



ANNUAL REPORT 2018-19

Irrigation & Waterways Department
Government of West Bengal



ANNUAL REPORT

2018-19





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Message from the Hon'ble Minister-in-Charge

Over the last eight years, the Irrigation & Waterways Department has grown by leaps and bounds, in size stature and in portfolio. During this period, my Department has increasingly prioritized our activities in a manner that provides maximum benefit to the common people, 'Maa -Maati -Manush'. The capital expenditure in 2018-19 is the highest in the history of the Department which is almost three times of that in 2010-11. We have strived to ensure last mile delivery so that dividends are reaped at the grass root level. Various works aimed to enhance irrigation benefits have been taken up during the year and efforts have been made for better flood management, and in doing this, our approach has been to reach out to the most vulnerable sections of the society.

We have, over these years strived to enhance our presence where it matters, our role in flood management as part of emergency services is one such example. I am proud to state that we are among the most progressive Irrigation Departments' across the country, having embraced technological advancements such as use of concrete tetra-pods to control erosion, use of Geo-bags and gabions to reconstruct flood protective embankments and automation measures such as SCADA in our irrigation projects. We have undertaken complete refurbishment of the drainage system in various districts. I am especially gratified to showcase the numerous independent schemes and programmes we have undertaken with State Government funding alone, bearing testimony to the State's self-reliance in recent years. We have also commenced work on the externally funded 'West Bengal Major Irrigation & Flood Management Project'.

It brings me great joy in presenting this Annual Administrative Report that captures glimpses of our wonderful journey to achieve progressively greater milestones over these few years.

Suvendu Adhikari

1st October, 2019



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Foreword

The Irrigation & Waterways Department (I&WD) has been playing a pivotal role in supporting agriculture and flood mitigation across the State through widespread interventions in the areas of surface irrigation, drainage and flood control. Established in the year 1920, it is one of the oldest functioning Departments in the State. I&WD has commissioned more than 93 irrigation projects in the State, creating long-term developmental impact through its various interventions. In the year 2018-19 alone, revamping of a cluster of irrigation projects taken up by I&WD resulted in restoration of irrigation potential of 30,012 acres. Similarly, 136 Km. of drainage channels were resuscitated and flood embankments and riverbank protection measures over a length of 142 Km. was successfully achieved in 2018-19.

The Irrigation & Waterways Department has taken a number of steps towards improvement of institutional efficiency through technological advancements and innovative planning in the last few years. This is reflected not only in several new initiatives and interventions but also in the approach to managing ongoing projects. Among the recent measures, rehabilitation of distressed structures based on the recommendation of the Safety Audit reports has been imparted topmost priority. Operation and Management of dams & barrages are being rapidly modernized with a view to improve safety and operational efficiency.

The Department recently undertook a detailed infrastructure gap analysis, based on which special infrastructure funding was mobilized for two major initiatives- revamping 57 medium and minor irrigation schemes, and replacement of old dilapidated bridges with 373 new RCC bridges on irrigation canals & drainage channels.

In line with our approach towards continual improvement of work efficiency, a number of new initiatives were taken by the Department this year, i.e better asset management through a Safety Audit and Health Check of vital structures (dams, barrages and bridges), Annual Asset Maintenance Plan and an On-line Dashboard that enables real time flood data dissemination through the web portal as well as by mobile application. We have also made efforts towards improving institutional efficiency through On-line Project Monitoring and Reporting System, undertaking Independent Technical Evaluation of projects, introducing Procedural Reforms for Project Sanctioning, adopting an Advance Work Plan Cycle, setting up in-house Regional Quality Control Laboratories & undertaking Capacity Augmentation measures through restructuring of Mechanical & Electrical wing by creation of new positions as well as setting up of new decentralized district level offices.

In this annual report, we have tried to chronicle our interventions over the past few years along with enumerating the Department's initiatives undertaken in the year 2018-19. We have also provided a glimpse of some of our future plans as we continue to strive towards fulfilling the Department's mandate and in achieving institutional excellence.

Naveen Prakash, IAS

1st October, 2019

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A Broad Overview of Irrigation & Waterways Department



1

A Broad Overview of Irrigation & Waterways Department

Irrigation & Waterways Department (I&WD) is a Works Department under the Government of West Bengal, entrusted with the task of providing irrigation facilities, offering reasonable protection against floods, alleviating drainage congestions, arresting erosion & up-keeping inland navigation channels in the State.

1.1. Genesis

❖ The Irrigation Department, was re-enacted as a discrete establishment in 1920 post bifurcation from the Works & Building Department. The Department was renamed as 'Irrigation & Waterways' Department in 1946.

1.2. Vision and Objectives

❖ I&WD is responsible for the development and regulation of inland water resources through major and medium surface irrigation projects and also for preventing and managing floods and water logging. To furnish the effectiveness and efficiency of its service delivery, the Department has formulated a 'Vision

Document' in 2016 to establish and guide all the activities it ought to undertake, structured by a sound and strategic decision making process.

1.2.1. Vision

❖ The vision of the I&WD as enshrined in the 'Vision Document' are:

(a) To harness river and surface water resources of the State in a sustainable manner; (b) To optimally utilize the Irrigation Potential and; (c) To regulate and moderate the effects of floods and drainage congestion through scientific Flood Management interventions.

1.2.2. Objectives

❖ The rationale for ensuring sustainable improvements in the provision, operation and maintenance of infrastructural facilities in surface water irrigation and flood management (including drainage) sub-sectors has governed the objectives of the Department. The key objectives are:

1

Reducing the gap between Irrigation Potential Created (IPC) and Irrigation Potential Utilized (IPU) through revitalization of the existing infrastructure

2

Harnessing water resources of the hitherto untapped channels and rivers for irrigation and other purposes

3

Rejuvenation of rivers and channels, upgrading existing flood management infrastructures including embankments, river bank protection works, sluices, pump houses, etc. as well as capacity addition to the existing infrastructure, all related to structural flood management

4

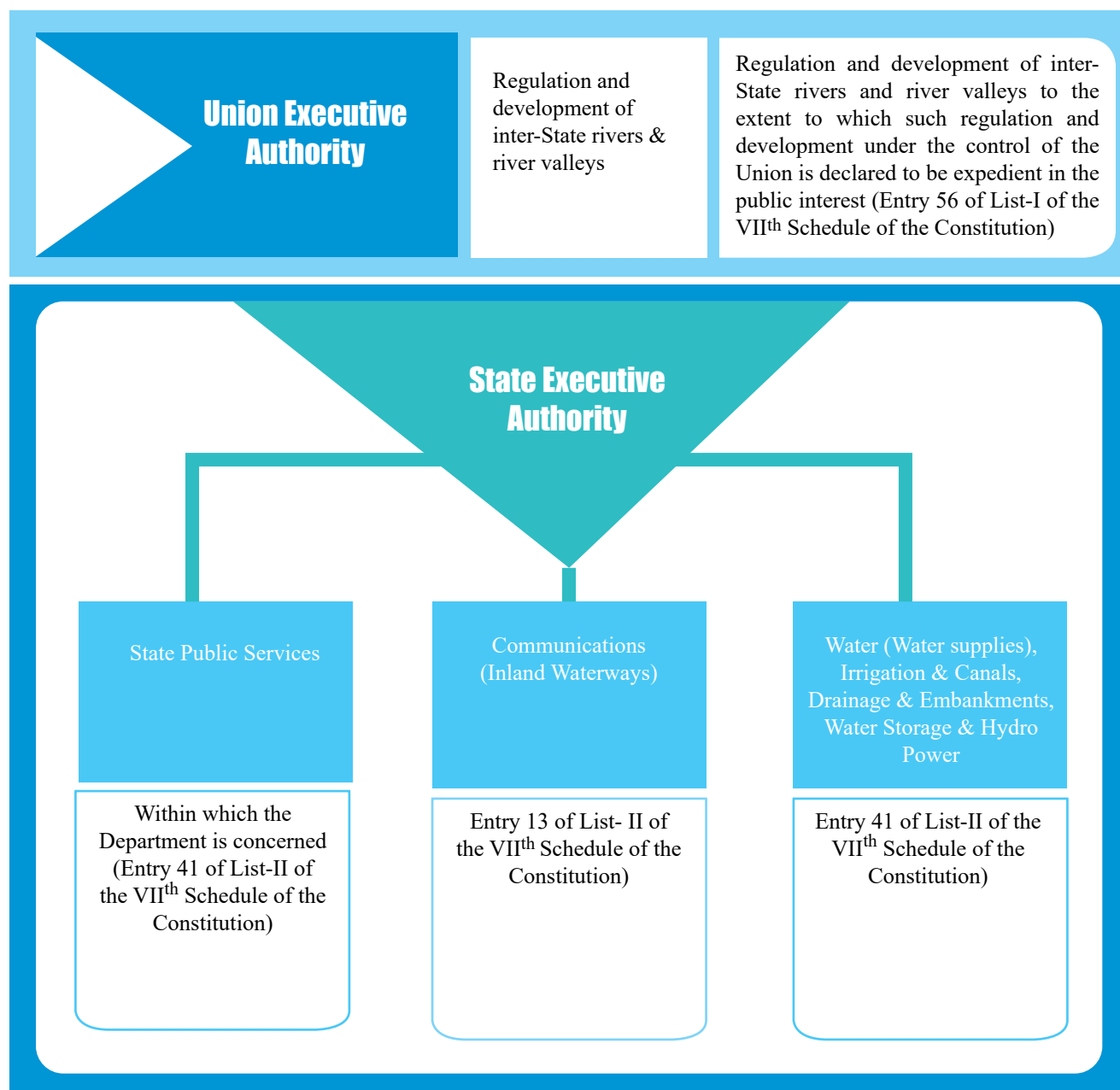
Improving Rural Connectivity, mainly by construction of permanent bridges

5

Development of web-based flood forecasting system as an essential tool for non-structural flood management

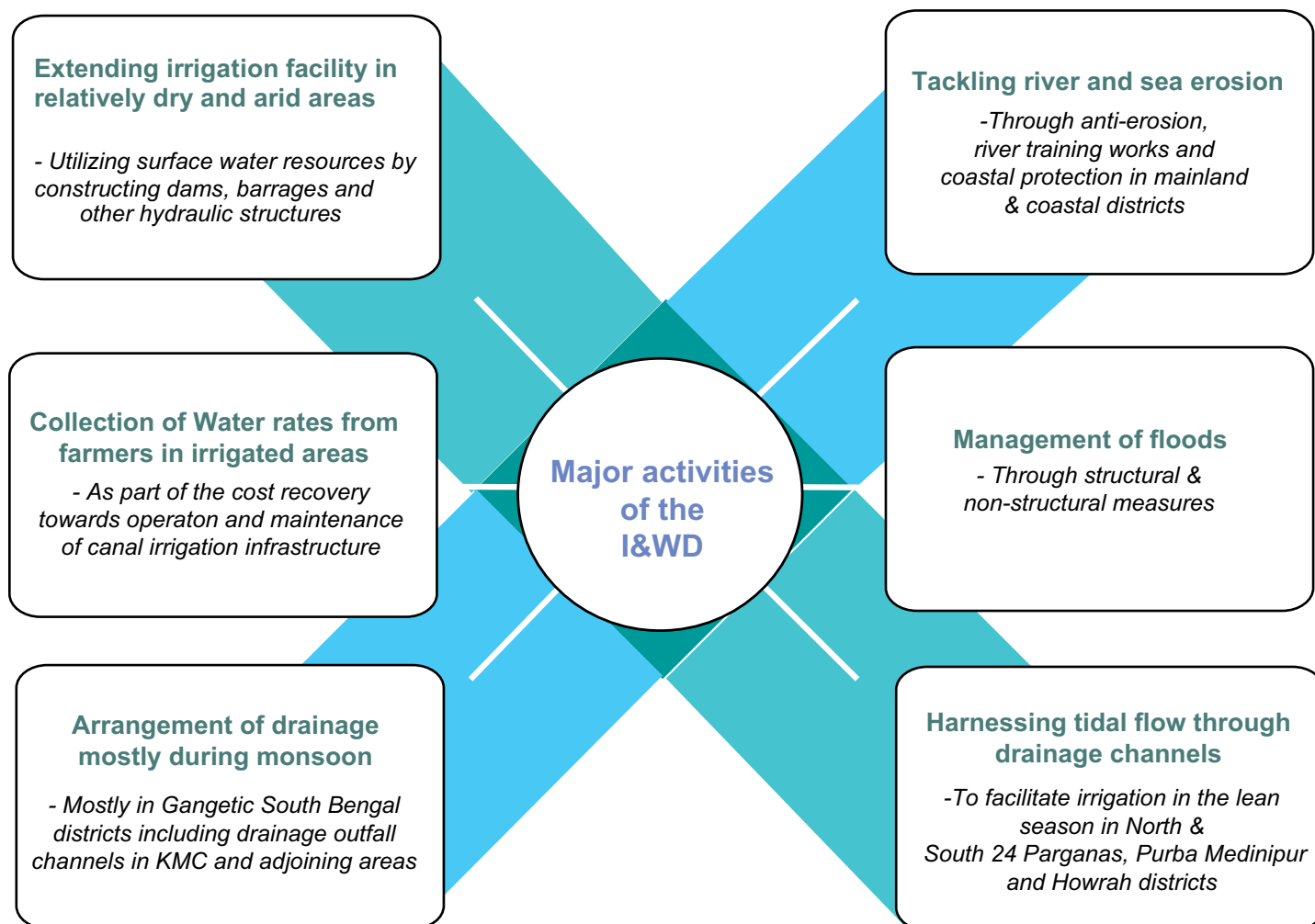
1.3. Functions and functionaries

- ❖ As stated in the Rules of Business, 1964 of the State Government, the I&WD is committed to carry out the following functions catering to the interests of the public:
 - ❑ Development and regulation of the State's inland water resources (primarily surface water resources) with the objective of preventing and controlling floods and water-logging.
 - ❑ Administration of irrigation works and maintenance of water resources.
 - ❑ Production, facilitation and provision of water-generated power.
- ❖ The functions of the I&WD fall within the administrative ambit of both the State and the Union executive authorities, as exhibited below:

