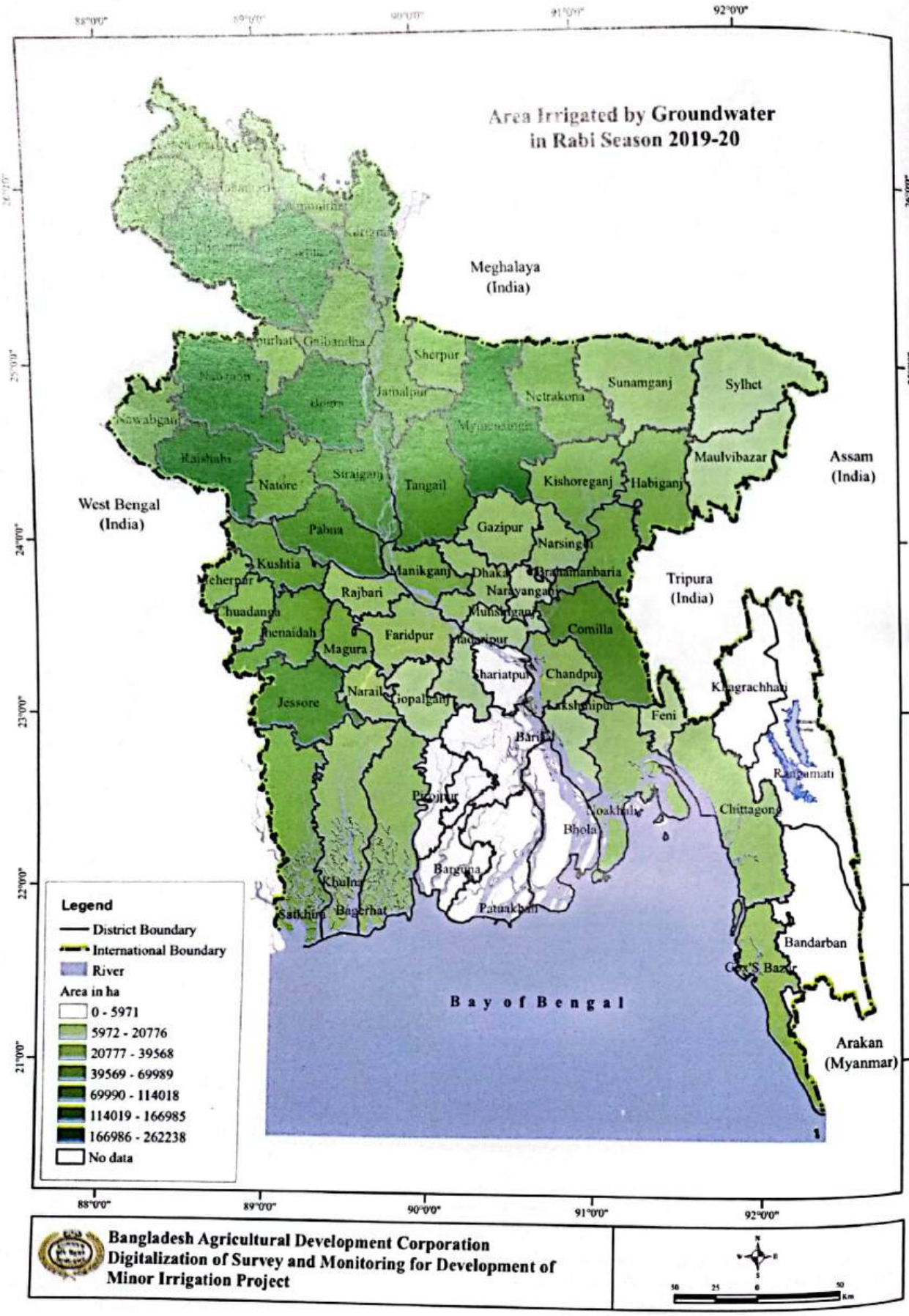

Figure 41: Area Irrigated By Groundwater.

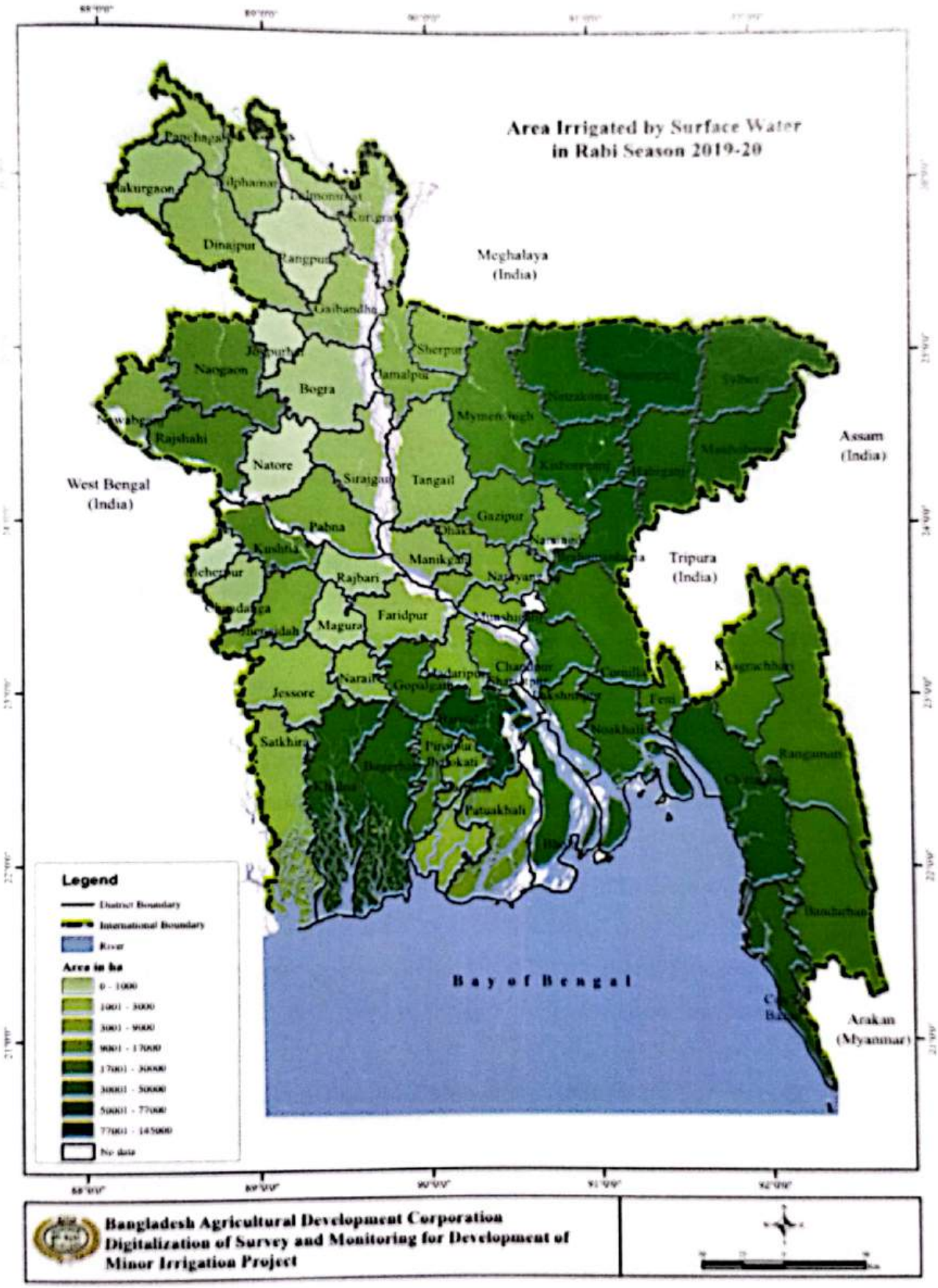

Figure 42: Area Irrigated By Surface water.

Study on Survey of Minor Irrigation Equipment, Area, Costing, Preparation of Data Base and Development of Software

BADC has been implementing survey and monitoring activities such as irrigation equipment, irrigated area, irrigation cost and crop production cost, source of power, pump capacity, benefitted farmers etc. in all over the country since 1999. The Survey was conducted through appointing enumerator and field employees of BADC, BMDA and DAE. On the basis of these collected data Annual Survey Report has been published during last two decades to provide technical assistance and suggestions to the government and policy makers for formulation of Minor Irrigation Policy.

At the era of Digitalization in processing and preserving or storing the above collected information's/data, it is essential to create a database and to develop a web base software for survey and monitoring of Minor Irrigation activities, cardinal information's are needed like Table, Graphs, Maps, GIS database etc. so it is important to prepare GIS database including Maps and 3D geometrical Maps for surface water and ground water too.

Digitalization of Survey & Monitoring for Development of Minor Irrigation Project under BADC has been taken a program named **Irrigation Equipment Survey & Monitoring System** to establish a database on about 16 lac irrigation equipment's through questionnaire incorporated with 49 columns needful information's and also develop a web base software to meet necessary queries about irrigation. Under this program BADC appointed CEGIS a trusty board of Water Resources Ministry as a consulting firm to accomplish the above assignment.

They are working in the field level to collect data and required information's about minor irrigation. Hope irrigation equipment's information's database and its web base software development will be completed within shortly. Some features of web base applications of the Study are shown in Figure 43 to 46 .

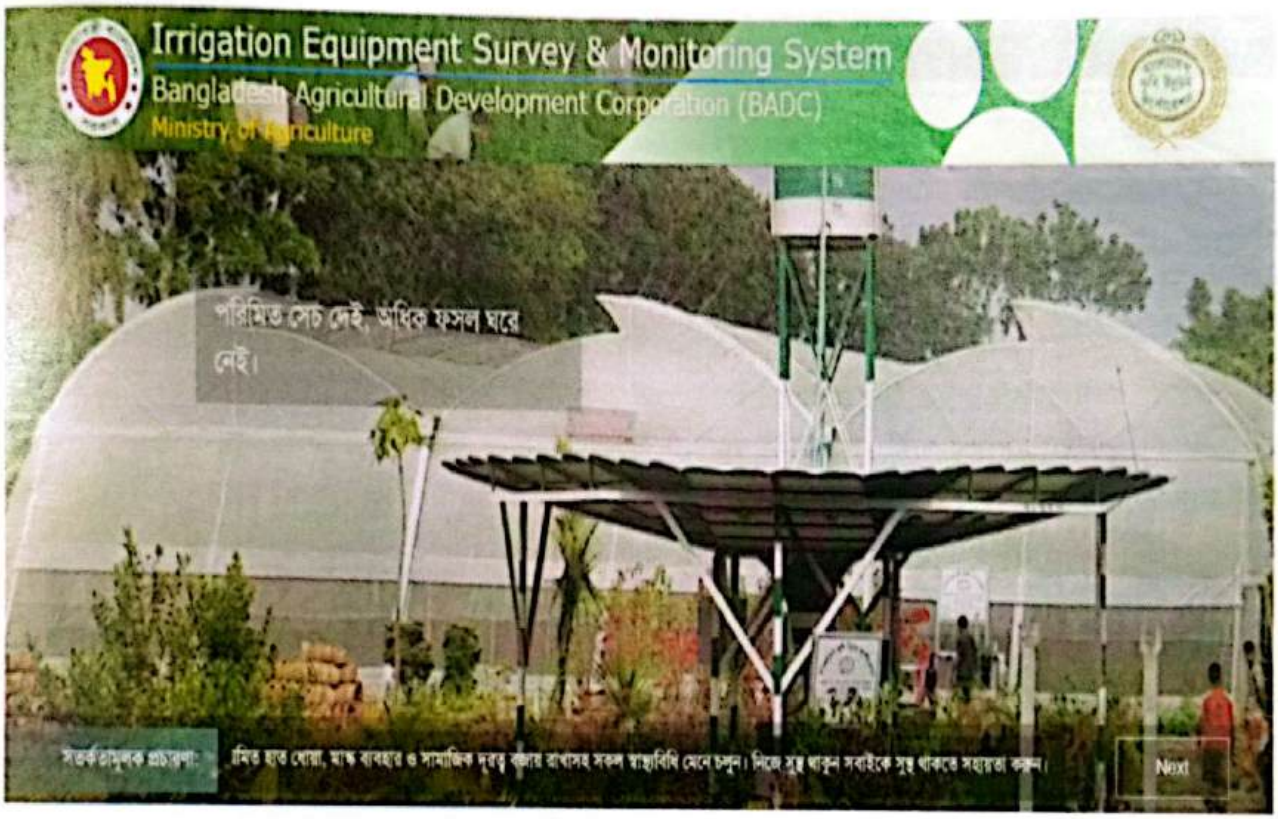

Figure 43: Features of Web Applications

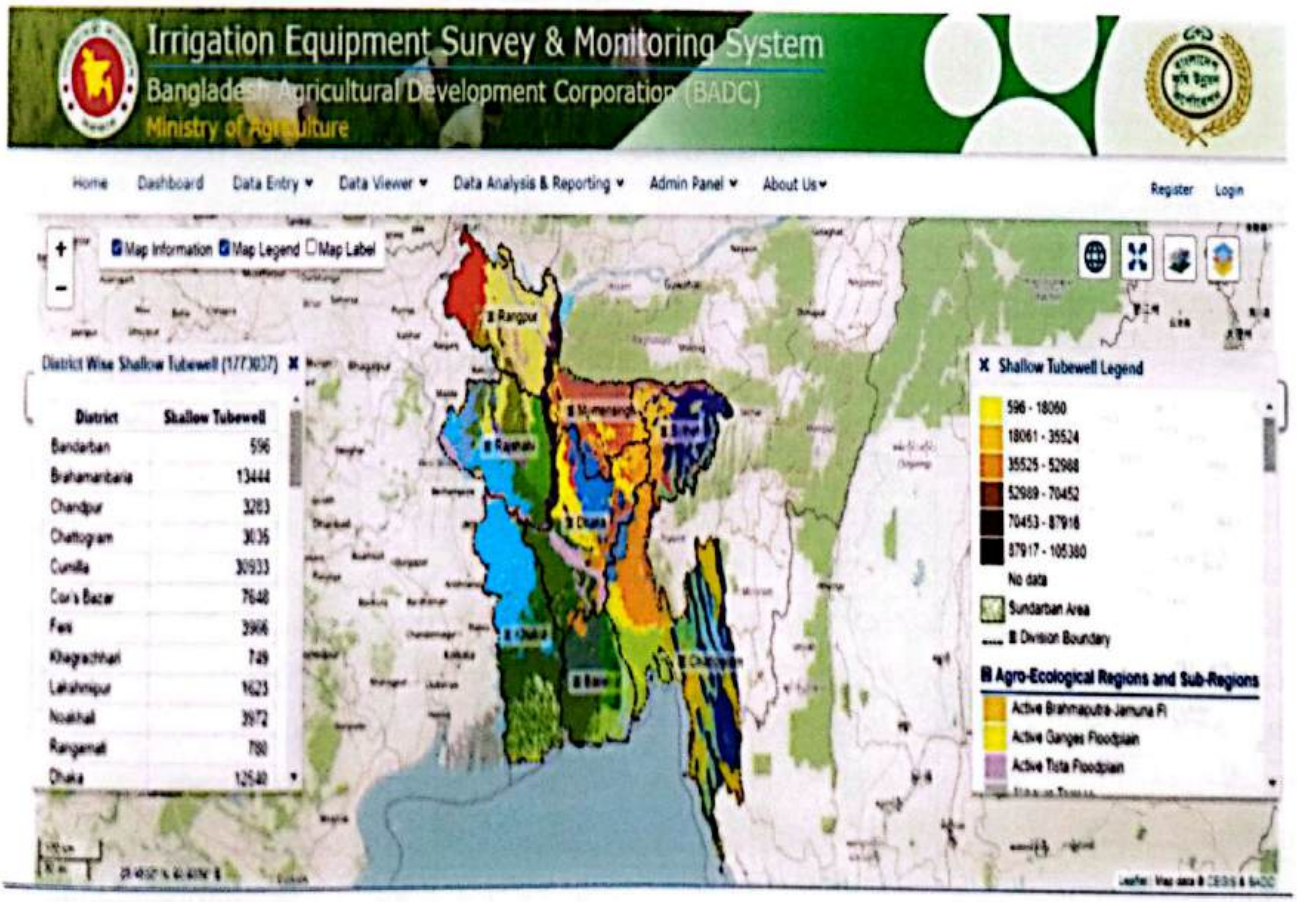

Figure 44: STW Irrigated Areas in Irrigation Equipment Survey and Monitoring System

