सत्यमेव जयते

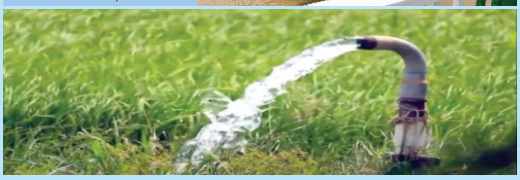
Report of the Comptroller and Auditor General of India on Performance Audit of Outcomes in Surface Irrigation of Bansagar Canal Project and Modernisation of Chaudhary Charan Singh Lahchura Dam Project


Adwa Bairaj, Bansagar Canal Project, Mirzapur


Adwa-Meja Link Canal Mirzapur


Dhasan Main Canal, Mahoba, Lehchura Dam Project


Lahchura Dam, Mahoba



SUPREME AUDIT INSTITUTION OF INDIA
लोकहितार्थ सत्यनिष्ठा
Dedicated to Truth in Public Interest

Government of Uttar Pradesh

Report No. 2 of the year 2023

Report of the
Comptroller and Auditor General of India
on
Performance Audit of
Outcomes in Surface Irrigation of
Bansagar Canal Project and Modernisation of
Chaudhary Charan Singh Lahchura Dam Project

Government of Uttar Pradesh
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Preface

This Report of the Comptroller and Auditor General of India has been prepared for submission to the Governor of Uttar Pradesh under Article 151 of the Constitution of India.

The Report contains results of the Performance Audit of Outcomes in Surface Irrigation of Bansagar Canal Project and Modernisation of Chaudhary Charan Singh Lahchura Dam Project covering the period 2014-15 to 2020-21.

The instances mentioned in this Report are those which came to notice in the course of test audit for the period 2014-15 to 2020-21 as well as those which came to notice in earlier years, but could not be reported in the previous Audit Reports; matters subsequent to the year 2020-21 have also been included, wherever necessary.

The audit has been conducted in conformity with the Auditing Standards issued by the Comptroller and Auditor General of India.

Executive Summary

The economy of Uttar Pradesh is based mainly on agriculture and about 65 *per cent* of the total population is dependent on agriculture. Sustainable development of agriculture is, therefore, of utmost importance for the overall development of the State. Out of total 240.93 lakh hectare area of the State, 187.75 lakh hectare (78 *per cent)* is agricultural land, of which 143.89 lakh hectare (77 *per cent*) is the net irrigated area. However, canal irrigation is provided in only 17 *per cent* of net irrigated area through 75,466 km canal network. Irrigation and Water Resources Department is responsible for construction, operation and maintenance of the canal network in the State.

The Performance Audit of Outcomes in Surface Irrigation of Bansagar Canal Project and Modernisation of Chaudhary Charan Singh Lahchura Dam Project (Lahchura dam project) covering period from April 2014 to March 2021 was conducted to assess the efficiency and effectiveness of the two canal projects. This report aims at identifying the areas that require systemic corrections and improvements.

Bansagar Canal Project envisaged construction of canal systems in Uttar Pradesh to utilise 34,008 million cubic feet (mcft) water from Bansagar dam with the objective to increase irrigation intensity of existing nine canal systems from 85 *per cent* to 150 *per cent* in the Culturable Command Area (CCA) of 2.32 lakh hectare in Prayagraj and Mirzapur districts after commissioning of BCP. The project was approved by the Central Water Commission in January 1994 at an estimated cost of ₹ 330.19 crore. However, further progress of the project remained slow due to which scheduled date of completion in the year 2004 was revised four times with consequential impact on time and cost overrun and the project was commissioned in July 2018. The State Government incurred expenditure of ₹ 3,419.37 crore on BCP during 1996-97 to 2020-21.

Lahchura Dam provides water to Dhasan Canal System having CCA of 97,169 hectare area in Mahoba and Hamirpur districts. Lahchura Dam apart from its own storage receives water from Pahari Dam. The structures of both Lahchura and Pahari Dams had become old and outdated due to which the existing falling shutters arrangement for controlling the flow of water was creating operational problem during monsoon season. Lahchura Dam project was approved in February 1979 at an estimated cost of ₹ 7.04 crore and connected Pahari Dam project was approved in February 2008 at the estimated cost of ₹ 76.68 crore. Due to slow progress of works, the Lahchura Dam Project and Pahari Dam Project were completed in March 2015 and March 2018 respectively. The State Government incurred expenditure of ₹ 328.30 crore during 1978-79 to 2014-15 on Lahchura Dam Project and ₹ 354.20 crore during 2009-10 to 2017-18 on Pahari Dam Project.

Audit noticed that though the Government spent huge amounts (BCP: ₹ 3,419.37 crore during 1996-97 to 2020-21; Lahchura and Pahari Dam Projects: ₹ 682.50

crore during 1978-79 to 2017-18) in both the projects, the outcomes of the projects, *viz.*, augmentation of water availability in canal network, creation of additional irrigation intensity and change in cropping pattern remained largely unachieved due to deficient planning for remodeling of existing canal systems, insufficient storage capacity of dams, inadequate supply of water in canals and consequently non-operation of canals for full cropping period.

Bansagar Project is a joint venture of the three States, *viz.*, Bihar, Madhya Pradesh and Uttar Pradesh under which Bansagar Dam was constructed at river Sone in Madhya Pradesh. As per the agreement executed (September 1973) between the three States, Uttar Pradesh is entitled to utilise 1.0 million acre feet (*i.e.*, 43,560 mcft) water from Bansagar reservoir. Bansagar Canal Project, Uttar Pradesh (BCP), which has been executed by the Government of Uttar Pradesh, envisaged construction of canals systems in Uttar Pradesh to utilise 34,008 mcft of water from Bansagar dam. However, even after commissioning of the project in July 2018, BCP authorities placed demand for 5,782 mcft (17 *per cent*) to 16,476 (48 *per cent*) water from Madhya Pradesh as against target to provide 34,008 mcft additional water to the existing nine canal systems under BCP. The reason for less demand of water could not be ascertained in Audit. Further, BCP was not even getting the lesser demanded quantity of water from Bansagar reservoir. It led to supply of only 1,680 mcft (five *per cent*) to 2,921 mcft (nine *per cent*) water to canal network under BCP and consequent short supply of water to field and non-operation of canals for full cropping period. As a result, the target of creation of additional irrigation intensity remained unachieved with shortfalls of 44 to 45 *per cent* in Rabi and 32 to 33 *per cent* in Kharif seasons even after spending ₹ 3,419.37 crore on BCP.

Similarly, there was short supply of water to Dhasan canal system in Lahchura Dam project because of inadequate water storage capacity of dams. As a result of short supply of water, canals were operated in shorter duration. The canal irrigation in Kharif was provided in only 455 hectare to 2,153 hectare (3 to 15 *per cent*) against the target of 14,575 hectare, though there was improvement in irrigation during Rabi season.

Both the selected irrigation projects, BCP and Lahchura Dam Project, had significant issues in planning and execution. In BCP, issues like current availability of water in the canal systems, capacity enhancement of existing canal systems, were either not addressed or inadequate provisions were made in the DPRs due to which envisaged objective of enhancing irrigation intensity of the canal could not be achieved. The scope of project of modernisation of Lahchura and Pahari Dam Projects were limited to replacing the old structures of the dams. Insufficient water storage capacity of Lahchura and Pahari Dam was not addressed, as a result, the project would not be able to provide canal irrigation in the entire command area of 97,169 hectare.

Scope of the construction works in both the projects could not be firmed up and kept changing during the course of execution of works. Due to this, the projects could be completed with a delay of more than 14 years (BCP) and six years (Lahchura Dam Project) along with huge cost overrun. Serious lapses in the

contract management were noticed. In BCP, the provision of cost escalation in labour, petroleum, oil & lubricant and material was included belatedly, after NIT and technical bid evaluation. Ineligible contractors were awarded works in Lahchura Dam project. In the execution of works, irregularities such as unjustified payment of price adjustment, irregular grant of interest free advances to contractors, unauthorised sanction of variations in the quantities of the contract, grant of time extension without proper justifications, inadequate quality control, *etc.*, were also noticed. The envisaged connectivity between canals was also not achieved. The canal networks were not maintained regularly.

Convergence efforts impacting the outcomes were also not adequate as there were short/delayed supply of certified seeds from the Government seed stores and inadequate soil testing in the selected villages. Command area of the canal systems was also not developed, restricting the utilisation of created irrigation intensity.

Recommendation 1: *The State Government should carry out study to explore the feasibility for enhancement of the storage capacity of Lahchura Dam and Pahari Dam so as to store adequate water from the river Dhasan.*

Recommendation 2: *The State Government should take up remodeling/ restoration work in canals under nine canal systems of Bansagar Canal Project and Dhasan Canal System in an efficient and effective way.*

Recommendation 3: *The State Government should investigate the matter of defective surveys and faulty assessment of requirements of the projects and fix responsibility of erring officers;*

Recommendation 4: *There is an urgent need of formulating effective mechanism for stringent monitoring of irrigation projects for timely completion. Series of delays needs to be looked into and remedial measures may be taken to ensure competence of contractor, penalty for delays and timelines in contract conditions for future projects.*

Recommendation 5: *The State Government should improve competitiveness of the tendering process through fair and transparent contract conditions and wide publication of tender notices and remove deficiencies in preparation of detailed estimates.*

Recommendation 6: *The State Government may review the basis for providing percentage weightage for price adjustment of labour and petrol, oil and lubricants in Bansagar Canal Project and take appropriate action against erring officers for arbitrary fixation of the percentage weightage without ascertaining their actual usages.*

Recommendation 7: *The State Government should ensure strict adherence to the Government orders and instructions regarding grant of time extension, approval of cost variations and extra items. Department may take appropriate action against the officials who flouted the provisions of Government instructions.*

Recommendation 8: *Since the Bansagar Canal Project has been completed without providing envisaged connectivity between canals, the State Government*

should assess the lapses in this area through a comprehensive review, fix responsibility and take corrective actions.

Recommendation 9: *There is an urgent need to identify and address the bottlenecks in the envisaged supply of water from Bansagar dam and further distribution of water to the connected canal systems. The State Government should assess and undertake such work in a time bound and coordinated manner in order to utilise the potential created optimally.*

Recommendation 10: *The State Government should conduct proper investigation to ascertain the circumstances due to which the irrigation facility could not be expanded in the command area of 97,169 hectare in Dhasan Canal System.*

Recommendation 11: *The State Government should ensure proper coordination between Agriculture Department and Irrigation and Water Resources Department to ensure optimum utilisation of available water, timely and adequate delivery of agricultural inputs to the farmers to promote adoption of suitable cropping pattern and consequential higher productivity and production in the crops. In future projects, we recommend that the DPR should contain a convergence plan involving all the stakeholder departments so as to develop the command area in an integrated manner.*

Recommendation 12: *The State Government should take action for the formation of Water User Association on priority basis so that canal systems can be operated efficiently with community participation.*

Chapter – I
Introduction

CHAPTER-I

Introduction

The present chapter deals with the means and coverage of irrigation facilities in Uttar Pradesh and outcome indicators to assess the performance of irrigation projects. Audit objectives, criteria, scope and methodology of audit have also been discussed in this chapter.

Brief snapshot of the Chapter

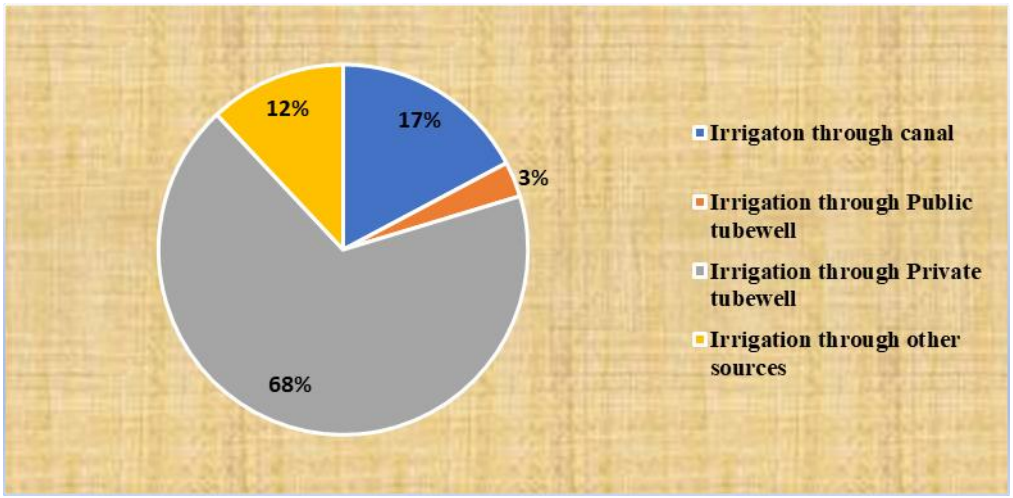
- Out of total 240.93 lakh hectare area of the State, 187.75 lakh hectare (78 *per cent)* is agricultural land, of which 143.89 lakh hectare (77 *per cent*) is the irrigated area;
- In Uttar Pradesh, canal irrigation is provided in 24.82 lakh hectare (17 *per cent* of irrigated area) through 75,466 km canal network.

1.1 Introduction

Uttar Pradesh is the most populous Indian State and the third largest State economy of the country. The economy of Uttar Pradesh is based mainly on agriculture and about 65 *per cent* of the total population is dependent on agriculture. Sustainable development of agriculture is, therefore, of the utmost importance for the overall development of society. Assured irrigation together with coordinated interventions including timely and sufficient availability of agricultural inputs help in achieving accelerated agricultural growth.

In addition to rain water, water for irrigation is obtained from both surface and underground water resources. Out of total 240.93 lakh hectare area of the State, 187.75 lakh hectare (78 *per cent)* is agricultural land, of which 143.89 lakh hectare (77 *per cent*) is the net irrigated area. The share of various irrigation sources in the net irrigated area of the State is depicted in **Chart 1.1**.

Chart 1.1: Sources of irrigation in the State

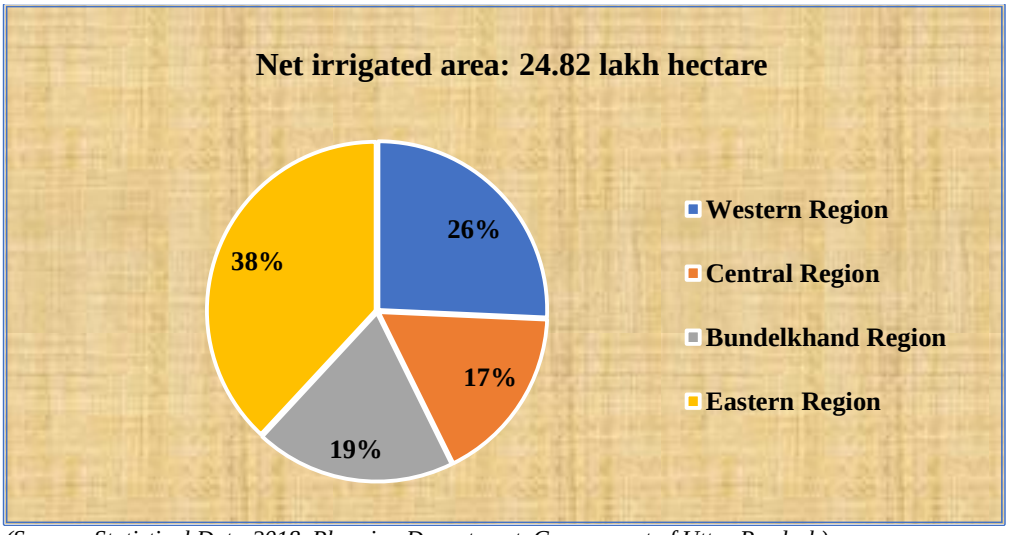


(Source: Statistical Data 2018, Planning Department, Government of Uttar Pradesh)

In Uttar Pradesh, canal irrigation is provided through 75,466 km canal network. Distribution of irrigated area through canals in four economic

regions of the State is depicted in ***Chart 1.2*** and region-wise details of districts is given in ***Appendix 1.1***.

Chart 1.2: Regional distribution of irrigated area through Canals



(Source: Statistical Data-2018, Planning Department, Government of Uttar Pradesh)

1.2 Organisational Set up

Irrigation and Water Resources Department is responsible for construction, operation and maintenance of the canal network in the State. The Department is headed by Additional Chief Secretary and the implementation of various works is carried out under the technical control of Engineer-in-Chief at the State level, Chief Engineer at Zone level, Superintending Engineer at Circle level and Executive Engineers at Division level.

Apart from Irrigation and Water Resources Department, other line Departments involved in the planning and operation of the irrigation projects are detailed in **Table 1.1**.

Table 1.1: Line Department and their roles

Line Department	Roles and Responsibilities
Agriculture Department	Agriculture planning regarding cropping pattern for the project, crop water requirement and targets of production and productivity
Ground Water Department & Minor Irrigation Department	Status of ground water availability for agriculture and its conjunctive use with the canal irrigation project
Horticulture Department	Cropping pattern of horticulture produce
Revenue Department	Estimation of production through crop cutting

1.3 Audit objectives

Performance Audit of Outcomes in Surface Irrigation of Bansagar Canal Project and Modernisation of Chaudhary Charan Singh Lahchura Dam Project was carried out to ascertain whether:

- Irrigation projects were planned in accordance with the intended objectives;

- The projects works were executed in an economic, efficient and effective manner and;
- The benefits contemplated in the projects were achieved and the same were delivered to the beneficiaries efficiently and effectively.

1.4 Audit criteria

The audit criteria have been drawn from the following:

- Guidelines issued by Central Water Commission (CWC) for preparation of Detailed Project Reports (DPRs), 2010;
- Government of India guidelines for Command Area Development and Water Management, 2015;
- Guidelines issued by CWC in respect of conjunctive use of ground water;
- Indicators for irrigation performance assessment suggested by CWC;
- DPRs of the selected irrigation projects;
- Uttar Pradesh Irrigation Manual; and
- Financial rules, State Government instructions relating to contract management for execution of works, procurements, rehabilitation, *etc*.

1.5 Scope of Audit and methodology

Audit intended to assess the effectiveness of the canal irrigation projects. The State Government, however, did not provide complete information of the irrigation projects under which these canals were constructed/operated[1]. However, the Department provided (August 2019) details of 19 irrigation projects completed/partially completed during April 2011 to March 2017. These 19 irrigation projects included 12 major irrigation projects as detailed in **Table 1.2**.

Table 1.2: Details of major irrigation completed/partially completed during April 2011-12 to 2016-17

Sl. No.	Name of Project	Year of Approval	Status	Cost of the project (₹ in crore)	Expected Benefit (Th. Hac.)
1.	Rajghat Canal Project	April 1981	Commissioned in March 2012	542.00	138.60
2.	Modernisaton of Chaudhary Charan Singh Lahchura Dam Project.	April 2003	Commissioned in March 2015	328.30	14.58
3.	Bansagar Canal Project (Uttar Pradesh)	February 1994	Commissioned in July 2018	3420.24	150.13
4.	Saryu Canal Project	July 1978	Ongoing[2]	10003.12	1404.00
5.	Arjun Sahayak Project	March 2010	Ongoing[3]	2655.29	44.38

[1] As per data of Central Water Commission (CWC) there are 118 major and medium (including Extension, Renovation and Modernisation) irrigation projects in Uttar Pradesh as of 2020.
[2] The project was subsequently commissioned in December 2021.
[3] The project was subsequently commissioned in November 2021.

Sl. No.	Name of Project	Year of Approval	Status	Cost of the project (₹ in crore)	Expected Benefit (Th. Hac.)
6.	Madhya Ganga Canal Project (Phase II)	June 2007	Ongoing	4234.11	146.00
7.	Badayun Irrigation Scheme	October 2011	Ongoing	2100.16	37.45
8.	Bhaurat Dam Project	November 2007	Ongoing	612.77	16.00
9.	Kanhar Irrigation Scheme	January 1979	Ongoing	2239.55	35.00
10.	Kachnauda Dam Project for Balance Work	January 2007	Ongoing	594.46	10.85
11.	Umarhut Canal Second Stage	January 2011	Ongoing[4]	149.60	25.66
12.	Project for construction of Rampur Barrage on River Kosi and Modernisation of Kosi Canal System in District Rampur	November 2014	Ongoing	629.80	24.25

In order to select a sample of projects, audit focused on two criteria, *viz.*, the projects which were completed/partially completed during the period January 2011 to March 2017 and were providing benefits for at least last two years as well. Accordingly, two major irrigation projects, *viz.*, Bansagar Canal Project, Uttar Pradesh (BCP) and Modernisation of Chaudhary Charan Singh Lahchura Dam project (Lahchura Dam Project) were selected out of 12 major irrigation project as detailed in **Table 1.2** for detailed review. Lahchura Dam, constructed to feed water to the Dhasan Canal System (DCS), receives water from the nearby Pahari Dam and Saprar Dam. Therefore, records in respect of Pahari Dam, Saprar Dam and DCS were also examined.

Records for the period April 2014 to March 2021 with backward/forward linkages were examined in the Department as well as field offices of the selected irrigation projects. Records were also examined and information collected from the concerned line departments, *viz.*, Agriculture, Ground water, Horticulture, Minor Irrigation and Revenue. Department and field offices covered in the Audit are detailed in ***Appendix-1.2***.

Besides, 29 canals (covering 119 villages) in both the selected Irrigation projects were selected using Simple Random Sampling without Replacement (SRSWOR) for detailed analysis of the outcomes. Evidence in respect of delivery of services were also collected through joint visits with departmental officers in the selected villages.

Audit objectives and criteria were discussed with the State Government in the Entry Conference held on 13 January 2020. The draft report was issued to the State Government in January 2022. Audit findings were also discussed in the Exit conference (30 July 2022) with the State Government. The replies of the

[4] The project was subsequently commissioned in September 2021.

State Government on the draft report was received in July 2022 and September 2022, which have been suitably incorporated in the report.

1.6 Brief description of the selected irrigation projects

1.6.1 Bansagar Canal Project (Uttar Pradesh)

Bansagar Project is a joint venture of the three States, *viz.*, Bihar, Madhya Pradesh and Uttar Pradesh under which Bansagar Dam was constructed at River Sone in Madhya Pradesh. As per the agreement executed (September 1973) between the three States, Uttar Pradesh is entitled to utilise 1.0 MAF[5] water from Bansagar reservoir and the cost of Bansagar Dam was to be shared in the proportion of water at the site to be utilised by Madhya Pradesh, Uttar Pradesh and Bihar, *i.e.*, 2:1:1, i.e., 50 *per cent*, 25 *per cent* and 25 *per cent* respectively.

Bansagar Canal Project, Uttar Pradesh (BCP) envisaged construction of canal systems in Uttar Pradesh to utilise 0.78 MAF[6] of Sone water from Bansagar dam[7] with the objective to increase irrigation intensity of existing nine canal systems[8] from 85 *per cent* to 150 *per cent* in the Culturable Command Area[9] (CCA) of 2.32 lakh hectare (ha) in Prayagraj and Mirzapur districts after commissioning of BCP. The additional irrigation intensity of 1.50 lakh ha was to be augmented by providing additional water to these existing nine canal systems.

As a part of the project, the water share of Uttar Pradesh was to be brought through a common water carrier and common water feeder followed by a dedicated feeder canal up to Adwa Barrage, constructed in Mirzapur district. From Adwa barrage, water was to be provided to Adwa Dam and Meja Dam. From Adwa Dam, water availability was to be augmented in Adwa Sukhara canal system. Similarly from Meja Dam, additional water was to be provided to the five existing canal systems[10] of Mirzapur district and three existing canal systems[11] of Prayagraj district.