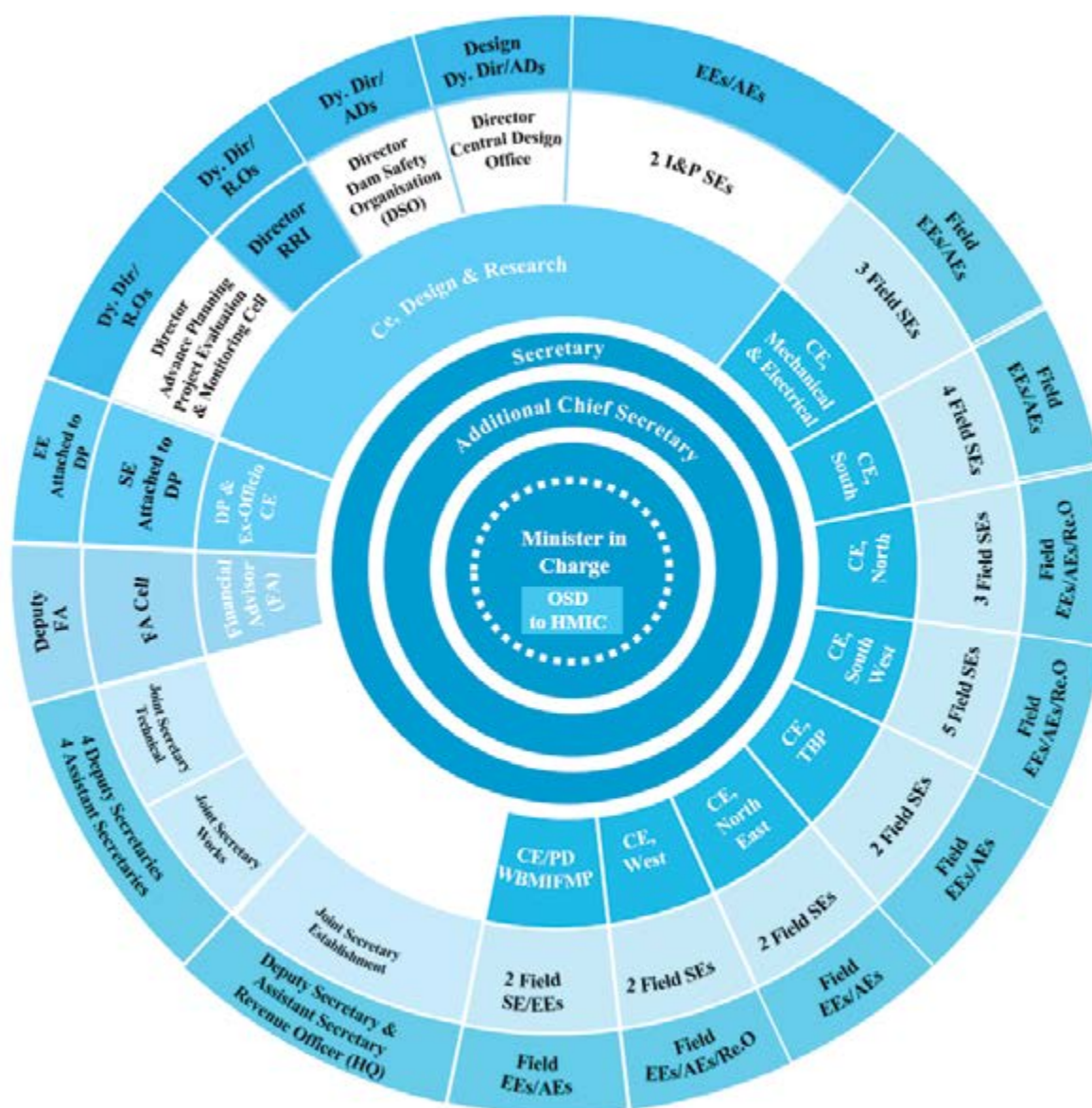


1.4. Key sectoral activities undertaken by the I&WD

The principle activities undertaken by the I&WD are aligned with the prioritized objectives as highlighted in Section 1.2.2 and adhere to the mandated functional responsibilities stated in Section 1.3. The same are represented below:



1.5. Departmental Organogram



KEY:

HMIC: Hon'ble Minister-in-Charge
 CE: Chief Engineer
 DP: Director of Personnel & Ex-Officio CE
 PD: Project Director
 WBMIFMP: West Bengal Major Irrigation and Flood Management Project
 OSD: Officer-on-Special Duty
 SE: Superintending Engineer
 EE: Executive Engineer

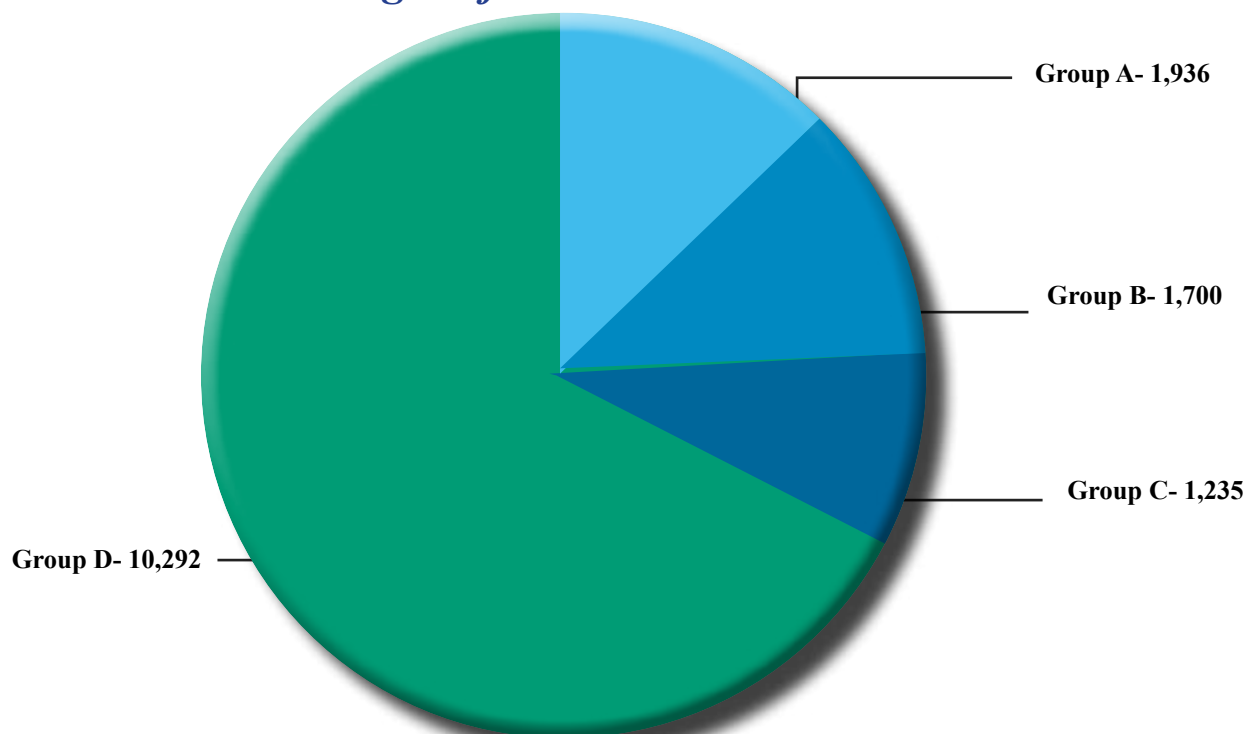
AE: Assistant Engineer
 I&P: Investigation & Planning Circle
 RRI: River Research Institute
 TBP: Teesta Barrage Project
 Dy. Dir: Deputy Director
 AD: Assistant Director
 R.O: Research Officer
 Re.O: Revenue Officer

In addition to the Circle Offices, Division Offices & Subdivision Offices entrusted with field work, the I&W Directorate has the following:

- ❑ Self-sufficient Central Design Office (CDO) equipped with modern technology and software for in-house design of all major hydraulic structures, bridges and buildings;
- ❑ Two Investigation & Planning Circles, one each in irrigation and flood management sectors responsible for survey and data collection, data warehousing and preparation of major schemes;
- ❑ One Advance Planning Project Evaluation & Monitoring Cell for collecting and maintaining databases, formulation of Annual Plan, Statistical Handbook, Monitoring of Central Flood Cell etc.;
- ❑ Besides Planning & Design Wings, the I&WD has a separate research organization named as “River Research Institute” (RRI) equipped with state-of-the-art instruments and technical experts for investigating behavioural pattern in rivers, sedimentation analysis of reservoirs and preparing appropriate hydraulic models. Further more, the RRI imparts short-term training courses to Departmental officers, other Government officials and research scholars in the field of river engineering;
- ❑ Dam Safety Organization (DSO): The DSO under the I&WD is responsible for undertaking pre and post monsoon periodic inspection of all the large dams and appurtenant structures across the State. The organization has issued separate guidelines for periodic inspection and maintenance of dams, Barrages and Bridges;
- ❑ Seven in-house ‘Departmental Quality Control & Testing Laboratories’ were made operational at Haringhata in Nadia district, Bankura in Bankura district, Berhampur in Murshidabad district, Contai in Purba Medinipur district, Galsi in Purba Bardhaman district, Salt Lake in Kolkata and Coochebehar Town in Coochbehar district for undertaking laboratory tests of various construction materials.
- ❑ One Public Relations & Statistical (PR&S) Cell under I&WD is there for collecting data of various works implemented, for generating public awareness regarding the activities of the Department through knowledge dissemination, publication of magazines, pamphlets, handouts, organizing seminars, workshops and participating in exhibitions, trade fairs, melas, etc. The Cell has till date, published 21 issues in Bengali and 2 issues in English of “SECHPATRA”, the Departmental magazine covering various contemporary issues on irrigation, flood and other sectors in water resources. The magazine features opinions of renowned sectoral experts on the subject. Activities of the Cell presently being managed by the officers and staff of the Irrigation & Waterways Directorate. These are proposed to be assigned to a dedicated ‘Documentation and Publication Unit’ from FY 2019-20 onwards.

❖ I&WD under the overall responsibility of the Additional Chief Secretary functions under the aegis of a Directorate which is headed by 10 Senior most engineers designated as Chief Engineers with specific responsibilities and independent zone of activities under their control. There are 41 Superintending Engineers, who are either in charge of Circles under the Chief Engineers or directly attached to him. Each Superintending Engineer has got several Executive Engineers (total 142 in number), independently in charge of Divisions within the Circle, or directly attached with the Chief Engineers & Superintending Engineers. Each Executive Engineer heads a number of Assistant Engineers, Junior Engineers and other field staff to assist for execution of the works. Total sanctioned strength of Assistant & Junior Engineer is 385 & 1,326 respectively. Delegation of power and responsibility to each of the above-mentioned category of officers have been codified with a view to ensure proper decentralisation and streamlining of administration. The sanctioned staff strength in I&W Directorate is illustrated in the pie chart below:

Strength of I&W Directorate



Category of employees in the I&W Directorate

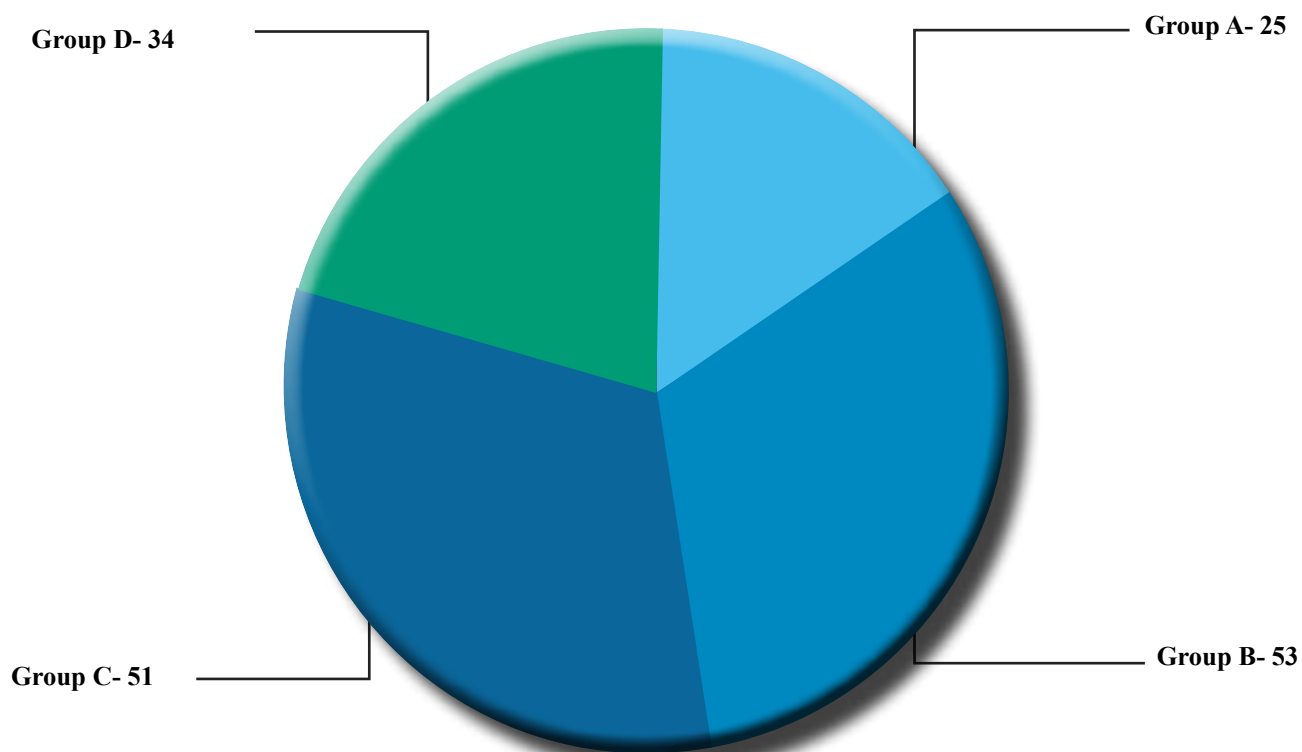
Group A - Chief Engineer, Superintending Engineer, Executive Engineer, Assistant Engineer, Junior Engineers, Administrative Officer, Revenue Officer, Assistant Canal Revenue Officer

Group B - Clerical Staff (Upper category), Surveyors, Draftsmen, Typists (Supervisory and Grade- I)

Group C - Clerical Staff (Lower category), Typists (Basic Grade), other Staff in Office Administration and Revenue Set-up, Tracer

Group D - Unskilled Staff of different categories

Strength of I&W Secretariat



Category of Officers/Employees in the I&W Secretariat

Group A - Additional Chief Secretary, Secretary, Personal Secretary to HMIC Joint Secretary, Deputy Secretary, Assistant Secretary, Law Officer, Registrar, Section Officer, Senior Supervisory Grade Typist

Group B - Upper Divisional Assistant, Head Assistant, Supervisory and Grade- I Typists

Group C - Lower Divisional Assistant, Muhharior Grade- I, Muhharior, Record Supplier, Cash Sarkar

Group D - Unskilled Staff of different categories



Major Achievements from FY 2011-12 to FY 2017-18



2

Projects under various thematic areas from FY 2011-12 to FY 2017-18

2.1. Projects under various thematic areas

2.1.1. Irrigation Development

❑ Enhancing state wide irrigation potential

❖ As the nodal agency responsible for ensuring sectoral improvement in the State, the I&WD adhering to its mandates and functional responsibilities has undertaken a number of diversified measures to uplift the overall development in the irrigation sub-sector to cater to the ulterior motive of generating benefits for the targeted population (farmers, agricultural households, rural population, etc.) in particular. The I&WD over the last 7 years has focused on creating a tangible impact through operationalization and improving the efficiency of existing infrastructure to unleash the untapped irrigation potential, an aspect often overlooked, but integral to optimize the desired quantum of benefits that can be generated through existing facilities before investing in additional infrastructure. Special drives were undertaken during the last 7 years to rehabilitate and improve old & dilapidated irrigation canal networks of Major and Medium irrigation projects which had been completed decades back along with creation of new irrigation potential through the ongoing Teesta Barrage Project and some other new schemes. As a part of that endeavor, rehabilitation and improvement of irrigation canals have been successfully completed for a total length of 950 Km. As a result, an additional 1,71,095 Hectare (Ha) of area was brought under irrigation after several decades. This includes 20,395 Ha of land in the western water-stressed districts of the State.

❑ A few successfully completed projects

❖ Reconstruction of the century-old defunct Anicut structure over Kangsabati river at Mohanpur in Paschim Medinipur district for irrigating 38,000 Ha of area in the

Blocks of Kharagpur-II, Debra, Pingla, Narayangarh and Panskura, benefiting around 30 Lakhs population.



Figure 1 Reconstructed Anicut structure over Kangsabati River at Mohanpur

❖ Construction of a mini barrage across Kuya river in Labhpur Block in Birbhum district for irrigating 580 Ha of area in the Block.



Figure 2 Mini Barrage across Kuya River in Labhpur

- ❖ Construction of a regulating structure in Kuia Kandar rivulet in Labhpur Block of Birbhum district for use in irrigation purposes and to arrest the floodwater overflow in the Kandar channel during monsoon.

- ❖ Successful commissioning of 138 check dams under 'Jalatirtha' programme, in Purulia and Bankura districts is a major step forward towards conservation and harnessing of surface water in the arid western districts of the State, bringing 5,456 Ha of additional area under irrigation.



Figure 3 Check Dam under 'Jalatirtha' at Rangametta, G.P.- Sukrughutu, P.S.-Barabazar, Purulia

- ❖ In order to meet the objective of harnessing sweet water resources in Sunderban area for the lean non-monsoon months and also to restore the drainage system during monsoons, one regulating structure was commissioned at Basanti Block and two more at Canning-II Block and Sagar Block.



Figure 4 10-vent Sluice structure in Sagar Block of South 24 Parganas

2.1.2. Flood Management

❑ Structural measures

- ❖ The I&WD undertook assignments relating to large-scale improvement of embankments and bank protection work on rivers and channels throughout the State, covering a total length of 2,978 Km. In this regard, completion of embankment improvement of 128 Km. in Kandi & adjoining areas of Murshidabad and Birbhum districts, reconstruction of 57 Km. length of 'Cyclone Aila' affected Sunderbans embankments are worth special mention.

- ❖ Furthermore, commissioning of the 3rd Additional Chowbhaga Pumping Station (P.S.) comprising six 150 cusecs and four 50 cusecs pumps with a total capacity of 1,100 cusecs. The 3rd Additional Chowbhaga P.S. along with the existing three pumping stations at Chowbhaga now drains the sewerage and storm water of the urban areas of Tollygunge Panchannagram Drainage basin under P.S.s Tollygunge, Jadavpur, Kasba and Tiljala.



Figure 5 3rd Additional Chowbhaga Pumping Station

- ❖ River training work in connection with extended runway at Cooch Behar airport, bank protection works at Padomoti, Dakshin Changmari, & Gourikone on river Teesta, at Debipur on river Fulahar, Miahhat & Khidirpur on Mahananda, Akhiriganj, Moya & Arjunpur on Ganga-Padma and Dhanpatnagar, Diar-Balagachi & Udaychandrapur on Bhagirathi, Chorchita

on Subarnarekha and Tamluk on Rupnarayan were a few other notable projects completed by the I&WD.



Figure 6 Bank protection work on river Teesta at Padomoti in Jalpaiguri district

❖ 8,244 Km. of drainage channels are maintained by the I&WD across the State to ensure smooth drainage of flood discharge, particularly during monsoon. With a view to improve the carrying capacities of silted up channels, a total length of 1,375 Km. of drainage channels/ rivers have been resuscitated during the last seven years.

❖ Successful completion of resuscitation work for drainage improvement of Beliaghata khal in Kolkata, Bagjola Khal and Kestopur Khal in North 24 Parganas, Tolly's Nullah/Adi-Ganga in South 24 Parganas and Lower Rampur Channel in Howrah, which also included major rivers and channels like Keliaghai, Kapeleshwari, Baghai and numerous channels in Purba and Paschim Medinipur have led to easement of drainage congestion.

❑ Non-Structural measures

Above and beyond the structural measures, I&WD also undertook a number of non-structural interventions to complement the former.

❖ Regular coordination in an organized manner was initiated and sustained with the Damodar Valley Corporation (DVC), National Hydroelectric Power Corporation (NHPC), Indian Meteorological Institute (IMD), Bharat Sanchar Nigam Limited (BSNL), Central Water Commission (CWC) and Governments

of Jharkhand & Odisha, for timely dissemination and sharing of flood related information for appropriate mitigation measures.

❖ Identification of vulnerable areas used for cultivation ('Char' land of rivers or blue line areas adjoining river banks) likely to be inundated during passage of floods, were identified up to mouza level in each of the districts and shared with the District Administrations for preparation of spatially appropriate rehabilitation and restoration plan.

❑ Flood emergency helplines

❖ Two toll-free helpline telephone numbers were established at Salt Lake and Jalpaiguri for use by the general public during the entire monsoon period from 1st June upto 31st October every year. The telephones used to operationalize the helplines are controlled from the 24*7 Flood Monitoring Cells in the districts and the Central Control Room at the Headquarters (HQ) at Jalasampad Bhawan in Salt Lake. Rainfall data, gauge level of major rivers, discharge data of important dams and barrages are shared through e-mails and fax with the Disaster Management Department, District Administrations and the Chief Secretary on a daily basis during monsoons.

2.1.3. Connectivity and Communication

❑ Special emphasis on rural connectivity

❖ I&WD has realized the objective of improving rural connectivity thereby endorsing the enhancement of rural mobility and convenience, improved spatial systems for better operations etc. I&WD, over the years has developed rural communication networks, particularly in the remote rural areas outside the jurisdiction of Public Works Department (PWD) and the Panchayat & Rural Development Department (P&RDD). The I&WD has acted as a facilitator in this process by constructing RCC bridges over various irrigation channels and drainage Khals so as to bring about a continued physical connectivity and communication in the area, as per the need of the local people. A total of 269 RCC bridges on various canals and channels were constructed and commissioned by I&WD during the period under consideration.

❑ Facilitation of inland water transport

❖ A permanent Jetty at Lot No.8, which is also known as Jetty No.4, was constructed by the I&WD in September 2014 to facilitate safe and prolonged Ferry Services over River Muriganga for approximately 6,000 passengers traveling to-&-fro between Kakdwip and Sagar Island. During Ganga Sagar Mela, this Jetty is extensively being used by the pilgrims. 4 more Jetties were completed in the district of Howrah.



Figure 7 Jetty at Lot No.8 in Kakdwip

❑ Support in road transport development

❖ A 5.5 m carriageway width and 7.60 Km. long Bituminous Road was constructed by the I&WD, which bypasses the Cooch Behar Town that has provided relief to the traffic load of the internal roads of the town and the people of Dinghata and Mathabhanga Blocks.



Figure 8 Bituminous road at Cooch Behar

❖ A pre-stressed RCC Road bridge was constructed over River Kangsabati between Lalgah & Amkola in Jhargram district. The total length of the bridge is 650 m. The bridge was commissioned in September, 2016.

Improvements in terms of rural connectivity have been observed for blocks Binpur-I&II, Jhargram and Jamboni.



Figure 9 Pre-stressed RCC Road Bridge, at Lalgah

2.1.4. Re-vitalization of assets and environment improvement

❑ Short Term Action Plan

❖ The I&WD formulated a “Short Term Action Plan” catering towards face-lifting of important structures i.e. dams, barrages, etc., prevention of encroachments in such campuses by erecting fencing, boundary walls, etc. and beautification including addition of new infrastructures to improve aesthetics which in turn can stimulate the tourism industry

❑ Coastal protection

❖ Coastal protection work has been undertaken to arrest severe erosion of Digha sea-shore by strategic placement of stone boulders and concrete revetments for a length of 10.55 Km. and face-lifting of the Digha



Figure 10 Anti-erosion work on Digha sea shore

sea-coast by constructing 8.32 Km. length of marine walkway from old Digha up to Udaypur near Odisha border. Apart from protecting the entire area from sea erosion; this has become an added attraction for thousands of tourists.



Figure 11 Marine walkway from Old Digha to Udaypur in Purba Medinipur

❑ Rehabilitation and face-lifting of infrastructure

❖ In accordance with the roadmap for holistic management and rehabilitation of dams, barrage sites & selective canal stretches, the irrigation office complexes at Singur, Bolpur, Suri, Baruipur, Sabang and Contai were renovated. Kangsabati dam site at Mukutmanipur in Bankura and Messanjore dam site at Dumka have also been facelifted. I&WD successfully completed the revamping of Kestopur Khal on both the banks adjoining VIP Road.



Figure 12 Beautification of Kestopur Canal adjoining VIP Road, in Kolkata

❑ Maintenance of channels & canals

❖ Cleaning of major drainage channels in and around Kolkata through Annual Maintenance Contracts (AMCs) to keep them free of solid wastes, water hyacinth and other obstructions, particularly in view of the spread of vector-borne diseases during the monsoon was initiated through an eminent drive by the I&WD.



Figure 13 Beliaghata Circular Canal kept under AMC

❖ Most of the drainage channels in the districts of North & South 24 Parganas, Kolkata and Howrah are being kept clean throughout the year.

2.1.5. Land Management

❑ Optimal utilization of land resources

❖ The State Government prioritized the formation of a 'Land Bank' with unused and vacant land possessed by various State Government departments lying unutilized either due to abandonment of projects or other reasons.