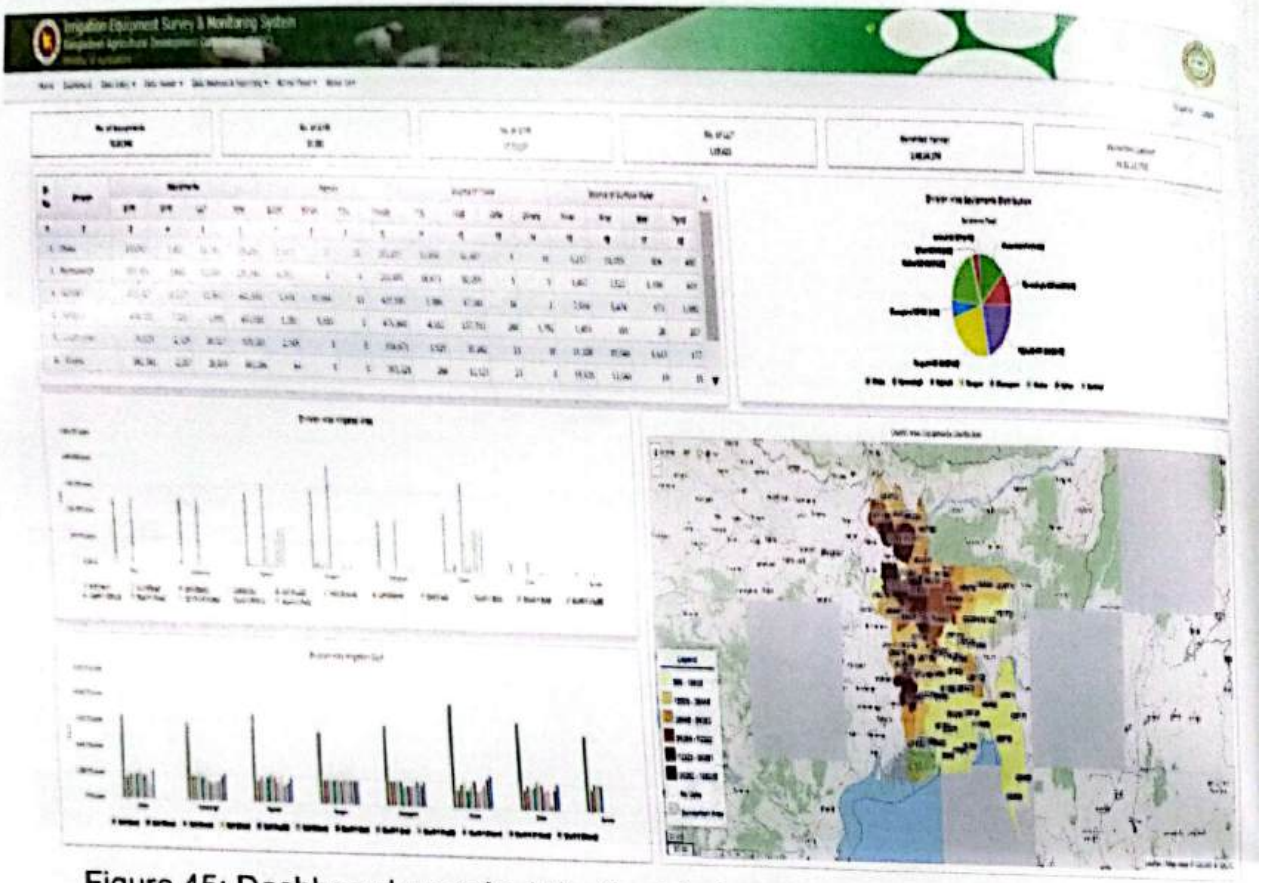

Figure 45: Dashboard page in Irrigation Equipment Survey and Monitoring System

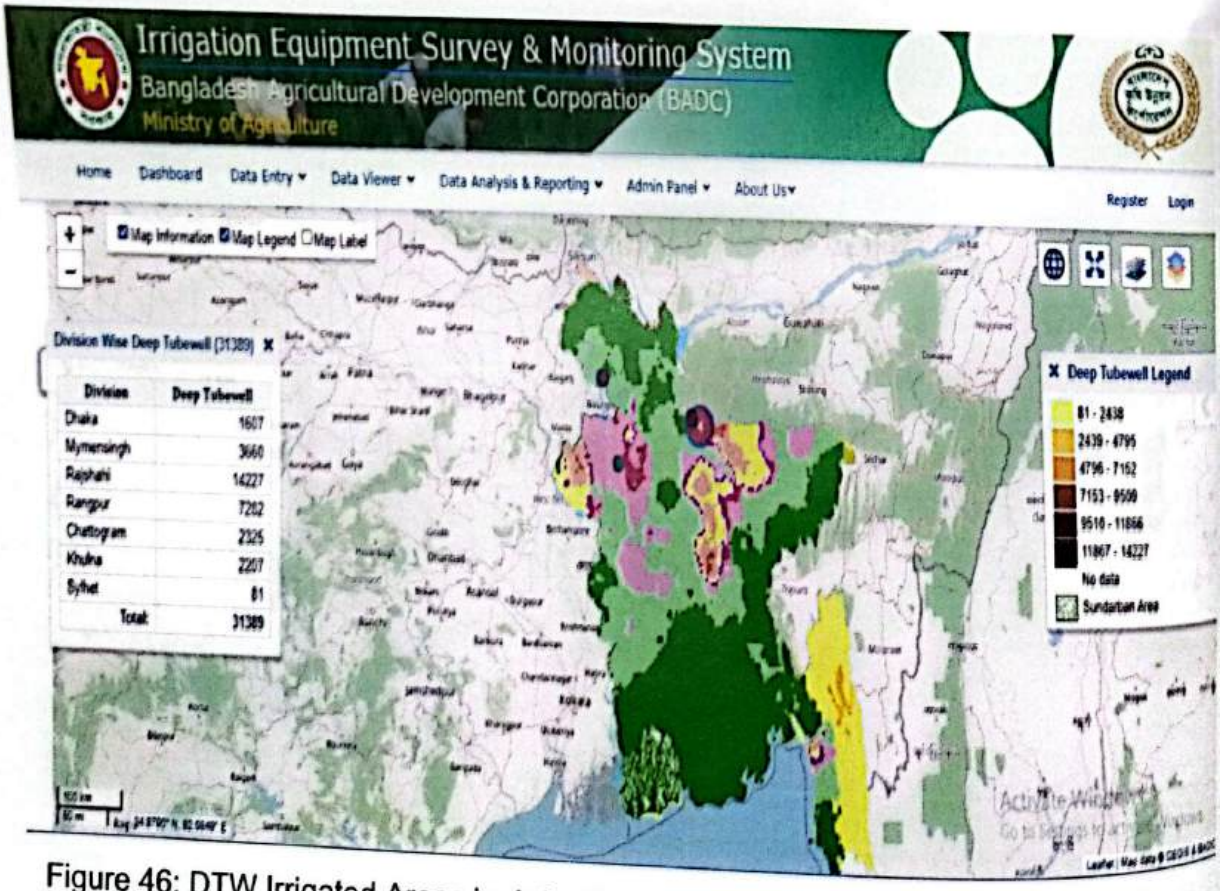

Figure 46: DTW Irrigated Areas in Irrigation Equipment Survey and Monitoring System

Groundwater recharge and withdrawal situation for irrigation purpose

Bangladesh is a deltaic country located within the floodplains of the three great rivers, the Brahmaputra, Ganges, and Meghna and their tributaries. The three major river networks often called the GBM river system drain to the Bay of Bengal through Bangladesh. The country is under tropical climate with heavy monsoon rain between the months of May- September. About 80% of the total annual rainfall occurs in between July- September. The average rainfall is 200 cm. The temperature rises from the month of February to the month of May and varies 5^0C - 42^0C. The overall climate is suitable for production of crops including high yielding variety round the year.

Groundwater is the water beneath surface of the earth which fills the pore spaces of the alluvium, soil or rock formation with water and flowing by gravity below the ground surface. Aquifer is a saturated permeable geologic formation which can yield significant quantities of water to wells and springs. Groundwater reservoir is other terms often used in place of the word aquifer. Sands constitute an aquifer which contains fresh water. Groundwater is the most vital natural resources of Bangladesh which contributes to about **72.82%** of the total irrigated area. The top of the water level in these reservoir is water table which liable to variations throughout the year. The static water level is the level to which water rises and water stands at rest in a well, when the well is not being pumped. When the well is pumped, the removal of water from the well (discharge) causes a drop in head (drawdown) in the well and water flows from the aquifer to the well and cone of depression expands until the amount of water removed from the well is balanced by the amount of water draining from the aquifer.

The recharge is the resultant of the balances of flow in the unsaturated zone for wet periods i.e. any addition to the groundwater reservoir by percolation through the land surface. Groundwater recharging in Bangladesh is occurred by the monsoon rainfall, flow from the rivers & canals, lateral groundwater movement and irrigation return. Groundwater level rises during wet periods by recharging and reached at minimum depth below the ground surface. With the cessation of recharge, the groundwater depletion begins by rapid drainage of surface water, response of evapotranspiration and withdrawal of groundwater for irrigation in dry season. The level reached at maximum depth (drawdown) in the dry season by the groundwater losses.

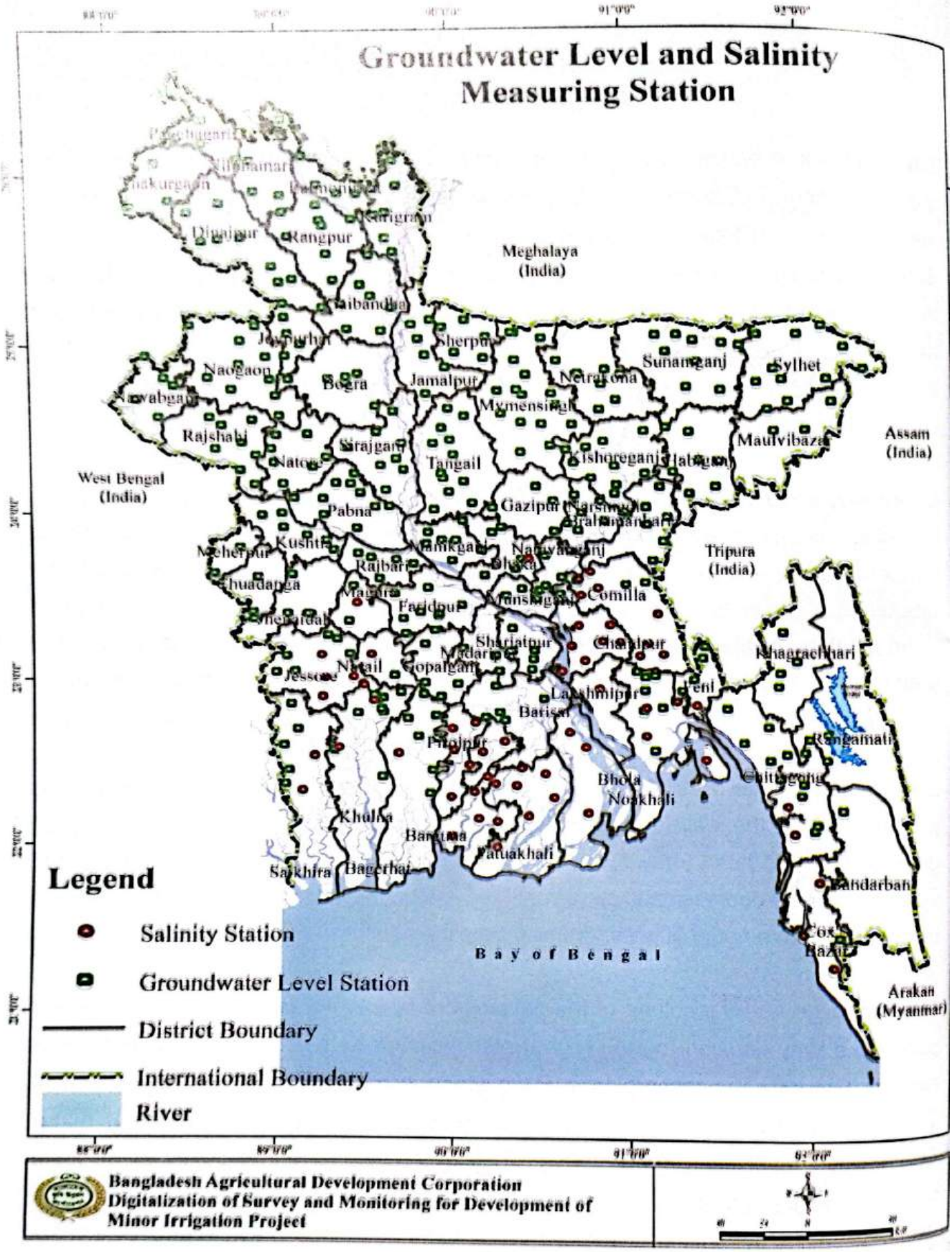

Figure 47: Groundwater Level and Salinity Measuring Station

Hydrograph refers to a graph showing the groundwater levels over time in a particular year. The data recorded in AWLR's from 2006-2020 are used for preparing the hydrographs. In this report, representative **4 regional** hydrographs for **15 years** are incorporated. The hydrographs have reflected the recharging of groundwater level and declining level (losses of groundwater) i.e. drawdown due to withdrawal groundwater in the dry seasons for irrigation for the years 2006-2020. It is observed that the maximum drawdown occurred at Gazipur Sadar in 2017 (37.38m). Next Consequence 3 Irrigation Season groundwater level raises and current season was 27.43m.

From the hydrographs it is depicted that the Gazipur Upazila is more critical for utilization of groundwater both for irrigation, industrial and domestic purposes. Other Upazilas are quite feasible for withdrawal of groundwater for irrigation.

Groundwater Table Hydrographs

Year	Upazila/District	No. of DTW	No. of STW	Irrigated Area (ha) for *Rabi* crop	Maximum Depletion Groundwater Level (m) (Jan-March)
2005-06	Saturia, Manikganj	43	3658	6782	6.05
2006-07		45	2762	6212	6.33
2007-08		44	3578	6466	6.12
2008-09		45	4216	9803	5.97
2009-10		47	4378	7554	6.69
2010-11		44	5047	11509	5.77
2011-12		44	4980	11524	6.23
2012-13		41	4477	5975	5.73
2013-14		38	3160	7272	5.77
2014-15		43	4253	5416	5.67
2015-16		43	4253	5416	5.62
2016-17		40	3459	5231	5.56
2017-18		40	3294	6242	5.54
2018-19		40	3316	6505	6.18
2019-20		42	2390	6520	6.11
2005-06	Fulbaria, Mymensingh	579	1773	14874	13.29
2006-07		587	1300	14730	13.14
2007-08		632	1844	21213	11.48
2008-09		279	2336	11196	14.26
2009-10		666	13973	47611	14.07
2010-11		609	2280	18640	12.41
2011-12		641	2386	21466	10.06
2012-13		625	2408	20151	12.58
2013-14		589	1798	20033	14.21
2014-15		641	2447	26304	14.39
2015-16		626	2447	26397	14.82
2016-17		625	2452	26345	15.04
2017-18		628	2542	24067	15.71
2018-19		595	2694	34467	12.25
2019-20		597	2720	34650	16.89
2005-06	Modhupur, Tangail	66	8234	27233	7.97
2006-07		50	4060	14015	8.92
2007-08		54	4128	11577	5.56
2008-09		93	4535	11042	6.19
2009-10		52	4982	10820	5.87
2010-11		87	6203	14596	5.98
2011-12		57	6297	14381	5.85

Year	Upazila/District	No. of DTW	No. of STW	Irrigated Area (ha) for *Rabi* crop	Maximum Depletion Groundwater Level (m) (Jan-March)
2012-13	Modhupur, Tangail	57	6297	12070	5.51
2013-14		51	4853	13955	5.97
2014-15		57	5657	14110	5.87
2015-16		68	5680	12190	6.18
2016-17		68	5680	9117	5.86
2017-18		78	5641	9788	6.95
2018-19		82	5197	9416	6.52
2019-20		83	5220	9530	5.47
2005-06	Savar Dhaka	145	542	6389	10.00
2006-07		133	475	6225	9.92
2007-08		146	495	4578	8.83
2008-09		92	453	2919	10.14
2009-10		128	490	6362	10.21
2010-11		125	555	4304	10.52
2011-12		112	485	7536	11.64
2012-13		105	436	4664	11.72
2013-14		98	425	3608	12.70
2014-15		99	361	5312	12.88
2015-16		99	361	6412	13.14
2016-17		91	462	5595	13.02
2017-18		77	651	5493	12.10
2018-19		61	661	4286	14.23
2019-20		62	1161	4590	14.85
2005-06	Sadar, Gazipur	181	745	5837	18.36
2006-07		162	638	5056	19.93
2007-08		143	654	4732	20.57
2008-09		192	866	8407	23.17
2009-10		123	897	5217	24.10
2010-11		147	1028	5911	24.93
2011-12		130	1074	3659	29.75
2012-13		98	1181	3816	30.00
2013-14		76	1080	3198	31.78
2014-15		76	647	2060	32.02
2015-16		60	489	2594	33.72
2016-17		60	1017	4271	37.38
2017-18		61	994	3299	32.22
2018-19		62	1033	3303	28.42
2019-20		63	1333	3410	27.43

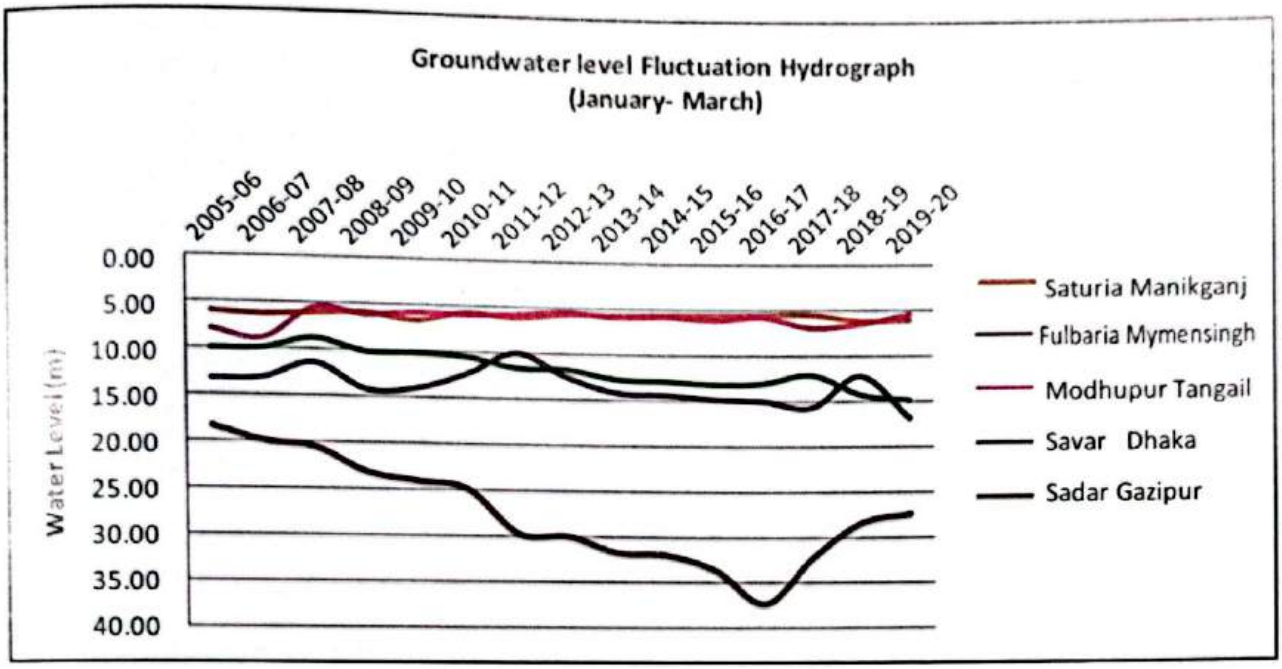

Figure 48: Changes in the depth of groundwater table (Jan-Mar) over time

The above figure 48 prepared by the maximum depth of groundwater level over the last 15 years (2006-2020) and it is indicating the fluctuation of groundwater level in the north central region of Bangladesh. The hydrograph implies that in the dry period (January-March), Gazipur sadar groundwater level found 27.43m in 2020 which is 0.99m raises than previous year (28.42m) and in Fulbaria of Mymensingh maximum depth is 16.89m and in Savar of Dhaka groundwater level found 14.85m in 2020 which is 0.62m declined than previous year (14.23m).