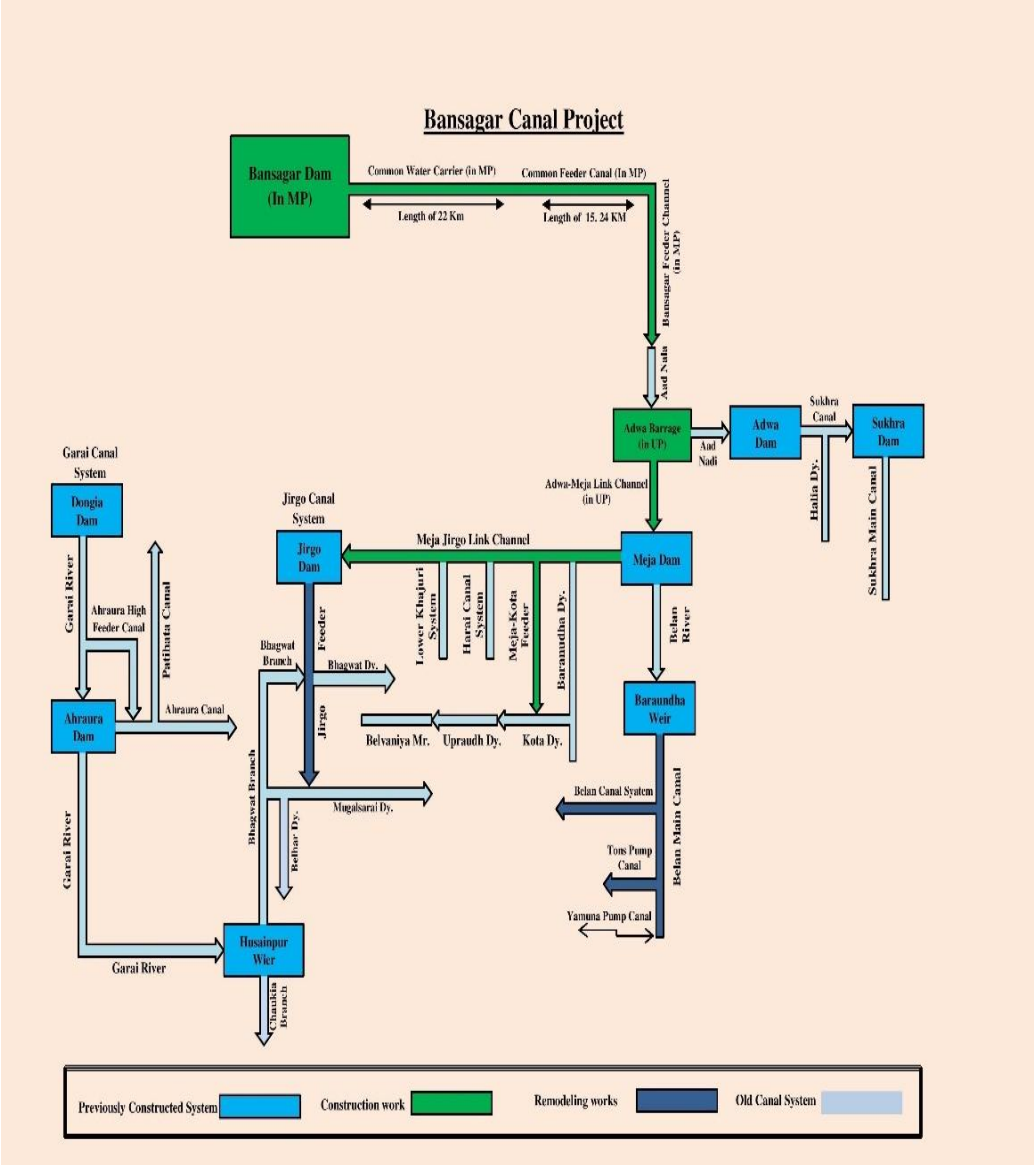
Bansagar Dam, common water carrier, common water feeder and Bansagar feeder canal are situated in territory of Madhya Pradesh whereas the rest structures are situated in the territory of Uttar Pradesh. Government of Madhya Pradesh executed construction work of Bansagar Dam, common water carrier and common water feeder and the cost of these constructions was shared[12] by Government of Uttar Pradesh (₹ 517.56 crore).

[5] Million Acre Feet.
[6] Equivalent to 34,008 million cubic feet (mcft)
[7] Out of allocated share (1.0 MAF) of Uttar Pradesh from Bansagar Dam, 0.22 MAF water was being utilised through Sone Pump Canal.
[8] Belan canal (from Belan river), Tons pump canal (Tons river), Yamuna pump canal (Yamuna river), Adwa Sukhra canal (Sukhara reservoir), Baraundha Distributary canal (Sirsi reservoir), Harrai canal (Harrai wier), Lower Khajuri canal (Khajuri river), Garai canal (Dongia and Ahiraura dams) and Jirgo canal (Jirgo dam).
[9] It is the area which can be physically irrigated from a scheme and is fit for cultivation.
[10] Baraundha distributary canal, Harrai canal system, Lower Khajuri canal system, Garai canal system and Jirgo canal system.
[11] Belan canal system, Tons pump canal system and Yamuna Pump canal system.
[12] Bansagar dam: 1/4 of cost of dam; Common water carrier: 1/3 of the cost of common water carrier; and Common feeder canal: 2/3 of cost of common water feeder.

Government of Uttar Pradesh executed construction work of Bansagar Feeder Canal, Adwa Barrage, Adwa Meja Link channel and Meja Jirgo link channel and remodeling of existing canals under (BCP). Construction of BCP was taken up in 1997 and finally commissioned in July 2018 with time overrun of 14 years after incurring expenditure of ₹ 3,419.37 crore (including ₹ 517.56 crore paid to Government of Madhya Pradesh).

A schematic diagram of Bansagar Project is given in **Figure 1.1** below:

Figure 1.1: Schematic diagram of Bansagar Project



(Source: CE, BCP)

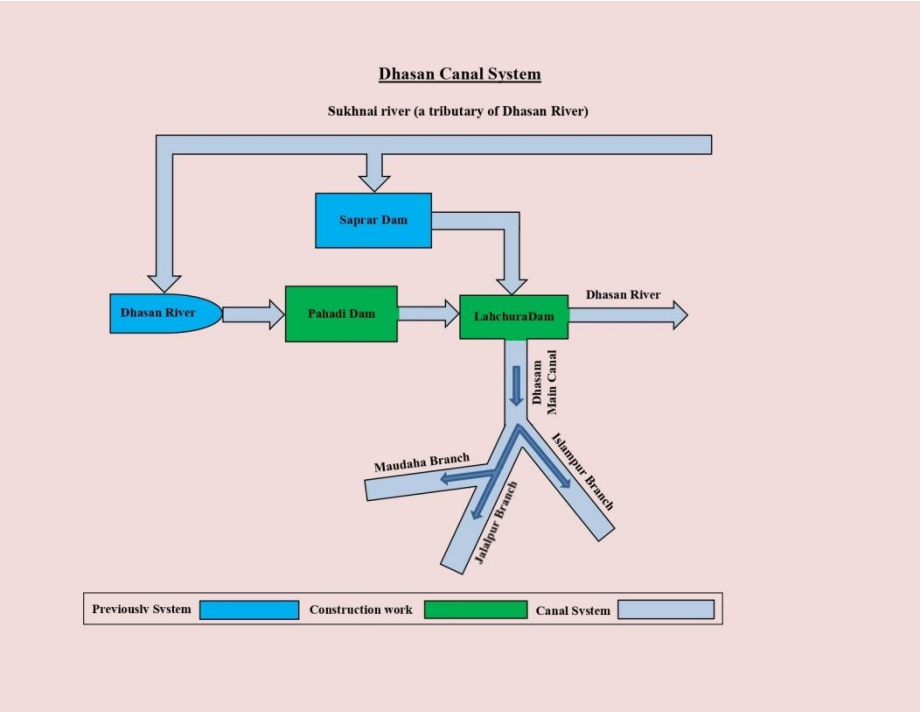
1.6.2 Lahchura Dam Project

Dhasan Canal System (DCS), constructed way back during 1906-10 covered a CCA of 97,169 hectare area in Mahoba and Hamirpur districts. DCS offtakes from Lahchura Dam constructed across Dhasan river[13]. Lahchura Dam apart

[13] Originated from Madhya Pradesh.

from its own storage, receives water from two other Dams, *viz.*, Pahari Dam and Saprar Dam. Pahari Dam is situated at river Dhasan, six miles upstream of the Lahchura Dam whereas Saprar Dam is situated across river *Sukhnai*, a tributary of Dhasan river. A schematic diagram is given below:

Figure 1.2: Schematic diagram of Dhasan Canal System



(Source: CE, Betwa Pariyojana)

The structures of both Lahchura and Pahari Dams had become old and outdated due to which the existing falling shutters arrangement for controlling the flow of water[14] was creating operational problem during monsoon season[15]. Therefore, to ensure optimum utilisation and assured supplies to DCS, the State Government approved (1979) a project of Modernisation of Chaudhary Charan Singh Lahchura Dam at an estimated cost of ₹ 7.04 crore. The modernisation work was completed in March 2015 at an expenditure of ₹ 328.30 crore. A project of Modernisation of Pahari Dam (Pahari Dam Project), which was constructed in the up-stream of Lahchura Dam was also approved separately by the State Government in January 2009 to replace the old structures. The project of Pahari Dam was completed in March 2018 at an expenditure of ₹ 354.20 crore. In both the projects, storage capacity of the Dams was not enhanced and only old structures of the Dams were replaced.

1.7 Outcomes indicators

Chief Engineer (BCP) informed (September 2022) that benefits of the irrigation projects are evaluated on the basis of data of irrigated area and cropping pattern. In the Performance Audit of Outcomes in Surface Irrigation of Bansagar Canal Project and Modernisation of Chaudhary Charan Singh

[14] Water was to be released from Pahari dam to Lahchura dam. Besides, water stored at Lahchura dam was to be released to DCS.
[15] The water in dams were stored mainly during monsoon season.

Lahchura Dam Project, the following broad outcomes were assessed vis-à-vis deliverable envisaged in DPRs of the sampled irrigation projects:

Outcomes indicators assessed in Audit	Related deliverable envisaged in the DPR of the sampled projects
Assured and adequate availability of water till the tail-end	● BCP envisaged augmentation of 22,495 million cubic feet (mcft) additional water in the existing nine canal systems which would create additional irrigation intensity in 1.50 lakh ha area comprising 0.89 lakh ha in Rabi and 0.61 lakh ha in kharif. ● Lachchura Dam project envisaged optimum utilisation and assured supply of water to DCS so as to create additional irrigation intensity in 14,575 hectare area in kharif.
Change in cropping pattern	● In BCP, crop area was to be enhanced to 83 *per cent* in Rabi and 67 *per cent* in Kharif against the existing crop area of 44 *per cent* and 41 *per cent* respectively. Besides, an additional cropping of vegetable in 17,150 hectare area along with change in cultivation area of oilseed and peas after completion of BCP. ● Lachchura Dam project envisaged cultivation of paddy in 0.15 lakh hectare which was not sown earlier.
Increase in crop yield as a result of irrigation project	● Improvement in productivity and additional production of grain in different crops of Rabi and Kharif were also targeted after commissioning of these irrigation projects

In audit, we have examined the records to assess the extent upto which above mentioned deliverables were achieved after commissioning of the projects. However, since all the above indicators/deliverables other than the first one depend upon multiple factors such as seeds, inputs, soil health and credit, Audit had focused more on assured supply of adequate water in canals while taking into consideration the other factors in order to draw conclusions, as detailed in **Chapter-IV**.

1.8 Structure of Report

This report has been structured in following four Chapters:

Chapter-I: Introduction: Brief of the projects, audit scope and approach and outcome indicators.

Chapter-II: Project Planning deals with assessment of need and shortcomings in detailed project reports.

Chapter-III: Project Implementation deals with availability of funds and contract management.

Chapter-IV: Project Outcomes deals with completion and commissioning of the selected projects and outcomes achieved against the benefits contemplated in the Detailed Project Reports of these projects.

1.9 Acknowledgement

We acknowledge the co-operation extended by Irrigation and Water Resources Department and its field offices, Agriculture Department and Revenue Department in conducting the Performance Audit of Outcomes in Surface Irrigation of Bansagar Canal Project and Modernisation of Chaudhary Charan Singh Lahchura Dam Project.

Chapter – II
Project Planning

CHAPTER-II

Project Planning

This chapter deals with issues related to conceptualisation and formulation of the projects to achieve the intended benefits.

Audit objective 1: *Whether the irrigation projects were planned in accordance with intended objectives.*

Brief snapshot of the Chapter:

- The project planning was deficient to achieve the intended objectives. While several significant works were not included in the DPR having adverse impact on the project outcomes, the Department took unexpected time to firm up drawings, designs and quantum of the works even after approval of the DPR and commencement of work.
- The scope of the projects underwent multiple revisions due to which, not only the cost of the project kept on changing but also the time schedules were not adhered to.
- In Bansagar Canal Project, Uttar Pradesh (BCP), the requirement of additional water was not assessed correctly for the existing canal systems and capacity enhancement of the existing canal system was included in respect of only limited number of canals, that too in an *ad hoc* manner.
- In Dhasan Canal System (DCS), the critical need of enhancement of water storage capacity of Lahchura and Pahari dams were not considered due to which the dams did not have adequate water to serve the need of DCS. Besides, provision for restoration of the DCS, receiving water from the Lahchura dam was not considered in the DPR despite the fact that it was in dilapidated condition.

2.1 Introduction

Detailed and well thought out planning is of great importance before conceptualising the implementation of an irrigation project. Lack of planning could hinder the fulfilment of the purpose of the irrigation project and as a result, the expected benefits would not be available even after spending huge amount of public money. In the planning of irrigation project, technical feasibility of the project formation, social and environmental impact, availability of water at source and its other uses, determination of project components and cost analysis, financial need and identification of financial sources, *etc.,* should be taken into consideration.

Paragraph 318 of Financial Handbook Volume-VI provides that detailed estimates must be prepared for every work proposed to be carried out, followed by Technical Sanction (TS) to the detailed estimate by the competent authority which gives guarantee that the proposals are structurally sound and the estimates are accurately calculated and based on adequate data.

According to the Guidelines of CWC, the Detailed Project Reports (DPRs) of the irrigation and multipurpose projects shall be prepared in accordance with applicable Indian standards and guidelines for preparation of DPRs of irrigation and multipurpose projects, issued by GoI after detailed survey and investigations.

Audit observed shortcomings in the project formulation which have been discussed in the succeeding paragraphs:

2.2 Shortcomings in Detailed Project Reports of Bansagar Canal Project (Uttar Pradesh)

2.2.1 Deficient planning leading to frequent revision of Detailed Project Reports

Survey work of BCP was taken up in 1977-78 and it was approved by the Advisory committee on Irrigation, Flood Control & Multipurpose Projects of Central Water Commission (CWC) in January 1994 at an estimated cost of ₹ 330.19 crore. However, further progress of the project remained slow and construction works of the project were taken up only in 1997-98. Even after 1997-98, the construction works were not performed adhering to the prescribed timeframe due to which scheduled date of completion was revised four times with consequential impact on time and cost overrun as detailed in **Table 2.1**.

Table 2.1: Revisions in project cost

(₹ in crore)

Year of sanction	Pre-revised estimated cost	Revised estimated cost	Percentage increase in project cost from original cost	Target date of completion	Level of completion of the project (in *per cent*)
(1)	(2)	(3)	(4)	(5)	(6)
1994 (Original)	330.19	-	-	2004	-
2003 (Ist revision)	330.19	955.06	189	2006	34
2007 (IInd revision)	955.06	2058.01	523	2010	43
2010 (IIIrd revision)	2058.01	3149.90	854	2013	75
2017 (IVth revision)	3149.90	3420.24	936	2018	90

(Source: CE, BCP)

The project was commissioned in July 2018 at an expenditure of ₹ 3,419.37 crore with a time overrun of 14 years and cost overrun of 936 *per cent*. The reasons cited in the variation statement of the DPRs of the project for delay in completion of the project were frequent changes in the scope of the project and insufficient release of funds by the State Government against the requirement placed by the CE during the execution of the project[1].

Audit analysis further revealed that CE, BCP did not properly assess requirement of various item of works, both at the time of project formulation in 1994 and also during subsequent revisions. As a result, not only quantities of these works were continuously revised but new items were added during the entire course of execution of the project. Audit examination of variation

[1] The work of BCP continued upto March 2019 after commissioning of the project.

statement in this regard disclosed that quantity of different structures, viz., regulators, cross drainage, canal bridges, escape, service roads were increased manifold (20 *per cent* to 581 *per cent*) during the entire period of execution of work (1994-2019). Besides, change in design of the structures also led to revisions in the cost of the project[2]. Details of changes in design was not available in the records in respect of all changes. However, it was observed from available records that in Bansagar feeder canal, design was changed from Cement Concrete (CC) lining to much costlier Reinforced Cement Concrete (RCC) lining in 2008 as the Department felt the need of RCC lining on the ground that the alignment of the canals was lying in the slip zone. Apart from this, increase in cost of the structures by the passage of time also adversely impacted the cost of project. Details of cost variations has been summarised in the **Table 2.2** and detailed in **Appendix-2.1.**

Table 2.2: Details of variations in the DPRs

(₹ in crore)

Period	Total cost variation	Broad reasons for variation			
		Inadequate provision	Change in design	Additional requirement	Price Escalation
1994 to 2003	355.46	122.80	26.25	Nil	206.41
2003 to 2007	969.08	209.81	330.80	154.86	273.61
2007 to 2010	913.73	140.08	311.35	175.57	286.73
2010 to 2017	507.85	82.87	252.36	Nil	172.62
Total		**555.56**	**920.76**	**330.43**	**939.37**

(Source: DPRs)

Furthermore, Audit observed that in the last project cost revision (2017), cost of six items were partly excluded from the scope of project, viz., earth work (₹ 42.73 crore), service road (₹ 42.00 crore), communication (₹ 9.83 crore), environment and ecology (₹10.26 crore), plantation (₹ 1.92 crore) and miscellaneous items (₹ 3.73 crore). In case of earth work, the estimated cost was reduced from ₹ 595.23 crore to ₹ 552.50 crore due to which execution of earth work was limited to 386.678 lakh cum (87 *per cent*) against the original estimated quantity of 442.085 lakh cum. In case of service road on canal banks, the executed length (26.706 km) was 15 *per cent* of estimated length (180.290 km). In case of other four items, viz., plantation, communication, environment and ecology and miscellaneous items, there was no detail in the DPR regarding quantum of reduction in the work vis-à-vis reduced cost of ₹ 25.75 crore. The exclusion of various works from the scope of the project after 23 years from the date of formulation of first DPR indicated the *ad hoc* approach of the Department. As a result of these exclusion, several works remained incomplete even after commissioning of the project in July 2018, affecting the project outcomes as discussed in Paragraph 4.2.1.

Thus, the drawing, design, scope and quantity of the works in BCP could not be firmed till 2017 and these were changed during the entire period of project implementation. As a result, not only the cost of the project kept on changing but also the time schedules were not adhered to.

[2] Audit observation related to inadequate funding has been discussed in **Paragraph 3.2.1.2**.

The State Government in its reply stated (July 2022) that BCP had been built in the region of southern slope of Kaimur hill and lower Vindhya range. Due to being rocky strata, need of the site changed from time to time. The Government further stated that Central Water Commission had also given directions time to time which necessitated changes in drawing and design in several structures.

The fact remained that the geographical and geological condition of the region was known to the Department before taking up BCP. Before starting BCP, extensive surveys, investigations and studies should have been carried out. However, the work of the project was started without adequate and accurate survey as shown by frequent revisions, in spite of the Department taking 17 years just to complete the survey and take decision on its basis. As a result, during the implementation of the project, the scope of the project kept on changing, the project got delayed by 14 years and the cost of the project increased manifold. Besides, the public was deprived of the benefits of the project for 14 years and public exchequer suffered due to huge cost overrun. The State Government, therefore, should investigate and fix the responsibility of erring officers for insufficient and incorrect surveys and should identify the circumstances due to which the scope of the project kept changing during the entire execution period of 23 years.

2.2.2 Incorrect assessment of need of water

BCP envisaged to increase irrigation intensity in 1,50,132 hactare (ha) area through augmentation of additional water to the existing nine canal systems in Prayagraj and Mirzapur Districts. In the DPR, the department analysed the additional water required for increasing the irrigation intensity to the targeted level after taking into account the existing water availability in these nine canal systems.

Audit observed from the DPR and records[3] of the Divisions that the assessment of the Department for additional water requirement was not correct. Out of nine canal systems, water availability in two canal systems[4] was lesser (37 to 62 *per cent*) than that was assessed in the DPR. In respect of other seven canal systems, the respective Divisions did not provide records of availability of water in the canal systems before BCP.

As a result of incorrect assessment of existing availability of water in the two canal systems, provision was made for only 2,087 mcft water[5] against the requirement of 4,434 mcft water[6]. As a result, the Department would be able to irrigate 26,935 hectare against 38,670 hectare[7] envisaged in the DPR with a shortfall of 30 *per cent* in the command areas of these two canal systems.

The State Government stated (July 2022) that the computation of the quantity of water required in various canal systems was made according to the crop cycle, season, available water resources and after examining the technical aspects in the Chief Engineer Committee.

[3] Gauge register indicating flow of water
[4] Lower Khajuri (406 out of 1,071 mcft; 62 *per cent)* and Garai canal systems (2,877 out of 4,559 mcft; 37 *per cent)*
[5] Lower Khajuri: 416 mcft and Garai canal system: 1671 mcft
[6] Lower Khajuri: the additional requirement of water was 1081 mcft, including existing shortfall of 665 msft; Garai canal system: the additional requirement of water was 3353 mcft including shortfall of 1682 mcft.
[7] Total requirement of water 7717 mcft (6230 mcft for Garai + 1487 mcft for Lower Khajuri) for 38670 ha.

The reply is not acceptable, as the DPR was prepared on incorrect data of water availability in Lower Khajuri and Garai canal systems.

2.2.3 *Ad hoc* selection of canals for remodeling

BCP envisaged to augment additional 637 MCM water from Bansagar Dam to the existing nine canal systems for crop water requirement. As such, Department was required to assess the water carrying capacity of existing nine canal systems and remodel these accordingly.

Audit observed that the Department proposed only 52 canals (length: 487 km) out of total 413 canals (length 1,851 km) in the existing nine canal systems for remodeling. Out of the 52 canals, 44 canals (length 468 km) were remodeled at the cost of ₹ 86.65 crore. However, Audit did not find evidence of comprehensive assessment for taking up only 52 canals (26 *per cent* canal length) and leaving the remaining canals out of the scope of remodeling.

Since capacity of 369 canals (length 1,383 km) covering command area 1.59 lakh hectare (69 *per cent*) was not augmented through remodeling of these canals, there was no assurance that the targeted enhancement of irrigation intensity to 150 *per cent* in this 1.59 lakh hectare would be achieved.

CE, BCP stated (July 2022) that the need of the remodeling work was assessed in respect of 52 canals by formulating area statistics. Further, Department did not provide reasons for not carrying out remodeling work in respect of these canals. Thus, the DPR of BCP was prepared in *ad hoc* manner with reference to remodeling of existing canals.