❖ The I&WD verified the land records and found that altogether 1,94,883.30 acres of land is currently under its possession in 19 districts, including Kolkata. It was identified that almost 2,091.079 acres of land were lying unused in 11 districts. The I&WD undertook physical plot wise verification for a more robust assessment of the respective identified plots with the assistance of the respective Block level officers of the Land & Land Reforms Department in order to prepare a comprehensive Land Bank during 2012.

2.1.6. Quality Assurance

❑ Guidelines for routine maintenance

❖ The Dam Safety Organization (DSO) under I&WD has published separate guidelines in 2016 for periodic inspection, standardization and maintenance of Dams, Barrages and Bridges by creation of important parameters for streamlining the same. Till 2017-18, the DSO had conducted inspection of 23 large dams in the districts of Purulia and Bankura. Additionally, rehabilitation work of 5 dams at Patloi, Tatko, Beko, Lipania and Dangra in Purulia district were completed.

❑ Safety Audit of major dams

❖ In line with State Government's emphasis on ensuring the quality and safety of important Infrastructure, Assets, WAPCOS Ltd. (a Government of India Undertaking) was engaged in 2017 for a Comprehensive Safety Audit of all the major Dams, Barrages and Bridges under the I&WD. Safety Audit of 33 dams, 30 barrages and 40 bridges were completed. The organization was assigned a mandate of structural evaluation of the application and efficiency of the safety policy, safety programs and safety systems of the structures.

❑ Improved surveillance coverage

❖ During 2017-18, I&WD took the initiative to cover the Jalsampad Bhawan headquarters and all major dams and barrages under CCTV Surveillance for improved monitoring, enhanced safety and security.

❑ Up-gradation of the Central Design Office (CDO)

❖ For better implementation and management of projects, CDO formulated guidelines/frameworks following the international best practices that ought to be followed by other Departments/agencies while submitting proposals related to waterway vetting by I&WD for structures like bridges, culverts, etc. to be constructed across rivers, irrigation canals, drainage channels. Time-bound preparation of drawings and designs were planned and implemented.

❑ In-house capacity building for Quality Testing

❖ Four Quality Control Laboratories were constructed which are being operated by in-house staff and operators for testing of cement, steel, stone-chips, sand and soil required for executing various works, thus reducing dependency on outsourcing to third party agencies. These are located at Haringhata in Nadia district, Bankura Town in Bankura district, Berhampur in Murshidabad district & Contai in Purba Medinipur district. In addition to this, training of the associated personnel with the advanced testing soft wares and associated with material testing methodologies is also done periodically.



Figure 14 Quality Control Laboratory

2.1.7. Reform Measures

❑ e-Tendering

❖ The I&WD switched over to standardized NIT (Notice Inviting Tenders) format throughout the State for all works' tenders. Standardization of the contract documents, introduction of item-rate and EPC contracts and simplification of tendering procedure were a few among the other reforms that have been included to make the process more user-friendly, efficient and transparent. Since 2016, every year, Bidders' Conferences are organized by I&WD to have an open interactive session with the bidders participating from all the districts of the State in presence of the Finance Department, National Informatics Centre (NIC) Tender Cell officers, Departmental officers and representatives of other engineering Departments in order to deliberate on various procedural issues and to familiarize the bidders on e-tendering as well as various changes brought out in the tendering process from time to time.

❑ e-Governance

❖ For effective implementation of e-Governance, the I&WD took up a special drive in 2015-16 to introduce a video conferencing system covering key regional offices of the districts. Accordingly, video conferencing facilities were installed at 5 locations, namely Salt Lake (HQ), Malda, Purba Bardhaman, Purba Medinipur and Jalpaiguri. Since Internet connectivity is being provided through WBSWAN, video conferencing facility has been arranged between the State HQ at Jalsampad Bhawan and the 5 district offices through WEBEL.

❑ Ease of Doing Business

❖ The I&WD has introduced time bound and On-line system with Standard Operating Procedures (SOP) for processing of applications for withdrawal of surface water for industrial and other purposes as well as disposal of drainage water from industries into the rivers and channels so as to facilitate ease of doing business. I&WD has introduced time-bound On-line system for giving permission to various applicants for disposal of waste water into rivers and drainage channels. A policy guideline has been brought into effect for providing permission to applicants seeking Right of Way (RoW) for construction of bridges and taking various utilities like pipelines and OFC, etc. over I&WD land.

❑ Administrative restructuring

❖ Major restructuring has been done at the top level of the engineering hierarchy (by following the Hub-spoke Model; where, Chief Engineers, Superintending Engineers and Executive Engineers of the Directorate having working jurisdiction in the districts have been shifted from the Salt Lake HQ to Malda, Bardhaman and Medinipur. The district level officers of Teesta Barrage Project and Subarnarekha Project who were not being properly utilized were placed in other districts based on program and vision of the Department. The Secretariat of the I&WD has been further strengthened by inducting new posts in the ranks of Assistant Secretary, Deputy Secretary and Joint Secretary.

❑ Promoting advanced studies in River Engineering

❖ The I&WD plans to undertake significant upgradation of the existing River Research Institute (RRI) starting with the introduction of a certified course curriculum. An Action Plan has been formulated with the help of EdCIL India Ltd, to revamp training modules for capacity building in the fields of River Engineering and Hydroinformatics, and introducing certified Master's degree courses in these subjects in due course.



Figure 15 River Research Institute, at Haringhata

❑ Employees attendance monitoring

❖ Since 2017, Biometric System for recording attendance has been introduced in all the offices located in the Departmental HQ at Jalsampad Bhawan, and also all the district level offices of Chief Engineers.

❑ Adherence to blueprint

❖ A Departmental Screening Committee, headed by the Secretary, was set up for identification of new projects/schemes adhering to the concept of advance work plan cycle for implementation in conformity with voted budget provisions.

❖ The I&WD set month-wise completion deadlines, and has successfully achieved most of them, for various projects since introduction of the Administrative Calendar by the State Government with a view to ensure timely implementation of schemes and other activities.



Report Card - FY 2018-19



3

Projects under various thematic areas during FY 2018-19

3.1. Projects under various thematic areas during FY 2018-19

❖ In alignment with the sustained endeavour towards accelerating sectoral progress in the State and ensuring effective delivery of services to the people, the I&WD, like previous 7 years, took up a significant number of new projects and programmes in FY 2018-19, along with advance planning & monitoring to achieve completion targets of the on-going ones. A host of measures were introduced during 2018-19 in multiple spheres, such as:

○	Irrigation development, flood management, rural connectivity and infrastructure development
○	Re-vitalization of assets and environmental improvement
○	Sustainable operations
○	Project management, evaluation and e-governance
○	Systematic asset management and advance planning
○	Quality assurance
○	Revenue augmentation
○	Institutional strengthening, capacity building and knowledge transfer
○	Safety Audit and inspection for health check up of major structures
○	Utilization of voted budget provisions

❖ Every year, the I&WD undertakes on an average 450 new projects under 'State Development Schemes' (SDS) voted budget wherein each project is characterized by a completion period of 2-3 years. Among the ongoing projects approved during preceding years, on an average, approximately 375 small, medium and large scale (mega) projects are altogether

completed every year. As on the end of 2018-19, the I&WD is engaged in implementation of three mega projects in the concerned sub-sectors. A few significant highlights of the achievements in 2018-19 across the afore mentioned domains are:

3.1.1 Irrigation development, flood management, rural connectivity & infrastructure development

Some of the key achievements of the I&WD during 2018-19 are:

❑ Irrigation Development

○ Restoration of lost irrigation potential:

❖ A total of 12,145.70 Ha of lost irrigation potential has been restored during 2018-19 by



Figure 16 Modernization of canal network of Midnapore Main Canal System in Paschim Medinipur district

renovation, improvement and modernization of a cluster of major and medium irrigation infrastructure developed during previously completed irrigation projects. Specifically, in this regard, the reconstruction of the Midnapore Anicut and the defunct Midnapore Main Canal System has comprehensively restored the provision of irrigation water in 38,000 Ha of land under Kharagpur-II, Debra, Narayangarh, Panskura & Pingla blocks of Purba & Paschim Medinipur districts.

○ **Increments in total irrigated area in select districts:**

❖ As direct positive externalities arising out of the successful restoration of the lost irrigation potential, 8.52 Lakh Ha of land was irrigated through irrigation canal networks during the Khariff season of 2018-19 in the districts of Bankura, Birbhum Jhargram, Purulia, Paschim Medinipur, Purba Medinipur, Paschim Bardhaman, Purba Bardhaman, Hooghly, Howrah and Jalpaiguri.

○ **Generation of new irrigation potential:**

❖ New irrigation potential of 614 Ha has been created during the year of 2018-19 by completion of 4 check dams in Bankura.



Figure 17 Check Dam constructed in Bankura

○ **Incorporation of state-of the-art technology:**

❖ Optimization of the irrigation potential has been driven by sound technological improvements in various operational aspects.

❖ In this light, it is worth mentioning that the rehabilitation and up-gradation including automation of barrage gate operations through Supervisory Control And Data Acquisition (SCADA)-Programmable Logic Controller (PLC) and V-SAT & GSM telemetry was completed for Teesta Barrage at Gazoldoba in the FY 2018-19 with real time Barrage Control linkages with the NHPC Dam (i.e TLDP-IV) at Siliguri and Jalpaiguri.

❖ Through this first-of-its-kind initiative, irrigation through canal networks on both the banks of the Teesta Barrage can now be controlled & monitored through automated gate operation.



Figure 18 SCADA Main Control Room of Teesta Barrage

❖ Inspired by the success of the automated gate operations in Teesta Barrage, similar technology is being adopted for gate operations in Messanjore Dam on river Mayurakshi in Dumka district of Jharkhand under the administrative control of the I&WD, work for which has been initiated in FY 2018-19 with an initial focus on refurbishment of electro-mechanical components of the Dam. A similar scheme has been tendered to facilitate operations of Durgapur Barrage on Damodar river in Bankura.



Figure 19 Teesta Barrage SCADA-PLC Automation Project Commissioned

❑ Flood Management

○ Embankment improvement and river bank protection:

Improvement of embankments and protection of river banks were completed for a total length of 142 Km. across various districts in FY 2018-19. A few among the major projects are as follows:

❖ The long neglected ex-zamindari embankments essential for preventing local floods in several districts in South Bengal, which were erstwhile maintained by the Panchayat & Rural Development Department, were handed over to the I&WD. A comprehensive plan of action has been taken up to restore these critically damaged ex-zamindari embankments. At the end of FY 2018-19, restoration for a stretch of 40 Km. across select districts have been completed.

❖ The reconstruction of another 26 Km. length of embankment in the 'Cyclone Aila' affected Sunderban area has been completed in 2018-19.



Figure 20 Reconstruction of "Aila" affected Sunderban embankment on the bank of Thakuran river in South 24 Parganas

❖ Implementation of the flood mitigation and drainage improvement scheme in Kandi & adjoining areas in Murshidabad and Birbhum districts has played a crucial role in ensuring advanced coverage levels of embankment reconstruction. Till FY 2018-19, most of the work in this context has been completed and the total length of embankment reconstructed in this area in FY 2018-19 itself stands at 20 Km.



Figure 21 Strengthening of embankment under Kandi Master Plan in Murshidabad

○ Resuscitation of drainage channels and allied infrastructure:

❖ Drainage channels form an integral component of efficient flood management system. The I&WD, in this light, has undertaken a number of projects to ensure systematic resuscitation of drainage channels complemented by structural improvements in supporting infrastructure. Additionally, sub-components under other relevant activities have contributed to the development of a well-rounded drainage channelization system in the State, as stated herein.



Figure 22 Re- excavation of River Keliaghai in Purba Medinipur in connection with KKB Project

■ Most of the work of Mega Flood Management Project in Keliaghai, Kapaleswari and Baghai have been completed at the end of FY 2018-19. Resuscitation of 308 Km. length of channels including main rivers viz. Keliaghai, Kapaleswari, Chandia, Baghai, etc. and a considerable number of tertiary drainage channels have been completed. Construction of 8 RCC bridges on different drainage channels in Purba and Paschim Medinipur districts along with improvement of bituminous roads on river banks have also been completed at the end of FY 2018-19.

■ As a whole, resuscitation of drainage channels for a total length of 136 Km. have been completed. A few notable ones include River Jamuna, Padma Khal and Sunti Khal in North 24 Parganas, SAMD, Peali river, TP Main Khal and Alampur Main Khal in South 24 Parganas, Moja Damodar & Short-Cut Channel in Howrah, Tamla Nullah in Paschim and Purba Bardhaman, Kunti Khal in Hooghly. This initiative has greatly improved flood resilience across 816 Sq. Km. benefiting 13.87 Lakh people.



Figure 23 Peali River in South 24 Parganas after desiltation

■ A consulting organization has been engaged to prepare a Detailed Project Report (DPR) for holistic improvement of flood management infrastructure in the districts of Malda, Uttar & Dakshin Dinajpur with primary focus on resuscitation of drainage channels and supporting infrastructure. A similar process is being followed in case of four northern districts of Darjeeling, Jalpaiguri, Alipurduar and Coochbehar by Departmental engineers. However, reconstruction work in critically vulnerable areas would be taken up on priority basis, going forward.