Groundwater Table Hydrographs

Year	Upazila/ District	No. of DTW	No. of STW	Irrigated Area (ha) for *Rabi* crop	Maximum Depletion Groundwater Level (m) (Jan-March)
2005-06	Mithapukur Rangpur	168	8200	24360	3.37
2006-07		134	10456	25850	3.30
2007-08		148	10836	34603	3.82
2008-09		149	11720	28803	3.91
2009-10		140	12800	30925	3.29
2010-11		120	18014	45043	3.13
2011-12		224	24271	45113	3.67
2012-13		209	19041	36842	3.84
2013-14		235	7398	20255	3.95
2014-15		256	15859	41846	4.01
2015-16		267	14690	44287	4.25
2016-17		263	14316	30849	3.50
2017-18		268	14320	34218	4.10
2018-19		318	29146	44202	4.44
2019-20		333	25255	45550	4.41

Year	Upazila/ District	No. of DTW	No. of STW	Irrigated Area (ha) for *Rabi* crop	Maximum Depletion Groundwater Level (m) (Jan-March)
2005-06	Fulbari, Dinajpur	128	5852	19012	6.19
2006-07		176	5678	17455	7.14
2007-08		214	5674	19361	6.63
2008-09		215	5408	11151	7.17
2009-10		216	5503	14227	6.79
2010-11		213	5515	19273	6.55
2011-12		211	1600	10028	5.97
2012-13		222	5542	17859	7.06
2013-14		226	5015	14922	6.84
2014-15		229	5052	16229	6.98
2015-16		229	5052	14712	6.92
2016-17		232	5599	13955	6.23
2017-18		237	5604	18888	6.89
2018-19		234	6950	23579	6.59
2019-20		240	7550	23989	7.87
2005-06	Kahaloo, Bogra	594	20775	29461	6.86
2006-07		561	632	26832	7.32
2007-08		214	615	7287	7.23
2008-09		574	5408	29822	7.60
2009-10		535	687	26836	7.81
2010-11		563	735	14376	8.01
2011-12		556	699	13692	7.99
2012-13		567	680	18110	8.14
2013-14		581	8628	40769	8.50
2014-15		585	570	20703	8.63
2015-16		617	570	24744	8.57
2016-17		572	670	25323	9.12
2017-18		574	675	23553	9.15
2018-19		632	575	25219	8.85
2019-20		614	635	25590	8.29
2005-06	Mohadevpur Naogoan	512	10713	25595	6.85
2006-07		510	10971	26080	7.01
2007-08		525	11554	33736	7.17
2008-09		549	11275	30750	7.45
2009-10		568	11542	32561	7.45
2010-11		570	14603	47398	6.84
2011-12		571	13540	47754	7.20
2012-13		572	15578	33635	6.60
2013-14		571	5580	26066	7.15
2014-15		571	15578	27610	7.38
2015-16		571	15578	29467	7.45
2016-17		571	3378	29090	8.45
2017-18		575	3385	29872	7.50
2018-19		571	6760	25735	7.40
2019-20		580	6810	25990	7.55
2005-06	Bagmara Rajshahi	444	4807	33452	8.95
2006-07		527	4593	36885	10.31
2007-08		643	5282	28607	9.89
2008-09		806	3829	36512	10.98
2009-10		673	3619	18489	9.85
2010-11		794	2572	18736	11.35
2011-12		602	3222	19419	11.20
2012-13		890	2052	48321	10.66
2013-14		904	596	26586	11.01
2014-15		869	3345	37313	11.13
2015-16		746	3345	46183	12.25
2016-17		854	1350	21285	13.45
2017-18		859	1355	24085	11.83
2018-19		860	3190	24230	11.93
2019-20		785	2550	22540	11.11

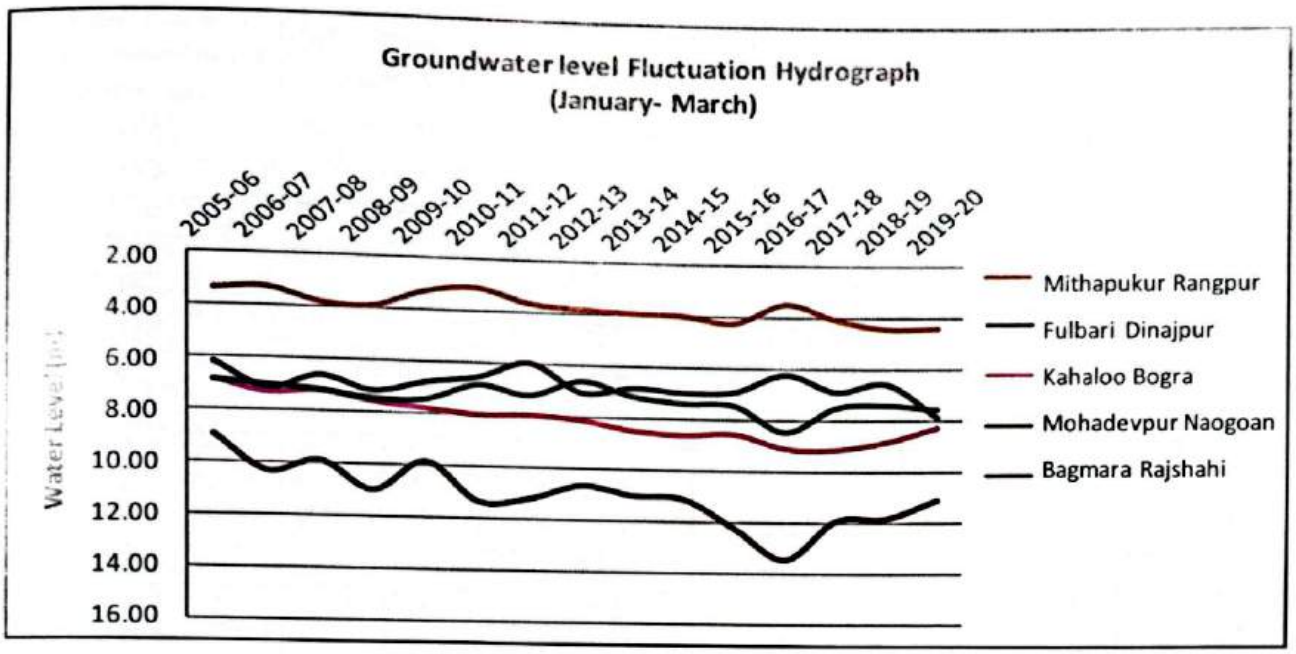

Figure 49: Changes in the depth of groundwater table (Jan-Mar) over time.

The above figure-49 prepared by the maximum depth of groundwater table over the last 15 years (2006-2020) is indicating the fluctuation of groundwater table in the north western region of Bangladesh. The hydrograph implies that in the dry period (January-March), Bagmara Rajshahi groundwater table declined and it was about 11.11m in 2020 which is 0.82m raises than in March/2019 (11.93m). The other Upazila's was within the capacity of the suction mode pump.

Groundwater Table Hydrographs

Year	Upazila/District	No. of DTW	No. of STW	Irrigated Area (ha) for *Rabi* crop	Maximum Depletion Groundwater Level (m) (Jan-March)
2005-06	Jhikorgacha, Jessore	270	7025	22409	7.13
2006-07		263	8205	18680	6.26
2007-08		277	7932	24064	5.50
2008-09		292	7863	21282	5.44
2009-10		275	8501	19513	5.35
2010-11		270	9407	28164	5.76
2011-12		183	8298	22282	5.74
2012-13		297	4932	15845	6.52
2013-14		297	9217	23134	5.37
2014-15		299	7967	16665	5.79
2015-16		303	8578	18251	5.85
2016-17		302	8226	19073	6.20
2017-18		310	8230	23426	6.66
2018-19		246	8240	24251	6.56
2019-20		241	8261	25520	6.14

Year	Upazila/District	No. of DTW	No. of STW	Irrigated Area (ha) for *Rabi* crop	Maximum Depletion Groundwater Level (m) (Jan-March)
2005-06	Sadar, Chuadanga	35	6603	12019	6.10
2006-07		36	6903	13503	6.09
2007-08		40	6683	13743	5.16
2008-09		42	6106	15720	5.90
2009-10		40	6575	16470	5.60
2010-11		36	7120	17596	6.32
2011-12		40	9638	21298	5.46
2012-13		37	8270	12564	6.21
2013-14		44	11475	13733	5.71
2014-15		40	6510	8488	6.02
2015-16		45	7030	13738	6.12
2016-17		38	11558	23633	6.22
2017-18		41	11573	25431	5.40
2018-19		36	13573	25731	5.35
2019-20		40	13825	26250	6.13
2005-06	Kalaroa, Sathkhira	447	2950	10925	6.52
2006-07		450	2526	11432	7.32
2007-08		450	3674	14255	7.23
2008-09		457	2650	17313	5.89
2009-10		460	2659	14001	5.32
2010-11		390	4208	19172	5.94
2011-12		190	4050	18241	5.09
2012-13		472	4048	16156	4.92
2013-14		476	4116	13967	5.22
2014-15		476	4116	13967	5.29
2015-16		483	1056	14699	5.14
2016-17		483	2057	17907	5.12
2017-18		483	2392	18383	5.22
2018-19		487	3392	19770	5.25
2019-20		478	3590	20110	6.75
2005-06	Sadar, Jhenaidah	131	11500	24073	5.89
2006-07		136	11902	23515	5.93
2007-08		137	13182	29038	4.56
2008-09		137	12645	24760	5.12
2009-10		133	12876	25460	5.27
2010-11		156	13342	39525	5.67
2011-12		169	10809	26128	5.00
2012-13		149	10034	17751	4.58
2013-14		150	18239	24614	4.90
2014-15		148	11368	19170	5.02
2015-16		148	6752	19545	4.98
2016-17		148	7990	21210	5.03
2017-18		156	8005	21533	5.04
2018-19		110	7400	21910	5.78
2019-20		96	9340	22855	5.85

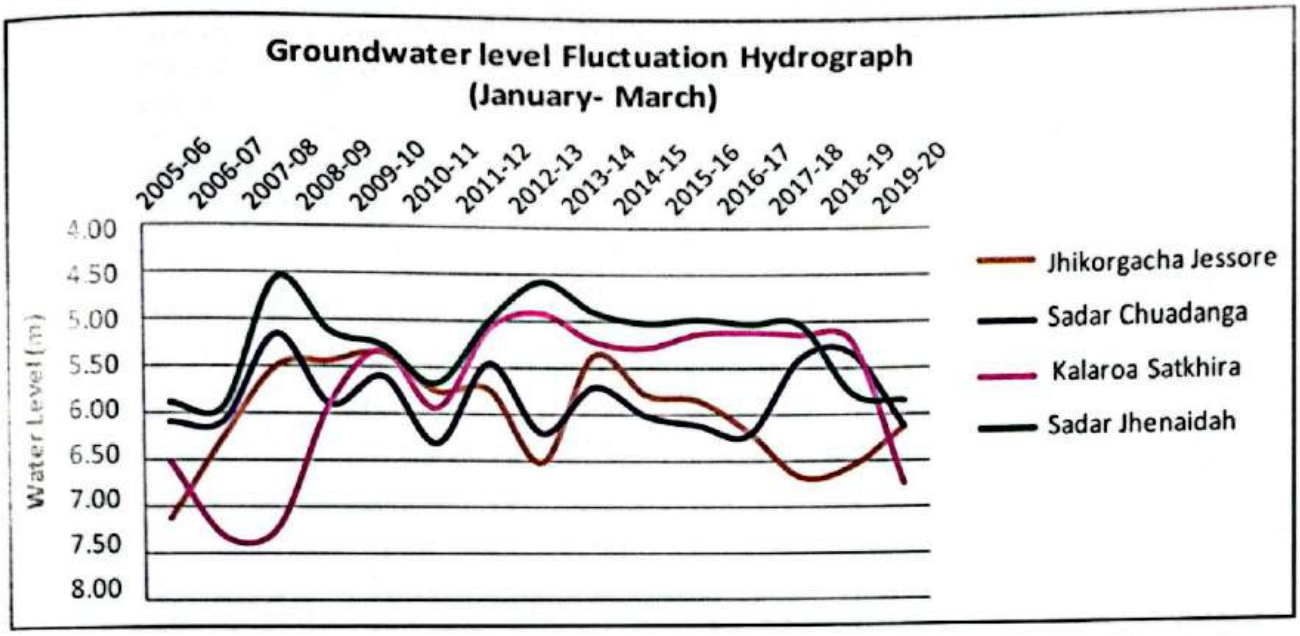

Figure 50: Changes in the depth of groundwater table (Jan-Mar) over time.

The above figure-50 prepared by the average depth of groundwater table over the last 15 years (2006-2020) is indicating the fluctuation of groundwater table in the South-Western region of Bangladesh. The hydrograph implies that in the dry period (January-March), all the upazila's water level was within the range of the suction lift pump.

Groundwater Table Hydrographs

Year	Upazila/District	No. of DTW	No. of STW	Irrigated Area (ha) for *boro* crop	Maximum Depletion Groundwater Level (m) (Jan-March)
2005-06	Chowdagram, Comilla	217	1162	10990	5.67
2006-07		214	1161	11110	5.85
2007-08		225	1147	11344	5.07
2008-09		226	1467	11645	5.63
2009-10		217	1357	10454	4.83
2010-11		213	1551	6276	4.88
2011-12		219	1634	8525	5.05
2012-13		176	1438	9185	5.13
2013-14		221	1395	8935	5.23
2014-15		221	1666	8410	5.12
2015-16		222	1600	13133	5.45
2016-17		220	1530	9225	6.03
2017-18		230	1535	13616	4.40
2018-19		158	1535	11616	3.85
2019-20		138	1345	10620	4.38
2005-06	Kachua, Chandpur	144	891	8310	4.56
2006-07		146	934	9544	4.02
2007-08		146	1104	8519	4.08
2008-09		146	1163	7904	3.04
2009-10		141	1252	9925	3.36
2010-11		140	1454	6005	3.09
2011-12		128	1525	7820	3.52
2012-13		136	1426	8075	3.16

Year	Upazila/District	No. of DTW	No. of STW	Irrigated Area (ha) for *boro* crop	Maximum Depletion Groundwater Level (m) (Jan-March)
2013-14	Kachua, Chandpur	63	1490	7565	3.47
2014-15		134	1426	9005	3.98
2015-16		135	1420	6780	3.96
2016-17		140	608	9787	4.04
2017-18		141	612	8095	5.41
2018-19		137	602	6219	5.50
2019-20		144	712	6520	4.82
2005-06	Sadar B.Baria	142	3000	13200	6.70
2006-07		142	3000	13500	6.00
2007-08		130	3207	14226	5.87
2008-09		144	4630	15145	6.37
2009-10		152	4626	18360	6.39
2010-11		105	1818	7091	5.76
2011-12		100	1879	7789	4.88
2012-13		98	1871	7770	5.57
2013-14		101	1858	11585	5.77
2014-15		102	1869	9560	4.98
2015-16		102	1869	8715	5.03
2016-17		101	1369	8579	4.55
2017-18		102	1373	9105	5.38
2018-19		54	1369	8305	5.52
2019-20		57	2359	8525	7.12

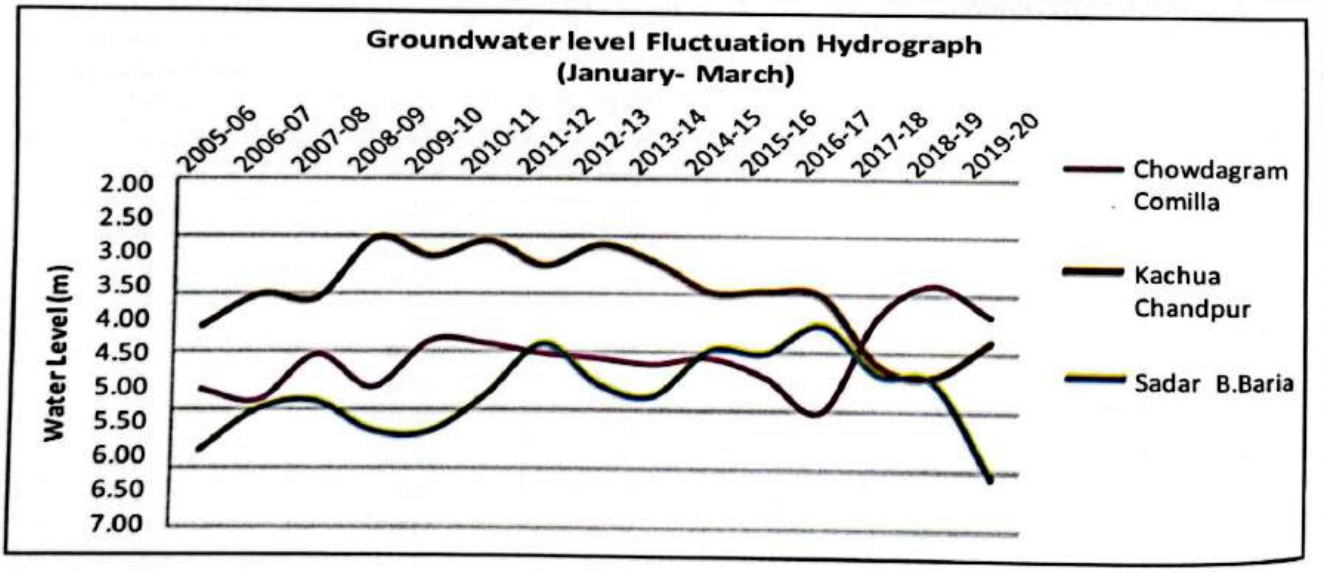

Figure 51: Changes in the depth of groundwater table (Jan-Mar) over time.