2.3 Shortcomings in Detailed Project Reports of Lahchura Dam Project and Pahari Dam Project

2.3.1 Multiple changes in DPR of Lahchura Dam Project

The State Government approved the project of Modernisation of Lahchura Dam, in Jhansi[8] district of Uttar Pradesh in February 1979 at an estimated cost of ₹ 7.04 crore. However, only ₹ 1.89 crore was allotted on the project till September 1983 due to which the progress of the project remained slow. In September 1983, heavy flood occurred in the Bundelkhand Region and the highest flood level at the Lahchura Dam was recorded at 17,995 cumecs. Since the head regulator of the Lahchura Dam was designed for the water discharge of only 16,000 cumecs, the need to reassess the hydrology of the river was felt for safe designing of the structures of the Lahchura Dam. From 1983 to February 2001, the process of changing the design of dam was under consideration at the levels of Chief Engineer (Betwa Project), Directorate of Design, Irrigation and Water Resources Department, Uttar Pradesh and Central Water Commission (CWC), GoI. In February 2001, CWC approved the hydrology of Lahchura Dam and on the basis of the revised hydrology, it accorded the technical sanction in March 2003. After getting technical clearances from CWC, the project was taken forward by revising the estimated cost to ₹ 94.18 crore. The cost of the project was again revised to ₹ 99.66 crore

[8] Now in Mahoba district.

in 2005 due to price escalations and process of executing contracts was taken up (December 2005). Details of revisions in the project cost are given in **Table 2.3.**

Table 2.3: Revisions in project cost under Modernisation of Lahchura Dam

Year of sanction	Pre-revised estimated cost	Revised estimated cost	Percentage increase in project cost from original cost	Target year of completion
1	2	3	4	5
1979 (Original)	7.04	Not applicable	Not applicable	Not available
2003 (Ist revision)	7.04	94.18	1238	Not available
2005 (IInd revision)	94.18	99.66	1316	Not available
2008 (IIIrd revision)	99.66	299.36	4152	2010
2012 (IVth revision)	299.36	328.30	4563	2015

The project was completed in March 2015 at an expenditure of ₹ 328.30 crore (229 *per cent*[9]) with a delay of more than six years[10].

Audit analysed the reasons for delay in completion of the project and observed that the project went through four cost revisions during 2003 to 2015. Audit requisitioned the records in respect of the revisions of the project but records related to the revisions taken place in 2008 and 2012 only were made available to Audit[11]. Examination of the records disclosed that new items of work costing ₹ 17.89 crore was added in the project during 2008-09. Drawings of the project were also kept changing during the revisions due to which the cost of the project increased by ₹ 57.79 crore in 2008 and ₹ 19.75 crore in 2012. Audit further observed that even after the last cost revision in 2012, the scope of work could not be firmed up as quantities of items of works costing ₹ 32.38 crore was further increased ***(Appendix-2.2)***.

Further, in the cost revision in 2008-09, CE, *Pariyojna Betwa* (CE) stated that the price escalation was phenomenal, particularly for construction material and labour, which along with some other factors elaborated in the DPR necessitated revision in the project cost. However, no specific justification in support of addition of new items costing ₹ 17.89 crore and cost escalation due to change in design (₹ 57.79 crore) was recorded. However, at the time of cost revision in 2012, CE accepted that due to unavailability of all construction drawings previously, the cost of project could not be finalised hence the revised proposal was submitted. This also indicated towards apathy of the project authorities in formulating project which led to cost overrun manifold[12].

In reply, the State Government stated (July 2022) that before preparing the dam projects to be built on big rivers, various items and quantities of work were determined on the basis of General drawings. The Government further stated that according to the land, rock, strata of the river bed found at the time of excavation of the foundation, work was done by revising the estimates in

[9] As compared to cost of the project (₹ 99.66 crore) revised in 2005 after which the Department entered into MoU to execute the works.
[10] Initially in the year 2005, MoU with contractor was to complete the work in 36 months hence, delay calculated from 2008.
[11] Records related to revisions taken place in 2003 and 2005 were not made available to Audit.
[12] Cost overrun with respect to original project cost (1979) of ₹ 7.04 crore.

respect of foundation depth, design and drawing. The Government also added that in December 2007 and February 2009, changes were made in the design as per the instructions given by Irrigation Research Institute, Roorkee and accordingly new items of work were included.

The fact remained that the Department took more than 17 years between September 1983 and February 2001 to design the flood level of the Lahchura Dam. Further, even after revising the project in 2003 on the basis of revised hydrology, the scope of the project could not be firmed up and it kept changing upto the last cost revision in 2012 which led to delayed completion of project along with significant excess cost.

Further, the State Government approved (July 2016) another project (Construction of Appurtenant Works of Lahchura Dam) at an estimated cost of ₹ 19.30 crore to execute the items of several works related to Modernisation of Lahchura Dam which were not included in the original DPR of Lahchura Dam Project. Belated execution of project works also had adverse cost impact leading to excess expenditure of at least ₹ 1.73 crore because the cost of the same item of works[13] were increased in 2016 as compared to that of in 2012 ***(Appendix-2.3).*** The State Government in this respect stated (July 2022) that the works such as protection work in the downstream of the dam, computerisation of Flood Gates (SCADA system), construction of right guide bund and development of parks near Lahchura Dam could not be included in the original estimate. Taking up of another work (Construction of Appurtenant Works of Lahchura Dam) to complete the balance work of Lahchura Dam clearly indicates that a comprehensive assessment of the requirements was not done initially under the modernization of Lahchura Dam project. Responsibility needs to be fixed for inadequate survey before preparation of DPR of Lahchura Dam project.

2.3.2 Preparation of Detailed Project Reports of Pahari Dam Project without detailed survey

As discussed in paragraph 1.6.2, the Lahchura Dam was receiving water from the Pahari Dam which was situated in the upstream of Lahchura Dam on river Dhasan. Pahari Dam has a water storage capacity of 47.80 MCM and was trapping water from Dhasan river before the water of river reaches to the Lahchura Dam.

The State Government approved a project of Pahari Dam in February 2008 at the estimated cost of ₹ 76.68 crore. As was done in Lahchura Dam Project, in the Pahari Dam Project, the old shutter type arrangement to operate the gates of dam was replaced with the mechanical gates so that the water flow from the dam could be handled efficiently. The estimated benefits from the Pahari Dam Project were the same as that was expected from the Lahchura Dam Project. In this project also, no work was executed to increase the water storage capacity of the dam. SE, Construction Circle, Mahoba entered into two agreements with M/s Ghanaram Infraengineers[14] in February 2009 and October 2014 for

[13] Earth work in excavation, drilling holes, cement concrete works and bag filling which had major cost difference.
[14] Earlier it was M/s Ghanaram (engineers and contractors).

execution of work spill way and for erection of gates in the spill way of the dam respectively.

Audit further observed that the cost of Pahari Dam Project was revised to ₹ 354.20 crore in 2011-12 from the original cost of ₹ 76.68 crore in 2007-08. Examination of records revealed that increase in the cost (₹ 277.52 crore) was due to inadequate/no provision in the original project (₹ 100.53 crore), inadequate investigation (₹ 22.71 crore), change in design (₹ 67.16 crore) and price escalation (₹ 68.68 crore). In the DPR, details of above mentioned changes were not elaborated and CE, Project Betwa, in its report stated that price escalation during this period was phenomenal, particularly, for the construction material and labour, inadequate provisions in some items in original project and unavoidable items required to be executed at the time of project execution. CE however, did not mention the circumstances under which requirement of the new work items could not be determined earlier and change in design of the project had taken place. Due to this, the project cost was enhanced by 362 *per cent* within a short period of three years.

The State Government replied (July 2022) that the work of the project was started on the basis of tentative drawings which was revised subsequently in February 2009 on the basis of detailed surveys. In respect of cost escalation in Pahari Dam Project, the Government stated that the original project was based on the schedule rate of 2006 and due to increase in cost of construction material and labour rates during the construction period, the cost of the project was also increased.

Fact remains that the DPR of the Pahari Dam Project was prepared in 2008 without finalising the drawings and designs. The statement of the State Government that the drawing of the project was finalised in February 2009 was however not correct because as per the records of the Divisions, the drawings were handed over to the contractors in spells, upto November 2012. Thus, due to insufficient surveys, investigations and studies, the scope of the project arrived at the time of original project was not made accurate due to which the scope of the project changed extensively (362 *per cent*) in the very next cost revision in 2012. The State Government, therefore, should investigate the matter of incorrect surveys and investigation while formulating the project estimates and fix the accountability of the erring officers.

2.3.3 Insufficient water storage capacity of dams

Water supply to DCS was to be made from storage of water at the Lahchura Dam. Water of Dhasan river was collected at the Lahchura Dam during monsoon season for releasing to DCS during dry Rabi season. Besides, storage of Lahchura Dam is replenished by the water of Pahari and Saprar Dams. Pahari and Saprar Dams receive water from Dhasan and Sukhnai river respectively during monsoon season.

Scrutiny of records revealed that in the DPR of Lahchura Dam Project, it was estimated that 8.7 TMC[15] of water would be required for providing

[15] Rabi: 5.8 TMC, Kharif: 0.50 TMC, filling of tanks: 1.20 TMC and water loss: 1.20 TMC.

irrigation to 34,955 ha[16] area of DCS. However, DPR further mentioned that maximum 0.37 TMC of water could be stored in Lahchura Dam. Besides, 1.61 TMC of water at Pahari Dam and 1.25 TMC water at Saprar Dam would be available for replenishment of Lahchura Dam storage. Thus, against the total requirement of 8.7 TMC at Lahchura Dam, only a maximum of 3.23 TMC of water could have been made available leaving a shortfall of 5.47 TMC (63 *per cent*).

Audit observed that this fact was in the notice of the Department as it was mentioned by the Department itself in the DPR. Therefore, to trap and store more water from Dhasan river, it was necessary to increase the storage capacity of the dams. However, in the project of Lahchura and Pahari Dams, the work of increasing the water storage capacity of the dams was not considered. No feasibility study on the option of taking more water from the Dhasan river was carried out.

Notably, 38.25 TMC[17] of water was going downstream of Lahchura Dam in river Dhasan during monsoon season, even after storing the water up to the storage capacity of Lahchura and Pahari Dams. The Department only got the work done to replace the old structures of both the dams and the utmost requirement of DCS regarding increase in water storage capacity of dams was not addressed. As a result, the irrigation facility in command area of DCS could not be augmented even after spending ₹ 682.50 crore on the modernisation of Lahchura and Pahari Dams.

Thus, there was shortfall of water at the dams, as discussed above, even for 31,910 ha planned in the DPR out of total 97,169 ha CCA of DCS. For providing irrigation facility in the entire command area of 97,169 ha, 24.18 TMC water would be required, which was not planned at all. As would be seen subsequently, even this planned potential could not be delivered to the farmers as mentioned in Paragraph 4.4.2.

The State Government replied (July 2022) that the geographical location of the Lahchura Dam and Pahari Dam is such that their submergence area partially falls in the region of Madhya Pradesh and Uttar Pradesh due to which it was not possible to increase the storage capacity of these dams. It was also stated by the State Government that the shortage of 5.47 TMC water on Lahchura Dam is met from the water received from the river in the months of November to February.

The Government's argument was not acceptable that the water storage capacity of these dams could not be increased due to spread of the submergence area of the dams up to Madhya Pradesh. It is noteworthy that many inter-state irrigation projects have been constructed in the country, therefore, the work of increasing the water storage capacity of the dams could have been done by adopting the process of necessary approval from the competent authorities. In fact, the project authorities had not even planned about the aspect of increasing the capacity of the dams while conceptualising the project for Lahchura and

[16] Which was reduced to 31,910 ha in the DPR of 2008-09
[17] After diverting 111 MCM water to the Arjun feeder canal in 2020-21, another system offtaking from Lahchura dam.

Pahari Dams. Further, the reply of the Government that shortage of 5.47 TMC water was met, is also not acceptable as against the requirement of 5.26 TMC water for 31,910 ha area during Rabi season, actual release during 2014-15 to 2020-21[18] was in the range of only 28 to 73 *per cent*.

2.3.4 DPR did not include restoration of Dhasan canal system

In order to carry the required volume of water from the dam to the fields, the canal system should have the required carrying capacity. However, the department did not include the work of restoration of canals in the original DPR and took this work only in 2021 in a subsequent project. This subsequent project for repairing of DCS mentioned that the structures of DCS was of more than 100 years and very damaged and dilapidated affecting irrigation. The CE projected the requirement of repairing and renovation of structures such as regulator gates[19] (110 number) at the head of canals, falls (310 number) in the internal section of the canals, canal bridges (277 number) and prepared estimates costing ₹ 27.50 crore for carrying out above mentioned works. The Department allotted ₹ 5.82 crore in March 2021. However, the works could not be taken up due to paucity of time in the financial year 2020-21. The canal systems remained dilapidated and unable to carry water of required capacity. The poor condition of the canal structure was also noticed (August 2021) during the joint physical verification which are illustrated in following Photographs:

Regulator gate not installed at the head of Masoodpura minor of DCS

Water flow controlled by temporary gate (wooden planks) at the head of Islampur Branch of DCS

It is, therefore, evident that renovation of DCS was one of the most important need of the command area which should have been addressed while conceptualising the project of Lahchura and Pahari Dams. However, no provision for the same was made in the DPRs. Not considering the development/improvement of the canal networks, while remodelling the head regulators at the dams (modernisation works) was indicative of improper planning.

[18] Except 2019-20
[19] To regulate water flow in canal

The State Government replied (July 2022) that the work of restoration of DCS, reconstruction of outlets and other works had been proposed under Uttar Pradesh Water Sector Restructuring Programme-Phase III for completion by March 2026.

The fact remained that in the project for Lahchura and Pahari Dams, the work of restoration of the DCS was not considered even though it was found necessary in subsequent surveys of the Department and therefore another renovation project was taken up.

To sum up, insufficient survey before formulation of DPRs led to multiple revisions in the scope of the projects. The current availability of water in the canal systems of BCP was not assessed correctly, which would affect the envisaged irrigation intensity of the project. In the Lahchura Dam Project, the project authorities did not provide for increasing storage capacity of the Lahchura Dam to trap and store adequate water from the river. DCS was not taken up for renovation to use the available water efficiently.

Recommendation 1: *The State Government should carry out study to explore the feasibility for enhancement of the storage capacity of Lahchura Dam and Pahari Dam so as to store adequate water from the river Dhasan.*

Recommendation 2: *The State Government should take up remodeling/ restoration work in canals under nine canal systems of Bansagar Canal Project and Dhasan Canal System in an efficient and effective way.*

Recommendation 3: *The State Government should investigate the matter of defective surveys and faulty assessment of requirements of the projects and fix responsibility of erring officers.*

Recommendation 4: *There is an urgent need of formulating effective mechanism for stringent monitoring of irrigation projects for timely completion. Series of delays needs to be looked into and remedial measures may be taken to ensure competence of contractor, penalty for delays and timelines in contract conditions for future projects.*

Chapter – III
Project Implementation

CHAPTER-III

Project Implementation

This chapter discusses issues related to financial management, execution of works including contract management and commissioning of the selected irrigation projects.

Audit objective 2: Whether project works were executed in an economic, efficient and effective manner.

Brief snapshot of the Chapter:

- Short release of fund *vis-à-vis* yearly demand affected the progress of works in Bansagar Canal Project (BCP). Expenditure management was not proper as financial liability amounting to ₹ 141.64 crore (BCP: ₹ 126.30 crore and Pahari Dam Project: ₹ 15.34 crore) was pending for want of funds even after completion of the projects.
- The contracts executed for the works of BCP was rescinded midway and the balance works were awarded to the new contractor. However, the quantum of work of old rescinded contracts was enhanced while carrying over these quantities in new Bill of Quantities.
- The tendering was not transparent and provision of allowing price adjustment was incorporated in bid documents belatedly, after the technical bid evaluation, resulting in favour to few bidders. Further, Department fixed share of Labour and Petrol Oil and Lubricant (POL) for price adjustment on *ad hoc* basis without ascertaining estimated/actual proportion of these components in entire work.
- In Lahchura and Pahari Dam Projects, contracts were awarded to bidders who did not fulfil the eligibility criteria to participate in the bidding process.
- Large variations in the quantity of the contracts occurred and the Chief Engineers (CE) approved such variations exceeding the delegated financial powers.
- In BCP, CE granted time extensions of 52 months to the contractor to complete all 94 works without analysing case to case justification for such extension. As a result, 34 works not affected with the hindrances were also granted time extension.
- The structures of the canal networks were not properly maintained due to insufficient funding.

3.1 Introduction

Subsequent to formulation and approval of the project, the process of implementation of projects should be started by allocation and availability of funds, acquiring required land, concluding contracts, *etc*. The execution of projects' works should be monitored rigorously to ensure completion of

project within the stipulated cost and time so that project deliverables could be made available timely and desired benefits delivered.

3.2 Financial management

Audit observations related to financial management of selected projects have been discussed in the succeeding paragraphs:

3.2.1 Financial Management: Bansagar Canal Project (Uttar Pradesh)

3.2.1.1 Allotment and expenditure thereagainst

The project received funds from the State budget during 1996-21. The Government of India (GoI) also provided financial assistance in the form of loan during 1997-98 to 2004-05 and grants-in-aid during 2004-19 under Accelerated Irrigation Benefit Programme (AIBP). The central assistance including loan was released for the project by making budgetary provisions in the Annual State budget. Year-wise details of allotment and expenditure during 1996-21 have been given in ***Appendix-3.1*** and summarised in **Table 3.1**.

Table 3.1: Year-wise position of funds

(₹ in crore)

Year	Central Loan Assistance / Central Assistance			State share	Grand Total	Expenditure
	Loan	Grant-in-aid	Total			
(1)	(2)	(3)	(4)=(2)+(3)	(5)	(6)=(4)+(5)	(7)
1996-1997 to 2013-14	219.80	544.81	764.61	1715.13	2479.74	2479.74
2014-2015	0.00	47.92	47.92	117.27	165.19	165.19
2015-2016	0.00	55.04	55.04	54.96	110.00	110.00
2016-2017	0.00	64.64	64.64	132.36	197.00	197.00
2017-2018	0.00	63.36	63.36	133.62	196.98	196.98
2018-2019	0.00	15.51	15.51	166.49	182.00	180.76
2019-2020	0.00	0.00	0.00	50.5	50.50	50.50
2020-2021	0.00	0.00	0.00	39.2	39.20	39.20
Total	**219.80**	**791.28**	**1011.08**	**2409.53**	**3420.61**	**3419.37**

(Source: CE, BCP, Prayagraj)

The expenditure of ₹ 3,419.37 crore includes ₹ 517.56 crore paid to Madhya Pradesh Government on account of cost sharing of three structures, *viz.*, Bansagar dam (₹ 459.66 crore), common water carrier (₹ 40.04 crore) and common water feeder (₹ 17.86 crore) under Bansagar Project. Apart from the expenditure incurred on the project as depicted in **Table 3.1**, a financial liability of ₹ 12.61 crore on account of pending payments related to works (₹ 12.15 crore) and purchase of land (₹ 0.46 crore) was outstanding in the three Divisions as of March 2021. Further, ₹ 45 crore deposited with Forest Department on account of rehabilitation work was yet to be recovered (March 2021), as the said rehabilitation of villages was not required.

The I&WRD, GoUP replied (July 2022) that liability of ₹ 46.38 lakh on account of payment for land purchase and ₹ 3.33 crore for the works remained pending which would be cleared on receipt of budget. Government further

added that correspondence was being made to get ₹ 45 crore from Forest Department.

The fact remained that even after commissioning of the project in July 2018 the financial liability under BCP remained unresolved (July 2022).

3.2.1.2 Short release of funds

Audit observed that release of funds for the project's work remained erratic during the course of implementation of BCP as the State Government released only 40 to 73 *per cent* funds against the yearly demands during 2014-20 by CE, BCP as detailed in **Table 3.2**.

Table 3.2: Release of funds against demand in BCP

(₹ in crore)

Year	Requirement of funds	Demand of fund by CE, BCP (in *per cent* of assessed requirement)	Release of fund by the State Government (in *per cent* of fund demanded)
2014-15	363.09	234.59 (65)	165.19 (70)
2015-16	197.90	277.90 (140)	110.00 (40)
2016-17	300.00	322.00 (107)	197.00 (61)
2017-18	290.59	270.59 (93)	196.98 (73)
2018-19	271.33	265.54 (98)	180.76 (68)
2019-20	90.57	79.20 (87)	50.50 (64)
2020-21	47.93	39.20 (82)	39.20 (100)

(Source: CE, BCP, Prayagraj)

Audit noticed that CE, BCP was preparing annual work plan indicating requirement of fund and targeted physical progress. However, as detailed in **Table 3.2**, fund released by the State Government for the project remained less than the projected requirement which had consequential impact on physical progress of work. The yearly shortfall against the physical targets of various components of the project under annual work plan remained in the range of 27 to 89 *per cent* during 2014-21. In the variation statement of revised DPR, CE, BCP had also attributed short release of funds as one of the reasons for slow progress of work.

3.2.1.3 Irregular diversion of centage charges

As per State Government order of 2011, 2014 and 2017, provision of establishment charges (termed as centage charges) at the rate of 6.875 *per cent* was to be made in the estimates for subsequent remittance into the revenue head of the State Government.

According to the assessment made by the Department, the revised cost of the project ₹ 3,420.24 crore included centage charges amounting to ₹ 177.72 crore[1]. Audit, however, observed that centage charges amounting to ₹ 45.61 crore only was deposited (March 2021) into the revenue head of the State Government, whereas the remaining amount of centage charges (₹ 132.11 crore) was irregularly diverted on the project works.

The State Government in its reply stated (July 2022) that during the year 2014-15 to 2021-22, a total amount of ₹ 886.33 crore had been spent on the

[1] At the rate of 6.875 *per cent* on the work cost of ₹ 2,585.08 crore.

works. Accordingly, total centage charge due was ₹ 57.02 crore against which ₹ 55.21 crore had been deducted till 2021-22 and the remaining amount of centage charges would be paid after allotment of budget.

The reply is not acceptable, as State Government had already released ₹ 177.72 crore towards centage charges on the project out of which only ₹ 55.21 crore was deposited (March 2022) under revenue head of Government account. Hence, there remained irregular diversion of ₹ 122.51 crore towards other expenditure on the project, *viz*., payment of price escalation, land cost, *etc*.

3.2.2 Financial Management - Lahchura and Pahari Dam Projects

3.2.2.1 Allotment and expenditure thereagainst

Lahchura Dam Project received funds from the State budget. Apart from this, project also received Central Financial Assistance (CFA) amounting to ₹ 72.48 crore under AIBP from the GoI during 2005-2011 and loan assistance amounting to ₹ 157.28 crore from NABARD during 2009-10 to 2014-15. Year-wise details are given in **Table 3.3**.

Table 3.3: Allotment and expenditure of funds to Lahchura Dam Project

(₹ in crore)

Year	Central Loan Assistance/Central Assistance			State Share	Grand Total	Expenditure
	NABARD Loan	Grant	Total			
(1)	(2)	(3)	(4)=(2)+(3)	(5)	(6)=(4)+(5)	(7)
Up to 2010	46.66	47.23	93.89	87.27	181.16	181.16
2010-11	40.50	25.25	65.75	2.14	67.89	67.89
2011-12	22.48	0.00	22.48	1.18	23.66	23.66
2012-13	12.61	0.00	12.61	0.66	13.27	13.27
2013-14	9.50	0.00	9.50	0.50	10.00	10.00
2014-15	25.53	0.00	25.53	6.79	32.32	32.32
Total	**157.28**	**72.48**	**229.76**	**98.53**	**328.30**	**328.30**

(Source: Maudha Dam Construction Division-I, Mahoba)

Further, Pahari Dam Project was provided funds from State budget (₹ 131.88 crore) and loan from NABARD (₹ 222.32 crore) during 2009-10[2] to 2017-18. Year wise cumulative position of allotment and expenditure is given in **Table 3.4**.