■ A comprehensive drainage scheme has been formulated to mitigate drainage congestion in Arambagh area of Hooghly district. Work for Phase-I of the Arambagh Master Plan was started during FY 2018-19. The first phase of the scheme envisages re-excavation of various drainage channels for a total length of 87 Km. and other allied works.

■ 2nd Additional Pumping Station, at Uttarbhag in the district of South 24 Parganas has been commissioned during 2018-19, which comprises of four 150 cusec and two 50 cusec pumps with a total installed capacity of 700 cusec; at the outfall of SAMD Part-I Channel. The total benefited area is Rajpur-Sonarpur Municipality, including Kheyada-I, Kheyada-II, Kamrabad, Kalikapur-I, Pratapnagar, Madarat and Sonarpur Gram Panchayat as well as Sonarpur and Baruipur, that has been assessed to benefit 147 Sq. Km. comprising of homestead and cultivable areas, serving 3.1 Lakh people.



Figure 24 2nd Additional Pumping Station at Uttarbhag in South 24 Parganas

■ Early Flood warning system

❖ A comprehensive Flood Forecasting System for the entire State to forecast time of occurrence of flood, level of flood water and extent of inundation, has already been taken up for execution under the 'National Hydrology Project'. The implementation period for the same is from FY 2016-17 to FY 2022-23. The project aims to install automatic rain-gauge and river-gauge

recorders, integrating those with a web based software to generate real-time flood data and finally devising a system in digital elevation modelling to forecast various parameters. Furthermore, four additional hydrological observatories were made operational during monsoon of 2018 at critical locations of important rivers like Mahananda, Damodar, Dwarakeswar and Short-cut Channel (diversion channel of Lower Damodar river). Gauge levels and river discharge data are observed daily at these four locations and disseminated to the Central Flood Control Room for effective flood forecasting and management.

■ Rural connectivity and infrastructure development

○ Construction of bridges for connectivity improvement:

❖ 11 new bridges have been completed by the I&WD in FY 2018-19 across select drainage channels out of which seven are in the Bankura, North & South 24 Parganas, two in the Purba Medinipur district and one bridge each in the Hooghly and Purba Bardhaman districts. A few major projects covering the distinct thematic areas discussed above which are under various stages of execution in 2018-19 are tabulated in the next page:



Figure 25 RCC bridge at Onda, Bankura

Table 1 Projects in various stages of execution during FY 2018-19

SL No.	Project Name	Project Cost (₹ in Cr.)	Implementation Period
1.	Improvement of the Mahananda Main Canal of the Teesta Barrage Project in block Phansidewa and Chopra, Darjeeling and Uttar Dinajpur districts	84.62	2018-21
2.	Rehabilitation of the Dauk Barrage in block PS Chopra, Uttar Dinajpur district	74.73	2018-20
3.	Implementation of 1 st phase of Ghatal Master Plan in, Paschim Medinipur district by improvement of Palaspai & Chandreswar canals, construction of Ranichak Pumping Station	157.0	2018-22
4.	Rehabilitation of the Durgapur Barrage (Civil & Electro-mechanical works) in block and PS Barjora in Bankura district	107.92	2018-20
5.	Improvement of the right bank main canal of the Kangsabati reservoir project including head regulator gate refurbishment in blocks Raipur and Rani bandh, Bankura district	75.00	2018-21
6.	Implementation of Arambag Master Plan for removal of drainage congestion: (For the channels: Kana Mundeswari, Kata Khal, Kana Darakeswar, Maloy-pur Khal, Bhomra Khal & Arora Khal) in Blocks Arambagh, Khanakul-I, Khanakul-II, P.S Arambagh & Khanakul, District Hooghly (Phase-I)	39.00	2018-20
7.	Improvement of Mayurakshi Bakreshwar Main Canal System of Mayurakshi Reservoir Project in Birbhum district	54.16	2017-19
8.	Pilot project for construction of 31 pre-fabricated RCC bridges replacing old dilapidated existing bridges in the districts of Bankura (17) and Birbhum (14)	43.34	2018-21
9.	Raising and strengthening of a cluster of embankments in Sunderban areas in the districts of North & South 24 Parganas	48	2018-20
10.	Development of a comprehensive flood-forecasting system for the entire State under The World Bank assisted National Hydrology Project of Ministry of Jal-Shakti, GoI	100	2018-23

3.1.2. Re-vitalization of assets and environmental improvement

❑ Aesthetic elevation and renovation

❖ The I&WD has successfully completed the revamping of Mahananda Barrage Park at Fulbari, renovated the State HQ at Jalasampad Bhawan and completed construction of new Divisional offices at Singur and Baruipur. Two pilot projects have also been taken up in FY 2018-19 for face-lifting of canal banks of Beliaghata Canal and Town Head-Cut Canal using vetiver grass, geo-textiles etc.



Figure 26 Children Park along L/B of Mahananda Barrage Pond at Siliguri

❑ Re-vitalization of Irrigation Assets

❖ The I&WD has undertaken noteworthy measures within an overall special initiative to encourage afforestation/tree plantation on vacant Departmental land at prospective locations. In the current pilot phase, 8 strategically significant locations have been identified for taking up this project adjacent to important barrages/dams like Durgapur Barrage, Teesta Barrage, Midnapore Anicut, etc. Post appropriate reconnaissance survey and identification of suitable Departmental land on these locations, the West Bengal Wetland Development Corporation Limited was approached to initiate afforestation planning basis which necessary implementation measures will be put to practice.

❑ Reduced risk of and exposure to vector borne diseases

❖ As on FY 2018-19, 600 Km. of drainage channels were kept free of debris, water hyacinth and other solid wastes round the year through Annual Maintenance Contracts (AMC). A number of measures were undertaken to ensure free flow of water and prevent water-logging and stagnation in the low-lying areas to minimize mosquito breeding in order to curb the spread of vector borne diseases in and around KMC and adjoining areas.



Figure 27 Drainage Channels in Kolkata under AMC

3.1.3. Sustainable Operations

❑ Leveraging existing communication networks:

❖ The I&WD has established continuous communication channels with the reservoir owning authorities outside the State, i.e. Damodar Valley Corporation, Government of Jharkhand and Government of Odisha for the purpose of moderating reservoir releases during periods of flood and to preserve water for irrigation to the maximum extent possible for utilization during non-monsoon periods. Such network provides the basis for inter-dependency among authorities which can be sustainably leveraged to cater to seasonal and other exogenous variations as per requirements. It also paves the way to replicate best practices in the concerned context, which can in due course in time lead to self sufficiency.

❑ Gradual shift towards effective risk and cost sharing possibilities

❖ Consequent upon the decision taken by the Ministry of Shipping, GoI in consultation with the State Government, a High Level Joint Committee was formed in 2018-19 under the Chairmanship of Additional Chief Secretary, I&WD with the Chairman of Kolkata Port Trust (KoPT) and Vice Chairman of Inland Waterways Authority of India (IWAI) as members to address the problem of severe erosion in Bhagirathi-Hooghly River System from Murshidabad up to South 24 Parganas district.

❖ The rationale behind the formation of such a committee rests on the need to identify scalable solutions to tackle the ever-increasing concerns regarding river bank erosion in the State aggravated by the geographical disparities through which the river systems flow in the State.

❖ Based on a detailed survey taken by the Joint Technical team comprising the concerned Central and State Government Agencies in June 2018, 193 locations, spread over a stretch of Hooghly-Bhagirathi River System (including the Feeder Canal), were identified by the Joint Committee wherein immediate and scalable actions are required.

❖ The committee has submitted its report to the Ministry of Shipping, recommending equal sharing of the total estimate cost of ₹ 968.44 Cr. Such commitments also bring about the safer possibilities for sustainable investments on the basis of fair expenditure and loss (if any) sharing protocols.

❖ As a part of fulfilling its commitment, I&WD has completed 28.48 Km. of anti-erosion work till FY 2018-19 on the vulnerable stretches of Bhagirathi river on the basis of key recommendations of the Joint Committee.

3.1.4. Project Management, Evaluation and e-governance

❑ Project performance evaluation

❖ The I&WD has initiated technical examination of projects, on a systematic random sampling basis, right from the conceptualization until the commission stage, with the help of internal 'Technical Examination Teams'. The enumerators are to independently evaluate the justification and performance of various capital projects against pre-determined and standardized project parameters. Evaluation statistics and project specific insights are shared with all concerned so as to negate repetition of identified mistakes and anomalies in future cases and also to identify and disseminate good engineering practices.



Figure 28 Modernization of canal network of Kangsabati Reservoir Project in Bankura district

❑ e-Governance

❖ The layout of an on-line web-based 'Plan Scheme Monitoring System' has been finalized in FY 2018-19 and the training on the operation of the online module has been imparted to the field officers. The physical and financial progress of ongoing schemes and regulation of funds can now be done more conveniently and on a real time basis. The indent of funds for each scheme has been planned to be routed from various Divisions only through this online system from FY 2019-20 onwards.

❑ **Refurbishment of official website with easy access to data**

❖ The official website of I&WD has been revamped and relaunched as a modified version with inclusion of real time data availability, providing insights into flood discharge and river gauge readings for ready reference and easy dissemination among one and all. The WBEIDCL is collaborating with I&WD to create a dynamic module in the Departmental web portal for processing online applications for obtaining historical hydrological data by other Departments, Organizations and Educational Institutions.

3.1.5. Systematic Asset Management and Advance Planning

❑ **Optimal utilization of land resources**

❖ The I&WD, after exhaustive verification of existing records has found that altogether 1,94,883.30 acres of land is owned by the I&WD in 22 districts, including Kolkata. Notably, as per the updated land bank report of 2018, I&WD owns 1,902.12 acres of vacant (usable) land across 13 districts of the State. Thus, 188.96 acres of vacant land identified during 2012 for Land Bank preparation could be utilized by other Departments for implementation of various developmental projects.

❑ **Delegation of functional responsibilities**

❖ The I&WD has handed over the maintenance responsibilities of 387 bridges across the State to the Public Works Department as per the policy of the State Government. The Department is however, entrusted with the responsibility of need based construction of additional bridges across drainage channels including maintenance of the same in rural areas.

❑ **Advance Work Planning Cycle**

❖ In conformity with the decision of the State Government to complete advance planning of works to be executed in FY 2019-20 by end of FY 2018-

19, and in continuation of the planning cycle exercise usually followed in I&WD for effective utilization of time and funds, the I&WD has completed the sectoral prioritization, and apportionment of funds for the first phase of new schemes for FY 2019-20. Thereafter, approval of the Departmental Screening Committee towards 249 new schemes, amounting to ₹ 533 Cr. was accorded in February 2019 out of the total allocation for Phase-I for FY 2019-20 amounting to ₹ 1,270 Cr. A provision of ₹ 116 Cr. had been kept for taking up rehabilitation of distressed Dams, Barrages and other important structures emerging from on-going safety audit. Tender processes have been initiated in March 2019 for these approved schemes so that these could be taken up for execution at the earliest from the 1st quarter of FY 2019-20. Several other DPRs are being scrutinized and the tender processes of these schemes would be initiated in the 1st/2nd quarter of FY 2019-20.

❖ As a part of advance planning, the Department has been following a practice of preparing an Administrative Calendar each year well in advance with a view to ensure timely implementation of schemes and other activities scheduled for the succeeding year. Out of 81 Departmental activities included in the Administrative Calendar of 2018 & 2019, during FY 2018-19, 78 activities were completed on target.

3.1.6. Quality Assurance

❑ **Quality Control Laboratories in districts**

❖ Three more 'Departmental Quality Control & Testing Laboratories', in addition to four existing units since November 2017, have been made operational in FY 2018-19, at Salt Lake (Kolkata), Galsi (Purba Bardhaman) and Coochebehar Town (Coochbehar district) to carry out regular quality check-ups of the Departmental works. In alignment, the existing in-house Quality Control Unit of Teesta Barrage Project is being upgraded and modernized by infusion of quality testing equipment to enable it to carry out requisite quality check-up of all the works of the Teesta Barrage Project.

❑ Operational manuals & guidelines

❖ A Departmental Manual for Canal Lining has been introduced in FY 2018-19. All executing units can use the Manual for finalizing specifications. It provides a ready reference to prepare irrigation schemes within a short time period and consequently helps in maintaining uniformity and quality in execution of schemes. Furthermore, guidelines for execution of river bank protection and anti-erosion works have been published in FY 2018-19 for effective design, planning and implementation in all the concerned projects.

❑ Uniformity in Departmental schedule of rates

❖ Until 2017-18, each district level Circle offices used to follow a separate and independent Schedule of Rates in preparation of estimates for Works' Tenders. These often led to wide disparities in item rates and nomenclature. To address this, Departmental Unified Schedule of Rates was brought into effect from 1st April 2018 for all works across all districts of the State.