The figure-51 prepared by the maximum depth of groundwater table over the last 15 years (2006-2020) is indicating the fluctuation of groundwater table in the South-Eastern region of Bangladesh. The hydrograph implies that in the dry period (January-March), all the upazila's water level was within the range of the suction lift pump to tap the water for irrigation.

The Survey and Monitoring Project has been monitoring groundwater level fluctuation round the year from Automatic Water Level Recorders (AWLR) and selected tube wells in each upazila all over the country. For continuation of previous activities 400 numbers of observation wells for groundwater level fluctuation and 60 sets nested wells (each set contain 5 nos of well) for salinity intrusion monitoring has been constructed. In each observation well a data logger has been installed under the project "Digitalization of Survey and Monitoring for Development of Minor Irrigation". So, a unique network of groundwater level fluctuation and groundwater salinity intrusion monitoring system has been established throughout the country.

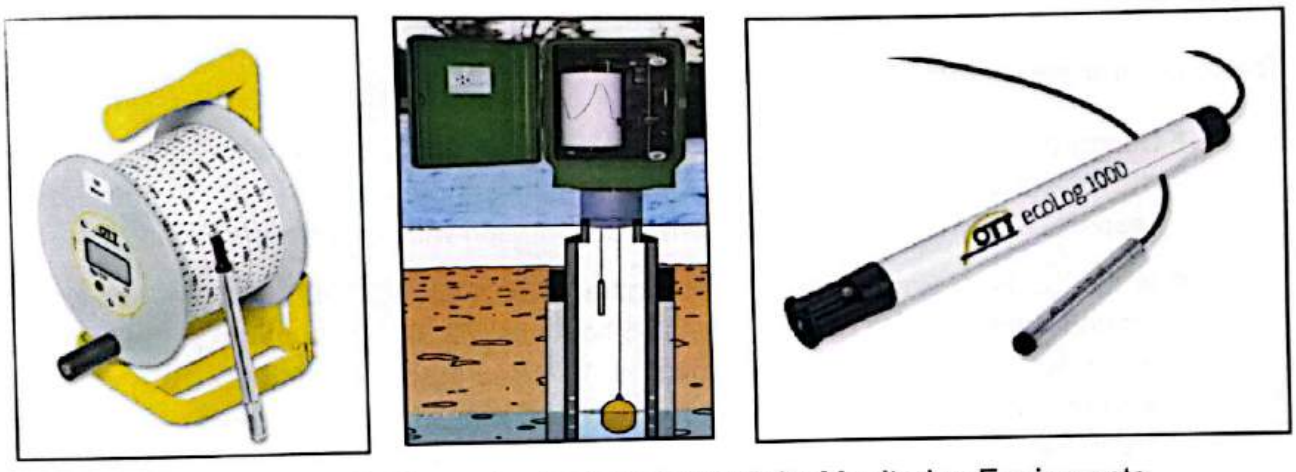

Figure 52: Groundwater Level & Salinity Monitoring Equipments

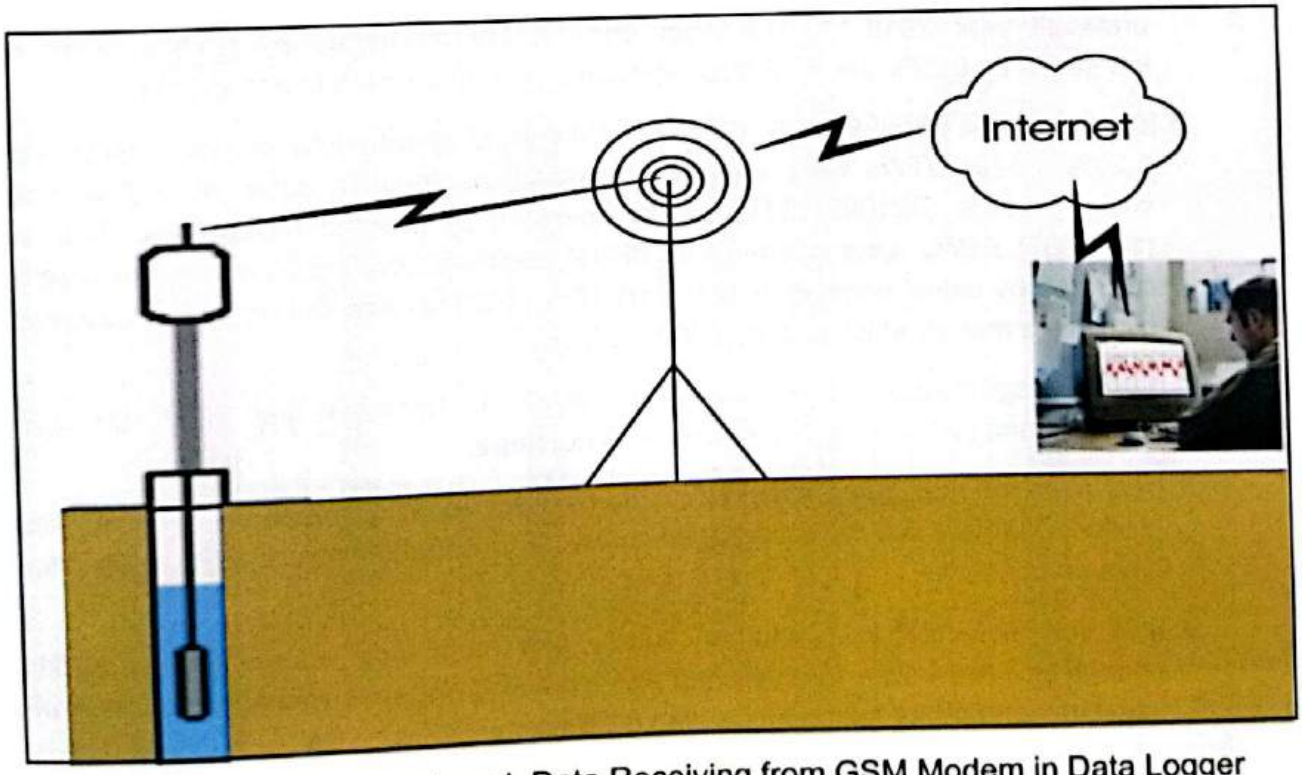

Figure 53: Groundwater Level Data Receiving from GSM Modem in Data Logger

FINDINGS OF THE SURVEY

The main objective of this survey was to find out the number of operated different irrigation equipment, area irrigated and beneficiaries. BADC, DAE and BMDA field staffs are collected the above irrigation equipment information's. We know that, the accurate area calculation was quite difficult, because there was no specific method to calculate the area. So the information's was collected from the statement of the equipment's owners and consultation with beneficiary farmers. It is mentioned that the irrigated area per equipment may vary from location to location as well as farmer to farmer.

The main findings of this survey report are:

- ★ During this irrigation season 2019-20 the operation of deep tube wells decreased by 1.67% but shallow tube wells and low lift pumps increased by 3.03 % and 6.80% respectively, which is very significant in comparison with the previous year.
- ★ In the 2019-20 Rabi season, total irrigated area was 5627598 hectares, of which groundwater irrigation covered 4098256 hectares, 72.82% of the total irrigated area; while surface water irrigation covered 1529342 hectares and 27.18% of total irrigated area. To comparison with the previous year which is indicates that using of groundwater in irrigation activities is discouraging significantly in boro season
- ★ The irrigated area during this Rabi season increased by 0.72% than that of the previous year 2018-19. The area under DTW increased by 0.75%, STW is increased by 0.22% and LLP also increased by 1.69% which is acceptable.
- ★ It is found that about 94.80% (35081) DTWs were operated by electric motors and 5.20% (1926) DTWs were operated by diesel engines. In case of shallow tube wells, 22.96% (321099) STWs were operated by electric motors and 77.04% (1077607) STWs were operated by diesel engines. Low Lift Pumps were mainly operated by diesel engines, which is 91.70% (183318) and the rest were operated by electric motors which is only 8.30% (16596).
- ★ The average irrigated area per DTW was 29.30 hectares, per STW was 2.15 hectares and per Low Lift Pump was 6.35 hectares.
- ★ The price of rice determines future investment to a considerable degree. The producer/farmers will be encouraged to invest in irrigation sector if the Boro price goes up unusually.
- ★ It is very essential to strengthen survey and monitoring activities by providing enough skill manpower for collecting and analyzing irrigation related data which will help Government for taking future plan & program.

Organization Wise Summary of Irrigation Equipment Used, Area Irrigated and Benefited Farmers Rabi Crops (Boro, Wheat, Potato, Maize, Onion and Vegetables) 2019-20

Type of Equipment	Name of organization	Operated by Electricity					Operated by Diesel			Total		
		Unit			Irrigated Area (ha)	Benefitted Farmers	Unit	Irrigated Area (ha)	Benefitted Farmers	Unit	Irrigated Area (ha)	Benefitted Farmers
		PDB	REB	TOTAL								
DTW	BADC	887	10159	11046	324153	1173598	942	21707	55850	11988	345860	1229448
	BMDA	963	14590	15553	511827	962380	0	0	0	15553	511827	962380
	Others	939	7543	8482	215379	812823	984	11179	100807	9466	226558	913630
	Total	2789	32292	35081	1051359	2948801	1926	32886	156657	37007	1084245	3105458
STW	BADC	10	135	145	725	2445	10	50	270	155	775	2715
	BMDA	0	0	0	0	0	0	0	0	0	0	0
	Others	36145	284809	320954	1030750	3447968	1077597	1969595	9397786	1398551	3000345	12845754
	Total	36155	284944	321099	1031475	3450413	1077607	1969645	9398056	1398706	3001120	12848469
LLP	BADC	231	2627	2858	64698	155772	5423	135789	159245	8281	200487	315017
	BMDA	28	491	519	13439	27034	0	0	0	519	13439	27034
	Others	2859	10360	13219	175622	543305	177895	880113	2645689	191114	1055735	3189994
	Total	3118	13478	16596	253759	726111	183318	1015902	2804934	199914	1269661	3531045
DTW +STW +LLP		42062	330714	372776	2336593	7125325	1262851	3018433	12359647	1635627	5355026	19484972
Manual & Artesian Well		0	0	0	0	0	0	0	0	0	7852	31256
Traditional Method		0	0	0	0	0	0	0	0	0	6825	22756
Gravity Flow		0	0	0	0	0	0	0	0	0	242356	195752
Solar Pump		0	0	0	0	0	0	0	0	3245	14524	42586
Dug Well		0	0	0	0	0	0	0	0	439	1015	1756
COUNTRY TOTAL		42062	330714	372776	2336593	7125325	1262851	3018433	12359647	1639311	5627598	19779079

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ANNEXURE-A

DIVISION WISE DATA ON IRRIGATION SURVEY-2019-20

DIVISION WISE IRRIGATION EQUIPMENT USED AND TOTAL AREA IRRIGATED

(IncludingSolar Pump, Dug Well, Gravity flow, Artisian Wells, Manual, & Traditional Methods)

Sl No.	Division	Total Area (ha)	Net Cultivable Area (ha)	Deep Tube Well				Shallow Tube Well				Low Lift Pump				Total Area irrigated by DTW, STW & LLP (8+12+16)	Solar Pump		Dug Well		Area irrigated by Manual Artisian well	Area irrigated by traditional Method (ha)	Area irrigated by gravity flow (ha)	Area irrigated by all Methods (ha) (17+19+21+22+23+24)
				Nos			Area irrigated (ha)	Nos			Area irrigated (ha)	Nos			Area irrigated (ha)		Nos	Area Irrigated (ha)	Nos	Area Irrigated (ha)				
				Elec	Diesel	Total		Elec	Diesel	Total		Elec	Diesel	Total										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	Dhaka	2048210	1337112	2370	194	2564	64901	53326	122983	176309	385128	3718	21486	25204	211346	661375	258	1125	12	20	1577	1698	15903	681698
2	Mymensingh	1066880	738029	3858	437	4295	148836	48007	108784	156791	324478	1640	10087	11727	105044	578358	73	327	15	45	344	591	19272	598937
3	Rajshahi	1572760	1387044	16505	587	17092	518267	64997	232596	297593	631765	1572	9955	11527	70120	1220152	280	1303	310	675	40	100	1500	1223770
4	Rangpur	1582100	1228786	8089	32	8121	216345	93504	305680	399184	790917	636	1291	1927	19210	1026472	593	2665	75	211	170	295	10278	1040091
5	Chittagong	3390860	1409906	1970	85	2055	63141	23558	43957	67515	217932	5473	39021	44494	304563	585636	235	1065	9	25	950	1721	73859	663256
6	Khulna	2228410	1147009	2092	566	2658	64919	31698	244402	276100	557240	833	35526	36359	137314	759473	361	1634	7	14	831	850	46026	808828
7	Sylhet	1263530	701230	196	25	221	7816	5925	19180	25105	93393	1654	41088	42742	247772	348981	108	499	7	15	3314	1106	73618	427533
8	Barisal	1322520	628162	1	0	1	20	84	25	109	267	1070	24864	25934	174292	174579	1337	5906	4	10	626	464	1900	183485
Country Total		14475270	8577278	35081	1926	37007	1084245	321099	1077607	1398706	3001120	16596	183318	199914	1269661	5355026	3245	14524	439	1015	7852	6825	242356	5627598

DIVISION WISE IRRIGATION EQUIPMENT USED AND TOTAL AREA IRRIGATED

Sl No.	Division	Deep Tube Well						Shallow Tube Well						Low Lift Pump						Solar Pump		DTW+STW+LLP+Solar Pump					
		Elec		Diesel		Total		Elec		Diesel		Total		Elec		Diesel		Total		Total		Elect. Total		Diesel Total		Grand Total	
		Nos	Area	Nos	Area	Nos	Area	Nos	Area	Nos	Area	Nos	Area	Nos	Area	Nos	Area	Nos	Area	Nos	Area	Elec. Nos	Elec. Area	Dies. Nos	Dies. Area	Total Nos	Total Area
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	Dhaka	2370	60844	194	4057	2564	64901	53326	175258	122983	209870	176309	385128	3718	57793	21486	153553	25204	211346	258	1125	59672	295020	144663	367480	204335	662500
2	Mymensingh	3858	138440	437	10396	4295	148836	48007	141221	108784	183257	156791	324478	1640	22734	10087	82310	11727	105044	73	327	53578	302722	119308	275963	172886	578685
3	Rajshahi	16505	513404	587	4863	17092	518267	64997	210677	232596	421088	297593	631765	1572	24033	9955	46087	11527	70120	280	1303	83354	749417	243138	472038	326492	1221455
4	Rangpur	8089	216077	32	268	8121	216345	93504	199220	305680	591697	399184	790917	636	10895	1291	8315	1927	19210	593	2665	102822	428857	307003	600280	409825	1029137
5	Chittagong	1970	61187	85	1954	2055	63141	23558	123132	43957	94800	67515	217932	5473	87173	39021	217390	44494	304563	235	1065	31236	272557	83063	314144	114299	586701
6	Khulna	2092	54168	566	10751	2658	64919	31698	149207	244402	408033	276100	557240	833	11505	35526	125809	36359	137314	361	1634	34984	216514	280494	544583	315478	761107
7	Sylhet	196	7219	25	597	221	7816	5925	32578	19180	60815	25105	93393	1654	21905	41088	225867	42742	247772	108	499	7883	62201	60293	287279	68176	349480
8	Barisal	1	20	0	0	1	20	84	182	25	85	109	267	1070	17721	24864	156571	25934	174292	1337	5906	2492	23829	24889	156656	27381	180485
Country Total		35081	1051359	1926	32886	37007	1084245	321099	1031475	1077607	1969645	1398706	3001120	16596	253759	183318	1015902	199914	1269661	3245	14524	376021	2351117	1262851	3018433	1638872	5369550