Table 3.4: Allotment and expenditure of funds to Pahari Dam Project

(₹ in crore)

Year	Allotment	Expenditure
2009-10	20.00	20.00
2010-11	31.28	31.28
2011-12	25.40	25.40
2012-13	20.28	20.28
2013-14	0.00	0.00

[2] Project was started in 2009-10.

Year	Allotment	Expenditure
2014-15	134.75	134.75
2015-16	80.00	80.00
2016-17	20.00	20.00
2017-18	22.49	22.49
Total	**354.20**	**354.20**

(Source: Irrigation Construction Circle, Mahoba)

Audit observed following irregularities in the expenditure management as discussed below:

3.2.2.2 Irregular diversion of stock and inflated expenditure

Audit observed that Executive Engineer Irrigation Construction Division, Mauranipur (EE) transferred stock material (cement and steel etc.) aggregating to ₹ 16.28 crore procured out of budget allotment of the Pahari Dam Project to the two Divisions of another project, *viz*., Arjun Shayak Pariyojna (Irrigation Construction Division 3rd Lalitpur and Maudaha Dam Construction Division 1st Mahoba) during 2014-16 for utilisation on the project other than Pahari Dam Project. However, concerned Divisions neither returned the stock material nor made payment in lieu of the stock material as of October 2021.

Further, EE made advance payment amounting to ₹ 2.07 crore to Pariyojana Bhandar, Kanpur in spells during October 2014 to October 2017 for supply of cement. However, the supply of cement was not received as of October 2021, despite correspondence in this respect by the EE to the Pariyojana Bhandar.

Therefore, the expenditure charged on the Modernisation of Pahari Dam Project was inflated by ₹ 18.35 crore.

The State Government stated (July 2022) that correspondence was being made with the concerned Divisions regarding refund/payment of stock material.

3.2.2.3 Pending liabilities

Audit observed that payment of ₹ 10.35 crore in both the agreements[3] for Pahari Dam Project was pending as of October 2021 for want of funds. Further, ₹ 4.99 crore related to centage charges, which was required to be deposited in the Government account, was diverted for the project work unauthorisedly. This had also resulted into creation of financial liability of ₹ 4.99 crore on account of payment of centage charges in the Government account.

The State Government stated (July 2022) that pending liabilities of ₹ 15.34 crore on account of contractual payments and centage charges would be cleared on availability of budget.

[3] Agreement no.: 01/SE/2009-10 for construction of spill way of Pahari Dam and Agreement no. 01/SE/2014-15 for construction of gates of spillway of Pahari Dam

Execution of works

3.3 Contract Management in Bansagar Canal Project (Uttar Pradesh)

As discussed in Chapter I, Government of Uttar Pradesh executed construction work of Bansagar Feeder Canal, Adwa Barrage, Adwa Meja Link channel, Meja Jirgo link channel and remodeling of existing canals under BCP. Major components of BCP were as follows:

Table 3.5: Major components of Bansagar Canal Project (Uttar Pradesh)

Sl. No.	Name of structure	Brief about the structure
1	Bansagar Feeder Channel (BSFC) (in MP)	A lined feeder channel having a length of 71.494 km and 46.46 cumec capacity has been constructed by the Government of Uttar Pradesh to supply water to 35.90 km long Aad Nala through which water flows to Adwa Barrage, as depicted in **Figure 1.1**.
2	Adwa Barrage (in UP)	Adwa Barrage is constructed across river Adwa in UP at about 5.0 km downstream of MP and UP boundary to divert 46.46 cumec of water from Adwa barrage to Meja Dam.
3	Adwa-Meja Link Channel (in UP)	25.6 km long link channel having 46.46 cumec capacity is made to transfer water from Adwa Barrage to existing Meja reservoir.
4	Meja-Jirgo Link Channel (MJLC) (in UP)	74.13 km long MJLC was to be made for transferring 16.43 cumec of water from Meja reservoir to the existing Jirgo reservoir. MJLC was to feed Baraundha Distributary, Harrai Canal System, Lower Khajuri Canal System before its outfall in Jirgo reservoir.
5	Meja-Kota Feeder Channel (MKFC) (in UP)	3.577 km long MKFC having 9.21 cumec capacity was made to augment existing Kota Distributary (Dy), Upraudh Dy, Belwania Minor canal, *etc*.
6	Remodeling of old canals (in UP)	Remodeling works of Main canal / Branch canal / Dys and minors of canal systems were to be undertaken to carry additional water under BCP.

The work of BCP was taken up from 1997-98 at the cost of ₹ 330.19 crore with scheduled completion by 2004. Subsequently, due to slow progress of work by the contractors, the Department had taken a decision (July 2012) to rescind the ongoing contracts and to execute the balance work through a high value single contract to ensure early completion of the project works. Accordingly, 45 ongoing contracts were rescinded[4] and balance quantity of works were calculated. The balance works were grouped in the form of 94 Bill of Quantities (BoQs). Notice for Inviting Tender (NIT) was issued in September 2012 for execution of the balance works of these 94 BoQs. The contract was concluded with M/s Ritwik Projects Private Limited (RPPL) in January 2013 at an agreed cost of ₹ 402.52 crore with the stipulated date of completion in January 2015.

[4] The SE did not provide the details of old contract which were not rescinded and continued even beyond January 2013.

3.3.1 Determination of balance works

As discussed above, the Department arrived at the balance works of BCP and grouped these works in 94 BoQs of aggregated estimated cost of ₹ 403.46 crore (contract cost ₹ 402.52 crore). Scrutiny of records revealed that these 94 BoQs included balance works of 45 rescinded contracts as well as other such works which were not taken up then. It also came to the notice that the quantities of balance work of the rescinded contracts were changed while adding these to the new BoQs and in most of the items, the quantities taken in the new BoQs were much more than the balance quantities of the rescinded contracts. In this regard, audit test checked the related records and observed that in seven out of 10 contracts test checked, two to 10 items of balance works were included in the new BoQs by enhancing these balance works from 11 to 838 *per cent* (cost: ₹ 5.28 crore). This included one BoQ[5] in which the quantity of excavation of other rocks was exceeded to more than 57 times. Details are given in ***Appendix-3.2***

It was also noticed in audit that the records relating to the new BoQs did not give any details of the circumstances or reasons under which the quantum of balance works of the old rescinded contracts were enhanced while carrying over these quantities in the new BoQs. Therefore, the abnormal changes in the quantities of works were not verifiable in audit.

The State Government stated (July 2022) that after rescinding 45 old contracts, 94 new BoQs were prepared by including balance works of the old 45 contracts including fresh work of Adwa Meja Link Canal and some more new works sanctioned subsequently as per the requirement of the site.

The Government, however, did not provide reason for enhancing the balance quantities of the old rescinded contracts in the new BoQs. The fact remained that the balance quantities worked out by the Department were enhanced without any justification in the new contract which was also fraught with the risk of manipulation and over payments to the contractors.

3.3.1.1 Security deposit not forfeited

Audit further observed that out of 45 contracts rescinded by SE, in 11 contracts, which were rescinded on the ground of not adhering to the work programme of the contracts, the security deposit amounting to ₹ 1.74 crore was not forfeited as of March 2021 ***(Appendix-3.3)*** as was provided under the terms and conditions of the contract. Thus, the contractors were extended undue favour to this extent.

In reply, the State Government stated (July 2022) that action was being taken to finalise the 11 contracts and accordingly to forfeit the security deposit of the contractors.

3.3.2 Belated insertion of contract conditions

As per provisions of para 360 of Financial Handbook (FHB) Volume VI, tender should invariably be invited in the most open and public manner

[5] BoQ no. 59018/MJ/11/DRX

possible, whether by advertisements in the Government gazette or newspapers so that all the prospective bidders may take cognizance of the work going to be executed by the Government and participate in the bidding process to make the process transparent and cost of work competitive and economic.

Audit observed that SE, Circle-2, BCP, Mirzapur (SE), invited (6 September 2012) pre-qualification bid for executing the balance works of BCP through a tender notice. Bids from the prospective bidders were to be obtained by 24 September 2012 and the same were to be opened on 25 September 2012[6].

Further examination of records in this respect disclosed that four bidders were found eligible in the pre-qualification bid evaluation by the tender committee to take part in the financial bidding. The tender committee forwarded the offer to the four successful bidders on 17 October 2012 to submit the financial bids by 26 October 2012 which was further extended to 05 November 2012. In response, the four bidders submitted the financial bids which were evaluated by the tender committee on 05 November 2012. The tender committee found M/s Rithwik Projects Pvt. Ltd. (RPPL) as the lowest tendered bidder and the contract was accordingly executed in January 2013 with RPPL.

Meanwhile, in another development, the State Government decided (18 October 2012) to include price escalation clause in contracts for irrigation works to adjust the cost of items, such as steel, labour, petrol oil and lubricant (POL) and cement, according to market price index. Accordingly, SE submitted (20 October 2012) a proposal to include this clause in the contract and issued (31 October 2012) addendum to contract's special condition of contract by e-mail to four bidders. Simultaneously, an errata was also e-mailed providing for a new paragraph on price adjustment in the rate of aggregates. This changes in the condition of contract had fundamentally changed the bid and it was now remunerative for contractors to bid for the project who got protection against any price escalation. Therefore, the SE should have called for fresh bids in order to make it transparent. However, SE did not take any action except notifying the four bidders shortlisted after pre-qualification bids. Thus, the special condition of the contract was introduced in the middle of the tender process which restricted the competition only among the four bidders which were shortlisted after technical bid evaluation. Had the condition of price adjustment been promulgated at the time of NIT, other prospective bidders could participate in the bidding process.

Thus, the belated insertion of price adjustment clause lacked transparency, since only four bidders were informed about the change in payment conditions and one of them (RPPL) got the contract. It was observed that RPPL was paid ₹ 89.22 crore by March 2019 on account of price escalation on material (cement and steel), labour, POL and aggregates.

The State Government replied (July 2022) that contract conditions with regard to adjust the fluctuations in the prices of labour, cement and steel and POL due to the changes in the market price index were communicated to the four

[6] Date of submission and opening of bids were revised on 27 September and 28 September 2012 respectively.

bidders shortlisted after technical bid evaluation before the date of submission of the financial bids.

The fact remained that the fundamental assumptions of NIT was changed due to introduction of price adjustment clause. However, instead of publishing it in open and public manner to attract more bidders for getting competitive bid, it was communicated to only four bidders shortlisted in the technical bid evaluation. Due to lack of transparency in the contract process as mentioned above, there was no assurance that the selection of bidder was fair and the contract was awarded at the lowest possible cost.

3.3.2.1 Unjustified payment of price adjustment

As discussed above, Special Condition of Contract (Addendum) envisaged payment of price adjustment to the contractor during the course of execution of work on account of change in the prices of labour, cement and POL. However, the contract did not specify the weightage of each component in percentage terms that would be applied for payment of price adjustments as per prescribed formula. Subsequently, a committee headed by SE, BCP decided (March 2015) that the applicable percentage on labour, POL, material (only steel and cement) for price adjustment formula in the contract would be 80 *per cent*, 15 *per cent* and 5 *per cent* respectively. The matter of undue benefit to contractor due to erroneous fixation of percentage weightage was raised by Audit (January 2019), as the Department had also allowed price adjustment on aggregates which was beyond the already provided 100 *per cent* weightage on price adjustments on labour, POL, material (only steel and cement). On being pointed out in Audit, another committee headed by SE, BCP revisited (January 2020) the earlier decision and reallocated the percentage share of the labour, POL and steel & cement at 51.85 *per cent*, 15 *per cent* and 17.76 *per cent* respectively in the same work.

Audit examined the related records and found that the percentage share of labour, POL and cement & steel determined in 2015 was based on the rates allowed in some of the old agreements executed way back in 1997-98 for execution of BCP works. The basis on which the percentage share of these components were determined in the agreements of 1997-98 was not available on record. The subsequent committee while revisiting the percentage share, retained the share of POL at 15 *per cent* and revised the percentage share of material (cement and steel) at 17.76 *per cent*, which was said to be determined on the actual basis.

For determining the percentage share of labour component, the committee kept cost of other material (7.14 *per cent*) and aggregates (8.25 *per cent*) out of the scope of price adjustment and considered the remaining share of cost of works (100 *per cent* - 48.15 *per cent*[7]= 51.85 *per cent*) as labour component. Considering the entire remaining share of 51.85 *per cent* as labour component was incorrect, as the cost of work also involved contractor's profit (10 *per cent*) and Tools and Plant (2.5 *per cent*) over which price adjustment was not admissible and thus, should not be included in the labour component.

[7] POL: 15 *per cent* + other material: 7.14 *per cent* + aggregates: 8.25 *per cent* + cement and steel: 17.76 *per cent.*

The inclusion of some other components in the cost of labour component could not be ruled out as the committee did not analyse the components comprehensively.

Pertinently, the Department in another irrigation project work, Saryu Canal Project (SCP), which was underway during same period to develop irrigation facilities in the eastern parts of the State determined the percentage share of labor and POL as 13.10 *per cent* and 11.47 *per cent* respectively[8] for application in the price adjustment formula. SCP and BCP are both major irrigation projects in which concrete infrastructure along with digging deep canals were executed. Therefore, the Department could have adopted the same modalities and procedures for determining the percentage share of components in BCP for allowing price adjustment. Payment of price adjustment on labour and POL at uniform rates (13.10 *per cent* for labour and 11.47 *per cent* for POL), as adopted in SCP, payment on these components could have been only ₹ 23.21 crore as against actual payment of ₹ 63.14 crore to the contractor.

Substantial difference in the percentage share of labour and POL components (38.75 *per cent* in labour component and 3.53 *per cent* in POL component) between the two canal projects reflects lack of standardisation and too much discretion at the hands of the CE. The department was, therefore, required to examine the entire process of determination of percentage share of components of work cost in BCP.

In reply, the State Government stated (July 2022) that all the three components of price adjustment, *viz*., Labour, POL, material (Cement and Steel) were determined by a committee constituted by Chief Engineer, Bansagar in March 2015 and re-fixed in January, 2020. The Government further added that BCP and SCP projects were not comparable as the work of BCP was carried out in hills of *Kaimur* Range and Lower Vindhya Range while the work of SCP was executed in the plain area between Ghaghra and Rapti Rivers.

Even if Government's argument that BCP and SCP had difference of terrain, the excavation of canals and creation of other pucca structures in the hilly areas were done mainly by breaking of rocks through blasting. In the work of canal construction in such types of difficult and mountain trenches, use of manual labour remains limited as works are executed using machines. Therefore, the use of labour and price adjustment on this component should have been less in BCP as compared to SCP. Moreover, the Government did not elaborate the basis for determination of percentage of labour and POL components in price adjustment. As such, the percentage of labour and POL taken and accordingly payment of price adjustment on these items to the contractor was not verifiable in audit.

3.3.3 Irregular grant of mobilisation advance

As per special conditions of the contract, mobilisation advance not exceeding five *per cent* of the contract value was to be paid to the contractor, if requested by the contractor. It was an interest free advance to contractor recoverable from the contractor's bills.

[8] In SCP, price adjustment was provided to the contractor on two items *viz.*, labour and POL.

Scrutiny of records revealed that the project authorities paid (March, 2013 to March, 2015) mobilisation advance of ₹ 23.83 crore[9] to RPPL against the maximum permissible advance of ₹ 20.13 crore. Thus, the contractor was extended undue benefit of ₹ 3.70 crore as an interest free mobilisation advance which was recoverable from its subsequent bills.

The State Government replied (July 2022) that mobilisation of ₹ 3.70 crore was allowed on extra item of work valuing ₹ 74.00 crore against the bank guarantee provided by the contractor in advance and the same had been adjusted against the bills of the contractor.

The reply of the Government was not acceptable, as the contract provided for granting of mobilisation advance to the contractor at the contracted cost and there was no provision for sanctioning mobilisation advance on the extra item of work allotted to contractor subsequently. It is noteworthy that in a similar situation of increase in the scope of work due to extra items of work, there was no provision to obtain additional performance security from the contractor in lieu of such increase.

3.4 Contract Management in Lahchura Dam Project

Lahchura Dam Project and connected Pahari Dam Project envisaged replacement of the existing weirs having falling shutters arrangement with a gated barrage. The construction work of Lahchura Dam Project was awarded to Engineering Projects (India) Limited (EPI) at the agreed cost of ₹ 61.84 crore in 2005 which was completed at an expenditure of ₹ 328.30 crore in March 2015 with a time overrun of seven years[10]. Subsequently, CE, Pariyozna Betwa, Jhansi made a proposal (2015-16) for execution of appurtenant works of Lahchura Dam Project (estimated cost: ₹ 21.69 crore) for some works[11] which could not be included in the original project and inevitably required to be done. Contract for executing the appurtenant work was awarded to M/s Hari Construction Co. Jhansi at an agreed cost of ₹ 13.69 crore in January 2016 which was completed in March 2017 at an expenditure of ₹ 19.30 crore.

For execution of works of Pahari Dam Project, SE executed two contracts with M/s Ghanaram (Engineers and contractors) in February 2009 at the agreed cost of ₹ 90.89 crore for construction of spillway and earthen embankment and with M/s Ghanaram Infra Engineers Pvt. Ltd. at the agreed cost of ₹ 90.40 crore in October 2014 for gates of spillway. The works under the two contracts were completed in November 2017 (and October 2017 at an expenditure of ₹ 200.19 crore and ₹ 101.62 crore respectively. The work of spillway was completed with delay of more than five years whereas the work of erection of gates in the dam was completed with a delay of one year from the schedule date of completion.

[9] ₹ 10.06 crore by EE, BCCD-5, Mirzapur and ₹ 13.76 crore by EE, BCCD-8, Mirzapur.

[10] Original schedule date of completion was in 2008.

[11] Construction of retaining wall on the left flank in the downstream of spill way (protection work), automation of flood gates (SCADA system), construction of approach road on the marginal bund, land scaping and development of part in the upstream of Lahchura Dam.

Significant audit observations have been discussed in the succeeding paragraphs:

3.4.1 NIT issued before sanction of work

Paragraph 370 of Financial Handbook, Volume VI prescribes that no authority may accept any contract for a work until an assurance has been received from the authority competent to provide funds for the same that such funds will be allotted before the liability matures. Paragraph 375 FHB Vol. VI further envisages that no work shall be commenced unless a properly detailed design and estimate have been sanctioned, allotment of funds made and orders for its commencement issued by the competent authority.

Audit scrutiny revealed that after completion of Lahchura Dam Project, the technical sanction for 'Construction of Appurtenant Works of Lahchura Dam' costing ₹ 21.69 crore was accorded (August 2015) by CE, Pariyojna Betwa. SE, Construction circle, Mahoba invited NIT in September 2015 and an agreement costing ₹ 13.69 crore for the work was executed by SE with the contractor in January 2016. However, the State Government accorded Administrative and Financial sanction of ₹ 19.30 crore for the project in July 2016. Thus, SE irregularly invited NIT**,** ten months before Administrative and Financial sanction for the project. Even agreement with the contractor was executed five month prior to receiving State Government's sanction for the project, which was irregular.

The State Government stated (July 2022) that the construction work under the agreement had been completed. However, the reply was not specific to the issue raised in the audit observation. The State Government may fix the responsibility of the erring officers responsible for irregular publication of NIT before administrative and financial sanction for the work.

3.4.2 Award of work to ineligible contractors

Government's order (2001) envisages that evaluation of technical and financial bids of the prospective bidders should scrupulously be done in an efficient and transparent manner during tendering process. The standards fixed for evaluation of technical bids should not be relaxed and changes in respect of the conditions of the bid evaluation would also not be allowed which should also be mentioned in the NIT. Financial bids of those bidders, who failed to qualify technical evaluation, would not be further entertained.

Audit observed that the conditions of NIT issued in September 2015 for the execution of work of appurtenant works required that contractor should be registered under 'AA category' having experience of execution of works of similar nature and value of work for construction of canal and have executed works valuing ₹ 15.00 crore in any one year during last five years. Two bidders, viz., M/s Ghanaram Infra Engineers Private Limited and M/s Hari Construction Jhansi participated in the bid for appurtenant work of Lahchura Dam Project and submitted their technical and financial bids. Audit found that M/s Hari Construction Jhansi was declared qualified in technical bid evaluation despite producing the documents of experience of works of lesser value at ₹ 8.13 crore which did not fulfil the NIT conditions. Moreover, being

the lowest bidder after opening of financial bid, the work was awarded to M/s Hari Construction Jhansi for appurtenant works of Lahchura Dam Project in January 2016. Thus, the work was awarded to an ineligible contractor. Pertinently, the work was completed with a delay of 11 months from the schedule date of completion.

Further, according to the guidelines issued in 1986 by the Irrigation Department, enlistment of contractors would be made separately for civil works and electrical/mechanical works. Contractors enlisted in a particular class would be entitled to tender in that category.

SE, Irrigation Construction Circle, Mahoba awarded works of construction of gates on the dam in the work of Pahari Dam Project to M/s Ghanaram Infra Engineers Pvt. Ltd. in October 2014 at the agreed cost ₹ 90.40 crore. Audit observed that in the tender document inviting bids from the prospective bidders, the Executive Engineer did not mention that the contractors registered under mechanical category would only be eligible for participating in the bid process for design, fabrication and erection of steel gates of Pahari Dam spillway. It was further observed in Audit that M/s Ghanaram Infra Engineers Private Limited was registered with I&WRD as 'AA' category contractor for executing the civil works and was not eligible for participating in the bidding for mechanical/electrical works. However, the contractor was allowed to take part in the bidding and subsequently was awarded the work. Pertinently, the contractor did not adhere to the completion schedule and could complete the work with a delay of one year from the schedule date of completion.

The State Government replied (July 2022) that the construction work under the agreement had been completed. However, the reply was not specific to the issue raised in the audit observations. Responsibility needs to be fixed on erring officers.

3.4.3 Short deposit of Performance Security

As per paragraphs 614 & 615 of the Financial Handbook, Volume VI, the contractor shall deposit securities (10 *per cent* of the face value of contract) within one week after his tender has been accepted.

Contrary to the provisions of the financial rules as well as conditions of NIT, in the work of 'construction of Pahari Dam spillway and its appurtenant works' out of ₹ 9.08 crore required to be deposited by the contractor on account of performance security, only ₹ 4.54 crore was obtained (February 2009) from the contractor at the time of executing the contract. CE had accepted (April 2009) the request of contractor that the remaining performance security amounting to ₹ 4.54 crore would be recovered from contractor's bill. However, the recovery of ₹ 4.54 crore was not made from the bills. Thus, the contractor was extended undue advantage of the same amount.

The State Government stated (July 2022) that the construction work under the agreement had been completed. However, the reply was not specific to the issue raised in the audit observations. State Government may fix the

responsibility of erring officers responsible for not recovering the performance security from the contractor.

3.4.4 Irregular grant of secured advance

In 'construction of Pahari Dam spillway and its appurtenant works' project (agreement no. 01/SE/2008-09), the Division paid ₹ 20.89 crore to the contractor as Secured Advance against the measured quantity of material brought to site. Similarly, in the work of BCP, secured advance amounting to ₹ 15.28 crore was paid to the contractor against the measured quantity of material brought to site during 2013-18 (***Appendix-3.4***). Audit scrutiny of both agreements revealed that there was no clause for payment of secured advance to the contractors. The payment of secured advance to contractors was beyond the contractual obligations of the Government and thus, irregular which resulted undue favour to both contractors.

The State Government stated (July 2022) that the secured advance was given to the contractors as per the provision of the Financial Handbook Volume VI.