3.1.7. Revenue Augmentation

❑ e-Auction of scraps and other unserviceable materials

❖ Amonumental quantum of unserviceable articles of stocks and condemnable machineries, tools & plants, irreparable vehicles, obsolete items, scraps, etc. were lying/getting dumped in various Departmental yards, at times even in the open, for decades. The remnants were primarily identified as being beyond standard bounds of economical repair by the Condemnation Committees set up in the I&WD with representations from mechanical and electrical wings of PWD and I&WD. Given a general absence of experience and expertise in conducting e-auctions, the I&WD took the decision with the approval of the Finance Department to use the e-auction platform of the Metal Scrap & Trading Corporation Limited, a Mini Nav Ratna, GoI Undertaking having more than 70,000 registered buyers all over the country for selling all kinds of unserviceable and unusable material above the reserve prices fixed by the Departmental Condemnation Committees. In this

way the process of e-auction was started during FY 2016-17 and by the end of FY 2018-19, most of the unserviceable materials have been sold, fetching the State government a revenue of approximately ₹ 11 Cr.



Figure 29 e-auction conducted to dispose off scraps lying in Departmental godown for decades

3.1.8. Institutional Strengthening, Capacity Building and Knowledge Management

❑ Short term training modules at River Research Institute (RRI)

❖ To impart training to the Departmental officers pertaining to various aspects of the advancements made in the fields of associated infrastructural development.

○ Revival of River Research Institute:

❖ EdCIL India Ltd, a Government of India education consultant, was hired to revive the River Research Institute and help the I&WD introduce two master degree courses respectively in River Engineering and Hydrology & Hydroinformatics from FY 2019-20. A proposal to create 12 new posts for the faculty and administrative operation of the proposed academic unit has been sent to the State Finance Department. The matter is under consideration of the Government.

❑ **Strengthening of the Design Wing**

❖ The Departmental Design Wing has been strengthened with procurement of the latest design applications which can be used as tools for effective, time bound disposal of design and drawing as per specific Departmental guidelines.

❑ **Administrative Remodeling exercise of the Mechanical & Electrical (M&E) Wing**

❖ The remodeling exercise has been taken up to augment the capacity of M&E Wing of the I&WD which is responsible for maintenance of vital Irrigation Infrastructure including Gates and other Electro-Mechanical components for the safety of various Dams, Barrages, Sluices and Pump houses etc. The augmentation of personnel for holistic capacity augmentation in the form of in-house staff also was realized with creation of 55 new posts in different categories, including 1 Chief Engineer (M&E), 2 Superintending Engineers (M&E) and 6 Executive Engineers (M&E) with the approval of the State Cabinet. In addition to this, four new Division offices have also been made operational - one each at Bankura, Purulia, Midnapore and Burdwan for more effective planning, implementation and supervision of works.

❑ **Digitization**

❖ Digital data & record preservation of all the project specific information for real time archiving for future referencing and call-back in the form of a digital library hosting old, historical data/information, drawings has been initiated. Until now, all the drawings of flagship projects like the Mayurakshi Reservoir along with project and land records of Kolkata have been digitized in the first phase during FY 2018-19. Digital preservation of audio-visual evidences of capital projects, and hosting those in the Departmental website for online project monitoring also is in progress.

❑ **Updation of Statistical Records**

❖ The last edition of Statistical Hand Book of the

Department has been published in December 2018 containing a snapshot encapsulating the holistic enumerification of the Departmental assets and physical and financial progress provided in different years and other hydro-meteorological data, has been uploaded in a separate module in the Departmental web portal for direct access by the Departmental officers.

❑ **Streamlining Procurement**

○ **Emergency/Contingency Procurement:**

❖ Making faster provision to tackle flood emergencies, short notice e-tenders/spot bids up to value ₹ 20 Lakhs have been delegated to the field engineers.

○ **Bidders Conference:**

❖ The I&WD in a major initiative has started organizing Annual Bidders' Conferences since 2016. The third Bidders' Conference was organized in January 2019. Bidders' Conferences are organized to ensure adequate participation of prospective bidders in Departmental tenders, to familiarize the bidders on e-tendering as well as other changes brought out in the tendering process and to understand their difficulties in participation and take appropriate remedial measures. Apart from interaction with regular bidders/contractors of the I&WD, a separate session was organized inviting participation from national level major civil contractors to familiarize them with upcoming major projects of the Department including The World Bank Project and construction of bridges under the Special Infrastructure funding, to solicit their participation in these large sized projects.

3.1.9. Safety Audit

❑ **Safety Audit, Rehabilitation and Restoration**

❖ Safety Audit of 33 dams, 30 barrages and 40 bridges have been completed so far. Major rehabilitation and restoration works have commenced for Durgapur Barrage, Dauk Barrage and Messenjore Dam.



Figure 30 Safety Audit of Kangsabati Dam Completed

❑ Regional Bridge Inspection & Monitoring Units

❖ Ensuring safety of the Departmental bridges is one of the key areas of intervention of the I&WD. Four units at the zonal levels (at Kolkata, Paschim Medinipur, Purba Burdhaman and Siliguri) with an Apex Committee at HQ have been set up in 2018 to undertake regular inspection of all the bridges and suggest appropriate rehabilitation measures excluding those covered under the special safety audit.

So far, 681 bridges have been inspected and categorized according to the various degrees of distress. Action Plan for remedying the defects have been formulated accordingly.

❑ Routine maintenance

❖ Scheduled periodic inspection works of dams were undertaken at 7 locations in Purulia (Kumari, Parga, Saharajore, Rupai, Moutarjore, Barabhum and Hanumata dams). Moreover, routine maintenance of all dams like removing of jungle and debris, repair of hosting arrangements was carried out regularly to ensure effective operations of the dams.

3.1.10. Voted budget and fund utilization

❑ Fund Utilization

❖ The I&WD has initiated a lot of schemes, which are at various phases of execution; the total capital fund utilization in FY 2018-19 stood at ₹ 1,202.39 Cr. (99%),

of the fund released by the Finance Department. This was 16.7% more than the capital budget expenditure made during previous FY of 2017-18 signifying progress made by the Department to innovate in terms of Scheme conceptualization.

❑ Prioritization of funds for closure

❖ Physical & financial closure of the spilled over schemes from the previous Financial Year(s) has been given top priority and majority of the previous years' schemes were completed within FY 2018-19.

3.2. Major projects approved for implementation in the next 7 years

❖ Some of the major projects that were approved for implementation in the next seven years, a few notable ones among these are:

3.2.1. Externally aided West Bengal Major Irrigation and Flood Management Project (WBMIFMP):

•	Project Cost: ₹ 2,881 Crore (US \$ 413 Million)
•	Sector: Irrigation and Flood Management
•	Duration: 2019-26

Present Status:

❖ The project has been cleared by the Ministry of Finance, Government of India and also appraised by the The World Bank and Asian Infrastructure Investment Bank. Feasibility study has been conducted by an independent consultant. Loan Negotiation and Loan Agreement signing are the next steps, before grounding the project in field, tentatively in November 2019-20. In addition to this, the State Project Management Unit and two District Project Management Units have already been made operational. Posts in different categories have been created for State Project Management Unit (SPMU) and District Project Management Unit (DPMUs) with the approval from the State Cabinet.

Project Items/Features:

❖ Irrigation development works in 40 blocks of four districts in the command area of DV Project, i.e. Purba Bardhaman, Bankura, Hooghly & Howrah in around 3.93 Lakh Ha, by various structural measures like canal rehabilitation including slope stabilization and work, upgradation of regulating structures and non-structural measures like automated gate operation, developing web-based application for farmers, promoting water use efficiency measures etc.

❖ Flood Management in 1,880 Sq. Km. in traditionally flood prone 20 blocks and 2 Municipalities in Lower Damodar Sub-Basin in Hooghly and Howrah districts.

❖ The Project Benefited, around 26.8 Lakh people in the districts referred above.

Physical Targets/Expected Outcomes:

❖ Modernization of canal network and management of total length of 2,776 Km. so as to increase canal water supply in the command area from 1,523.8 Million Cubic Meter (MCM) to 2,776.88 MCM (82% augmentation) and consequently reduce use of water from non-canal sources (mostly ground water) from 2,489.3 MCM to 1,660.72 MCM (33% reduction), thereby arresting rate of decline of the groundwater table.

❖ Improving the flood embankment for a total length of 124 Km. and desilting channels for a total length of 215 Km. so as to reduce depth of inundation during floods with average depth from 1999-2017, by at least 30%.

3.2.2. Rejuvenation & improvement of 57 Medium & Minor Irrigation Surface Irrigation Schemes in Purulia, Jhargram, & Bankura districts under Special Infrastructure Funding

❖ The project aims to re-model regulating structures and outlet gates to minimize operational losses and wastage of water to improve operational efficiency of the assets.

•	Approved Project Cost: ₹ 311.74 Cr.
•	Sector: Irrigation
•	Duration: 2018-22

Present Status:

❖ The Project has been sanctioned & tenders invited. Out of 56 schemes taken up, 27 schemes worth ₹ 157.13 Cr. have been more or less been completed at the end of FY 2018-19. Tenders for the remaining 29 schemes, identified for implementation have been finalized and work has started in the field.

Project Items/Features:

❖ I&WD had constructed a large number of Medium and Minor Irrigation Projects in Purulia, Jhargram & Bankura districts, close to five decades back.

These schemes comprised of a small storage dam across streams on minor rivers, head-works and canal distribution network of length close to 200 Km. either in one to three adjoining blocks combined. Many of these schemes have lost functional efficiencies to a considerable extent due to water seepage from dilapidated structures and loss of storage capacities of reservoirs and distribution network due to siltation.

This project aims to redress the same by retrofitting the assets through overhauling/capital asset development of the existing super structure by designed interventions. It will also include the following interventions:

■ Desiltation and lining of canals in selective and critical reaches to increase conveyance efficiency.

■ Re-modelling/modernization of regulating structures and outlet gates to minimize operational losses and wastage of water.

Physical Targets/Expected Outcomes:

❖ The project envisages irrigation of 36,579 Ha of Kharif in Purulia, Jhargram & Bankura districts by restoration of 9,968 Ha of lost potential. It envisages generating additional yield of Kharif paddy to the tune of 15,600 Metric Tonne (MT).

❖ Additional yield of Rabi crops and winter vegetables is also expected, subject to availability of water in the reservoirs after monsoon. 57 of such Medium & Minor Irrigation Schemes have been identified district wise for filling up the gap to restore and increase irrigation coverage by way of various structural interventions as furnished in the Table 2 below:

Table 2 Identified Medium & Minor Irrigation Schemes

Project	CCA/IPC (Ha)	Average Kharif area irrigated/ IPU (Ha)	Gap as per original project plan (Ha)	Achievable extent of gap filling (Ha)	Observations
Medium / Minor schemes in Purulia (32 Nos.)	35,000 (IPC)	28,000 (IPU)	7,000	6,000	15% of the gap will remain due to incomplete land acquisition and other reasons.
Medium / Minor schemes in Bankura (11 Nos.)	5,259 (CCA)	2,657 (Area irrigated)	2,612	2,351	10% of the gap will remain due to change in land use pattern.
Medium / Minor schemes in Jhargram (13 Nos.)	7,585 (CCA)	5,627 (Area irrigated)	1,958	979	50% of the gap will remain due to substantial change of land use pattern because of urbanization, industrialization etc. and other reasons, which are irreversible in nature.
*Jhumur Ghorahaga Minor Scheme at Jalpaiguri (1 No.)	729 (IPC)	295 (Area irrigated)	434	638	In case of the instant scheme, there is scope of extension by remodeling the head works and further extending the canal system, which would not require any additional land. (*Note- Not taken up)
Total 57 Projects	48,573	36,579	12,004	9,968	—



Tatko Irrigation Scheme, Purulia



Nandaranga Irrigation Scheme, Bankura



Taragonia Irrigation Scheme, Purulia



Moutajore Irrigation Scheme, Purulia



Beko Irrigation Scheme, Purulia



Bandhu Irrigation Scheme, Purulia

Figure 31: Rejuvenation and improvement of 6 out of 27 Medium & Minor Surface Irrigation Schemes in Purulia, Jhargram, & Bankura districts completed till FY 2018-19

3.2.3. Replacement of 373 wooden and dilapidated RCC bridges over irrigation canals and drainage channels, by new RCC bridges in South Bengal districts, i.e. Birbhum, Bankura, Paschim & Purba Bardhaman, Paschim & Purba Medinipur

❖ A comprehensive approach has been undertaken to replace 373 old, dilapidated and distressed bridges over a period of 4 years under Special Infrastructure Fund of the State Government. District wise list of the bridges identified for replacement and estimated cost of bridges is shown in the Table no.3 below:

•	Approved Project Cost: ₹ 738.24 Cr.
•	Sector: Rural Connectivity
•	Duration: 2018-2022

Present Status:

❖ A consultant has been engaged to prepare the design, drawing, estimate and bid documents and monitoring during execution. A pilot project of construction of 31 identified pre-fabricated bridges in the district of Bankura (17) and Birbhum (14) has already commenced from 2018-19. Tender for the first package of replacement/reconstruction of 122 old and dilapidated bridges is under finalization. Thus, 31 pre-fabricated bridges as a pilot project and 373 bridges under Special Infrastructure Funding totaling to 404 bridges would be completed over a period of 4 years.