Division Wise Irrigation Equipment used, Area Irrigated and Benefitted Farmer

(Area in Hectare)

DTW

SL NO	DIVISION	Organization	DEEP TUBEWELL OPERATED BY ELECTRICITY AND DIESEL											
			DTW Operated by Electricity					DTW Operated by Diesel			Total			
			PDB	REB	Total	Area	Farmers	Unit	Area	Farmers	Unit	Area	Farmers
1	Dhaka	BADC	93	1360	1453	36122	167494	41	1251	4535	1494	37373	172029
		Others	280	637	917	24722	123303	153	2806	9024	1070	27528	132327
		Total	**373**	**1997**	**2370**	**60844**	**290797**	**194**	**4057**	**13559**	**2564**	**64901**	**304356**
2	Mymensingh	BADC	359	2843	3202	120609	421979	332	8110	18563	3534	128719	440542
		Others	233	423	656	17831	87279	105	2286	23698	761	20117	110977
		Total	**592**	**3266**	**3858**	**138440**	**509258**	**437**	**10396**	**42261**	**4295**	**148836**	**551519**
3	Rajshahi	BADC	175	2125	2300	68884	238041	0	0	0	2300	68884	238041
		BMDA	571	9341	9912	342696	709476	0	0	0	9912	342696	709476
		Others	311	3982	4293	101824	357573	587	4863	59179	4880	106687	416752
		Total	**1057**	**15448**	**16505**	**513404**	**1305090**	**587**	**4863**	**59179**	**17092**	**518267**	**1364269**
4	Rangpur	BADC	78	580	658	15362	43580	3	50	210	661	15412	43790
		BMDA	392	5249	5641	169131	252904	0	0	0	5641	169131	252904
		Others	48	1742	1790	31584	97683	29	218	1873	1819	31802	99556
		Total	**518**	**7571**	**8089**	**216077**	**394167**	**32**	**268**	**2083**	**8121**	**216345**	**396250**
5	Chittagong	BADC	117	1337	1454	35531	170590	55	1729	7105	1509	37260	177695
		Others	38	478	516	25656	92750	30	225	1792	546	25881	94542
		Total	**155**	**1815**	**1970**	**61187**	**263340**	**85**	**1954**	**8897**	**2055**	**63141**	**272237**
6	Khulna	BADC	57	1742	1799	42178	118745	503	10300	24597	2302	52478	143342
		Other	28	265	293	11990	50700	63	451	4701	356	12441	55401
		Total	**85**	**2007**	**2092**	**54168**	**169445**	**566**	**10751**	**29298**	**2658**	**64919**	**198743**
7	Sylhet	BADC	8	172	180	5467	13169	8	267	840	188	5734	14009
		Others	0	16	16	1752	3475	17	330	540	33	2082	4015
		Total	**8**	**188**	**196**	**7219**	**16644**	**25**	**597**	**1380**	**221**	**7816**	**18024**
8	Barisal	BADC	0	0	0	0	0	0	0	0	0	0	0
		Others	1	0	1	20	60	0	0	0	1	20	60
		Total	**1**	**0**	**1**	**20**	**60**	**0**	**0**	**0**	**1**	**20**	**60**
Country Total		BADC	**887**	**10159**	**11046**	**324153**	**1173598**	**942**	**21707**	**55850**	**11988**	**345860**	**1229448**
		BMDA	**963**	**14590**	**15553**	**511827**	**962380**	**0**	**0**	**0**	**15553**	**511827**	**962380**
		Others	**939**	**7543**	**8482**	**215379**	**812823**	**984**	**11179**	**100807**	**9466**	**226558**	**913630**
		Total	**2789**	**32292**	**35081**	**1051359**	**2948801**	**1926**	**32886**	**156657**	**37007**	**1084245**	**3105458**

Division Wise Irrigation Equipment used, Area Irrigated and Benefitted Farmer

(Area in Hectare)

STW

SL No	DIVISION	Organization	SHALLOW TUBEWELL OPERATED BY ELECTRICITY AND DIESEL											
			STW Operated by Electricity					STW Operated by Diesel			Total			
			PDB	REB	Total	Area	Farmers	Unit	Area	Farmers	Unit	Area	Farmers	
1	Dhaka	BADC	0	0	0	0	0	0	0	0	0	0	0	
		Others	6961	46365	53326	175258	624438	122983	209870	794903	176309	385128	1419341	
		Total	6961	46365	53326	175258	624438	122983	209870	794903	176309	385128	1419341	
2	Mymensingh	BADC	0	0	0	0	0	0	0	0	0	0	0	
		Others	6277	41730	48007	141221	478293	108784	183257	1104234	156791	324478	1582527	
		Total	6277	41730	48007	141221	478293	108784	183257	1104234	156791	324478	1582527	
3	Rajshahi	BADC	0	0	0	0	0	0	0	0	0	0	0	
		BMDA	0	0	0	0	0	0	0	0	0	0	0	
		Others	2053	62944	64997	210677	665189	232596	421088	2042584	297593	631765	2707773	
		Total	2053	62944	64997	210677	665189	232596	421088	2042584	297593	631765	2707773	
4	Rangpur	BADC	10	135	145	725	2445	10	50	270	155	775	2715	
		BMDA	0	0	0	0	0	0	0	0	0	0	0	
		Others	18493	74866	93359	198495	792647	305670	591647	2678987	399029	790142	3471634	
		Total	18503	75001	93504	199220	795092	305680	591697	2679257	399184	790917	3474349	
5	Chittagong	BADC	0	0	0	0	0	0	0	0	0	0	0	
		Others	227	23331	23558	123132	415563	43957	94800	401389	67515	217932	816952	
		Total	227	23331	23558	123132	415563	43957	94800	401389	67515	217932	816952	
6	Khulna	BADC	0	0	0	0	0	0	0	0	0	0	0	
		Others	1411	30287	31698	149207	376809	244402	408033	2142276	276100	557240	2519085	
		Total	1411	30287	31698	149207	376809	244402	408033	2142276	276100	557240	2519085	
7	Sylhet	BADC	0	0	0	0	0	0	0	0	0	0	0	
		Others	694	5231	5925	32578	94469	19180	60815	232824	25105	93393	327293	
		Total	694	5231	5925	32578	94469	19180	60815	232824	25105	93393	327293	
8	Barisal	BADC	0	0	0	0	0	0	0	0	0	0	0	
		Others	29	55	84	182	560	25	85	589	109	267	1149	
		Total	29	55	84	182	560	25	85	589	109	267	1149	
Country Total		BADC	10	135	145	725	2445	10	50	270	155	775	2715	
		BMDA	0	0	0	0	0	0	0	0	0	0	0	
		Others	36145	284809	320954	1030750	3447968	1077597	1969595	9397786	1398551	3000345	12845754	
		Total	36155	284944	321099	1031475	3450413	1077607	1969645	9398056	1398706	3001120	12848469	

Division Wise Irrigation Equipment used, Area Irrigated and Benefitted Farmer

(Area in Hectare)

LLP

SL NO	DIVISION	Organization	LOW LIFT PUMP OPERATED BY ELECTRICITY AND DIESEL									Total		
			LLP Operated by Electricity					LLPOperated by Diesel						
			PDB	REB	Total	Area	Farmers	Unit	Area	Farmers	Unit	Area	Farmers
1	Dhaka	BADC	93	865	958	23151	48032	1906	44600	53841	2864	67751	101873
		Others	484	2276	2760	34642	115753	19580	108953	341907	22340	143595	457660
		Total	577	3141	3718	57793	163785	21486	153553	395748	25204	211346	559533
2	Mymensingh	BADC	36	363	399	8039	16167	1188	22700	39869	1587	30739	56036
		Others	331	910	1241	14695	45697	8899	59610	171296	10140	74305	216993
		Total	367	1273	1640	22734	61864	10087	82310	211165	11727	105044	273029
3	Rajshahi	BADC	0	42	42	1303	2881	27	314	465	69	1617	3346
		BMDA	16	329	345	8065	20426	0	0	0	345	8065	20426
		Others	342	843	1185	14665	40610	9928	45773	103525	11113	60438	144135
		Total	358	1214	1572	24033	63917	9955	46087	103990	11527	70120	167907
4	Rangpur	BADC	40	54	94	1694	3870	87	1069	1690	181	2763	5560
		BMDA	12	162	174	5374	6608	0	0	0	174	5374	6608
		Others	126	242	368	3827	6504	1204	7246	11399	1572	11073	17903
		Total	178	458	636	10895	16982	1291	8315	13089	1927	19210	30071
5	Chittagong	BADC	3	411	414	9101	24641	1386	39807	31997	1800	48908	56638
		Others	766	4293	5059	78072	255936	37635	177583	910972	42694	255655	1166908
		Total	769	4704	5473	87173	280577	39021	217390	942969	44494	304563	1223546
6	Khulna	BADC	8	188	196	4173	11549	106	3060	2987	302	7233	14536
		Others	186	451	637	7332	20853	35420	122749	255640	36057	130081	276493
		Total	194	639	833	11505	32402	35526	125809	258627	36359	137314	291029
7	Sylhet	BADC	21	417	438	8258	22055	344	12345	12501	782	20603	34556
		Others	175	1041	1216	13647	34390	40744	213522	485718	41960	227169	520108
		Total	196	1458	1654	21905	56445	41088	225867	498219	42742	247772	554664
8	Barisal	BADC	30	287	317	8979	26577	379	11894	15895	696	20873	42472
		Others	449	304	753	8742	23562	24485	144677	365232	25238	153419	388794
		Total	479	591	1070	17721	50139	24864	156571	381127	25934	174292	431266
Country Total		BADC	231	2627	2858	64698	155772	5423	135789	159245	8281	200487	315017
		BMDA	28	491	519	13439	27034	0	0	0	519	13439	27034
		Others	2859	10360	13219	175622	543305	177895	880113	2645689	191114	1055735	3188994
		Total	3118	13478	16596	253759	726111	183318	1015902	2804934	199914	1269661	3531045

ANNEXURE-B

DISTRICT WISE DATA ON IRRRIGATION SURVEY-2019-20

DISTRICT WISE IRRIGATION EQUIPMENT USED AND TOTAL AREA IRRIGATED

(Excluding Dug Well)

Sl No	Districts	Total Area (ha)	Net Cultivable Area (ha)	Nos of Irrigation Equipment Used & Area Irrigated														Total Area irrigated by DTW, STW & LLP (9+13+17)	Solar Pump		Area Irrigated by Manual/Artisian well	Area Irrigated by traditional Method (ha)	Area Irrigated by gravity flow (ha)	Area Irrigated by all Methods (ha) (18+19+20+21)
				Name of Organization	Deep Tube Well				Shallow Tube Well				Low Lift Pump											
					Nos			Area Irrigated (ha)	Nos			Area Irrigated (ha)	Nos			Area Irrigated (ha)								
					Elec	Diesel	Total		Elec	Diesel	Total		Elec	Diesel	Total			Nos.	Area Irrigated (ha)					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
				BADC	122	0	122	2032	0	0	0	0	39	19	58	1298	3330	0	0	0	0	0	3330
				Others	52	5	57	1882	3031	6295	9326	25965	154	1671	1825	10174	38021	0	0	0	0	0	38021
1	Dhaka	146360	94238	Total	174	5	179	3914	3031	6295	9326	25965	193	1690	1883	11472	41351	10	40	10	50	245	41696
				BADC	11	2	13	396	0	0	0	0	32	33	65	1572	1968	0	0	0	0	0	1968
				Others	17	1	18	566	628	2831	3459	10605	71	868	939	6360	17531	0	0	0	0	0	17531
2	Munshigonj	100430	60191	Total	28	3	31	962	628	2831	3459	10605	103	901	1004	7932	19499	12	57	0	327	1275	21158
				BADC	22	0	22	720	0	0	0	0	78	0	78	1290	2010	0	0	0	0	0	2010
				Others	8	0	8	134	1584	1105	2689	11090	252	855	1107	9001	20225	0	0	0	0	0	20225
3	Narayangonj	68440	51321	Total	30	0	30	854	1584	1105	2689	11090	330	855	1185	10291	22235	12	54	250	220	925	23684
				BADC	218	2	220	4922	0	0	0	0	66	10	76	1894	6816	0	0	0	0	0	6816
				Others	0	0	0	0	5369	14144	19513	42895	85	103	188	1093	43988	0	0	0	0	0	43988
4	Manikgonj	138370	90253	Total	218	2	220	4922	5369	14144	19513	42895	151	113	264	2987	50804	26	117	0	250	0	51171
				BADC	84	0	84	2085	0	0	0	0	114	34	148	4358	6443	0	0	0	0	0	6443
				Others	0	2	2	45	6538	9126	15664	37366	77	437	514	2609	40020	0	0	0	0	0	40020
5	Narsingdi	115010	82926	Total	84	2	86	2130	6538	9126	15664	37366	191	471	662	6967	46463	12	58	0	41	2852	49414
				BADC	357	27	384	7737	0	0	0	0	109	1134	1243	15224	22961	0	0	0	0	0	22961
				Others	0	20	20	623	3856	7784	11640	17301	364	2518	2882	11465	29389	0	0	0	0	0	29389
6	Gazipur	180640	101475	Total	357	47	404	8360	3856	7784	11640	17301	473	3652	4125	26689	52350	14	65	742	350	0	53507
				BADC	346	10	356	8983	0	0	0	0	118	47	165	4663	13646	0	0	0	0	0	13646
				Others	540	54	594	15239	20404	26944	47348	105192	72	301	373	2123	122554	0	0	0	0	0	122554
7	Tangail	341430	220085	Total	886	64	950	24222	20404	26944	47348	105192	190	348	538	6786	136200	19	85	350	0	0	136635
				BADC	95	0	95	3362	0	0	0	0	172	376	548	23840	27202	0	0	0	0	0	27202
				Others	178	43	221	5149	3610	19774	23384	46470	447	6320	6767	35196	86815	0	0	0	0	0	86815
8	Kishoregonj	268860	173307	Total	273	43	316	8511	3610	19774	23384	46470	619	6696	7315	59036	114017	33	145	225	240	7256	121883
				BADC	87	0	87	2710	0	0	0	0	54	25	79	2160	4870	0	0	0	0	0	4870
				Others	38	12	50	1220	1388	13777	15165	22376	59	635	694	3779	27375	0	0	0	0	0	27375
9	Faridpur	202590	133050	Total	125	12	137	3930	1388	13777	15165	22376	113	660	773	5939	32245	24	108	0	0	1500	33853
				BADC	83	0	83	3576	0	0	0	0	15	14	29	188	3764	0	0	0	0	0	3764
				Others	63	5	68	1775	1738	13411	15149	29119	49	52	101	1075	31969	0	0	0	0	0	31969
10	Rajbari	109230	71969	Total	146	5	151	5351	1738	13411	15149	29119	64	66	130	1263	35733	23	103	0	0	750	36586
				BADC	0	0	0	0	0	0	0	0	40	25	65	1592	1592	0	0	0	0	0	1592
				Others	8	3	11	364	2286	2082	4368	15874	378	787	1165	11961	28199	0	0	0	0	0	28199
11	Madaripur	112570	76024	Total	8	3	11	364	2286	2082	4368	15874	418	812	1230	13553	29791	22	99	0	0	0	29890
				BADC	28	0	28	850	0	0	0	0	61	160	221	7752	8602	0	0	0	0	0	8602
				Others	4	0	4	96	2458	4330	6788	16832	326	3777	4103	34070	50998	0	0	0	0	0	50998
12	Gopalgonj	146870	101438	Total	32	0	32	946	2458	4330	6788	16832	387	3937	4324	41822	59600	26	117	0	220	550	60487
				BADC	0	0	0	0	0	0	0	0	60	29	89	1920	1920	0	0	0	0	0	1920
				Others	9	8	17	435	436	1380	1816	4043	426	1256	1682	14689	19167	0	0	0	0	0	19167
13	Shariatpur	117410	80635	Total	9	8	17	435	436	1380	1816	4043	486	1285	1771	16609	21087	25	77	0	0	550	21714

DISTRICT WISE IRRIGATION EQUIPMENT USED AND TOTAL AREA IRRIGATED

(Excluding Dug Well)