The reply was not tenable, as there was no provision in the terms and conditions of the agreements for granting secured advance to the contractor.

3.4.5 Cost of granite stones excavated from Lahchura Dam Project not recovered

The scope of work of Lahchura Dam Project *inter alia* included excavation of earth for construction of various structures. The terms and conditions of MoU executed (December 2005) with the contractor (M/S EPI) provided that all suitable materials from excavation of dam and appurtenant works would be used in the construction of various structures of project as per requirement by preparing disposal area plan and the materials not included in the disposal plan would be duly stacked in an area of 500 meters from the site of excavation.

Audit observed that in the excavation of earth during March 2006 to March 2015, 2.78 lakh cum granite stones were obtained, which were stacked in the vicinity to the work site and accounted for in the stock account. However, contrary to the provisions of the MoU, the entire quantity of the granite stones was issued to the contractor from the stock during March 2006 to March 2015. Audit examination of records further revealed that execution of four items of works, *viz.*, Random rubble (RR) stone masonry, launching apron, rock toe filter and stone pitching (part of the modernisation work) required use of granite stones. The contractor, therefore, utilised 1.50 lakh cum granite stones on these works and the Division while making payment to the contractor for these four works made deductions amounting to ₹ 4.28 crore (including royalty)[12] in lieu of utilisation of granite stones. Remaining 1.28 lakh cum granite stones costing ₹ 5.67 crore[13], were in the possession of the contractor as of October 2022. This issue was earlier highlighted in Paragraph 4.9.6, Annexure 4.16 of the Report of Comptroller and Auditor General of India on

[12] At the applicable rates.
[13] Arrived at by Audit at the rate of ₹ 445 per cum (including cost of royalty of ₹ 75 per cum) prescribed in the SoR of 2015.

Accelerated Irrigation Benefit Programme (Report no. 22 of 2018 of Union Government).

However, the Division neither made any correspondence with the contractor for returning the balance quantity of granite stones possessed by it even after a lapse of more than six years from the date of completion of work nor it initiated the process for levying and recovering the cost of the granite stones from the contractor.

The State Government in its reply (July 2022) mentioned that according to MoU, the excavated materials not fit for use shall be waste for which no compensation would be taken from contractor.

The State Government reply that the remaining granite (1.28 lakh cum) with the contractor was waste is not acceptable because all the granite stones were stacked, taken on stock account and then issued to the contractor. Besides, the Division stated (October 2022) that the cost of the remaining granite stones which was in the possession of the contractor, would be recovered. Thus, there was a wide difference between the replies of the State Government and the concerned Construction Division. Therefore, it is necessary to conduct an enquiry in the matter by the State Government to conclude the issue and for fixing of accountability of the erring officers for the irregularity in issuing the granite to contactor and non-recovery of cost of granite.

3.4.6 Labour Cess not deducted/deposited

According to 'The Building and Other Construction Workers' Welfare Cess Act, 1996' and 'Uttar Pradesh Building and Other Construction Workers' (Regulation of Employment and Conditions of Service) Rules 2009, a labour cess at the rate of one *per cent* of construction cost was to be recovered from the employer and the same was to be deposited into labour welfare board.

Scrutiny of records revealed that the estimates for construction of 'Lahchura Dam Project' and construction of 'Appurtenant Works of Lahchura Dam Project' was sanctioned for ₹ 328.30 crore and ₹ 19.30 crore respectively which included the cost of works, contingency and labour cess. The amount for labour cess of ₹ 90.87 lakh was provisioned in the cost estimates of Lahchura Dam Project though the burden of the labour cess was to be borne by the contractor. Therefore, separate provision in the cost estimate was not warranted. Audit in this regard further observed that the Division subsequently utilised the funds allotted in lieu of payment of labour cess on other item of project works. Besides, labour cess amounting to ₹ 80 lakh (one *per cent* of value of works: ₹ 79.97 crore[14]) was not deducted from the contractor's bills as a result of which the same amount could not be deposited in the labour welfare board as was required in the Government order of December, 2010.

Similarly, in Pahari Dam Project, ₹ 2.54 crore was provisioned in the cost estimates of ₹ 354.20 crore. The Division deposited ₹ 22.31 lakh out of ₹ 2.54 crore with the Labour Board on account of payment of labour cess and the remaining amount of ₹ 2.32 crore was diverted on the project works. Audit

[14] In respect of 13 bills paid after the promulgation of Government order (December, 2010).

further observed that out of due payment of ₹ 3.02 crore (one *per cent* of ₹ 301.81 crore), ₹ 2.64 crore was deposited with the Labour Board as of October 2021 and the remaining amount of labour cess amounting to ₹ 0.37 crore was not deposited in the respective head of account.

The State Government replied (July 2022) that a provision of ₹ 90.87 lakh in the project cost of Lahchura Dam Project was made for Labour cess which was utilised for other essential works of the project. Government further stated that remaining recovery on account of labour cess would be made from the contractor's bill on allotment of funds.

In respect of Pahari Dam Project, the Government stated (July 2022) that discrepancies regarding labour cess would be incorporated in the proposed revision of the Project. The Government further stated that the balance recovery of ₹ 0.37 crore on account of labour cess would be made from the contractor's bill.

3.5 Unauthorised sanction of cost variations under BCP and Lahchura Dam Project

The State Government issued (June 1995) order[15] defining delegation of financial power of the authorities. The Government order of June 1995 *inter alia* provided that the Chief Engineer (CE) would be empowered to sanction the increase in the cost of work, up to maximum 15 *per cent* of original estimated cost[16] and the increase beyond the limit of 15 *per cent* would be sanctioned by the Administrative Department.

Bansagar Canal Project (Uttar Pradesh)

Audit observed that in 43 out of 94 BoQs in BCP, the cost of work increased by 11 to 892 *per cent* of the estimated cost (total estimated cost: ₹ 215.03 crore; increase in cost: ₹ 228.04 crore). The increase was in the range of 100 to 892 *per cent* in 12 works, 50 to 99 *per cent* in 12 works and 11 to 49 *per cent* in the balance 19 works ***(Appendix-3.5)***. The CE sanctioned these cost variations and the amount was paid to the contractor, though it should have been forwarded to the Administrative Department in terms of State Government's Order of June 1995.

Further scrutiny revealed that the increase in the cost of work included ₹ 84.70 crore due to variation in the quantities agreed under the contract and ₹ 143.34 crore due to including the extra items of work. However, neither the Divisions while submitting the proposals for approval of variations to CE nor the CE while granting approval on the proposals of the Divisions provided clear justification/circumstances for such large variation in the quantities and the extra items. In 39 (91 *per cent*) out of 43 above mentioned works, it was merely mentioned that the variations occurred due to the conditions of the work site and in respect of remaining four works, CE stated that the variation in the cost occurred due to reasons, such as, change in design, addition of new items, *etc*.

[15] GO. No. A-2-1602 / 10-95-24 (14) – 95 dated 01.06.1995.

[16] Limited to the power of the authority for granting the technical sanction of the work estimate.

In reply, the State Government stated (July 2022) that the variations in the cost of work was within the last revised administrative and financial sanction of ₹ 3,420.24 crore for the project approved by the State Government in July 2018.

Lahchura Dam Project

In respect of appurtenant work of Lahchura Dam Project, there were significant variations ranging between 26 *per cent* and 125 *per cent (*cost: ₹ 3.74 crore) ***(Appendix-3.6)*** as compared to the quantities for which contract was awarded to the contractor. In this case also, CE approved the variations saying that the variations occurred as per the need of the work sites without explaining the circumstances under which such large variations took place after technical sanction of work accorded by the same CE.

In reply, the State Government stated (July 2022) that though CE had approved variations ranging from 26 *per cent* to 125 *per cent* in some items of works, it did not increase the total cost of the project.

The reply of the State Government in case of BCP as well as Lahchura Dam Project was not tenable, as the State Government's order of 1995 refers to the estimated cost of the work and not the cost of DPR of the project to which the work is a part. Further, the contention of the State Government that the total cost of the project was not affected despite approval of variations by CE was also not tenable, as in the last revision of BCP, six items of works (service road, earth work, communication, environment and ecology, plantation and miscellaneous items as detailed in **Paragraph 2.2.1**) costing ₹ 110.47 crores were partly excluded from the scope of the project. However, the effect of such exclusion on the project was not examined by the Expenditure Finance Committee. Furthermore, the CE who determined the original quantity of work items, had approved the large excesses in the quantities and the execution of new items of work without giving justification. Thus, there is a strong case for further investigation in the matter as the CE clearly exceeded the delegated powers defined by the State Government in June 2015 and being the sole sanctioning authority misused his position to pass on undue benefit to the contractors. Therefore, the State Government should investigate the matter through on-site verification of execution of works and also formulate such a system to ensure the compliance of the existing instructions/orders strictly so that situations of arbitrariness in the decisions by the CEs could be avoided.

Case study 3.5.1

Test check of records related to the agreements executed before January 2013 disclosed that the work of construction of Adwa barrage was awarded in August 2005 by SE, BCP. The terms and conditions of the contract *inter alia* stipulated that in case of variation in quantities occurring beyond 20 *per cent* of the agreed cost, a recovery from the contractor's bill at the rates ranging between 1.25 *per cent* and 5 *per cent* **(*Appendix-3.7*)** would be made. Besides, in case of minus variation, the contractor would be paid incentive at the rates ranging between 2.50 *per cent* and 10 *per cent* of the

contracted value.

Audit observed that against the agreement cost of ₹ 15.06 crore, works valuing ₹ 38.44 crore (155 *per cent*) was executed by the contractor during August 2005 to January 2018. This variation of ₹ 23.38 crore included variation in quantities (₹ 9.85 crore) and extra items (₹ 13.53 crore) which was approved by CE in contravention of the State Government order of June 1995 by stating that the variations were as per need of site.

Audit in this respect further observed that out of 46 items of works, in 40 items, the contractor executed works over and above the contracted quantities (35 *per cent* to 630 *per cent*) and thereby was liable for recovery of ₹ 98.66 lakh as per the contract. Further, in five items of works, there were minus variations in the quantities, hence incentive amounting to ₹ 38.70 lakh was due to the contractor. However, the Division neither imposed the recovery on the contractor nor paid incentive to the contractor as of October 2021.

Audit observed that the terms and conditions of the contract for providing incentive for minus variation and recovery for excess execution of work was itself not justified on the two grounds. Firstly, the rate of the incentive (2.5 to 10 *per cent*) for minus variation was much more than the rate of recovery (1.25 to 5 *per cent*) on account of execution of works in excess quantities making the term of the contract favourable to the contractor. Secondly, the work should be executed up to the quantum agreed between the Department and the Contractor and any liberty should not be given to the contractor to execute the work either in lesser or more quantity. Besides, the execution of the work must be done as per the need of site which should, in any case, be determined by the engineer-in-charge. Therefore, the term of the contract for providing incentive and recovery for variations in the quantity of the work was unwarranted.

The State Government did not furnish replies to the Audit observation.

3.6 Irregular grant of time extension to the contractor under BCP

Article III of the contract bond with RPPL for the balance work of BCP envisaged that the work to be performed under the contract shall be commenced within 15 days from the date of notice to start the work and shall be diligently executed and completed, ready for handing over to the Engineer-in-Charge before due date of completion. Clause 5 of Conditions of contract envisaged that extension of time for completion of the work may be granted on the ground of any unavoidable hindrance to its execution having arisen which shall be on reasonable grounds. Clause 2(B) of the contract bond prescribes that the contractor shall be liable to pay compensation for the work falling in arrears of the progress statement, not exceeding 10 *per cent* of the estimated cost of the work.

Audit scrutiny revealed that the stipulated date of completion of BCP work under contract with RPPL was January 2015. However, the contractor could not complete the contracted works up to the scheduled date of completion, *i.e.*, January 2015. The contractor, for the first time, applied for extension of time

for 12 months in November 2014. The contractor attributed the delay in completion of works due to delays in availability of forest land for construction work falling under the *Kaimur* range and drawings in respect of several works to be provided by the Department.

Further scrutiny revealed that the contractor did not complete the work even up to the extended time limit and applied for extension of time limit on five more occasions, one after the other, during July 2015 to June 2018 on the grounds of delayed availability of forest land for construction work falling under *Kaimur* range; delayed availability of drawings in respect of several works; hindrances caused due to rains, bad weather, strike of Junior engineers; and release of water into MJLC from the Sirsi Dam disrupting continuity in the related construction work. It was observed that every time, CE, BCP acceded to the requests of the contractor and granted time extensions without imposing any liquidated damage.

Audit analysis in this respect revealed that though the said forest land of the *Kaimur* range was made available to the contractor with delay but the same had been made available to the contractor in August 2015. Despite this, the contractor did not complete the works on these land and sought time extension during the subsequent occasions thereafter. As regard to the justification of rains and bad weather, these situations were anticipated while deciding the stipulated date of completion (January 2015) at the time of entering into agreement, therefore, could not have been considered as a valid justification. Regarding delayed availability of drawing to the contractor, it was revealed that works under 22 BoQs were stated to have been affected due to this reason. Audit, however, could not analyse the circumstances under which the drawing could not be made available to the contractors for want of related records.

Out of 94 BoQs, at the maximum, 60 BoQs remained affected during the limited time period because of several obstacles/hindrances, as discussed above. However, the contractor sought time extension in respect of all 94 BoQs, generally on almost the same grounds. In such a situation, it was imperative for CE to do work-wise analysis in relation to the applications of the contractor for time extension and to take decision to extend the timelines in the cases where there was a delay on the part of the Department in unavoidable circumstances by passing speaking order in this regard. On the contrary, CE granted the time extensions in respect of all 94 BoQs including those, which did not have any hindrances/obstacles mentioned by the Contractor in the applications.

It is also worth mentioning that the contract conditions included the provision of extra payment to the contractor on account of increase in the prices of labour, POL, cement, steel and aggregates. Thus, time extension for the work also resulted in undue favour to the contractor in terms of price adjustment. As per records, the contractor was paid ₹ 89.22 crore on account of price adjustment. Thus, due to a deliberately casual attitude on the part of the CE, price adjustments were paid to the contractor over and above his legitimate dues whereas the contractor was liable for penalty for delay in work in terms of Clause 2(B) of the contract.

The State Government stated (July 2022) that under some of the 94 BoQs, land was to be acquired and in some other BoQs the work site was located in the forest land on which permission was not granted by the forest department to get the work done. The Government also informed that the land acquisition process continued till June 2018 due to which the progress of the work was affected. The Government further stated that M/s Ritwik Projects Pvt Ltd was granted price adjustments as per the terms of the agreement. The BoQs which had no hindrances were completed as per timeline and price adjustment was paid accordingly.

Facts remains that CE, BCP granted time extensions to contractor without any analysis of the grounds for delays in work on case to case basis. Due to lack of analysis in cases of extension of time and unavailability of sufficient evidence in the records, the legitimate grounds on which CE granted time extensions to the contractor was not verifiable in Audit. However, the audit analysis in this regard definitely indicates that the CE was liberal in granting extension of time to the contractor without giving relevant justification for the same.

3.7 Quality Control

Quality control involves testing of materials and workmanship in a project to ensure that the works are executed as per the approved standards and quality specifications.

In the contract bond with RPPL, technical specifications *inter alia* provided specification in respect of material[17] and workmanship. As per contract bond all works shall be carried out in accordance with the detailed specifications mentioned in the contract bond. In case specification of any work was not given, the same shall be carried out in accordance with relevant Indian Standard/ Indian Roads Congress specification.

Scrutiny of records revealed that Quality Control Division carried out 5,603 cube tests, 202 sieve tests, five cement tests, 62 soil tests and six brick tests during 2013-14 to 2019-20, out of which, samples of 337 cube tests, 28 sieve tests and four brick tests were declared failed ***(Appendix-3.8 A)***. Corrective measures in respect of failed samples were to be taken by the Divisions, but no records in respect of corrective measures taken by the Divisions were made available to audit, though asked for. Audit in this respect further observed that sampling for quality testing was not carried out even once in 33 BoQs[18]. Thus, quality assurance in respect of works carried out under these 33 BoQs was not ascertainable in Audit.

Audit test checked the quality test reports in respect of 38 BoQs. In 24 BoQs, number of samples for cube tests taken was below the prescribed norms[19]. Shortfalls in taking samples ranged from 75 to 99 *per cent* in 15 BoQs, 50 to 75 *per cent* in six BoQs and from 25 to 50 *per cent* in three BoQs. Details are

[17] Cement, fine and coarse aggregate, steel reinforcement, earthwork (compaction), cement concrete, stone, cement pointing, form work, construction joints, copper water stops, P.V.C water seal, wearing course, drainage of roadways, copper seals, joint filler board, G.P. sheet seal.

[18] Out of 94 BoQs awarded to RPPL in January 2013.

[19] Quantity of concrete work of one to five cubic meter (cum):one sample; six to 15 cum: two samples, 16 to 30 cum: three samples, 31 to 50 cum: four samples, 51 and above: four plus one additional samples for each additional 50 cum or part thereof.

given in ***Appendix-3.8 B.*** Thus, cube testing for determining the strength of CC work with sufficient number of samples was not carried out as per norms.

The State Government did not furnish specific replies to audit observations and stated (July 2022) that quality checks were conducted from time to time and test reports were sent to the concerned Divisions.

The fact remained that adequate assurance on the quality of works executed could not be drawn in Audit.

3.8 Maintenance of the canals

The key components of an effective canal maintenance system include setting the norms for periodic maintenance, conducting regular surveys of canal structures to assess the actual need for maintenance work. Apart from this, accurate estimation of the requirement of funds for maintenance work, placing timely demand for funds and allocation of adequate funds by the Department were equally important so that the maintenance work could be performed in a systematic manner.

The Department did not prescribe any criteria specifying the norms and criteria regarding periodicity/cycle for taking up the canals for maintenance. State Government, however, prescribed (December 2000) norms for budgeting funds for maintenance of canals based on size of the command area. The norms prescribed[20] by the State Government *inter alia* envisaged fund requirement at the rate of ₹ 978.80 per ha for main, branch and distributary canals whereas ₹ 908.85 per ha for the minor canals for performing yearly maintenance of these canals.

Audit did not find any evidence in the records of the test checked Divisions regarding conduct of surveys to ascertain physical status of canals. Further, none of the test checked Divisions prepared canal wise estimates elaborating the plan for annual maintenance of canals. Considering the size of the command area of the nine canal systems of BCP and DCS under Lahchura Dam project, Audit worked out yearly requirement of ₹ 20.00 crore and ₹ 3.28 crore respectively for maintenance of BCP and DCS canals ***(Appendix-3.9)***. In respect of seven canal systems of BCP, the details of allotment of fund on maintenance work was not available distinctly as the respective Divisions were operating other canals systems too and the allotment was received in lump sum. Against the requirement of ₹ 4.50 crore[21], in remaining two canal systems (Tons Pump Canal and Yamuna Pump Canal) of BCP, the allotment was ₹ 1.04 crore to ₹ 1.71 crore during 2014-21, which was fully utilised. Further, in respect of DCS, ₹ 1.04 crore to ₹ 1.82 crore was allotted during 2014-21, except ₹ 3.34 crore in 2019-20.

As regards to conduct of annual maintenance of canals, despite repeated requests, the Divisions did not provide the details of canals taken up for maintenance during 2014-21. Audit analysed the records of maintenance in

[20] The norm prescribed by the State Government (₹ 210 per ha. for main, branch and distributary canals and ₹ 195 per ha. for minor canals) was provided annual increment by Audit at the rate of 8 *per cent* for 20 year *i.e.*, from 2000 to 2020 in order to update the rates.

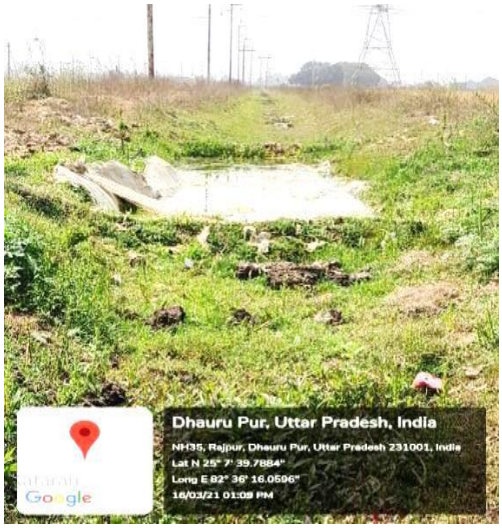
[21] Worked out by audit as per norm.

respect of 29 test checked canals, which revealed that two canals were not taken up for yearly maintenance even once in seven years, six canals were taken up only one year and four canals were taken up for maintenance in two years out of the seven years. Details are given in ***Appendix-3.10***. Further, the joint physical verification of selected canals also revealed their poor condition which were found full of shrubs/vegetation and damaged banks as depicted in photographs below:

Silted Banwa minor of BCP (Last maintained; 2020-21)

Silted Bilgaon minor in DCS (Last maintained; 2019-20)

Poor condition of Dasauti minor of BCP (Last maintained; 2020-21)



Bharuhana minor of BCP in poor state (Last maintained; 2019-20)

The State Government did not furnish reply in respect of audit observation related to BCP. Regarding Lahchura Dam Project, the Government replied that the budget provision was increased in the year 2020-21 from ₹ 148.03 lakh to ₹ 400.00 lakh per year for DCS.

Facts remained that effective system for performing proper upkeep of canal structures was not put in place due to which the canal structures were in poor conditions. Audit further analysed the performance of 12 canals having inadequate maintenance (nil to two times during last seven years) which

revealed that in the command area of eight of these canals, irrigation was not provided as per targets and shortfalls ranged between 68 and 99 *per cent* in seven canals and in one canal, no irrigation was provided during 2014-21.

To sum up, BCP witnessed delays in release of fund which led to slow progress in works. The contract management under the selected irrigation projects was deficient. The tendering process was not transparent and provision of allowing price adjustment was incorporated in contracts belatedly allowing undue benefit to only few bidders. Similarly, in the works of Lahchura Dam Project, NIT was issued before sanction of works and works were awarded to ineligible bidders. Monitoring of the execution of the projects was very poor leading to frequent time extensions and variations in quantities. There was arbitrariness in fixation of price adjustment for various components, allowing time extension to contractors, besides extending undue favour to contractor in terms of irregular release of interest free advances and non-recovery of cost of granites and labour cess. Quality control of work was an area of concern.

Recommendation 5: *The State Government should improve competitiveness of the tendering process through fair and transparent contract conditions and wide publication of tender notices and remove deficiencies in preparation of detailed estimates.*

Recommendation 6: *The State Government may review the basis for providing percentage weightage for price adjustment of labour and petrol, oil and lubricants in Bansagar Canal Project and take appropriate action against erring officers for arbitrary fixation of the percentage weightage without ascertaining their actual usages.*

Recommendation 7: *The State Government should ensure strict adherence to the Government orders and instructions regarding grant of time extension, approval of cost variations and extra items. Department may take appropriate action against the officials who flouted the provisions of Government instructions.*

Chapter – IV
Project Outcomes

CHAPTER-IV

Project Outcomes

This chapter deals with the benefits expected and the extent to which these have been achieved after completion of both the irrigation projects, covered in the Performance Audit. Apart from this, the availability of certain major inputs required for successful agricultural practices in the command area of these two canal projects, has also been discussed in this chapter.

Audit Objective 3: Whether the benefits contemplated in the projects were achieved and the same were delivered to the beneficiaries efficiently and effectively.