Project Location:

Table 3 Total estimated cost of bridges to be replaced

Sl. No.	District	No. of bridges to be replaced	Total length of replacement (m)	Estimated Cost (₹ Cr.)
1.	Birbhum	63	848.3	63.03
2.	Bankura	69	1,732.0	128.69
3.	Paschim Bardhaman	6	260.0	19.32
4.	Purba Bardhaman	52	1,536.0	114.12
5.	Paschim Medinipur	355	7140.0	530.50
6.	Purba Medinipur	187	6,500.8	483.01
Total		373	24,783.6	738.24

❖ The project targets replacement of about 373 wooden or old and dilapidated other types of bridges over irrigation canals and drainage channels, by new RCC bridges, in 6 South Bengal Districts, i.e. Birbhum, Bankura, Paschim & Purba Bardhaman, Paschim & Purba Medinipur.

Physical Targets/Expected Outcomes:

❖ Old wooden or other types of narrow and worn out bridges constructed by the I&WD decades ago, have been identified for replacement by new RCC bridges having carriageway width varying from 3.0 m to 7.5 m, depending on the traffic volume and to commensurate with the existing width as well as prospective width of connecting roads in the future.

❖ The project is expected to be converged effectively with the ongoing project of improving rural road network under PMGSY and other programmes, would provide effective rural connectivity and augment access to District/Subdivision/Block Headquarters etc. It will also reduce the travel time and consequently result in savings in fuel expenses.



Figure 32 Pilot project of replacement of 31 wooden and dilapidated RCC bridges over irrigation canals and drainage channels, by new, pre-fabricated RCC bridges, in Birbhum & Bankura

3.2.4. Dredging in River Muri Ganga

❖ The project envisages increasing navigational efficiency and turnaround times of the trans-shipment vessels by increasing navigable depth used for the purpose of navigation, tourism and trade.

•	Approved Project Cost: ₹ 131.30 Cr.
•	Sector: Navigation, Tourism and Trade
•	Duration: Capital Cost for 2 years (2018-19 & 2019-20) and Maintenance Cost Dredging for 7 years (2020-21 till 2026-27)

Present Status:

❖ The Dredging Corporation of India (DCI) has been awarded the contract through tender for carrying out Capital Dredging of Muri Ganga River in two phases - before and after the ensuing Ganga Sagar Mela-2019 and subsequently maintaining the channel navigability for the next 7 years by taking up maintenance dredging.

❖ Only a nominal part of the capital dredging could be completed in 2018-19, due to paucity of time. Inspite of that, the trans-shipment during peak periods increased by 30% .

Project Items/Features:

❖ The Muri Ganga River channel serves as the main waterway connecting Sagar Island with the main land and plays an important role in the dynamic estuary. For decades, this channel has undergone many changes, particularly, reduction of capacity due to siltation. Furthermore, three Electricity Transmission Pylons/Towers constructed on the river-bed obstructing the flow resulting in sedimentation. The reduction in navigable depth due to siltation poses problems in transportation of pilgrims, in shipment of essential items to Sagar Island, and in navigation, even by small wooden launches.

❖ The availability of the ferries only during the high-water time, lasting for about 8 hours in a daily

cycle from 5 am to 11 pm, is highly inadequate for such large number of pilgrims. Therefore, the project was conceptualized by the Govt. of West Bengal to ensure smooth and unhindered movement with enhanced navigable hours extending to 24*7 during Ganga Sagar Mela, which is the second largest congregation of mankind after the Kumbha Mela.

❖ On examining several options for layout of navigational channels, I&WD has proposed various navigational routes in addition to the existing ones based on the scale and need of navigation

■ Opening up of a channel from LCT Jetty at Lot-8 straight to Kachuberia jetty at Sagar Island for movement of bigger steel body vessels during Sagar Mela and for movement of small and large vessels during the remaining period.

■ Opening of a new channel from Jetty No.4 straight to Kachuberia Jetty at Sagar Island following existing deep-water pockets as much as possible only before/during the Mela period and it would be used by smaller vessels other than 3 large steel body vessels.

■ Opening of a connecting channel from LCT Jetty to Jetty no.5 connecting all other jetties and this channel would be periodically maintained throughout the year.

Physical Targets /Expected Outcomes:

❖ The target is to complete the capital dredging in two major navigational channels before Ganga Sagar Mela 2020.



Photo source: I&WD digital archive

the 1990s, the number of people in the world who are under 15 years of age is expected to increase from 1.1 billion to 1.5 billion.

As the world's population grows, the demand for food and other resources will increase. This will put pressure on the environment and on the world's food supply.

One way to meet this demand is to increase the amount of food that is produced. This can be done by using more land for agriculture, by using more fertilizers and pesticides, and by using more water.

Another way to meet this demand is to reduce the amount of food that is wasted. This can be done by using less food, by using food more efficiently, and by reducing food losses.

There are many other ways to meet this demand, and it is important to find the best way to do so. This will require the cooperation of all people in the world.

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The Way forward and Action Plan for FY 2019-20 and Beyond



4

The Way forward and Action Plan for FY 2019-20 and Beyond

4.1. 15 Year Vision Plan of the Department (since 2016)

❖ West Bengal is bestowed with abundant water resources which accounts for over 7% of the total water resources in the country. The average annual rainfall stands at 1700 mm which varies from a maximum of 3500 mm in Jalpaiguri district to a minimum of 1200 mm in Purulia. There are three major river basins, namely Brahmaputra basin, Ganga basin and Subarnarekha basin. The entire region is characterised by numerous inter-connected rivers, which are mostly rain-fed, except some snow-fed rivers in the northern part. Irrigation & Waterways Department is responsible for Development and Regulation of Inland Water Resources through Major, Medium and occasionally Minor Surface Irrigation Projects and also for Preventing and Controlling Floods and Water logging. Irrigation Potential created by these schemes till the FY 2015-16 is 16.27 Lakh Ha against the ultimate achievable Potential of 20.11 Lakh Ha. Completed Major Irrigation Projects having command area more than 10,000 Ha are: Barrage & Irrigation System of Damodar Valley Project (DV), Mayurakshi Reservoir Project, Kangsabati Reservoir Project, Hinglow Reservoir Project and Midnapore Canal System. On-going major irrigation project is Teesta Barrage Project. Another project, i.e. Subarnarekha Barrage Project has not shown any significant progress. There are 31 completed and 2 on-going medium irrigation projects. Numbers of completed and ongoing Minor Irrigation Projects are 120 and 6 respectively. I&WD also maintains 10,400 Km. length of flood embankments and 8,244 Km. length of Khals and Drainage channels.

4.1.1. Irrigation Sector

❖ The Department plans on reducing the gap between Irrigation Potential Created (IPC) and Irrigation

Potential Utilized (IPU) through revitalization of existing Irrigation Infrastructure.

❑ Enhancing efficiency of canal network

❖ Work of improving the efficiency in critical reaches of the irrigation canal network of all major and medium irrigation projects, completed almost six decades back has already begun. Loss of irrigation water due to seepage and dilapidated structures and silted up distribution network has reduced the efficiency of the entire system. Efforts are required to revamp and modernize the entire distribution system of major and medium projects in a phased manner, starting from the DV system, which has the biggest command area among the major irrigation projects. Simultaneously, other important Projects i.e. Mayurakshi, Kangsabati and Hinglow Major Irrigation Systems will also be brought under the purview of renovation, revitalization and modernization within a period of 5-10 Years to enhance and optimize their irrigation potential. Moreover revamping of old minor irrigation projects including those related to harnessing of tidal water, are in the pipe line.

❑ Storing and Harnessing Surface Water

❖ The Annual Rainfall in West Bengal varies from 1,200-3,500 mm. Low rainfall in western districts is also slightly above average rainfall of comparable districts in India. However, surface and groundwater availability comes under stress during prolonged non-monsoon months, particularly during peak and end of summer, as storage facility of surface run-off is grossly inadequate as more than 80% flows down the sea. On-going construction of check dams under 'Jalotirtha' programme is a major step forward towards conservation and harnessing of surface water in arid districts of the State. Our goal in the next couple of years is to undertake construction of such check dams in all South & Central

Bengal districts across the myriads of drainage channels and streams criss-crossing the terrain, to promote multifarious activities like irrigation, household needs, fishery, duckery and also for groundwater recharging and soil conservation. On-going major irrigation project i.e. Teesta Barrage Project scope is being reviewed in the present perspective with a view to complete the project with revised scope.

4.1.2. Flood Sector

❑ Improvement of existing Flood Control Structures

❖ The I&WD maintains around 10,400 Km. length of flood protective embankments throughout the State including seawall and coastal embankments in Purba Medinipur & South 24 Parganas districts. The embankments are mostly earthen, while 1,298 Km. (12.5% of the total length) is permanently armoured with cement/brick/boulder pitching. The onus of maintenance of such a huge length of girdle of embankment is another big challenge. We propose to upgrade the embankments by raising, strengthening and armouring wherever required and feasible, so as to provide reasonable degree of protection to the flood prone areas, which comprises of around 43% of the total geographical area of the State. Emphasis would also be laid on using innovative and state-of-the-art technologies during improvement of embankments.

○ Implementation of comprehensive Flood-management Schemes:

The major flood management schemes, namely:

- ❖ Aila affected Sunderban Embankment Reconstruction Project,
- ❖ Kaliaghai-Kapaleswari-Baghai Basin Drainage Project and
- ❖ Kandi Master Plan.

❑ Implementation of a separate flood management scheme each for Lower Damodar Area in Hooghly & Howrah districts and erosion affected area of Alipurduar.

❑ Implementation of a comprehensive Flood Forecasting System

❖ Under the 'National Hydrology Project', installation of automatic rain gauge and river gauge recorders, integrating those with web-based software to generate real time flood related data and finally a system using such data in digital elevation modelling would be designed, developed and introduced for dissemination of information to people in flood prone areas well in advance by forecasting time of occurrence of flood, flood water level and extent of inundation. The system will also facilitate in disaster management operations including rescue, rehabilitation and providing relief materials in a more planned way.

4.1.3. Rural Connectivity

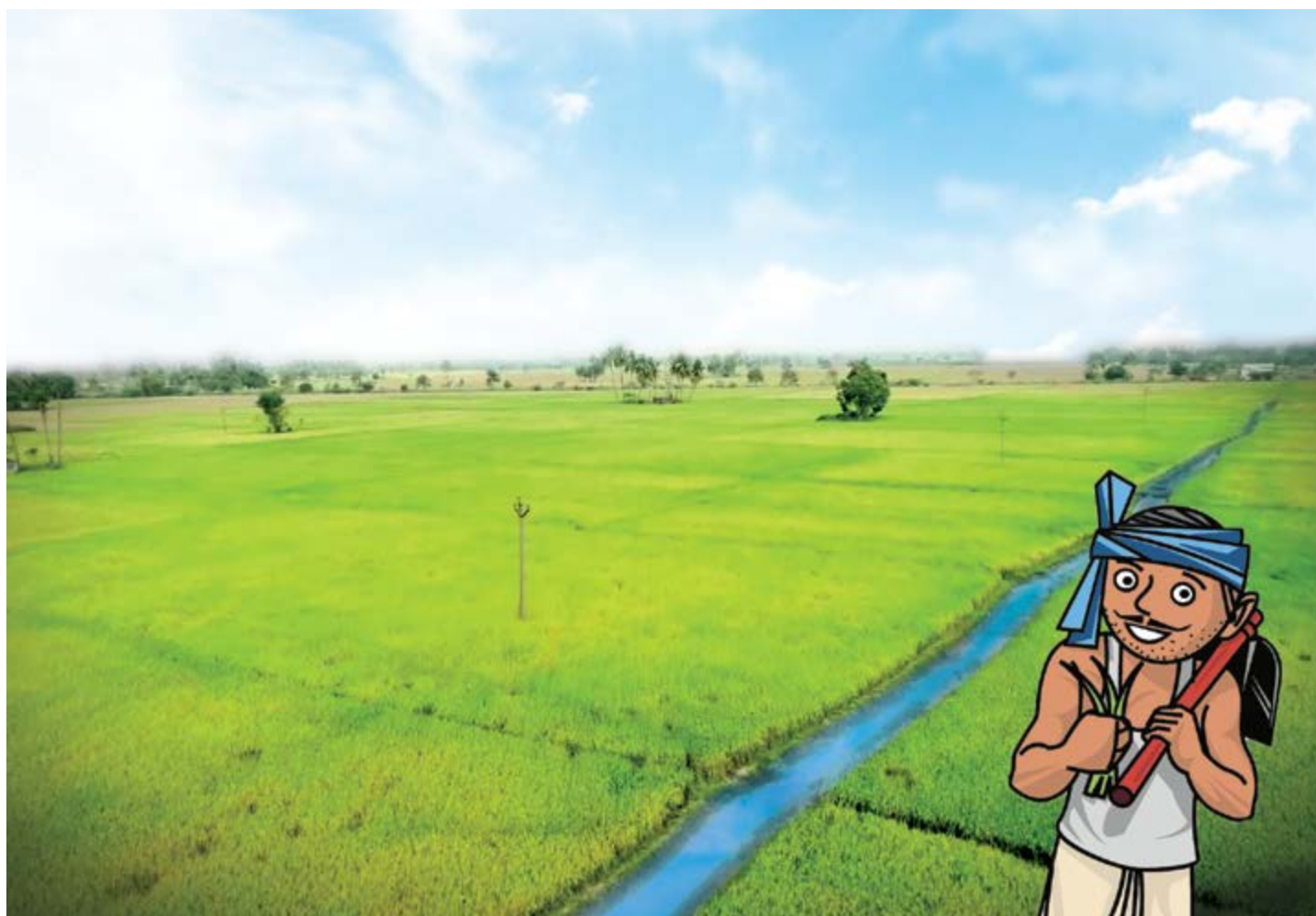
❑ Construction of bridges and improvement of canal inspection roads to establish rural connectivity

❖ The target of building good connectivity in remote rural areas for quicker access to District/Subdivision/Block Headquarters, schools, colleges, market places, etc. is being achieved by roads being constructed under the Pradhan Mantri Grameen Sadak Yojana (PMGSY). Such roads cross over numerous drainage channels and irrigation canals, and the connecting bridges, originally built by the I&WD in many areas are often wooden or narrow and old RCC bridges. As many as 161 number of such bridges have been converted into properly designed RCC bridges having sufficient carriageway width, during the last five years and work is going on for conversion of 43 more such bridges. Our target is to replace wooden or narrow and dilapidated old RCC bridges by construction of new RCC bridges in next 2-3 years through a comprehensive Action Plan. Total number of such bridges is 1,057 at present. Implementation of such a plan would provide substantial and tangible social benefits to the rural population by way of quicker and easier access to important locations and boost up rural economy due to reduction in distance for transportation of agricultural products to the market, besides easier access to health, educational and recreational facilities.