Sl No	Districts	Total Area (ha)	Net Cultivable Area (ha)	Nos of Irrigation Equipment Used & Area Irrigated													Total Area irrigated by DTW, STW & LLP (9+13+17)	Solar Pump		Area irrigated by Manual/Artisian well	Area irrigated by traditional Method (ha)	Area irrigated by gravity flow (ha)	Area irrigated by all Methods (ha) (18+19+20+21)
				Name of Organization	Deep Tube Well				Shallow Tube Well				Low Lift Pump					Nos.	Area Irrigated (ha)				
					Nos			Area Irrigated (ha)	Nos			Area Irrigated (ha)	Nos			Area Irrigated (ha)							
					Elec	Diesel	Total		Elec	Diesel	Total		Elec	Diesel	Total								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Dhaka Division		2048210	1337112	BADC	1453	41	1494	37373	0	0	0	0	958	1906	2864	67751	105124	0	0	0	0	0	105124
				Others	917	153	1070	27528	53326	122983	176309	385128	2760	19580	22340	143595	556251	0	0	0	0	0	556251
				Total	2370	194	2564	64901	53326	122983	176309	385128	3718	21486	25204	211346	661375	258	1125	1577	1698	15903	681678
				BADC	2356	319	2675	101296	0	0	0	0	48	345	393	6178	107474	0	0	0	0	0	107474
				Others	300	79	379	10616	17129	28960	46089	107306	301	4399	4700	32558	150480	0	0	0	0	0	150480
14	Mymensing	439460	301438	Total	2656	398	3054	111912	17129	28960	46089	107306	349	4744	5093	38736	257954	23	103	236	341	4526	263160
				BADC	339	1	340	9922	0	0	0	0	36	93	129	3952	13874	0	0	0	0	0	13874
				Others	9	12	21	482	9699	36343	46042	96143	122	197	319	2611	99236	0	0	0	0	0	99236
15	Jamalpur	211520	146915	Total	348	13	361	10404	9699	36343	46042	96143	158	290	448	6563	113110	12	54	0	0	3200	116364
				BADC	62	1	63	2860	0	0	0	0	57	108	165	3544	6404	0	0	0	0	0	6404
				Others	347	14	361	9019	10446	8608	19054	41439	242	490	732	5884	56342	0	0	0	0	0	56342
16	Sherpur	136470	99114	Total	409	15	424	11879	10446	8608	19054	41439	299	598	897	9428	62746	14	63	8	0	7023	69840
				BADC	445	11	456	14641	0	0	0	0	258	642	900	17065	31706	0	0	0	0	0	31706
				Others	0	0	0	0	10733	34873	45606	79590	576	3813	4389	33252	112842	0	0	0	0	0	112842
17	Netrokona	279430	190562	Total	445	11	456	14641	10733	34873	45606	79590	834	4455	5289	50317	144548	24	107	100	250	4523	149528
				BADC	3202	332	3534	128719	0	0	0	0	399	1188	1587	30739	159458	0	0	0	0	0	159458
Mymensingh Division				Others	656	105	761	20117	48007	108784	156791	324478	1241	8899	10140	74305	418900	0	0	0	0	0	418900
		1066880	738029	Total	3858	437	4295	148836	48007	108784	156791	324478	1640	10087	11727	105044	578358	73	327	344	591	19272	598892
				BADC	1	0	1	24	0	0	0	0	0	0	0	0	24	0	0	0	0	0	24
				BMDA	2852	0	2852	115608	0	0	0	0	146	0	146	3810	119418	0	0	0	0	0	119418
				Others	662	130	792	17516	2348	22117	24465	33885	88	2776	2864	13623	65024	0	0	0	0	0	65024
18	Rajshahi	242540	185996	Total	3515	130	3645	133148	2348	22117	24465	33885	234	2776	3010	17433	184466	40	225	12	0	0	184703
				BADC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				BMDA	1583	0	1583	61145	0	0	0	0	39	0	39	545	61690	0	0	0	0	0	61690
				Others	35	0	35	684	5266	9365	14631	36984	317	1205	1522	11346	49014	0	0	0	0	0	49014
19	C.Nababgonj	170250	126627	Total	1618	0	1618	61829	5266	9365	14631	36984	356	1205	1561	11891	110704	19	85	0	100	0	110889
				BADC	197	0	197	5623	0	0	0	0	0	0	0	0	5623	0	0	0	0	0	5623
				BMDA	288	0	288	6973	0	0	0	0	0	0	0	0	6973	0	0	0	0	0	6973
				Others	114	46	160	2781	5082	31423	36505	78886	76	0	76	642	82309	0	0	0	0	0	82309
20	Natore	190020	128871	Total	599	46	645	15377	5082	31423	36505	78886	76	0	76	642	94905	42	189	8	0	0	95102
				BADC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				BMDA	4090	0	4090	119007	0	0	0	0	160	0	160	3710	122717	0	0	0	0	0	122717
				Others	527	127	654	15648	9303	43956	53259	106569	284	3875	4159	15704	137921	0	0	0	0	0	137921
21	Naogoan	343560	281475	Total	4617	127	4744	134655	9303	43956	53259	106569	444	3875	4319	19414	260638	44	198	0	0	0	260836
				BADC	468	0	468	11342	0	0	0	0	11	27	38	684	12026	0	0	0	0	0	12026
				BMDA	307	0	307	13011	0	0	0	0	0	0	0	0	13011	0	0	0	0	0	13011
				Others	308	87	395	7752	5164	17066	22230	113369	235	1474	1709	13274	134395	0	0	0	0	0	134395
22	Pabna	237610	184905	Total	1083	87	1170	32105	5164	17066	22230	113369	246	1501	1747	13958	159432	25	112	0	0	0	159544
				BADC	461	0	461	11667	0	0	0	0	0	0	0	0	11667	0	0	0	0	0	11667
				BMDA	154	0	154	3885	0	0	0	0	0	0	0	0	3885	0	0	0	0	0	3885

DISTRICT WISE IRRIGATION EQUIPMENT USED AND TOTAL AREA IRRIGATED

(Excluding Dug Well)

Sl No	Districts	Total Area (ha)	Net Cultivable Area (ha)	Nos of Irrigation Equipment Used & Area Irrigated													Total Area Irrigated by DTW, STW & LLP (9+13+17)	Solar Pump		Area Irrigated by Manual/Artisian well	Area Irrigated by traditional Method (ha)	Area Irrigated by gravity flow (ha)	Area Irrigated by all Methods (ha) (18+19+20+21)
				Name of Organization	Deep Tube Well				Shallow Tube Well				Low Lift Pump					Nos.	Area Irrigated (ha)				
					Nos			Area Irrigated (ha)	Nos			Area Irrigated (ha)	Nos			Area Irrigated (ha)							
					Elec	Diesel	Total		Elec	Diesel	Total		Elec	Diesel	Total								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
				Others	266	32	298	5259	22354	53187	75541	118471	134	405	539	4629	128359	0	0	0	0	0	128359
23	Sirajgonj	240210	173220	Total	881	32	913	20811	22354	53187	75541	118471	134	405	539	4629	143911	22	99	9	0	1000	145019
				BADC	1159	0	1159	39935	0	0	0	0	31	0	31	933	40868	0	0	0	0	0	40868
				BMDA	282	0	282	10516	0	0	0	0	0	0	0	0	10516	0	0	0	0	0	10516
				Others	1163	89	1252	29925	12863	49587	62450	118591	51	193	244	1220	149736	0	0	0	0	0	149736
24	Bogra	289870	224700	Total	2604	89	2693	80376	12863	49587	62450	118591	82	193	275	2153	201120	63	283	11	0	500	201914
				BADC	14	0	14	293	0	0	0	0	0	0	0	0	293	0	0	0	0	0	293
				BMDA	356	0	356	12551	0	0	0	0	0	0	0	0	12551	0	0	0	0	0	12551
				Others	1218	76	1294	27122	2617	5895	8512	25010	0	0	0	0	52132	0	0	0	0	0	52132
25	Joypurhat	101240	81250	Total	1588	76	1664	39966	2617	5895	8512	25010	0	0	0	0	64976	25	112	0	0	0	65088
				BADC	2300	0	2300	68884	0	0	0	0	42	27	69	1617	70501	0	0	0	0	0	70501
				BMDA	9912	0	9912	342696	0	0	0	0	345	0	345	8065	350761	0	0	0	0	0	350761
				Others	4293	587	4880	106687	64997	232596	297593	631765	1185	9928	11113	60438	798890	0	0	0	0	0	798890
Rajshahi Division		1572760	1387044	Total	16505	587	17092	518267	64997	232596	297593	631765	1572	9955	11527	70120	1220152	280	1303	40	100	1500	1223095
				BADC	71	0	71	1506	32	0	32	120	16	55	71	1581	3207	0	0	0	0	0	3207
				BMDA	460	0	460	13197	0	0	0	0	45	0	45	1473	14670	0	0	0	0	0	14670
				Others	209	12	221	4335	9292	31880	41172	91909	17	98	115	673	96917	0	0	0	0	0	96917
26	Gaibandha	211480	153608	Total	740	12	752	19038	9324	31880	41204	92029	78	153	231	3727	114794	42	189	0	0	0	114983
				BADC	293	0	293	7107	23	0	23	108	33	0	33	158	7373	0	0	0	0	0	7373
				BMDA	678	0	678	21608	0	0	0	0	8	0	8	262	21870	0	0	0	0	0	21870
				Others	122	3	125	2552	17103	64848	81951	158250	14	12	26	227	161029	0	0	0	0	0	161029
27	Rangpur	240060	199667	Total	1093	3	1096	31267	17126	64848	81974	158358	55	12	67	647	190272	138	620	0	0	0	190892
				BADC	54	0	54	1397	13	0	13	59	9	0	9	0	1456	0	0	0	0	0	1456
				BMDA	273	0	273	8842	0	0	0	0	0	0	0	0	8842	0	0	0	0	0	8842
				Others	16	0	16	187	19091	20426	39517	58363	21	68	89	559	59109	0	0	0	0	0	59109
28	Nilphamari	154660	83645	Total	343	0	343	10426	19104	20426	39530	58422	30	68	98	559	69407	47	211	0	0	4569	74187
				BADC	35	0	35	799	28	0	28	170	9	24	33	161	1130	0	0	0	0	0	1130
				BMDA	226	0	226	5910	0	0	0	0	0	0	0	0	5910	0	0	0	0	0	5910
				Others	0	0	0	0	14383	24010	38393	59651	140	58	198	2241	61892	0	0	0	0	4258	66150
29	Lalmonirhat	124740	101034	Total	261	0	261	6709	14411	24010	38421	59821	149	82	231	2402	68932	52	233	0	0	0	69165
				BADC	54	0	54	1254	49	10	59	318	6	8	14	44	1616	0	0	0	0	0	1616
				BMDA	515	0	515	12930	0	0	0	0	3	0	3	77	13007	0	0	0	0	0	13007
				Others	1	0	1	17	11585	37238	48823	99205	72	429	501	3194	102416	0	0	0	0	0	102416
30	Kurigram	224500	142443	Total	570	0	570	14201	11634	37248	48882	99523	81	437	518	3315	117039	27	121	0	0	3120	120280
				BADC	151	3	154	3349	0	0	0	0	21	0	21	819	4168	0	0	0	0	0	4168
				BMDA	1629	0	1629	54768	0	0	0	0	57	0	57	1744	56512	0	0	0	0	0	56512
				Others	1442	14	1456	24711	12483	64484	76967	178436	102	518	620	4089	207236	0	0	0	0	0	207236
31	Dinajpur	344430	288348	Total	3222	17	3239	82828	12483	64484	76967	178436	180	518	698	6652	267916	217	974	0	0	0	268890
				BADC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				BMDA	1424	0	1424	40510	0	0	0	0	51	0	51	1537	42047	0	0	0	0	0	42047

DISTRICT WISE IRRIGATION EQUIPMENT USED AND TOTAL AREA IRRIGATED

(Excluding Dug Well)

Sl No	Districts	Total Area (ha)	Net Cultivable Area (ha)	Nos of Irrigation Equipment Used & Area Irrigated														Total Area Irrigated by DTW, STW & LLP (9+13+17)	Solar Pump		Area Irrigated by Manual/Artisian well	Area Irrigated by traditional Method (ha)	Area Irrigated by gravity flow (ha)	Area Irrigated by all Methods (ha) (18+19+20+21)
				Name of Organization	Deep Tube Well				Shallow Tube Well				Low Lift Pump											
					Nos			Area Irrigated (ha)	Nos			Area Irrigated (ha)	Nos			Area Irrigated (ha)								
					Elec	Diesel	Total		Elec	Diesel	Total		Elec	Diesel	Total									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
				Others	0	0	0	0	5400	44499	49899	81912	0	0	0	0	81912	0	0	0	0	0	81912
32	Thakurgoan	178170	151841	Total	1424	0	1424	40510	5400	44499	49899	81912	51	0	51	1537	123959	49	220	0	0	0	124179
				BADC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				BMDA	436	0	436	11366	0	0	0	0	10	0	10	281	11647	0	0	0	0	0	11647
				Others	0	0	0	0	4022	18285	22307	62416	2	21	23	90	62506	0	0	0	0	0	62506
33	Panchagar	104060	108200	Total	436	0	436	11366	4022	18285	22307	62416	12	21	33	371	74153	21	97	175	295	2589	77304
				BADC	658	3	661	15412	145	10	155	775	94	87	181	2763	18950	0	0	0	0	0	18950
				BMDA	5641	0	5641	169131	0	0	0	0	174	0	174	5374	174505	0	0	0	0	0	174505
				Others	1790	29	1819	31802	93359	305670	399029	790142	368	1204	1572	11073	833017	0	0	0	0	4258	837275
Rangpur Division		1582100	1228786	Total	8089	32	8121	216345	93504	305680	399184	790917	636	1291	1927	19210	1026472	593	2665	170	295	10278	1039880
				BADC	0	0	0	0	0	0	0	0	5	66	71	2047	2047	0	0	0	0	0	2047
				Others	25	4	29	681	2521	2289	4810	24915	883	4669	5552	30863	56459	0	0	0	0	0	56459
34	Chittagong	528290	194701	Total	25	4	29	681	2521	2289	4810	24915	888	4735	5623	32910	58506	12	54	345	345	17925	77175
				BADC	6	0	6	196	0	0	0	0	34	67	101	3325	3521	0	0	0	0	0	3521
				Others	13	0	13	949	361	467	828	9410	335	2307	2642	20829	31188	0	0	0	0	0	31188
35	Lakshmipur	144040	109390	Total	19	0	19	1145	361	467	828	9410	369	2374	2743	24154	34709	15	67	0	0	3452	38228
				BADC	15	0	15	533	0	0	0	0	7	6	13	385	918	0	0	0	0	0	918
				Others	17	0	17	1059	2440	476	2916	16083	382	885	1267	17488	34630	0	0	0	0	0	34630
36	Feni	99040	69903	Total	32	0	32	1592	2440	476	2916	16083	389	891	1280	17873	35548	25	112	0	0	2835	38495
				BADC	51	0	51	1675	0	0	0	0	0	19	19	437	2112	0	0	0	0	0	2112
				Others	0	0	0	0	1859	3762	5621	20882	32	8760	8792	37840	58722	0	0	0	0	0	58722
37	Noakhali	368590	145353	Total	51	0	51	1675	1859	3762	5621	20882	32	8779	8811	38277	60834	20	90	0	0	9452	70376
				BADC	0	22	22	950	0	0	0	0	36	49	85	2270	3220	0	0	0	0	0	3220
				Others	0	0	0	0	1074	4525	5599	25886	391	2271	2662	25284	51170	0	0	0	0	0	51170
38	Cox's Bazar	249190	98900	Total	0	22	22	950	1074	4525	5599	25886	427	2320	2747	27554	54390	15	67	220	225	2852	57754
				BADC	0	0	0	0	0	0	0	0	0	504	504	8798	8798	0	0	0	0	0	8798
				Others	1	0	1	25	56	0	56	0	26	2505	2531	5299	5324	0	0	0	0	0	5324
39	Rangamati	611610	140655	Total	1	0	1	25	56	0	56	0	26	3009	3035	14097	14122	40	180	0	314	7253	21869
				BADC	0	0	0	0	0	0	0	0	0	68	68	2571	2571	0	0	0	0	0	2571
				Others	0	0	0	0	25	85	110	275	94	2154	2248	7517	7792	0	0	0	0	0	7792
40	Khagrachari	274920	39454	Total	0	0	0	0	25	85	110	275	94	2222	2316	10088	10363	32	144	0	245	7523	18275
				BADC	0	0	0	0	0	0	0	0	0	388	388	13948	13948	0	0	0	0	0	13948
				Others	0	0	0	0	36	314	350	1216	45	958	1003	2174	3390	0	0	0	0	0	3390
41	Bandarban	447900	140457	Total	0	0	0	0	36	314	350	1216	45	1346	1391	16122	17338	15	77	0	0	1425	18840
				BADC	1136	8	1144	25746	0	0	0	0	125	92	217	7916	33662	0	0	0	0	0	33662
				Others	314	15	329	14357	11633	18217	29850	72974	1234	3922	5156	29975	117306	0	0	0	0	0	117306
42	Comilla	314630	227821	Total	1450	23	1473	40103	11633	18217	29850	72974	1359	4014	5373	37891	150968	18	81	0	245	0	151294
				BADC	154	25	179	5348	0	0	0	0	98	33	131	2759	8107	0	0	0	0	0	8107
				Others	46	0	46	2884	860	1534	2394	13537	521	4120	4641	31208	47629	0	0	0	0	0	47629
43	Chandpur	164530	100996	Total	200	25	225	8232	860	1534	2394	13537	619	4153	4772	33967	55736	20	90	40	152	6560	62578

DISTRICT WISE IRRIGATION EQUIPMENT USED AND TOTAL AREA IRRIGATED

(Excluding Dug Well)