Brief snapshot of the Chapter

- BCP was commissioned in July 2018 even though four out of nine canal systems were not connected due to lack of link channels to divert water from Meja-Jirgo Link Channel.
- Water availability in the canal network of Bansagar Canal Project (BCP) was not augmented to the desired level. As against the target of receipt of 34,008 mcft water from Bansagar dam, actual supply was limited to only five to nine *per cent*.
- Similarly, in Dhasan Canal System (DCS), water was not released from the Lahchura dam as per the requirements and shortfalls ranged from 22 to 68 *per cent* during 2014-15 and 2020-21 due to shortage of water in the dam.
- Short release of water in the canal systems impacted the performance of the canals during 2014-21. Only 46 *per cent* canals were operated during entire Rabi season after commission of BCP in July 2018. In DCS, none of the 88 canals were operated during the full cropping period of five months in Rabi season during 2014-21.
- In BCP, the targeted increase in irrigation intensity (Rabi: 83 *per cent* and Kharif: 67 *per cent*) after commissioning of BCP was not achieved and there was short achievement in creation of irrigation intensity ranging from 44 to 45 *per cent* in Rabi and 32 to 33 *per cent* in Kharif.
- In DCS, out of 97,169 hectare command area, the Department targeted to extend canal irrigation facility to only 31,910 hectare (33 *per cent*) under Rabi crop and 14,575 hectare (15 *per cent*) under Kharif crop. However, Department failed to extend irrigation facility even to the targeted area.
- The expected benefit of increase in productivity and additional production of grains was not achieved. Audit also noticed short/delayed supply of certified seeds to farmers and inadequate soil testing.
- Command area of the canals were not developed to carry water from the outlets to the fields.

4.1 Introduction

After completion and commissioning of irrigation projects, it is pertinent to assess the extent to which the objectives and goals of the projects have been achieved.

4.2 Completion and commissioning of projects

Bansagar Canal project was commissioned in July 2018 and the work of Lahchura Dam Project and connected Pahari Dam Project was completed in March 2015 and March 2018 respectively.

4.2.1 Incomplete works of Bansagar Canal Project (Uttar Pradesh)

As discussed in **Paragraph 3.3**, BCP comprises of construction of major six structures/works. Audit however observed that four out of the six structures/works, Bansagar Feeder Channel, Adwa Barrage, Adwa Meja Link Channel and Meja Kota Feeder Channel were completed upto May 2018. However, two other components *viz.*, Meja Jirgo Link Channel (MJLC) and remodelling of old canals were partially completed even upto the date of commissioning of the project (July 2018) as detailed in Table 4.6 below.

Table 4.1: Status of completion of project

Name of component	Quantity	Status of completion in July 2018
Bansagar Feeder Channel (BSFC)	71.494 Km	Completed
Adwa Barrage	Diversion of 46.46 cumec water received under BCP.	Completed
Adwa-Meja Link Channel (AMLC)	25.60 Km	Completed
Meja-Jirgo Link Channel (MJLC)	71.13 Km	Partially completed
Meja-Kota Feeder Channel (MKFC)	3.577 Km	Completed
Remodeling of canals	Remodeling of 52 canals comprising of 487 Km length	Remodelling of 44 canals in 468 km length was completed

(Source: CE, BCP, Prayagraj)

Audit further observed that four out of nine canal systems under BCP were not connected for want of link channels to divert water from MJLC as discussed below:

- The 75.550 km long link channel connects Meja dam to Jirgo reservoir of Mirzapur district. MJLC in its journey to Jirgo reservoir was to feed water into Meja Kota Feeder Channel (MKFC)[1] (at Km. 13.10 of MJLC; 3824 Mcft), Harrai Canal System (at Km. 36.480 of MJLC; 261 mcft), Lower Khajuri system (at Km. 45.950 of MJLC; 416 mcft) before falling into Jirgo reservoir (at km 75.550; 3909 mcft). Two other canal systems, *viz.*, Garai and

[1] Meja Kota Feeder channel was to feed to Baraundha Distributary canal.

Jirgo canals, were to be initiated from Jirgo reservoir to carry 11,374 mcft water to irrigate 55,439 ha. Command area.

Audit observed that MJLC was not connected to Jirgo reservoir at Km 75.550 as was proposed in the DPR. When Audit raised the issue, the concerned Division stated that MJLC at Km 71.130 was linked to the existing *Bandhawa* drain through which the water was reaching into Jirgo reservoir. The Division however, neither explained the circumstances under which the MJLC was not constructed upto 75.550 km to carry water into Jirgo reservoir directly, nor provided the records in support of release of water into the *Bandhawa* drain. The photograph below depicts construction of MJLC only upto Km 71.130 instead of upto Km 75.550 to connect Jirgo reservoir as envisaged in the DPR:

The State Government replied (July 2022) that the MJLC, which has a length of 71.150 km, was connected with the *Bandhawa* drain which carry water to Jirgo Reservoir. The Government further added that the work of head regulators of MKFC, Harrai Canal System and Lower Khajuri system were completed and these canals were made operational since July 2021.

The fact remains that the MJLC was not connected to Jirgo dam. Moreover, the State Government did not furnish evidence in respect of augmentation of water in Jirgo dam from MJLC as stated been made through *Bandhawa* drain.

- The existing Harrai Canal System (PPA[2]: 4,616 ha) was to be provided additional 15 cusecs water from MJLC. Examination of records disclosed that no connectivity was provided from MJLC to divert water into Harrai Canal System through a link channel. When Audit raised the issue, the concerned

[2] PPA: Proposed protected area.

Division stated that Harrai canal system had been provided from MJLC through a natural drain. However, no evidence in support of the statement was provided by the Division. Further, the Sirsi Dam Division, Mirzapur under whose control the Harrai canal system was operated specifically informed that no additional water was received from MJLC during 2014-21. Thus, the Harrai canal system was not provided benefit under BCP.

The lack of connectivity from MJLC to divert water into Harrai Canal System through link channel is depicted in the following photograph:

In reply, the State Government stated (July 2022) that the construction work of approach channel to supply water to the Harrai canal had been completed by the year 2018 and the canal was being operational. However, the contractor's bill attached with the reply of the Government pertains to the construction of Head Regulator on Harrai Canal which did not include the construction of link channel. Besides, no data has also been provided by the Department in respect of release of additional water in Harrai canal. Therefore, Audit could not ascertain whether the Harrai canal was actually receiving water from the MJLC.

- Lower Khajuri Canal System (LKCS) offtakes from Khajuri river for providing irrigation facility in 8,016 ha area of Mirzapur district. To divert 416 mcft additional water from MJLC under BCP, head regulator at Km 45.950 of MJLC was constructed to take forward the water into Khajuri river. Audit however, did not find evidence in the records of the Division regarding construction of channel between the head regulator and river. During joint site visit carried out in March 2021 also confirmed that the head regulator was not connected to the river through the dedicated link channel as shown in following photograph:

Without linking of head regulator to the river, diversion of water from MJLC to the river was not feasible. The farmers present during joint site visit also confirmed that no link channel was constructed.

Total target of creation of irrigation intensity in 1.50 lakh ha under BCP, included 55,385 ha area in the command of MJLC. Of this, irrigation intensity in 30,411 ha area (55 *per cent*) through the four canal systems[3] were not created even after commissioning of BCP by incurring expenditure of ₹ 3,419.37 crore.

In reply, the State Government stated (July 2022) that the link channel to release water into the Lower Khajuri reservoir had been constructed in June 2021. The Government, however, did not provide data regarding the release of water from BCP to Lower Khajuri reservoir through the newly constructed link channel.

4.3 Project outcomes

Project-wise deliverables envisaged in the Detailed Project Reports of both projects are detailed in **Table 4.2**.

Table 4.2: Projected targets in BCP and Lahchura Dam Projects

BCP		Lahchura Dam Project	
Targets	**Achievements**	**Targets**	**Achievements**
Deliverable: Augmentation of water availability in the canal network			
22,495 million cubic feet (mcft) additional water was to be provided in the existing nine canal systems by bringing 34,008 mcft[4] water from Bansagar dam.	Only five to nine *per cent* water was received during 2017-21.	To ensure optimum utilisation and assured supply of water to Dhasan canal System (DCS).	The supply of water from Lahchura dam ranged between 32 to 78 *per cent* for the area covered during 2014-21.

[3] Harrai canal system: 1728 ha; Lower Khajuri canal system: 2572 ha; Garai canal system:12301 ha and Jirgo canal system: 13810 ha.

[4] The gap of (34,008 mcft *minus* 22,495 mcft) was due to enroute losses and evaporation losses, besides utilization as drinking water (200 mcft).

BCP		Lahchura Dam Project	
Targets	**Achievements**	**Targets**	**Achievements**
Deliverable: Creation of irrigation intensity			
An additional irrigation intensity in 1.5 lakh ha area comprising 0.89 lakh ha in Rabi and 0.61 lakh ha in kharif was to be created for overall creation of 3.47 lakh ha irrigation intensity (Rabi: 1.92 lakh ha and kharif: 1.55 lakh ha after commissioning of BCP against Rabi: 1.03 lakh ha and kharif: 0.94 lakh ha before commission of BCP)	After commissioning of BCP, irrigation intensity was achieved only 2.13 lakh hectare (Rabi: 1.08 lakh ha and kharif: 1.05 lakh ha. in kharif)	An additional irrigation intensity in 14575 hectare area in kharif was to be created apart from existing coverage of 31910 hectare ha area in Rabi crop.	Irrigation intensity to the extent of 13692 to 30923 hectare (43 to 97 *per cent*) in Rabi and 455 to 2153 hectare (three to 15 *per cent*) in kharif was achieved. No irrigation was provided in kharif 2016-17.
Deliverable: Change in cropping pattern			
Crop area was to be enhanced to 83 *per cent* in Rabi and 67 *per cent* in kharif against the existing crop area of 44 *per cent* and 41 *per cent* respectively. Besides, an additional cropping of vegetable in 17,150 ha area was proposed along with change in cultivation area of oilseed and peas after completion of BCP, as further detailed in **Table 4.3**.	Crop area in Rabi and kharif was enhanced to only 46 *per cent* and 45 *per cent* respectively. In respect of crop area of oilseed, peas and vegetable, data was not made available.	Project envisaged cultivation of paddy in 0.15 lakh ha which was not sown earlier.	No information was made available in respect of cultivation of paddy during kharif season.

(Source: DPRs)

Apart from above, change in sown area, improvement in productivity and additional production of grain in different crops of Rabi and Kharif were also targeted after commissioning of these irrigation projects as detailed in **Table 4.3**.

Table 4.3: Projected targets of sown area, productivity and production

Name of project	Name of crop	Sown area (hectare)		Productivity (quintal per hectare)		Production (Quintal)	
		Before project	After project	Before project	After project	Before project	After project
BCP	**Rabi**						
	Wheat	21573	21573	15	40	323595	862920
	Gram	13999	13999	09	18	125991	251982
	Oilseed	36594	21581	08	15	292752	323715
	Peas	17150	15013	08	15	137200	225195
	Vegetables	NA	17150	00	250	NA	4287500
	Kharif						
	Maize	40867	40867	15	23	613005	939941
	Pulses	19949	19949	09	16	179541	319184
DCS	**Rabi**						
	Wheat	11557	19146	35	35	404495	670110

Name of project	Name of crop	Sown area (hectare)		Productivity (quintal per hectare)		Production (Quintal)	
		Before project	After project	Before project	After project	Before project	After project
	Gram	12764	12764	20	20	255280	255280
	Kharif						
	Jwar	1650	NA	15	NA	24750	NA
	Paddy	NA	14575	00	40	NA	583000

(Source: DPRs) (NA: Not Available)

Audit examination of the records disclosed short achievement in almost all parameters, as discussed in the succeeding paragraphs:

4.4 Augmentation of water availability

The primary objective of the two selected irrigation projects was to augment water availability in the canal network by way of increased supply of water in BCP and by enhancing water use efficiency in DCS.

4.4.1 Water availability in Bansagar Canal Project (Uttar Pradesh)

In BCP, 34,008 million cubic feet (mcft) water was to be obtained from Bansagar dam, situated in Madhya Pradesh each year during 1st October to 28th May (240 days) at the rate of 141.70 mcft per day[5]. The brought in water was to be diverted to the two dams, *viz.*, Adwa dam and Meja dam and thereafter, the nine canal systems were to be provided water from these two dams to augment the water availability in these canal systems.

To bring water share of Uttar Pradesh (34008 mcft), Bansagar Project created structures like Bansagar Dam, Common Water Carrier, Common Water Feeder, Bansagar Feeder Canal, etc. Audit, however, observed that during the period from 2017 to 2021, only 1,680 to 2,921 mcft (five to nine *per cent*) of water was received from Bansagar dam as detailed in **Table 4.4.**

Table 4.4: Receipt of water from Bansagar dam

(Quantity of water in mcft)

Year	Quantum of water to be released from Bansagar dam	Quantum of water for which demand raised (percentage to col.2)	Supply of water (percentage to col. 2)	Shortfall against demand (Col.3-Col.4)/ percentage to col. 3
1	2	3	4	5
2017-18	34008	6791 (20)	2824 (08)	3967 (58)
2018-19	34008	5782 (17)	2921 (09)	2861 (49)
2019-20	34008	NA	1680 (05)	NA
2020-21	34008	16476 (48)	2458 (07)	14018 (85)

(Source: SE, Second Circle, BCP, Mirzapur) (NA – data not provided)

Audit scrutiny revealed that the Superintending Engineer (SE), BCP placed less demand for water, ranging between 5,782 and 16,476 mcft during the period 2017-21 against the water share of Uttar Pradesh, i.e., 34,008 mcft. SE, BCP stated (August 2021) that keeping in view the rainfall during 2018-21,

[5] 1,640 cusec x 24 hours (i.e. 86400 second) = 141.70 million cubic feet (mcft) per day

the demand was placed as per actual requirement of water in the canal network. However, SE, BCP did not provide related records based on which the demand for quantity of water was computed. Further, as detailed in Paragraph 4.4.3, there was short supply of water from canals to field clearly indicating inadequate demand of water.

Thus, SE, BCP did not demand release of water from Bansagar reservoir as per the envisaged share. However, BCP was not even getting the lesser demanded quantity of water from Bansagar reservoir despite funding of ` 517.56 crore to Government of Madhya Pradesh for Bansagar Dam, common water carrier and common water feeder under Bansagar Project. Since only five to nine *per cent* of the share of Uttar Pradesh was received from Bansagar dam, the objective of increasing the availability of water in the nine canal systems of BCP remained unachieved.

The State Government replied (July 2022) that 1,640 cusecs of water were to be received from Bansagar reservoir for which demand was placed repeatedly to Chief Engineer, Ganga Kachhar, Rewa, Madhya Pradesh by the authorities of Bansagar Canal project (Uttar Pradesh) and also by Engineer-in-chief (Project), Lucknow. However, the evidence provided (September 2022) by the State Government in support of its claim revealed that SE, BCP had requested for release of only 5,791 mcft during 2021-22. The demand of water included 1,640 cusecs only for 13 days and in the remaining days of 2021-22, demand ranged between 200 and 1500 cusecs of water. Further, the State Government did not provide information in respect of actual receipt of water during 2021-22.

4.4.2 Water availability in Dhasan Canal System

In DCS, short release of water against the requirement was observed in Rabi season as detailed in **Table 4.5**.

Table 4.5: Release of water in DCS from Lahchura dam

Year	*(in hectare)*			*(in MCM)*		
	CCA	Targeted area	Irrigated Area	Required water against irrigated area[6]	Quantity of water actually released in DCS	Shortfall in water availability (Col. 5-Col. 6)/ (*per cent*)
1	2	3	4	5	6	7
2014-15	97169	31910	14652	103	68.37	35 (34)
2015-16	97169	31910	13692	97	42.21	54 (56)
2016-17	97169	31910	28820	203	108.27	95 (47)
2017-18	97169	31910	17509	123	46.58	77 (62)
2018-19	97169	31910	28726	202	64.90	138 (68)
2019-20	97169	31910	30923	218	169.03	49 (22)
2020-21	97169	31910	27004	190	64.20	126 (66)

(Source: Test checked division of DCS)

[6] Worked out by Audit on the basis of prescribed norms in the DPR of the project vide which water requirement for rabi crop was 15 acre per mcft.

It is evident from **Table 4.5** that water was not released in DCS as per the requirement and shortfalls ranged 22 to 68 *per cent* during 2014-15 and 2020-21. Thus, the CCA irrigated during 2015-21 was provided less water than the requirement. The above shortage of water was for the actual irrigated area against the targeted area of 31,910 hectare. The water deficit was even more (25 to 81 *per cent*) for the targeted area of 31,910 hectare. EE, Saprar Division, Jhashi attributed short supply of water in DCS to less availability of water in the Lahchura dam.

The State Government replied (July 2022) that after completion of project of Lahchura dam, adequate water was released into Dhasan Canal system for 31,910 ha area of Rabi crop during 2016-21, except in 2017-18 during which lesser inflow from Dhasan river was recieved. The State Government further added that water requirement of 5,758 mcft for 31,910 hectare area was given in the original project report of Lahchura dam which is not practical and hence wrong.

Thus, the State Government had questioned the credibility of water requirement computed in the DPR of the Lahchura Dam Project which was prepared by its own Department and approved by the Government. However, the reply is not acceptable, since the department did not revise the requirement of water for the field in Rabi and Kharif Season in the subsequent revised DPRs. Further, the DPR of BCP also provided for similar water requirement of 13 acre per mcft as against 15 acre per mcft in Lahchura Dam Project. Therefore, instead of contradicting the presumptions of DPR, the State Government should take measures to provide adequate water to DCS as targeted in the DPR.

4.4.3 Supply of water from canals to field

Audit observed that the department did not have data in respect of quantum of water released from each canal to the fields. As such, the quantum of water actually delivered into the field against the requirement could not be ascertained. Audit, therefore, worked out water supplied[7] in respect of the test checked 29 canals (BCP: 23 canals and DCS: six canals) during the period of operation of canals. It was noticed that in BCP, there was short supply of water by 18 canals during Rabi and 12 canals during Kharif crops as these canals could have delivered only one to 16 inch water into the fields in Rabi and three to 15 inch water in Kharif crops ***(Appendix-4.1 A)*** against 21 inches[8] prescribed in DPR[9]. Similarly, in six test checked canals in DCS, against the requirement of 18 inches[10] of water in Rabi crops, only three to 15 inch water could have been provided in the field ***(Appendix-4.1 B)***.

[7] Considering the flow of water in canal at full supply level.

[8] Crop water requirement for wheat (23 inches); gram (20 inches); oil seed (18 inches) and vegetables (22 inches) with an average of 21 inches in Rabi. Similarly, in respect of Kharif crops, crop water requirement was for Paddy (32 inches); Maize (08 inches) and pulses (20 inches) with an average of 21inches.

[9] For the total irrigation intensity of 3.47 lakh hectare (8.58 lakh acre), 65,598 mcft water was required as per the norms prescribed in the DPR of BCP. Thus, one mcft water would be required for 13 acre area.

[10] In the DPR of DCS it has been provided that one mcft water would be required for 15 acre area.

Furthermore, four to 13 (17 to 57 *per cent*) out of 23 test checked canals in BCP and four to five (67 to 83 *per cent*) out of six test checked canals in DCS did not feed water up to the tail end (***Appendix-4.2).*** It was also observed that four out of 44 canals which were remodeled to carry additional flow of water, did not feed water till tail end. Thus, as discussed in Paragraph 2.2.3, out of 1,851 km canals only 468 km were remodeled and even in remodeled canals, tail end problems have occurred. Shortfalls in tail feeding in such number of canals, indicated towards the short availability of water at the source as discussed in Paragraphs 4.4.1 and 4.4.2.

4.5 Operation of canals in shorter duration

Timely supply of water to the field is significant for optimum production. As per norms mentioned in DPRs, Rabi crops requires water in spells during the cropping period of five months (11 October to 10 March). Similarly, Kharif crops requires water in spells during four months' cropping period (01 June to 30 September).

Audit observed that out of 413 canals[11] in the nine canal systems of BCP, the Department prepared roster for operation of only 162 to 403 canals during 2014-21 (Rabi season) that too for not full cropping period, as detailed in **Table 4.6**.

Table 4.6: Operation of canals in shorter duration during Rabi crop in BCP

Year	Total number of canals	Number of canals operated	Period during which canals were in operation				
			One month	Two months	Three months	Four months	Five months
1	2	3	4	5	6	7	8
2014-15	413	403	36	00	129	00	238
2015-16	413	162	00	00	70	00	92
2016-17	413	376	00	10	72	56	238
2017-18	413	403	03	92	37	33	238
2018-19	413	403	00	36	03	126	238
2019-20	413	403	00	00	76	181	146
2020-21	413	403	00	00	76	181	146
Total	**2891**	**2553**	**39**	**138**	**463**	**577**	**1344**

(Source: Test checked divisions of BCP)

Thus, though canal operation was improved after commissioning of BCP in July 2018, even then only 46 *per cent* canals[12] could be operated during entire cropping period of Rabi and remaining canals could be operated only during one to four months of cropping period against five months cropping period.

Similarly, in DCS, the Department planned to operate 54 to 64 canals during 2014-21 (Rabi season) out of 88 canals. Against this, none of the canal could be operated beyond two months cropping period, leading to huge shortfalls in supply of canal water in the command area. Year-wise details are given in **Table 4.7**:

[11] Including main canals, branch canals, distributaries and minor canals
[12] Column 8 divided by column 2.

Table 4.7: Operation of canal in short duration in DCS

Year	Total no. canals	No. of canals taken on roaster	Operation of canals in the cropping period				
			One month	Two months	Three months	Four months	Five months
2014-15	88	58	58	00	00	00	00
2015-16	88	54	32	22	00	00	00
2016-17	88	64	14	50	00	00	00
2017-18	88	54	54	00	00	00	00
2018-19	88	64	14	50	00	00	00
2019-20	88	63	00	63	00	00	00
2020-21	88	63	15	48	00	00	00

(Source: Test checked division of DCS)

Audit noticed that rosters for operation of canals were prepared by Irrigation and Water Resources Department in consultation with Agriculture Department. Due to operation of canals only during first two months against the cropping period of five months in Rabi, the canal irrigation to the field was not provided upto the maturity period which may lead to crop failure. The farmers could have been advised by the Agriculture Department to grow crop variety with shorter maturing period. However, Audit did not find any evidence in the records of Agriculture Department (District Agriculture Offices) of having issued directions to the farmers regarding sowing of crops according to the availability of water from the canals in the command area.

The State Government did not provide specific reply on the issue of operating the canals for short duration in BCP. In case of DCS, the State Government replied (July 2022) that out of total 88 canals of DCS, 64 canals were running and water was fed till the tail end. It added that restoration work of the remaining 24 canals was proposed to be completed under UPWSRP project by 2026 after which all 88 canals would be operated. The Government further stated that in the command area of DCS, wheat is sown on an average 50 *per cent* area and peas, gram and other Rabi crops are sown in 50 *per cent* area during Rabi season. It stated that as per guidelines, maximum four times irrigation is required for wheat and maximum two times irrigation is required for other Rabi crops like peas and gram, which is being provided through DCS.

The justification of the State Government in respect of operation of canals during short periods is not tenable, as the supply of water is required at different stages of crop growth during entire cropping period (October to March). However, the canals were run only during first two months of the cropping period which indicated that supply of water to the field was not stretched up to the maturity period. As a result, the water requirement of the Rabi crops of the farmers was not be met through the canal system even after completion of Lahchura Dam Project.