4.1.4. Programme for implementation

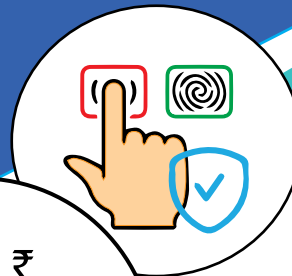
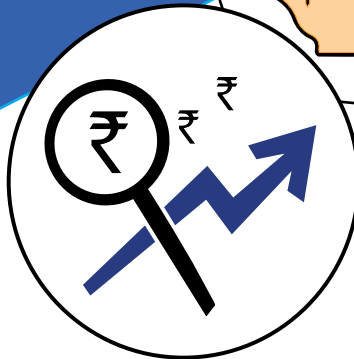
❑ Progress in sync with Vision Document

❖ Formulation and implementation of the schemes in sync with the Vision Document in successive years is a continuous process that is being followed in the Department since 2017-18. Status of the on-going projects during 2018-19 has already been provided in the foregoing Chapter. It is to be mentioned that the three major flood management projects slated in Paragraph 4.1.2 above are nearing completion as on 31st March 2019, range of physical progress varying from 75-98%.





Key Physical and Financial Achievements & Indicators during the last 3 years (FY 2016-19)



5

Snapshot of Financial & Physical Achievements during FY 2016-19

5.1. Snapshot of Financial & Physical Achievements from FY 2016-19

Financial indicators

❖ The total expenditure of the Department stood at ₹ 1,966.3 Cr. in FY 2018-19, up by 14.58% from the total expenditure in FY 2017-18.

❖ This is primarily due to an increase in capital expenditure which stood at ₹ 1,202.39 Cr. in FY 2018-19, an increase of 16.70% from the total capital expenditure in FY 2017-18 (₹ 1,030.29 Cr.). It is to be noted herein that capital expenditure increased

marginally from FY 2016-17 to FY 2017-18, clearly indicating the Department's prioritized interventions in creation of assets and effective investment in new infrastructure in FY 2018-19.

❖ Overall distribution of shares of expenditures by different economic categories has experienced minimal variation since FY 2016-17. Maintenance costs increased significantly to 15.7% of the total expenditure in FY 2017-18, up from 11.21% of the total expenditure in FY 2016-17. This was primarily due to the Department's focused interventions and initiatives in sustaining existing flood control and irrigation infrastructure.

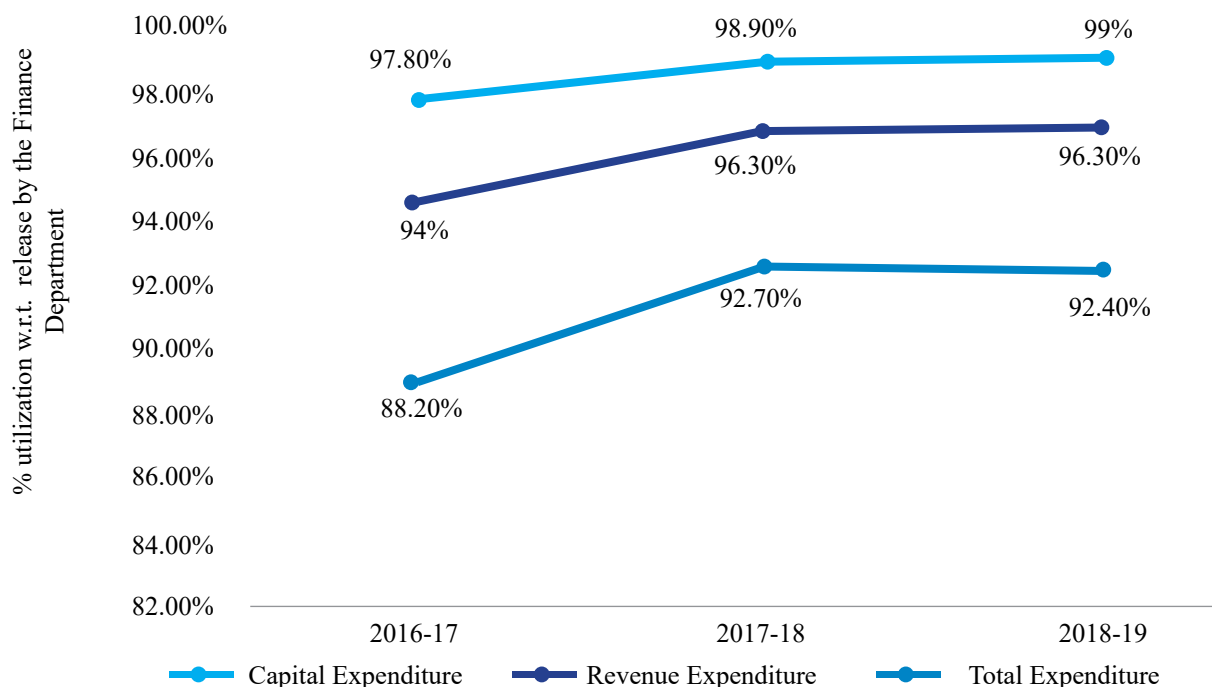


Figure 31 Utilization of funds by the Department from FY 2016-19

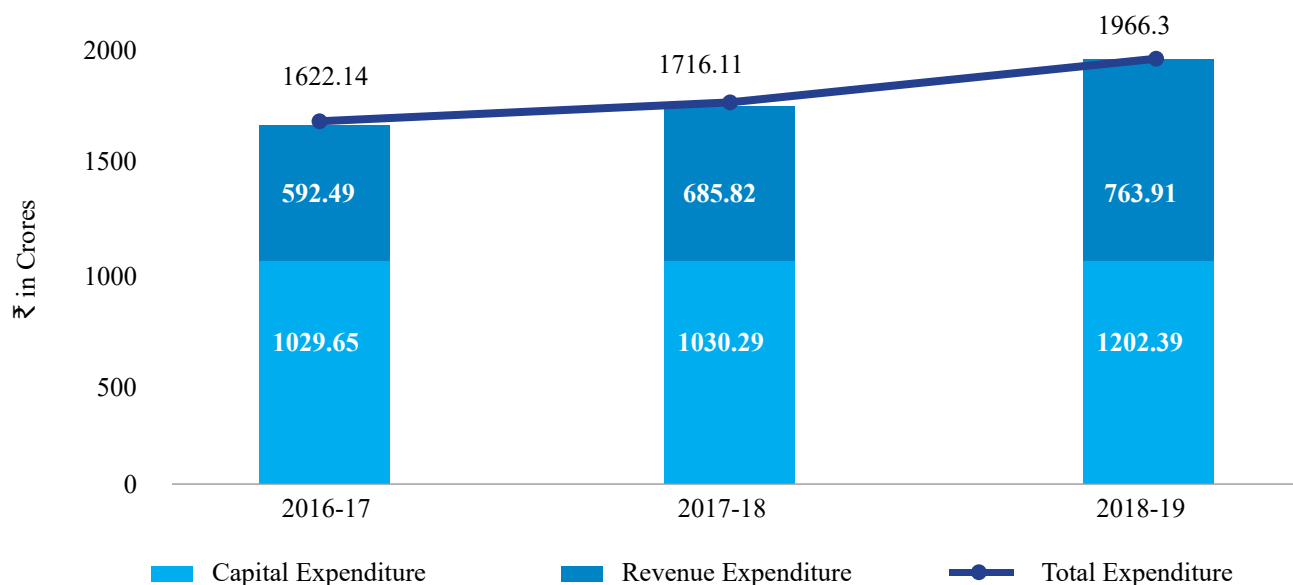


Figure 32 Capital and Revenue Expenditure by the Department from FY 2016-19

❖ Total expenditure utilization with respect to fund released by Finance Department has remained constant at 96.30% in FY 2018-19. Utilization of allocated capital expenditure reached a decade long high of 99% in FY 2018-19 and has been performing better in comparison to the revenue expenditure utilization and even the total expenditure utilization.

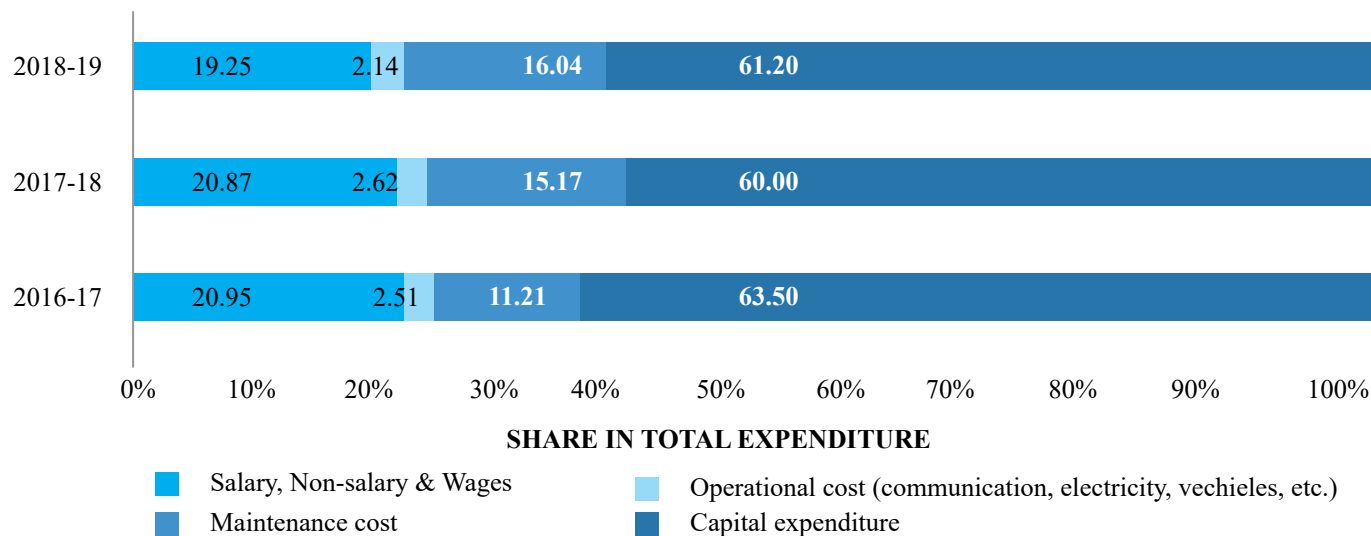
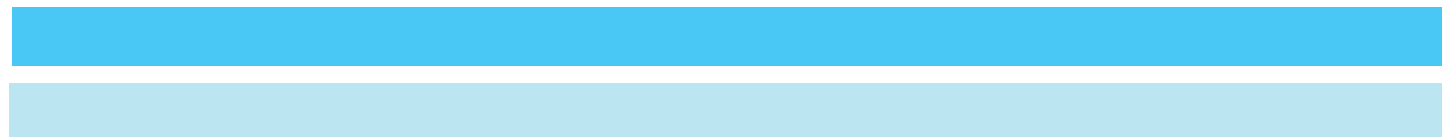


Figure 33 Share of total expenditure of the Department from FY 2016-19

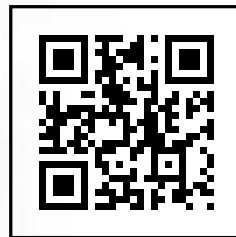
❖ It is to be noted that given time taken in processing the bills of work and overlaps experienced in the working season in two consecutive financial years, expenditure as part of a scheme/project to improve physical progress often gets recorded in the next financial year and as such, the intensity of achievements and absolute quantification of progress may be underscored.

Physical indicators

- ❖ Positive correlation observed between progressive improvements in capital and revenue expenditures since FY 2016-17 and coverage levels in terms of length of strengthened embankments and productive irrigable land.
- ❖ The Department has followed a phase-oriented approach to invest periodically and as such results achieved vary in absolute terms, often denoting a declining trend of achievement. However, it is to be noted that quantum of physical progress in each year is anecdotal and represent achievements as per year-on-year need based investments. Considering total irrigation potential generated/restored or total irrigable land brought under crop production, a steady increase in the level of achievement is observed.







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