Sl No	Districts	Total Area (ha)	Net Cultivable Area (ha)	Nos of Irrigation Equipment Used & Area Irrigated													Total Area Irrigated by DTW, STW & LLP (9+13+17)	Solar Pump		Area Irrigated by Manual/Artisian well	Area Irrigated by traditional Method (ha)	Area Irrigated by gravity flow (ha)	Area Irrigated by all Methods (ha) (18+19+20+21)
				Name of Organization	Deep Tube Well				Shallow Tube Well				Low Lift Pump					Nos.	Area Irrigated (ha)				
					Nos			Area Irrigated (ha)	Nos			Area Irrigated (ha)	Nos			Area Irrigated (ha)							
					Elec	Diesel	Total		Elec	Diesel	Total		Elec	Diesel	Total								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
				BADC	92	0	92	2812	0	0	0	0	109	94	203	4452	7264	0	0	0	0	0	7264
				Others	100	11	111	5926	2693	12288	14981	32754	1116	5084	6200	47178	85858	0	0	0	0	0	85858
44	B. Baria	188120	142276	Total	192	11	203	8738	2693	12288	14981	32754	1225	5178	6403	51630	93122	23	103	345	195	14582	108347
	Chittagong Division			BADC	1454	55	1509	37260	0	0	0	0	414	1386	1800	48908	86168	0	0	0	0	0	86168
				Others	516	30	546	25881	23558	43957	67515	217932	5059	37635	42694	255655	499468	0	0	0	0	0	499468
		3390860	1409906	Total	1970	85	2055	63141	23558	43957	67515	217932	5473	39021	44494	304563	585636	235	1063	950	1721	73859	663231
				BADC	896	72	967	20382	0	0	0	0	72	16	88	2016	22398	0	0	0	0	0	22398
				Others	195	26	221	8241	3511	55873	59384	96620	154	1009	1163	4087	108948	0	0	0	0	0	108948
45	Jessore	260690	190468	Total	1090	98	1188	28623	3511	55873	59384	96620	226	1025	1251	6103	131346	57	256	0	0	0	131602
				BADC	103	0	103	2726	0	0	0	0	11	0	11	300	3026	0	0	0	0	0	3026
				Others	0	0	0	0	1123	27389	28512	50642	6	112	118	472	51114	0	0	0	0	0	51114
46	Meherpur	75160	65964	Total	103	0	103	2726	1123	27389	28512	50642	17	112	129	772	54140	80	356	0	0	0	54496
				BADC	37	0	37	1115	0	0	0	0	15	0	15	305	1420	0	0	0	0	0	1420
				Others	30	14	44	1134	2321	31347	33668	80379	36	217	253	1167	82980	39	175	0	0	17523	100503
47	Kushtia	160880	104124	Total	67	14	81	2249	2321	31347	33668	80379	51	217	268	1472	84400	39	175	0	0	17523	101798
				BADC	151	9	160	4318	0	0	0	0	0	0	0	0	4318	0	0	0	0	0	4318
				Others	14	5	19	1176	723	32774	33497	47117	10	185	195	1068	49361	0	0	0	0	0	49361
48	Chuadanga	117410	86354	Total	165	14	179	5494	723	32774	33497	47117	10	185	195	1068	53679	41	135	0	0	550	54364
				BADC	362	418	780	17180	0	0	0	0	8	17	25	425	17605	0	0	0	0	0	17605
				Others	1	2	3	40	6824	15963	22787	52186	181	2130	2311	6867	59093	0	0	0	0	0	59093
49	Satkhira	381730	149371	Total	363	420	783	17220	6824	15963	22787	52186	189	2147	2336	7292	76698	10	75	275	275	750	78073
				BADC	2	0	2	51	0	0	0	0	19	44	63	1725	1776	0	0	0	0	0	1776
				Others	1	1	2	33	3768	6715	10483	29073	185	14888	15073	45213	71319	0	0	0	0	0	71319
50	Bagerhat	395910	118810	Total	3	1	4	84	3768	6715	10483	29073	204	14932	15136	46938	73095	25	125	311	305	4652	78488
				BADC	3	0	3	75	0	0	0	0	0	27	27	787	862	0	0	0	0	0	862
				Others	2	5	7	80	4041	9805	13846	27636	13	15829	15842	65232	92948	0	0	0	0	0	92948
51	Khulna	439440	147170	Total	5	5	10	155	4041	9805	13846	27636	13	15853	15866	66019	93810	17	78	245	270	7526	101929
				BADC	240	4	244	6479	0	0	0	0	0	0	0	0	6479	0	0	0	0	0	6479
				Others	47	9	56	1572	8316	30463	38779	94920	4	439	443	1860	98352	0	0	0	0	0	98352
52	Jhenidah	196480	138935	Total	287	13	300	8051	8316	30463	38779	94920	4	439	443	1860	104831	58	265	0	0	15025	120121
				BADC	0	0	0	0	0	0	0	0	21	0	21	575	575	0	0	0	0	0	575
				Others	0	0	0	0	186	16221	16407	34541	33	572	605	3675	38216	0	0	0	0	0	38216
53	Narail	96800	72341	Total	0	0	0	0	186	16221	16407	34541	54	572	626	4250	38791	22	115	0	0	0	38906
				BADC	6	0	6	152	0	0	0	0	50	2	52	1100	1252	0	0	0	0	0	1252
				Others	3	1	4	165	885	17852	18737	47126	15	40	55	4401	47731	0	0	0	0	0	47731
54	Magura	103910	73472	Total	9	1	10	317	885	17852	18737	47126	65	42	107	5501	48983	12	54	0	0	0	49037
	Khulna Division			BADC	1799	503	2302	52478	0	0	0	0	196	106	302	7233	59711	0	0	0	0	0	59711
				Others	293	63	356	12441	31698	244402	276100	557240	637	35420	36057	130081	699762	0	0	0	0	0	699762
		2228410	1147009	Total	2092	566	2658	64919	31698	244402	276100	557240	833	35526	36359	137314	759473	361	1634	831	850	46026	808814
				BADC	12	0	12	535	0	0	0	0	83	109	192	6974	7509	0	0	0	0	0	7509

DISTRICT WISE IRRIGATION EQUIPMENT USED AND TOTAL AREA IRRIGATED

(Excluding Dug Well)

Sl No	Districts	Total Area (ha)	Net Cultivable Area (ha)	Nos of Irrigation Equipment Used & Area Irrigated																		
				Name of Organization	Deep Tube Well				Shallow Tube Well				Low Lift Pump				Total Area Irrigated by DTW, STW & LLP (9+13+17)	Solar Pump		Area Irrigated by Manual/Artisian well	Area Irrigated by traditional Method (ha)	Area Irrigated by gravity flow (ha)	Area Irrigated by all Methods (ha) (18+19+20+21)
					Nos			Area Irrigated (ha)	Nos			Area Irrigated (ha)	Nos			Area Irrigated (ha)		Nos.	Area Irrigated (ha)				
					Elec	Diesel	Total		Elec	Diesel	Total		Elec	Diesel	Total								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
				Others	2	0	2	355	2608	1383	3991	15445	465	8331	8796	35862	51662	0	0	0	0	0	51662
55	Sylhet	345210	193372	Total	14	0	14	890	2608	1383	3991	15445	548	8440	8988	42836	59171	25	112	452	263	12520	72518
				BADC	34	0	34	877	0	0	0	0	160	81	241	5485	6362	0	0	0	0	0	6362
				Others	0	0	0	0	1340	6091	7431	27197	192	14835	15027	101613	128810	0	0	0	0	0	128810
56	Sunamgonj	374720	189662	Total	34	0	34	877	1340	6091	7431	27197	352	14916	15268	107098	135172	25	125	250	220	27833	163600
				BADC	133	8	141	4287	0	0	0	0	158	91	249	5975	10262	0	0	0	0	0	10262
				Others	14	17	31	1727	1852	6144	7996	37918	533	8064	8597	50431	90076	0	0	0	0	0	90076
57	Habigonj	263660	195398	Total	147	25	172	6014	1852	6144	7996	37918	691	8155	8846	56406	100338	35	157	1200	278	13520	115493
				BADC	1	0	1	35	0	0	0	0	37	63	100	2169	2204	0	0	0	0	0	2204
				Others	0	0	0	0	125	5562	5687	12833	26	9514	9540	39263	52096	0	0	0	0	0	52096
58	M.Bazar	279940	118798	Total	1	0	1	35	125	5562	5687	12833	63	9577	9640	41432	54300	23	105	1412	345	19745	75907
				BADC	180	8	188	5734	0	0	0	0	438	344	782	20603	26337	0	0	0	0	0	26337
				Others	16	17	33	2082	5925	19180	25105	93393	1216	40744	41960	227169	322644	0	0	0	0	0	322644
Sylhet Division		1263530	701230	Total	196	25	221	7816	5925	19180	25105	93393	1654	41088	42742	247772	348981	108	499	3314	1106	73618	427518
				BADC	0	0	0	0	0	0	0	0	96	135	231	6235	6235	0	0	0	0	0	6235
				Others	1	0	1	20	56	25	81	215	203	11116	11319	73561	73796	0	0	0	0	0	73796
59	Barisal	278450	174033	Total	1	0	1	20	56	25	81	215	299	11251	11550	79796	80031	135	658	0	0	0	80689
				BADC	0	0	0	0	0	0	0	0	40	22	62	2499	2499	0	0	0	0	0	2499
				Others	0	0	0	0	0	0	0	0	2	1173	1175	8589	8589	0	0	0	0	0	8589
60	Jhalokathi	70680	53587	Total	0	0	0	0	0	0	0	0	42	1195	1237	11088	11088	24	125	0	0	850	12063
				BADC	0	0	0	0	0	0	0	0	30	36	66	4247	4247	0	0	0	0	0	4247
				Others	0	0	0	0	8	0	8	13	41	3329	3370	15101	15114	0	0	0	0	0	15114
61	Pirojpur	127780	52464	Total	0	0	0	0	8	0	8	13	71	3365	3436	19348	19361	24	124	626	0	0	20111
				BADC	0	0	0	0	0	0	0	0	38	79	117	2798	2798	0	0	0	0	0	2798
				Others	0	0	0	0	10	0	10	14	86	2037	2123	11577	11591	0	0	0	0	0	11591
62	Patuakhali	322130	89917	Total	0	0	0	0	10	0	10	14	124	2116	2240	14375	14389	15	68	0	0	1050	15507
				BADC	0	0	0	0	0	0	0	0	20	55	75	1734	1734	0	0	0	0	0	1734
				Others	0	0	0	0	10	0	10	25	40	112	152	1253	1278	0	0	0	0	0	1278
63	Borguna	183130	113212	Total	0	0	0	0	10	0	10	25	60	167	227	2987	3012	563	2452	0	464	0	5928
				BADC	0	0	0	0	0	0	0	0	93	52	145	3360	3360	0	0	0	0	0	3360
				Others	0	0	0	0	0	0	0	0	381	6718	7099	43338	43338	0	0	0	0	0	43338
64	Bhola	340350	144949	Total	0	0	0	0	0	0	0	0	474	6770	7244	46698	46698	576	2479	0	0	0	49177
				BADC	0	0	0	0	0	0	0	0	317	379	696	20873	20873	0	0	0	0	0	20873
				Others	1	0	1	20	84	25	109	267	753	24485	25238	153419	153706	0	0	0	0	0	153706
Barisal Division		1322520	628162	Total	1	0	1	20	84	25	109	267	1070	24864	25934	174292	174579	1337	5906	626	464	1900	183475
				BADC	11046	942	11988	345860	145	10	155	775	2858	5423	8281	200487	547122	0	0	0	0	0	547122
				BMDA	15553	0	15553	511827	0	0	0	0	519	0	519	13439	525266	0	0	0	0	0	525266
				Others	8482	984	9466	226558	320954	1077597	1398551	3000345	13219	177895	191114	1055735	4282638	0	0	0	0	4258	4286896
Country Total		14475270	8577278	Total	35081	1926	37007	1084245	321099	1077607	1398706	3001120	16596	183318	199914	1269661	5355026	3245	14524	7852	6825	242356	5626583

District Wise Irrigation Equipment used, Area Irrigated and Benefitted Farmer

DTW

Sl No	District Name	DEEP TUBEWELL OPERATED BY ELECTRICITY AND DIESEL											
		DTW Operated by Electricity					DTW Operated by Diesel			Total			
		PDB	REB	Total	Area	Farmers	Unit	Area	Farmers	Unit	Area	Farmers
1	Dhaka	37	137	174	3850	22798	5	64	256	179	3914	23054
2	Munshigonj	10	18	28	901	3284	3	61	220	31	962	3504
3	Narayangonj	0	30	30	854	8155	0	0	0	30	854	8155
4	Manikgonj	16	202	218	4863	23900	2	59	685	220	4922	24585
5	Narsingdi	0	84	84	2085	15169	2	45	175	86	2130	15344
6	Gazipur	1	356	357	6957	26925	47	1403	3885	404	8360	30810
7	Tangail	234	652	886	23158	109127	64	1064	3895	950	24222	113022
8	Kishorgonj	11	262	273	7790	38836	43	721	2883	316	8511	41719
9	Faridpur	25	100	125	3750	19663	12	180	790	137	3930	20453
10	Rajbari	37	109	146	5226	17187	5	125	240	151	5351	17427
11	Madaripur	0	8	8	204	387	3	160	240	11	364	627
12	Gopalgonj	0	32	32	946	4882	0	0	0	32	946	4882
13	Shoriatpur	2	7	9	260	484	8	175	290	17	435	774
	Dhaka Division	**373**	**1997**	**2370**	**60844**	**290797**	**194**	**4057**	**13559**	**2564**	**64901**	**304356**
14	Mymensing	341	2315	2656	102491	399112	398	9421	35216	3054	111912	434328
15	Jamalpur	40	308	348	10129	20822	13	275	3140	361	10404	23962
16	Sherpur	209	200	409	11489	52889	15	390	2687	424	11879	55576
17	Netrokona	2	443	445	14331	36435	11	310	1218	456	14641	37653
	Mynensingh Division	**592**	**3266**	**3858**	**138440**	**509258**	**437**	**10396**	**42261**	**4295**	**148836**	**551519**
18	Rajshahi	429	3086	3515	131483	267590	130	1665	10043	3645	133148	277633
19	C.Nababgonj	255	1363	1618	61829	116133	0	0	0	1618	61829	116133
20	Natore	1	598	599	14927	70915	46	450	6790	645	15377	77705
21	Naogoan	8	4609	4617	133355	290162	127	1300	22267	4744	134655	312429
22	Pabna	8	1075	1083	31510	123216	87	595	1800	1170	32105	125016
23	Sirajgonj	1	880	881	20616	71489	32	195	2305	913	20811	73794
24	Bogra	344	2260	2604	80003	235762	89	373	10154	2693	80376	245916
25	Joypurhat	11	1577	1588	39681	129823	76	285	5820	1664	39966	135643
	Rajshahi Division	**1057**	**15448**	**16505**	**513404**	**1305090**	**587**	**4863**	**59179**	**17092**	**518267**	**1364269**
26	Gaibandha	39	701	740	18918	33388	12	120	1285	752	19038	34673
27	Rangpur	47	1046	1093	31249	60839	3	18	85	1096	31267	60924
28	Nilphamari	68	275	343	10426	14856	0	0	0	343	10426	14856
29	Lalmonirhat	151	110	261	6709	10877	0	0	0	261	6709	10877
30	Kurigram	0	570	570	14201	32092	0	0	0	570	14201	32092
31	Dinajpur	154	3068	3222	82698	165191	17	130	713	3239	82828	165904
32	Thakurgoan	10	1414	1424	40510	57249	0	0	0	1424	40510	57249
33	Panchagar	49	387	436	11366	19675	0	0	0	436	11366	19675

District Wise Irrigation Equipment used, Area Irrigated and Benefitted Farmer

DTW

Sl No	District Name	DEEP TUBEWELL OPERATED BY ELECTRICITY AND DIESEL											
		DTW Operated by Electricity					DTW Operated by Diesel			Total			
		PDB	REB	Total	Area	Farmers	Unit	Area	Farmers	Unit	Area	Farmers	
	Rangpur Division	**518**	**7571**	**8089**	**216077**	**394167**	**32**	**268**	**2083**	**8121**	**216345**	**396250**	
34	Chittagong	1	24	25	641	2402	4	40	400	29	681	2802	
35	Lakshmipur	0	19	19	1145	3357	0	0	0	19	1145	3357	
36	Feni	7	25	32	1592	2875	0	0	0	32	1592	2875	
37	Noakhali	0	51	51	1675	12800	0	0	0	51	1675	12800	
38	Cox's Bazar	0	0	0	0	0	22	950	750	22	950	750	
39	Rangamati	1	0	1	25	95	0	0	0	1	25	95	
40	Khagrachari	0	0	0	0	0	0	0	0	0	0	0	
41	Bandarban	0	0	0	0	0	0	0	0	0	0	0	
42	Comilla	137	1313	1450	39843	171077	23	260	1656	1473	40103	172733	
43	Chandpur	2	198	200	7578	28378	25	654	5635	225	8232	34013	
44	B. Baria	7	185	192	8688	42356	11	50	456	203	8738	42812	
	Chittagong Division	**155**	**1815**	**1970**	**61187**	**263340**	**85**	**1954**	**8897**	**2055**	**63141**	**272237**	
45	Jessore	2	1088	1090	26641	73525	98	1982	9816	1188	28623	83341	
46	Meherpur	0	103	103	2726	26510	0	0	0	103	2726	26510	
47	Kushtia	7	60	67	2184	9983	14	65	189	81	2249	10172	
48	Chuadanga	9	156	165	5286	16131	14	208	830	179	5494	16961	
49	Satkhira	21	342	363	8915	18641	420	8305	17719	783	17220	36360	
50	Bagerhat	0	3	3	76	270	1	8	17	4	84	287	
51	Khulna	0	5	5	127	314	5	28	32	10	155	346	
52	Jhenidah	45	242	287	7906	23064	13	145	670	300	8051	23734	
53	Narail	0	0	0	0	0	0	0	0	0	0	0	
54	Magura	1	8	9	307	1007	1	10	25	10	317	1032	
	Khulna Division	**85**	**2007**	**2092**	**54168**	**169445**	**566**	**10751**	**29298**	**2658**	**64919**	**198743**	
55	Sylhet	2	12	14	890	2906	0	0	0	14	890	2906	
56	Sunamgonj	2	32	34	877	1794	0	0	0	34	877	1794	
57	Habigonj	4	143	147	5417	11869	25	597	1380	172	6014	13249	
58	M.Bazar	0	1	1	35	75	0	0	0	1	35	75	
	Sylhet Division	**8**	**188**	**196**	**7219**	**16644**	**25**	**597**	**1380**	**221**	**7816**	**18024**	
59	Barisal	1	0	1	20	60	0	0	0	1	20	60	
60	Jhalokathi	0	0	0	0	0	0	0	0	0	0	0	
61	Perojpur	0	0	0	0	0	0	0	0	0	0	0	
62	Patuakhali	0	0	0	0	0	0	0	0	0	0	0	
63	Barguna	0	0	0	0	0	0	0	0	0	0	0	
64	Bhola	0	0	0	0	0	0	0	0	0	0	0	
	Barisal Division	**1**	**0**	**1**	**20**	**60**	**0**	**0**	**0**	**1**	**20**	**60**	
	Country Total	**2789**	**32292**	**35081**	**1051359**	**2948801**	**1926**	**32886**	**156657**	**37007**	**1084245**	**3105458**	