4.6 Augmentation in Irrigation Intensity

4.6.1 Achievement of irrigation targets in Bansagar Canal Project (Uttar Pradesh)

BCP was targeted to create 1,50,132 ha additional irrigation intensity (Rabi: 89,316 ha; Kharif: 60,816 ha) in addition to the existing irrigation intensity of 1,97,222 ha (Rabi: 1,03,196 ha; Kharif: 94,026 ha) under nine canal systems in Prayagraj and Mirzapur districts. Thus, after commissioning of BCP, irrigation intensity of 3,47,354 ha was to be achieved (Rabi: 1,92,512 ha; Kharif: 1,54,842 ha.) in the CCA of 2,32,441 ha.

Audit, however, observed that the irrigation intensity remained almost same in post-project period as compared to pre-project period as depicted in **Chart 4.1** and **Chart 4.2**.

Chart 4.1: Irrigation intensity in Rabi

(Targets and achievements in ha)

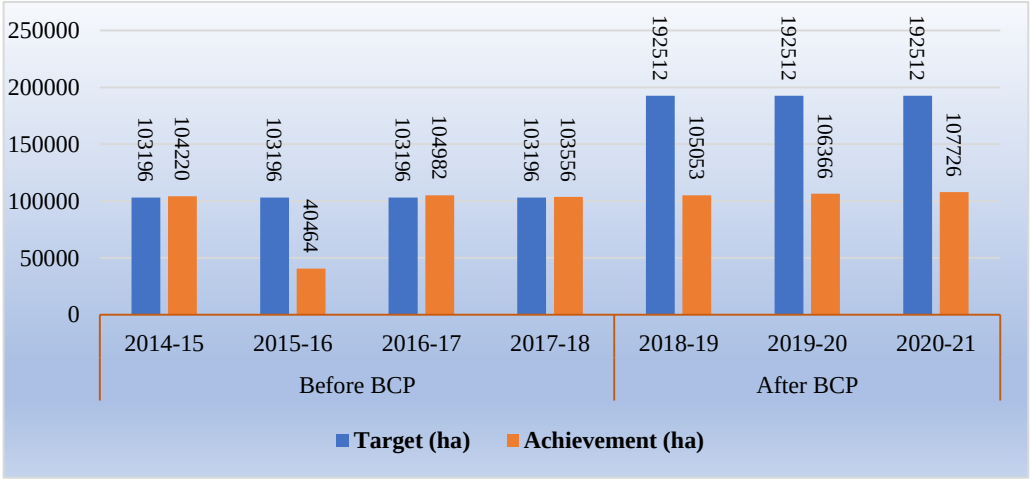
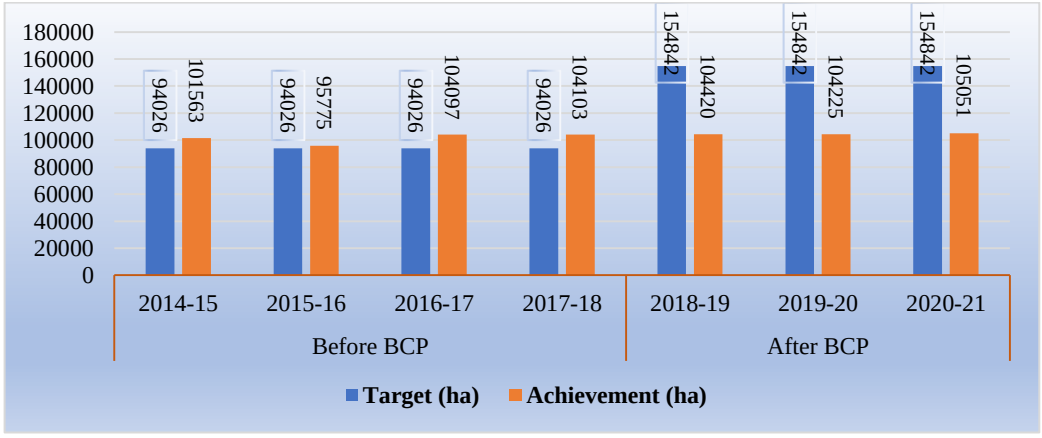


Chart 4.2: Irrigation intensity in Kharif

(Targets and achievements in ha)



Resultantly, the targeted increase in irrigation intensity (Rabi: 83 *per cent* and Kharif: 67 *per cent*) after commissioning of BCP was not achieved and there was short achievement in creation of irrigation intensity ranging from 44 to 45

per cent in Rabi and 32 to 33 *per cent* in Kharif. Similar trend in respect of irrigation intensity was observed in the nine canal systems as detailed in ***Appendix-4.3***.

The State Government replied (July 2022) that after completion of work of BCP, irrigation coverage was increased to 1.29 lakh hectare (Rabi) and 1.24 lakh hectare (kharif) in 2020-21.

The reply of the Government was not acceptable, as it was evident from the records of Divisions of BCP's nine canal systems that irrigation coverage was 1.08 lakh hectare (Rabi) and 1.05 lakh hectare (Kharif) in 2020-21. Thus, the target of irrigation intensity in Rabi crop, *i.e.*, 1.93 lakh ha (Rabi) and 1.55 lakh ha (Kharif), remained unachieved despite marginal increase (four *per cent)* of irrigation intensity in Rabi after commissioning of BCP, *i.e.*, between 2017-18 and 2020-21.

4.6.2 Achievement of irrigation targets in Dhasan Canal System

In the DPR of Lahchura Dam Project, Department proposed for canal irrigation of 31,910 ha (33 *per cent*) under Rabi and 14,575 ha (15 *per cent*) under Kharif out of 97,169 ha command area of DCS. Audit, however, observed that the actual irrigation against the proposed area of 31,910 ha ranged from 43 to 97 *per cent* in Rabi crop and three to 15 *per cent* during kharif crop. Details are given in **Table 4.8.**

Table 4.8: Details of Irrigation in Rabi and Kharif under DCS

(In hectares)

Year	Rabi			Kharif		
	PPA	Actual Irrigation	Shortfall (*per cent*)	PPA	Actual Irrigation	Shortfall (*per cent*)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2014-15	31910	14652	17258 (54)	NIL*	2830	Not applicable
2015-16	31910	13692	18218 (57)	14575	1556	13019 (89)
2016-17	31910	28820	3090 (10)	14575	00	14575 (100)
2017-18	31910	17509	14401 (45)	14575	455	14120 (97)
2018-19	31910	28726	3184 (10)	14575	856	13719 (94)
2019-20	31910	30923	987 (3)	14575	1348	13227 (91)
2020-21	31910	27004	4906 (15)	14575	2153	12422 (85)

(Source: Test checked division of DCS)

** The project was completed in March 2015, hence targeted CCA is taken as NIL.*

The Department could reduce the shortfall in achievement of canal irrigation from 2018-19 onward in respect of Rabi. However, as discussed in Paragraph 4.5, none of the DCS canal was operated beyond two months cropping period due to which required amount of water was not provided to irrigated area. Further, in respect of Kharif, there was wide gap between irrigation target and achievement.

The State Government replied (July 2022) that after completion of Lahchura Dam Project in March 2015, it became possible to run the DCS at full capacity from the Rabi season during 2016 as a result of which targets during Rabi season were almost achieved during year 2016-17, 2018-19, 2019-20 and

2020-21. Whereas in the year 2017-18, the proposed Rabi target could be partially achieved due to less inflow in the Dhasan river. The State Government also replied that there was increase in the irrigated areas of Kharif between 2016-17 and 2020-21.

The fact remained that the achievement of canal irrigation in Kharif was minuscule as the achievement was three to 15 *per cent* of targeted CCA. Further, in respect of Rabi, the canal was not operated during the full cropping season from October to March. Furthermore, even after a lapse of more than 100 years from the construction of DCS, the canal irrigation facility to the targeted CCA could not be extended beyond 31,910 ha, thereby, depriving the farmers in 65,259 ha. area of the facility of canal irrigation. Therefore, the circumstances under which the irrigation facility was not expanded in the command area of more than 67 *per cent* of the canal system even after incurring substantial expenditure and passage of time should be ascertained and responsibility fixed.

4.7 Increase in productivity and production

As a result of increased supply of water into the canal network and with the creation of additional irrigation intensity, higher productivity and additional production in agriculture was also targeted in both sampled projects. In the Detailed Project Report of BCP, additional production of 11.32 lakh quintal grains[13] was envisaged in the command area of nine canal systems by enhancing their productivity[14]. In DCS, additional production of 8.24 lakh quintal grains[15] was contemplated after Lahchura and Pahari dam projects.

However, data of production and productivity in respect of the command area of BCP and DCS was not made available by the Agriculture Department despite repeated requests. Director Agriculture (Statistics), Agriculture Department, however, provided limited data of production and productivity in respect of 79 out of 90 selected villages in BCP and 19 out of 29 selected villages in DCS. Audit analysed these data of production and productivity to ascertain the extent of achievement *vis-à-vis* targets for production and productivity.

Further, timely and adequate availability of other agricultural inputs such as quality seeds, soil testing, fertilizer, agriculture implants, training and guidance to the farmers, etc., are amongst the key factors influencing the agricultural productivity and production. In view of this, the status of supply of certified seeds to the farmers and soil testing by the Department in the farmers' field have also been analysed in test check of records by Audit. The significant Audit findings have been discussed in the succeeding paragraphs:

[13] Wheat:5.39 lakh qtl; gram:1.26 lakh qtl; maize:3.27 lakh qtl. and pulses: 1.40 lakh qtl. Apart from this, vegetable cropping in 17,150 hectare was expected in BCP.

[14] Wheat: 15 qtl/ha to 40 qtl/ha; Gram: 9 qtl/ha to 18 qtl/ha; maize: 15 qtl/ha to 23 qtl/ha and pulses: 9 qtl/ha to 16 qtl/ha.

[15] Wheat: 2.66 lakh qtl and paddy:5.83 lakh qt; further the pre-project production of Jwar (0.25 lakh quintal) was excluded in the post-project target.

4.7.1 Distribution of certified Seed

Seed is the basic and most critical input for sustainable agriculture. It is, therefore, important that quality seeds are made available to the farmers at affordable prices. The distribution of seeds to farmers is undertaken through departmental outlets at block level, outlets of seed corporations, cooperatives and through private dealers. The distribution of seeds from the departmental outlets is made at the subsidised rates.

4.7.1.1 Short/delayed supply of certified seeds to the farmers

Audit observed that supply of certified seeds from the Government seed stores catering to four districts of the command areas of BCP and DCS was minimal, ranging from four to 12 *per cent* in BCP (Mirzapur and Prayagraj districts) and one to seven *per cent* in DCS (Hamirpur and Mahoba districts) as against the requirement of seeds for sown area as detailed in **Appendix-4.4 (A)**. Further, the supply of seeds in the test checked villages was also unsatisfactory as the supplies were in the range of one to seven *per cent* in BCP and two to 17 *per cent* in DCS as compared to the assessed requirement of seeds in the command area of these selected villages ***(Appendix-4.4 B)***.

Agriculture Department had prescribed timelines for supply of seeds to the seed stores so that the same could be made available to the farmers well before the sowing period. Audit, however, observed that seeds were supplied to the central stores of the four districts with delay ranging up to 97 days **(Appendix-4.5 A)**. This led to further delay in receipt of seeds at the block level stores (up to 250 days after sowing period) from where the seeds were to be supplied to the farmers ***(Appendix-4.5 B).***

Audit also collected data of sale of seeds from the private dealers and observed that the distribution of seeds from private dealers[16] was in the range of 30 *per cent* to 85 *per cent* in BCP and from 17 *per cent* to 41 *per cent* in DCS as detailed in Appendix-4.4 A. Further, entire supplied seeds at Government store was distributed in each year during 2014-21. Thus, the less availability as well as delayed availability of subsidised seeds to the farmers from Government store left the farmers with the only option of purchasing the seeds from private vendors at relatively expensive rates to adhere to the prescribed sowing period.

4.7.1.2 Distribution of other than recommended varieties of seed

Agriculture department of the Government of Uttar Pradesh recommended specific varieties of seeds for different climatic zones of the State in order to get the maximum yield. In respect of wheat, 28, 30 and 30 varieties of seeds were recommended for the districts of Bundelkhand region, Prayagraj and Mirzapur districts respectively. Similarly, in respect of paddy, 17, 24 and 25 varieties of seeds were recommended for Bundelkhand region, Prayagraj and Mirzapur districts respectively. Details are given in ***Appendix- 4.6.***

[16] Including Cooperative, UP Agro, Beej Vikas Nigam, Kribhco, etc.

Audit, however, observed that in four districts, covering the two selected irrigation projects, the distribution of recommended varieties of seeds from the Government seed stores ranged only from three to seven *per cent* in case of wheat. In case of paddy, the distribution of other than recommended variety of seeds ranged from 21 to 100 *per cent*. District-wise details are given in **Table 4.9**.

Table 4.9: Distribution of varieties of seeds which were not recommended

(in quintal)

Name of districts	Crop	Period during 2014-21	
		Total quantity of seed distributed	Quantity of distribution of seeds of other varieties (*per cent*)
Bansagar Canal Project, Uttar Pradesh			
Prayagraj	Wheat	92588	87225(94)
	Paddy	21678	4478(21)
Name of districts	**Crop**	**Period during 2014-21**	
		Total quantity of seed distributed	**Quantity of distribution of seeds of other varieties (*per cent*)**
Mirzapur	Wheat	40835	39541(97)
	Paddy	6574	3176(48)
Dhasan Canal System			
Hamirpur	Wheat	25252	23663(94)
	Paddy	68	63(93)
Mahoba	Wheat	12322	11509(93)
	Paddy	17	17(100)

(Source: DD, Agriculture in test checked districts)

Hence, the farmers of these four districts remained deprived of distribution of suitable variety of seeds of wheat and paddy.

The State Government did not furnish any reply.

4.7.2 Soil testing

Soil tests are used to determine the chemical properties of the soil including soil's nutrient level and pH content. On the basis of result of soil testing, farmers can define the quantity and exact type of fertiliser that is needed for application to improve the soil for practicing agriculture. Government of India (GoI) also launched Soil Health Card Scheme (SHCS) in February 2015 under which diagnostic soil health assessment of farmer fields was to be taken up periodically at least once in three years. Districts and villages were to be selected in such a way that the villages could be covered at every three years. After conducting soil testing, soil health cards were to be issued to the farmers containing recommendations of nutrients and fertilizers required for the individual farms.

Deficiencies noticed in the soil testing have been discussed in the succeeding paragraph:

4.7.2.1 Soil Testing Laboratories not established at village level

Soil testing laboratories at village level were to be established under Soil Health Card Scheme of GoI to minimize delays in soil testing and maximize convenience to farmers by providing soil testing facility at the doorstep.

Audit, however, observed that the soil testing laboratories were not established at village level in any of the four districts covering BCP and DCS.

4.7.2.2 Inadequate soil testing

Audit examined records related to soil testing conducted in 90 selected villages under command area of BCP and 29 selected villages under command area of DCS. Audit noticed that during 2015-21 in BCP villages, soil health tests were not conducted even once in five villages (six *per cent*) and in 79 villages (88 *per cent*), soil testing was conducted only once. Audit also obtained responses of 383 farmers during joint physical verification of canals in which 36 farmers stated that soil testing was carried out in their fields. Of these 36 farmers, 27 farmers stated that they were provided SHCs after the soil testing.

In DCS, out of 29 test checked villages, soil testing was not carried out in three villages during 2014-21 and in one village of Mahoba district, soil testing was conducted only once. Audit also obtained responses of 128 farmers in which 19 farmers stated that soil testing was carried out in their fields but only 12 of these 19 farmers stated that they were provided SHC.

Further, as per GoI's guidelines, analysis of soil on the parameter of Boron was necessary in respect of soil having pH value of more than 6.5. Boron deficiency in soil having pH value of more than 6.5 leads to adverse impacts on the productivity of the crops. Audit test checked Soil Health Cards in respect of all 39,429 beneficiaries of 101 villages of the Prayagraj, Mirzapur, Mahoba and Hamirpur where soil testing was conducted and SHC issued. It was observed that in 50 test checked villages of Hamirpur, Mahoba and Mirzapur, PH value of soil was more than the prescribed limit of 6.5, necessitating the need of Boron testing in these villages. However, Boron testing was not done in Hamirpur (during 2019-21), Mahoba (during 2015-17) and in Mirzapur (during 2015-21).

Thus, the soil testing was to be intensified to determine the soil health. Furthermore, one of the benefits to determine appropriate use of chemical fertilizer in the farming and timely advice, could not be achieved due to inadequate soil testing.

4.8 Productivity

Audit observed that in BCP against the proposed target of 40 quintal per hectare productivity of wheat (before BCP: 15 quintal/hectare), achievement ranged between 5.49 and 46.30 quintal per hectare during 2015-21 in sampled villages. In respect of Gram, against the target of productivity of 18 quintal per hectare (before BCP: nine quintal/hectare), the achievement was in the range of 2.44 to 18.69 quintal per hectare during 2015-21. Details are given in **Table 4.10.**

Table 4.10: **Details of productivity of Wheat and Gram in BCP**

Year	Productivity of wheat (quintal per hectare)				Productivity of gram (quintal per hectare)			
	Target	No. of sampled villages	Productivity achieved	Percentage achievement	Target	No. of sampled villages	Productivity achieved	Percentage achievement
Before BCP								
2015-16	15	79	5.49 to 29.25	37 to 195	9	15	2.44 to 7.65	27 to 85
2016-17	15	79	11.93 to 35.69	80 to 238	9	15	5.44 to 13.48	60 to 150
2017-18	15	79	11.84 to 40.90	79 to 273	9	15	4.87 to 17.14	54 to 190
After BCP								
2018-19	40	79	18.90 to 46.30	47 to 116	18	15	9.60 to 14.60	53 to 81
2019-20	40	79	5.66 to 38.10	14 to 95	18	15	5.95 to 18.69	33 to 104
2020-21	40	48	15.18 to 40.01	38 to 100	18	14	10.36 to 13.82	58 to 77

(*Source: Data collected from Director, Agriculture Department*)

Audit in this respect further observed that target of productivity of wheat (40 quintal per ha) was achieved only in two test checked villages (three *per cent*) in 2017-18, eight villages (10 *per cent*) in 2018-19 and one village (two *per cent*) in 2020-21 out of 79 villages[17] data of which was analysed in Audit. Only one village in 2019-20 could achieve the proposed target of productivity.

Similarly, in DCS, against the proposed target of 35 quintal per hectare production of Wheat, the achievement ranged from 5.80 to 46.59 quintal per hectare during 2015-21. Details are given in **Table 4.11.**

Table 4.11: Details of productivity of Wheat and Gram in DCS

Year	Productivity of wheat (quintal per hectare)				Productivity of gram (quintal per hectare)			
	Target	No. of sampled villages	Productivity achieved	Percentage achievement	Target	No. of sampled villages	Productivity achieved	Percentage achievement
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
2015-16	35	19	5.80 to 25.44	17 to 73	20	16	0.31 to 7.93	2 to 40
2016-17	35	19	21.07 to 41.83	60 to 120	20	16	8.26 to 13.93	41 to 70
2017-18	35	19	19.05 to 46.59	54 to 133	20	16	5.03 to 19.20	25 to 96
2018-19	35	19	15.30 to 41.10	44 to 118	20	16	5.07 to 16.31	25 to 82
2019-20	35	19	26.14 to 44.10	75 to 126	20	16	5.98 to 18.97	30 to 95
2020-21	35	09	29.91 to 44.60	85 to 127	20	15	8.44 to 15.18	42 to 76

(*Source: Data collected from Director, Agriculture Department*)

[17] In 2020-21, data was available for 48 villages in respect of wheat and 14 villages in respect of Gram.

It was further noticed that target of productivity was achieved only in eight test checked (42 *per cent*) villages in 2016-17, ten test checked villages (53 *per cent*) in 2017-18, eleven test checked villages (58 *per cent*) in 2018-19, fifteen test checked villages (79 *per cent*) in 2019-20 and four test checked villages (44 *per cent*) in 2020-21, out of six crops of wheat during 2015-21. In respect of Gram, against the proposed target of 20 quintal per hectare production of Gram was only 0.31 to 19.20 quintal per hectare during 2015-21. Further, paddy was cropped in only two test checked villages during 2019-21. Details are given in ***Appendix-4.7 A & B.***

4.9 Production

In BCP, analysis of data of production[18] in respect of wheat (25 villages) and gram (nine villages) disclosed that in 21 villages, production of wheat decreased by four to 55 *per cent* in 2020-21 as compared to production in 2018-19. However, there was increase in the production of wheat in four villages in the range of five to 43 *per cent*. Similarly, production of Gram decreased by two to 50 *per cent* in 2020-21 in all the nine test checked villages as compared to that of in 2018-19. In respect of other crops, *viz*., peas, oilseed, vegetable, maize and *Arhar*, information was not available. In DCS, production of Wheat and Gram increased in the test checked villages. Details have been given in ***Appendix-4.8.***

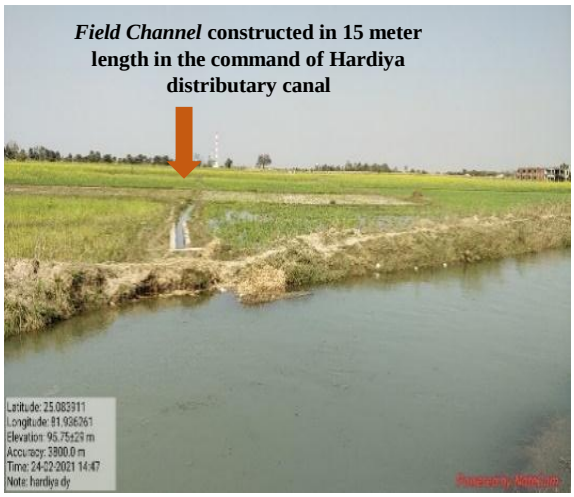
The State Government did not furnish any reply.

4.10 Development of command area

Optimum utilisation of canal water in the fields depends upon the development of command area of the canal system. According to the guidelines of Command Area Development and Water management (CADWM) Programme issued by GoI in September 2015, the activities of command area development *inter alia* included survey, planning, design and execution of On Farm Development (OFD) works including lined field channels. The CADWM programme is implemented under Pradhan Mantri Krishi Sinchai Yojna (PMKSY) - Har Khet Ko Pani from 2015-16 onwards. In order to promote water use efficiency in irrigation, the CADWM programme has been targeting at least 10 *per cent* of CCA for development of micro-irrigation infrastructure for facilitating use of sprinkler/drip/pivots irrigation systems.

In Uttar Pradesh, Greater Sharda Sahayak Command Area Development Authority (GSSCADA) under the administrative control of I&WRD, is responsible for development of command area of the canal systems. However, GSSCADA did not prepare any project for command area development in the command of BCP and DCS. As such, no command area development work was undertaken and farmers were drawing water from the canals through their own resources.

[18] Comparable data of production for the years 2018-19 and 2020-21 were available only in respect of 25 villages (wheat) and 09 villages (Gram) out of 92 villages in BCP.



***Field Channel* constructed in 15 meter length in the command of Hardiya distributary canal**

Audit in this respect further observed that a provision of ₹ 17.37 crore[19] was made in BCP for construction of head and tail wall of outlet (₹ 12.64 crore) of the canal and *field channel*[20] (₹ 4.73 crore). Audit noticed that 869 outlets were constructed in the canals of the three[21] out of nine canal systems during 2012-18. In 639 out of 869 outlets, *field channel* in the length of only 15 metre in each outlet was constructed to carry water from the outlets to the field. No further construction of *field channels* to take forward the water into field was carried out. Unavailability of *field channels* beyond 15 metre led to inadequate connectivity between field and canal outlet. As such the command area of both the canal system was not developed to carry water up to the fields.