District Wise Irrigation Equipment used, Area Irrigated and Benefitted Farmer

STW

Sl No	District Name	SHALLOW TUBEWELL OPERATED BY ELECTRICITY AND DIESEL											
		STW Operated by Electricity					STW Operated by Diesel			Total			
		PDB	REB	Total	Area	Farmers	Unit	Area	Farmers	Unit	Area	Farmers
1	Dhaka	212	2819	3031	11772	57229	6295	14193	59866	9326	25965	117095
2	Munshigonj	198	430	628	2885	9447	2831	7720	26929	3459	10605	36376
3	Narayangonj	218	1366	1584	9075	34875	1105	2015	9431	2689	11090	44306
4	Manikgonj	513	4856	5369	14114	44894	14144	28781	117388	19513	42895	162282
5	Narsingdi	95	6443	6538	19138	77441	9126	18228	67456	15664	37366	144897
6	Gazipur	138	3718	3856	9293	32263	7784	8008	32299	11640	17301	64562
7	Tangail	4127	16277	20404	63650	218820	26944	41542	136022	47348	105192	354842
8	Kishorgonj	878	2732	3610	16580	47943	19774	29890	113368	23384	46470	161311
9	Faridpur	19	1369	1388	3894	11887	13777	18482	78069	15165	22376	89956
10	Rajbari	270	1468	1738	3640	8713	13411	25479	80481	15149	29119	89194
11	Madaripur	36	2250	2286	10298	45990	2082	5576	25764	4368	15874	71754
12	Gopalgonj	238	2220	2458	9044	30146	4330	7788	37597	6788	16832	67743
13	Shoriatpur	19	417	436	1875	4790	1380	2168	10233	1816	4043	15023
Dhaka Division		**6961**	**46365**	**53326**	**175258**	**624438**	**122983**	**209870**	**794903**	**176309**	**385128**	**1419341**
14	Mymensing	3623	13506	17129	50743	191158	28960	56563	346636	46089	107306	537794
15	Jamalpur	252	9447	9699	33815	94390	36343	62328	423855	46042	96143	518245
16	Sherpur	2315	8131	10446	28164	82874	8608	13275	89662	19054	41439	172536
17	Netrokona	87	10646	10733	28499	109871	34873	51091	244081	45606	79590	353952
Mymensingh Division		**6277**	**41730**	**48007**	**141221**	**478293**	**108784**	**183257**	**1104234**	**156791**	**324478**	**1582527**
18	Rajshahi	329	2019	2348	8669	15996	22117	25216	115896	24465	33885	131892
19	C.Nababgonj	759	4507	5266	18864	33564	9365	18120	101594	14631	36984	135158
20	Natore	0	5082	5082	16467	43323	31423	62419	314254	36505	78886	357577
21	Naogoan	0	9303	9303	33091	67632	43956	73478	358764	53259	106569	426396
22	Pabna	285	4879	5164	22216	82011	17066	91153	468021	22230	113369	550032
23	Sirajgonj	0	22354	22354	51978	195111	53187	66493	298384	75541	118471	493495
24	Bogra	550	12313	12863	45662	193314	49587	72929	325406	62450	118591	518720
25	Joypurhat	130	2487	2617	13730	34238	5895	11280	60265	8512	25010	94503
Rajshahi Division		**2053**	**62944**	**64997**	**210677**	**665189**	**232596**	**421088**	**2042584**	**297593**	**631765**	**2707773**
26	Gaibandha	974	8350	9324	22914	208256	31880	69115	351395	41204	92029	559651
27	Rangpur	125	17001	17126	30827	142626	64848	127531	618601	81974	158358	761227
28	Nilphamari	5132	13972	19104	27763	77352	20426	30659	151642	39530	58422	228994
29	Lalmonirhat	9982	4429	14411	16733	78980	24010	43088	203413	38421	59821	282393
30	Kurigram	353	11281	11634	23825	121549	37248	75698	379202	48882	99523	500751
31	Dinajpur	317	12166	12483	44816	102373	64484	133620	586754	76967	178436	689127
32	Thakurgoan	53	5347	5400	16568	35982	44499	65344	214806	49899	81912	250788
33	Panchagar	1567	2455	4022	15774	27974	18285	46642	173444	22307	62416	201418
Rangpur Division		**18503**	**75001**	**93504**	**199220**	**795092**	**305680**	**591697**	**2679257**	**399184**	**790917**	**3474349**

District Wise Irrigation Equipment used, Area Irrigated and Benefitted Farmer

STW

Sl No	District Name	SHALLOW TUBEWELL OPERATED BY ELECTRICITY AND DIESEL											
		STW Operated by Electricity					STW Operated by Diesel			Total			
		PDB	REB	Total	Area	Farmers	Unit	Area	Farmers	Unit	Area	Farmers	
34	Chittagong	0	2521	2521	17973	58030	2289	6942	35304	4810	24915	93334	
35	Lakshmipur	0	361	361	7870	10573	467	1540	4917	828	9410	15490	
36	Feni	0	2440	2440	15222	37650	476	861	3142	2916	16083	40792	
37	Noakhali	0	1859	1859	13891	36309	3762	6991	28695	5621	20882	65004	
38	Cox's Bazar	70	1004	1074	10457	34382	4525	15429	47490	5599	25886	81872	
39	Rangamati	22	34	56	0	0	0	0	0	56	0	0	
40	Khagrachari	15	10	25	50	165	85	225	698	110	275	863	
41	Bandarban	25	11	36	140	468	314	1076	3768	350	1216	4236	
42	Comilla	95	11538	11633	34958	130181	18217	38016	183790	29850	72974	313971	
43	Chandpur	0	860	860	10578	31586	1534	2959	12620	2394	13537	44206	
44	B. Baria	0	2693	2693	11993	76219	12288	20761	80965	14981	32754	157184	
Chittagong Division		**227**	**23331**	**23558**	**123132**	**415563**	**43957**	**94800**	**401389**	**67515**	**217932**	**816952**	
45	Jessore	180	3331	3511	23405	60688	55873	73215	534367	59384	96620	595055	
46	Meherpur	45	1078	1123	11092	24449	27389	39550	225353	28512	50642	249802	
47	Kushtia	209	2112	2321	24178	51743	31347	56201	209075	33668	80379	260818	
48	Chuadanga	58	665	723	6346	24220	32774	40771	295394	33497	47117	319614	
49	Satkhira	160	6664	6824	24372	54586	15963	27814	112216	22787	52186	166802	
50	Bagerhat	57	3711	3768	12835	31282	6715	13238	55097	10483	26073	86379	
51	Khulna	45	3996	4041	8862	47906	9805	18774	86989	13846	27636	134895	
52	Jhenidah	525	7791	8316	28650	48602	30463	66270	275617	38779	94920	324219	
53	Narail	42	144	186	1265	15381	16221	33276	152671	16407	34541	168052	
54	Magura	90	795	885	8202	17952	17852	38924	195497	18737	47126	213449	
Khulna Division		**1411**	**30287**	**31698**	**149207**	**376809**	**244402**	**408033**	**2142276**	**276100**	**557240**	**2519085**	
55	Sylhet	121	2487	2608	10330	4492	1383	5115	17868	3991	15445	22360	
56	Sunamgonj	241	1099	1340	9608	36952	6091	17589	68143	7431	27197	105095	
57	Habigonj	305	1547	1852	12214	51620	6144	25704	88109	7996	37918	139729	
58	M.Bazar	27	98	125	426	1405	5562	12407	58704	5687	12833	60109	
Sylhet Division		**694**	**5231**	**5925**	**32578**	**94469**	**19180**	**60815**	**232824**	**25105**	**93393**	**327293**	
59	Barisal	9	47	56	130	430	25	85	589	81	215	1019	
60	Jhalokathi	0	0	0	0	0	0	0	0	0	0	0	
61	Perojpur	0	8	8	13	26	0	0	0	8	13	26	
62	Patuakhali	10	0	10	14	52	0	0	0	10	14	52	
63	Barguna	10	0	10	25	52	0	0	0	10	25	52	
64	Bhola	0	0	0	0	0	0	0	0	0	0	0	
Barisal Division		**29**	**55**	**84**	**182**	**560**	**25**	**85**	**589**	**109**	**267**	**1149**	
Country Total		**36155**	**284944**	**321099**	**1031475**	**3450413**	**1077607**	**1969645**	**9398056**	**1398706**	**3001120**	**12848469**	

LLP

District Wise Irrigation Equipment used, Area Irrigated and Benefitted Farmer

Sl No	District Name	LOW LIFT PUMP OPERATED BY ELECTRICITY AND DIESEL											
		LLP Operated by Electricity					LLPOperated by Diesel			Total			
		PDB	REB	Total	Area	Farmers	Unit	Area	Farmers	Unit	Area	Farmers	
1	Dhaka	90	103	193	3723	17399	1690	7749	26106	1883	11472	43505	
2	Munshigonj	32	71	103	1698	3977	901	6234	14051	1004	7932	18028	
3	Narayangonj	45	285	330	5092	24445	855	5199	20124	1185	10291	44569	
4	Manikgonj	50	101	151	2180	4707	113	807	1054	264	2987	5761	
5	Narsingdi	18	173	191	3583	7308	471	3384	8467	662	6967	15775	
6	Gazipur	37	436	473	6356	10886	3652	20333	36710	4125	26689	47596	
7	Tangail	26	164	190	4204	7981	348	2582	3939	538	6786	11920	
8	Kishorgonj	150	469	619	12145	29566	6696	46891	123475	7315	59036	153041	
9	Faridpur	6	107	113	1963	4866	660	3976	9535	773	5939	14401	
10	Rajbari	28	36	64	859	2470	66	404	624	130	1263	3094	
11	Madaripur	22	396	418	5786	18471	812	7767	23599	1230	13553	42070	
12	Gopalgonj	31	356	387	4817	14730	3937	37005	90755	4324	41822	105485	
13	Shoriatpur	42	444	486	5387	16979	1285	11222	37309	1771	16609	54288	
Dhaka Division		**577**	**3141**	**3718**	**57793**	**163785**	**21486**	**153553**	**395748**	**25204**	**211346**	**559533**	
14	Mymensing	66	283	349	4724	15301	4744	34012	90833	5093	38736	106134	
15	Jamalpur	43	115	158	3000	6775	290	3563	10509	448	6563	17284	
16	Sherpur	54	245	299	3253	8558	598	6175	16999	897	9428	25557	
17	Netrokona	204	630	834	11757	31230	4455	38560	92824	5289	50317	124054	
Mymensingh Division		**367**	**1273**	**1640**	**22734**	**61864**	**10087**	**82310**	**211165**	**11727**	**105044**	**273029**	
18	Rajshahi	33	201	234	4823	15019	2776	12610	13853	3010	17433	28872	
19	C.Nababgonj	120	236	356	6252	12540	1205	5639	4105	1561	11891	16645	
20	Natore	10	66	76	642	2810	0	0	0	76	642	2810	
21	Naogoan	94	350	444	6884	18287	3875	12530	31815	4319	19414	50102	
22	Pabna	25	221	246	2461	6695	1501	11497	42067	1747	13958	48762	
23	Sirajgonj	53	81	134	1643	5419	405	2986	11115	539	4629	16534	
24	Bogra	23	59	82	1328	3147	193	825	1035	275	2153	4182	
25	Joypurhat	0	0	0	0	0	0	0	0	0	0	0	
Rajshahi Division		**358**	**1214**	**1572**	**24033**	**63917**	**9955**	**46087**	**103990**	**11527**	**70120**	**167907**	
26	Gaibandha	0	78	78	2295	3840	153	1432	2480	231	3727	6320	
27	Rangpur	33	22	55	452	927	12	195	699	67	647	1626	
28	Nilphamari	13	17	30	217	542	68	342	626	98	559	1168	
29	Lalmonirhat	55	94	149	1903	3384	82	499	995	231	2402	4379	
30	Kurigram	42	39	81	569	1446	437	2746	1634	518	3315	3080	
31	Dinajpur	34	146	180	3621	4448	518	3031	6500	698	6652	10948	
32	Thakurgoan	0	51	51	1537	1914	0	0	0	51	1537	1914	
33	Panchagar	1	11	12	301	481	21	70	155	33	371	636	

District Wise Irrigation Equipment used, Area Irrigated and Benefitted Farmer

LLP

Sl No	District Name	LOW LIFT PUMP OPERATED BY ELECTRICITY AND DIESEL											
		LLP Operated by Electricity					LLPOperated by Diesel			Total			
		PDB	REB	Total	Area	Farmers	Unit	Area	Farmers	Unit	Area	Farmers	
Rangpur Division		**178**	**458**	**636**	**10895**	**16982**	**1291**	**8315**	**13089**	**1927**	**19210**	**30071**	
34	Chittagong	113	775	888	16169	47009	4735	16741	69911	5623	32910	116920	
35	Lakshmipur	10	359	369	8490	19716	2374	15664	68315	2743	24154	88031	
36	Feni	99	290	389	8929	29063	891	8944	32429	1280	17873	61492	
37	Noakhali	8	24	32	665	3691	8779	37612	199903	8811	38277	203594	
38	Cox's Bazar	48	379	427	7274	21742	2320	20280	49744	2747	27554	71486	
39	Rangamati	26	0	26	166	500	3009	13931	32900	3035	14097	33400	
40	Khagrachari	18	76	94	999	2161	2222	9089	22049	2316	10088	24210	
41	Bandarban	32	13	45	479	2056	1346	15643	15556	1391	16122	17612	
42	Comilla	201	1158	1359	16218	46664	4014	21673	151554	5373	37891	198218	
43	Chandpur	82	537	619	8984	45130	4153	24983	134071	4772	33967	179201	
44	B. Baria	132	1093	1225	18800	62845	5178	32830	166537	6403	51630	229382	
Chittagong Division		**769**	**4704**	**5473**	**87173**	**280577**	**39021**	**217390**	**942969**	**44494**	**304563**	**1223546**	
45	Jessore	22	204	226	3237	8749	1025	2866	6592	1251	6103	15341	
46	Meherpur	6	11	17	390	950	112	382	764	129	772	1714	
47	Kushtia	8	43	51	685	2180	217	787	1584	268	1472	3764	
48	Chuadanga	8	2	10	142	1505	185	926	1841	195	1068	3346	
49	Satkhira	46	143	189	2454	4341	2149	4838	9549	2338	7292	13890	
50	Bagerhat	77	127	204	2166	4106	14932	44772	134488	15136	46938	138594	
51	Khulna	13	0	13	114	325	15853	65905	76612	15866	66019	76937	
52	Jhenidah	2	2	4	48	55	439	1812	3275	443	1860	3330	
53	Narail	10	44	54	1005	3200	572	3245	21455	626	4250	24655	
54	Magura	2	63	65	1264	6991	42	276	2467	107	1540	9458	
Khulna Division		**194**	**639**	**833**	**11505**	**32402**	**35526**	**125809**	**258627**	**36359**	**137314**	**291029**	
55	Sylhet	41	507	548	9252	19230	8440	33584	125771	8988	42836	145001	
56	Sunamgonj	58	294	352	5880	12750	14916	101218	171742	15268	107098	184492	
57	Habigonj	78	613	691	5852	22350	8155	50554	107033	8846	56406	129383	
58	M.Bazar	19	44	63	921	2115	9577	40511	93673	9640	41432	95788	
Sylhet Division		**196**	**1458**	**1654**	**21905**	**56445**	**41088**	**225867**	**498219**	**42742**	**247772**	**554664**	
59	Barisal	77	222	299	4245	16351	11251	75551	197886	11550	79796	214237	
60	Jhalokathi	12	30	42	1650	3423	1195	9438	24509	1237	11088	27932	
61	Perojpur	13	58	71	2708	5448	3365	16640	40092	3436	19348	45540	
62	Patuakhali	43	81	124	1568	2380	2116	12807	34123	2240	14375	36503	
63	Barguna	20	40	60	970	2248	167	2017	5999	227	2987	8247	
64	Bhola	314	160	474	6580	20289	6770	40118	78518	7244	46698	98807	
Barisal Division		**479**	**591**	**1070**	**17721**	**50139**	**24864**	**156571**	**381127**	**25934**	**174292**	**431266**	
		3118	**13478**	**16596**	**253759**	**726111**	**183318**	**1015902**	**2804934**	**199914**	**1269661**	**3531045**	