Development of command area under PMKSY (Per Drop More Crop)

Per Drop More Crop component of PMKSY *inter alia* envisaged promoting efficient water conveyance and precision water application devices like drips, sprinklers, pivots, rain-guns in the farm, secondary storage structures at tail end of the canal system to store water when available in abundance, extension activities for promotion of scientific moisture conservation and agronomic measures, capacity building, training and awareness campaign, information communication technology interventions in the field of water use efficiency, precision irrigation technologies, on farm water management, crop alignment, *etc*. Department of Horticulture and Food Processing implemented this scheme in the State.

Audit noticed that from the records of District Horticulture Officers of districts Hamirpur and Mahoba that expenditure of ₹ 27.66 crore[22] was incurred under PMKSY (Per Drop More Crop) during 2016-21[23] for distribution of sprinkler sets to the farmers and other extension activities covering 15,514.28 hectare in Hamirpur and Mahoba districts served by DCS. Similarly, District Horticulture Officers of districts Mirzapur and Prayagraj incurred ₹ 39.61 crore[24] during 2018-21[25] for distribution of sprinkler sets to the farmers and other extension activities covering 12,076.61 hectare in Mirzapur and Prayagraj districts in which BCP provided irrigation facility.

[19] Total expenditure: ₹ 12.78 crore.
[20] Field channel is a narrow channel (both earthen and *pucca*) to bring water from the canal outlet and to distribute the water into the field for irrigation.
[21] Belan canal, Tons Pump Canal and Yamuna Pump Canal systems.
[22] Hamirpur: ` 16.40 crore and Mahoba: ` 11.26 crore
[23] Mahoba in respect of 2017-21.
[24] Mirzapur: ` 31.41 crore and Prayagraj: ` 8.20 crore
[25] District Horticulture Officer Prayagraj provided information only in respect of 2019-20 and 2020-21.

Joint field visits in the command area of BCP and DCS

Audit conducted field visits with departmental officers in respect of selected 23 canals in BCP and six canals in DCS and noticed that field channels were not constructed in the fields and wherever these were spotted, the field channels were in poor conditions, broken and full of silt and shrubs as depicted in following photographs:

Outlet at Jingha Minor (BCP)

Field channel full with shrubs at Mahuli Minor (BCP)

Field channel not constructed at Masoodpura Minor (DCS)

Field channel not constructed at Italia Minor(DCS)

The State Government replied (July 2022) that under BCP, construction/repair work of outlets and field channels was carried out in the command area of Belan canal, Tons pump canal and Yamuna pump canal systems. In respect of DCS, the Government replied that the command area of Dhasan canal system would be developed by forming water user associations under the Participatory Irrigation Management Act, 2011 and coordinating with the Command Area Development Authority.

The reply of the Government in respect of BCP was not acceptable, as no field channel beyond 15 metre was constructed to carry canal water up to the field level. Further, GSSCADA had also accepted (January 2020) that command area development work was not carried out in BCP and DCS. Thus, most of the users were deprived of water till their field despite investment of ` 4,101.87 crore (₹ 3,419.37 crore in BCP, ₹ 328.30 crore in Lahchura Dam Project and ₹ 354.20 crore in Pahari Dam Project).

4.11 Water User Association not formed

Water User Association (WUA) at *kulaba,* minor or distributary level was to be constituted by I&WRD with the main objective to bring about water users' participation in water management and also to create among the water users' a sense of ownership of irrigation system in their area. WUA was *inter alia* responsible to:

- prepare crop plan as per water budget and soil condition;
- prepare water indent and submit it to immediate upper level WUAs or competent canal officer;
- receive water on the volumetric basis and supply it to landholders in an equitable and transparent manner**;**
- prevent unauthorised irrigation and wastage of water;
- plan, design and implement activities relating to command area development in its area of operation;
- assist, participate and recover water charges; *and*
- prepare inventory of assets in its charge and maintenance activities.

Scrutiny of the records, however, revealed that WUAs were not constituted in the command area of BCP and DCS compromising the efficient operation of the canal network.

To sum up, the water availability in canal systems remained much less than the target, which affected the operation of canals and intended level of water was not supplied in the command area of both projects. Command Area Development work was also not undertaken by I&WRD to provide water to farmers up to field level. Audit also noticed shortage of seeds, distribution of seeds of other than recommended variety and inadequate soil testing to suggest correct measures to farmers. As a result, even after completion of both the projects, there was shortfall in achieving the targeted benefits in terms of increase in water availability for irrigation and improvement in productivity of crop. Water User Associations were not constituted by I&WRD to involve the users of canal water.

Recommendation 8: *Since the Bansagar Canal Project has been completed without providing envisaged connectivity between canals, the State Government should assess the lapses in this area through a comprehensive review, fix responsibility and take corrective actions.*

Recommendation 9: *There is an urgent need to identify and address the bottlenecks in the envisaged supply of water from Bansagar dam and further distribution of water to the connected canal systems. The State Government should assess and undertake such work in a time bound and coordinated manner in order to utilise the potential created optimally.*

Recommendation 10: *The State Government should conduct proper investigation to ascertain the circumstances due to which the irrigation facility could not be expanded in the command area of 97,169 hectare in Dhasan Canal System.*

Recommendation 11: *The State Government should ensure proper coordination between Agriculture Department and Irrigation and Water Resources Department to ensure optimum utilisation of available water, timely and adequate delivery of agricultural inputs to the farmers to promote adoption of suitable cropping pattern and consequential higher productivity and production in the crops. In future projects, we recommend that the DPR should contain a convergence plan involving all the stakeholder departments so as to develop the command area in an integrated manner.*

Recommendation 12: *The State Government should take action for the formation of Water User Association on priority basis so that canal systems can be operated efficiently with community participation.*

(BIJAY KUMAR MOHANTY)
Principal Accountant General (Audit-I)
Uttar Pradesh

PRAYAGRAJ
THE 26 FEB 2023

COUNTERSIGNED

(GIRISH CHANDRA MURMU)
Comptroller and Auditor General of India

NEW DELHI
THE 02 MAR 2023

Appendices

Appendix 1.1
Details of economic region-wise districts in Uttar Pradesh
(Reference: Paragraph no. 1.1)

Sl. No.	Name of the Region	Name of the District
1.	Western Region (30 districts)	1-Saharanpur, 2-Muzaffarnagar, 3-Shamli, 4-Bijnor, 5-Moradabad, 6-Rampur, 7-Amroha 8-Sambhal, 9-Meerut, 10-Bagapat, 11-Ghaziabad, 12-Bulandshahr, 13- Gautam Buddh Nagar, 14-Hapur, 15-Mathura, 16-Agra, 17-Firozabad, 18-Mainpuri, 19-Aligarh, 20-Hthras, 21-Etah, 22-Kasganj, 23-Badaun, 24-Bareilly, 25-Pilibhit, 26-Shahjahanpur, 27-Farrukhabad, 28-Kannauj, 29-Etawah, 30-Auraiya
2.	Central Region (10 districts)	31-Kheri, 32-Sitapur, 33-Hardoi, 34-Unnao, 35-Lucknow, 36-Raebareli, 37-Kanpur Dehat, 38-Kanpur Nagar, 39-Fatehpur, 40-Barabanki
3.	Bundelkhand Region (07 districts)	41-Jalaun, 42-Jhansi, 43-Lalitpur, 44-Hamirpur, 45-Mahoba, 46-Banda, 47-Chitrakoot
4.	Eastern Region (28 districts)	48-Pratapgarh, 49-Prayagraj, 50-Kaushambi, 51-Bahraich, 52-Shrawasti, 53-Balrampur, 54-Gonda, 55-Faizabad, 56-Ambedkar Nagar, 57-Sultanpur, 58-Amethi, 59-Sidharthnagar, 60-Basti, 61-Sant Kabir Nagar, 62-Gorakhpur, 63-Kushi Nagar, 64-Deoria, 65-Maharajganj, 66-Azamgarh, 67-Mau, 68-Ballia, 69-Varanasi, 70-Ghazipur, 71-Jaunpur, 72-Chandauli, 73-Mirzapur, 74-Sonbhadra, 75-Sant Ravidas Nagar.

Appendix 1.2

Department and field offices covered in the Audit

(Reference: Paragraph no. 1.5)

Sl. No.	Name of the department	Name of the office
1.	Irrigation & Water Resources Department	Additional Chief Secretary, Irrigation & Water Resources Department, Lucknow
2.		Engineer-in-Chief, Irrigation & Water Resources Department, Lucknow
		Chief Engineer, Bansagar Canal Project, Prayagraj
3.		Chief Engineer, Betwa, Jhansi
4.		Chief Engineer, Pariyojna Betwa, Jhansi
5.		Superintending Engineer, Bansagar Circle-2, Mirzapur
6.		Superintending Engineer, Irrigation Construction Circle Mahoba
7.		Superintending Engineer, Irrigation work Circle-IV, Jhansi
8.		Superintending Engineer, Tubewell, Jhansi
9.		Executive Engineer, Bansagar Canal Construction Division-1, Prayagraj
10.		Executive Engineer, Bansagar Canal Construction Division-5, Mirzapur
11.		Executive Engineer, Bansagar Canal Construction Division-7, Mirzapur
12.		Executive Engineer, Bansagar Canal Construction Division-8, Mirzapur
13.		Executive Engineer, Bansagar Canal Construction Division-10, Mirzapur
14.		Executive Engineer, Belan Canal Division, Prayagraj
15.		Executive Engineer, Tons Pump Canal Division, Prayagraj
16.		Executive Engineer, Mirzapur Canal Division, Mirzapur
17.		Executive Engineer, Irrigation Division Chunar, Mirzapur
18.		Executive Engineer, Sirsi Dam Division, Mirzapur
19.		Executive Engineer, Tubewell Division-3, Prayagraj
20.		Executive Engineer, Tubewell division, Mirzapur
21.		Executive Engineer, Quality Control Division (Bansagar Canal Project) Prayagraj
22.		Executive Engineer, Irrigation Division, Mahoba
23.		Executive Engineer, Irrigation Construction Division, Mauranipur, Jhansi
24.		Executive Engineer, Maudaha Dam Construction Division-1, Mahoba
25.		Executive Engineer, Maudaha Construction Division, Hamirpur
26.		Executive Engineer, Saprar Division, Jhansi
27.		Executive Engineer Tubewell Division, Hamirpur
28.		Executive Engineer, Participatory Irrigation Management Cell (PIM), Lucknow
29.		Command Area Development Authority, Lucknow
30.		Bhumi Sanrakshan Adhikari, (Land Development & Water Resources Department), Kaushambi
31.		Bhumi Sanrakshan Adhikari, (Land Development & Water Resources Department) Prayagraj
32.		Bhumi Sanrakshan Adhikari (Irrigation & Watershed Management Programme) Mirzapur
33.		Bhumi Sanrakshan Adhikari (Irrigation & Watershed Management Programme) Mahoba
34.		Bhumi Sanrakshan Adhikari, (Land Development & Water Resources

Sl. No.	Name of the department	Name of the office
		Department), Hamirpur
35.	Agriculture Department	Additional Chief Secretary, Agriculture Department, Lucknow
36.		Director, Agriculture Department, Lucknow
37.		Deputy Director, Agriculture along with District Agriculture Officer & Plant Protection Officer, Prayagraj
38.		Deputy Director, Agriculture along with District Agriculture Officer & Plant Protection Officer, Mirzapur
39.		Deputy Director, Agriculture along with District Agriculture Officer & Plant Protection Officer, Mahoba
40.		Deputy Director, Agriculture along with District Agriculture Officer & Plant Protection Officer, Hamirpur
41.		Asst. Director, Soil Testing, Banda
42.		Bhumi Sanrakshan Adhikari, Agriculture (Phoolpur), Prayagraj
43.		Bhumi Sanrakshan Adhikari (Rashtriya Jalagam), Agriculture, Mirzapur
44.		Bhumi Sanrakshan Adhikari (Rashtriya Jalagam), Agriculture, Mahoba
45.		Bhumi Sanrakshan Adhikari, Charkhari, Mahoba
46.		Bhumi Sanrakshan Adhikari, Agriculture Kulpahad, Mahoba
47.		Bhumi Sanrakshan Adhikari, Hamirpur
48.		Bhumi Sanrakshan Adhikari, Agriculture, Rath, Hamirpur
49.	Revenue Department	Chief Revenue Officer, Prayagraj
50.		Chief Revenue Officer, Mirzapur
51.		Chief Revenue Officer, Mahoba
52.		Chief Revenue Officer, Hamirpur
53.		Sub-Divisional Magistrate, Rath Hamirpur
54.		Sub-Divisional Magistrate, Sarila Hamirpur
55.	Ground Water Department	Director, Ground Water, Lucknow
56.		Geophysicist Ground Water Mirzapur
57.		Geophysicist Ground Water, Jhansi
58.		Executive Engineer, Ground Water Division, Prayagraj
59.		Executive Engineer, Ground Water Division Chitrakoot Dham Mandal, Banda
60.	Minor Irrigation Department	Superintending Engineer, Minor Irrigation, Jhansi
61.		Executive Engineer, Minor Irrigation Division, Prayagraj
62.		Executive Engineer, Minor Irrigation Division, Mirzapur
63.		Executive Engineer, Minor Irrigation Division, Mahoba
64.		Executive Engineer, Minor Irrigation Division, Hamirpur
65.	Department of Horticulture and Food processing	District Horticulture Officer, Mirzapur
66.		District Horticulture Officer, Mahoba
67.		District Horticulture, Officer, Hamirpur

Appendix-2.1
Details of cost variations
(Reference: Paragraph no. 2.2.1)

Sub-Head	Year in which project revised	Previous cost	Revised Cost	Variation (+) or (-)	Variation due to				Remarks
					Price escalation	Inadequate provision	Change in design	Additional requirements	
1	2	3	4	5	6	7	8	9	10
A-Preliminary	2003	95.38	830.64	735.26	186.87	548.39	0	0	Due to chance in price and detailed investigation
	2010	1,153.58	1,790.82	637.24	197.32	439.92	0	0	-
	2017	1,790.82	1,802.91	12.09	12.09	0	0	0	Provision has been made as per requirement. Due to rise in price index cost of work increased
B-Land	2003	133.91	753.68	619.77	249.22	370.55	0	0	Quantity increased from 135 ha to 200.70 ha. and rise in price
	2010	736.85	839.95	103.1	103.1	0	0	0	-
	2017	839.95	1731.1	891.15	891.15	0	0	0	Due to change in land acquisition act, rate of land increased abruptly
C-Works	2003	855.75	2,121.59	1,265.84	1,265.84	0	0	0	Originally C-Works consisted raising Baraudha Pickup weir, head sluices at Adwa Dam, Meja Dam and Jirgo Dam. Adwa Barrage has not been proposed.
	2010	4,001.16	8,071.55	4,070.39	1,536.5	219.5	2,314.39	0	Provision has been made as per design.
	2017	8,071.55	1,0840.04	2,768.49	2,768.49	0	0	0	Provision has been made as per design but due to insufficient flow of budget works could not completed timely and remains incomplete. Due to rise in price index cost of work increased.
D-Regulator	2003	137.94	491.2	353.26	231.77	138.28	0	0	Escape increased from two to three
	2010	655.31	1269.15	613.84	189.16	0	235.52	189.16	18 nos. regulator is provided in place of 15 Nos.
	2017	1,269.15	2,884.68	1,615.53	1,615.53	0	0	0	Due to insufficient flow of budget works could not completed timely and remains incomplete. Due to rise in price index cost of work increased.
E-Fall	2003	380.99	233.72	-147.27	0	0	0	0	No change
	2010	1,544.29	1,907.34	363.05	80.43	0	0	282.62	32 Nos. fall is provided as per

Sub-Head	Year in which project revised	Previous cost	Revised Cost	Variation (+) or (-)	Variation due to				Remarks
					Price escalation	Inadequate provision	Change in design	Additional requirements	
1	2	3	4	5	6	7	8	9	10
									requirement of side condition in place of 29 Nos.
	2017	1,907.34	3,022.84	1,115.5	1,115.5	0	0	0	Due to insufficient flow of budget works could not completed timely and remains incomplete. Due to rise in price index cost of work increased.
F-Cross Drainage work	2003	418.76	7,930.64	7,511.88	644.63	6,867.23	0	0	Drainage crossing increased from 61 to 136
	2010	33,637.92	61,687.63	28,049.71	9,898.75	6,128.74	5,896.31	6,125.91	300 Nos. Cross Drainage is provided in place of 216 Nos.
	2017	61,687.63	66,467.32	4,779.69	4,779.69	0	0	0	Due to insufficient flow of budget works could not completed timely and remains incomplete. Due to rise in price index cost of work increased.
G-Bridges	2003	102.01	1,023.31	921.3	430.74	290.34	200.22	0	Bridges increased from 36 to 47.
	2010	3,338.92	7,319.23	3,980.31	1,585.15	1,028.60	0	1,366.56	245 Nos. bridges is provided in place of 192 Nos.
	2017	7,319.23	10,547.20	3,227.97	3,227.97	0	0	0	Due to insufficient flow of budget works could not completed timely and remains incomplete. Due to rise in price index cost of work increased.
H-Escape	2003	237.96	354.62	116.66	116.66	0	0	0	Escape length reduced from Km 6.00 to Km 4.69
	2010	2,194.11	5,115.10	2,920.99	1,033.61	147.66	0	1,739.72	29 Nos. Escape is provided in place of 24 Nos.
	2017	5,115.10	7,158.66	2,043.56	2,043.56	0	0	0	Due to insufficient flow of budget works could not completed timely and remains incomplete. Due to rise in price index cost of work increased.
K-Building	2003	55.14	154.59	99.45	82.71	16.74	0	0	Originally 62 no. buildings were proposed, now no. of buildings has been increased to 74 no. due to increase of works and requirement.

Sub-Head	Year in which project revised	Previous cost	Revised Cost	Variation (+) or (-)	Variation due to				Remarks
					Price escalation	Inadequate provision	Change in design	Additional requirements	
1	2	3	4	5	6	7	8	9	10
	2010	2,361.98	2,589.5	227.52	68.26	159.26	0	0	Buildings have been taken as per CWC guideline.
	2017	2589.5	2639.66	50.16	0	0	50.16	0	Buildings have been taken as per CWC guideline.
L-(i) Earth work	2003	6,302.53	15,660.12	9,357.59	8,531.48	330.44	495.67	0	Quantity of work increased from 99.11 lac cum to 174.55 lac cum.
	2010	41,499.32	59,522.84	18,023.52	3,674.26	0	10,761.95	3,587.31	Due to change in depth of MJLC and increase in width of left bank from 3.85 M to 6.00 M
	2017	59,522.84	55,249.53	-4,273.31	0	0	0	0	Provision has been made as per requirement
L-(ii) Lining	2003	4,040.71	15,140.98	11,100.27	7,584.13	2,221.11	1,295.09	0	Due to change in design and quantity of CC lining.
	2010	32,462.58	55,233.88	22,771.3	8,106.34	1,926.44	11,580.48	1,158.04	Mainly cost has increased due to provision of R.C.C. lining and price rise. At the same time the length of slope stabilization is 17.0 KM.
	2017	55,233.88	80,419.57	25,185.69	0	0	25,185.69	0	Mainly cost has increased due to provision of R.C.C. lining and structural Lining & Trough Work.
L-(iii) Service Road	2003	243.28	348.43	105.15	109.42	65.42	0	0	Service road increased from Km. 18.50 to Km 30.60.
	2010	2,713.29	4,927.19	2,213.9	727.45	1,274.10	0	212.35	190.498 Km. painted road is provided in place of 130.963 Km.
	2017	4,927.19	727.36	-4,199.83	0	0	0	0	Provision has been made as per requirement
L-(iv) Tunnel	2003	393	2,120.63	1,727.63	589.5	569.06	569.07	0	Due to change in design.
	2010	2,643.17	3,710.25	1,067.08	373.48	53.35	0	640.25	As indicated due to price rise and inadequate design.
	2017	3,710.25	5,174.05	1,463.8	0	1,463.8	0	0	As indicated due to price rise and inadequate design. But due to insufficient flow of budget works could not completed timely and remains

Sub-Head	Year in which project revised	Previous cost	Revised Cost	Variation (+) or (-)	Variation due to				Remarks
					Price escalation	Inadequate provision	Change in design	Additional requirements	
1	2	3	4	5	6	7	8	9	10
									incomplete. Due to rise in price index cost of work increased.
M-Plantation	2003	50.7	104.04	53.34	41.99	11.35	0	0	As per latest norms of CWC and interest towards environments.
	2010	239.91	461.33	221.42	39.86	181.56	0	0	Provision has been made as per requirement.
	2017	461.33	269.24	-192.09	0				Provision has been made as per requirement
O-Miscellaneous	2003	328.15	1,589.87	1,261.72	426.57	835.16	0	0	Taken as per latest guidelines of CWC.
	2010	2,479.24	3,855.12	1,375.88	277.36	1,098.52	0	0	Provision has been made as per norms of C.W.C.
	2017	3,855.12	3,481.94	-373.18	0	0	0	0	Provision has been made as per requirement
P-Maintenance	2003	9.63	21.76	12.13	12.13	0	0	0	Taken as per latest guidelines of CWC.
	2010	1,323.69	1,328.45	4.76	4.76	0	0	0	Provision has been made as per norms of C.W.C.
	2017	1,328.45	1,669.38	340.93	340.93	0	0	0	Provision has been made as per norms of C.W.C. Due to rise in price index cost of work increased.
Q-Special T&P	2003	22.42	11.1	-11.32	0	0	0	0	As per latest sanction of CWC. New equipment's need not be purchased.
	2010	169.12	169.12	0	0	0	0	0	Previously old equipment laying in the department were considered to be used which have new achieved their hours so some new equipment have been proposed.
	2017	169.12	169.12	0	0	0	0	0	-
R-Communication	2003	72.5	254.01	181.51	108.75	7.96	64.8	0	Three nos. of helipads have been added in addition to diversion of National highway and as per latest norms of CWC.
	2010	433.75	1,791.71	1,357.96	412.94	134.99	0	810.03	10.213 Km. construction are painted road in place of 2.528 Km.
	2017	1791.71	809.14	-982.57	0	0	0	0	Provision has been

Sub-Head	Year in which project revised	Previous cost	Revised Cost	Variation (+) or (-)	Variation due to				Remarks
					Price escalation	Inadequate provision	Change in design	Additional requirements	
1	2	3	4	5	6	7	8	9	10
									made as per requirement
U-Dys and Minors	2003	0	0	0	0	0	0	0	-
	2010	2,427.73	3,293.00	865.27	173.05	346.11	346.11	0	Provision has been made as per design.
	2017	3293	9,578.34	6,285.34	0	6285.34	0	0	Provision has been made as per requirement. Due to rise in price index cost of work increased
V-Water courses	2003	0	0	0	0	0	0	0	-
	2010	800.72	1,199.71	398.99	71.82	327.17	0	0	Due to price rise and inadequate provision.
	2017	1,199.71	1,737.10	537.39	0	537.39	0	0	Provision has been made as per requirement. Due to rise in price index cost of work increased
X- Environment & Ecology	2003	17.1	50.43	33.33	25.65	7.68	0	0	As per latest norms of CWC
	2010	10,081.60	12,187.75	2,106.15	118.93	541.79	0	1,445.43	Provision has been made as per recommendation of I.B.W.L. of Govt. of India.
	2017	12,187.00	11,161.46	-1,025.54	0	0	0	0	Provision has been made as per requirement
Y- Losses on Stock	2003	2.41	5.44	3.03	3.03	0	0	0	As per norms
	2010	330.93	208.55	-122.38	0	0	0	0	-
	2017	208.55	676.13	467.58	467.58	0	0	0	Provision has been made as per requirement. Due to rise in price index cost of work increased
Total	**2003**	**13,758.78**	**49,072.70**	**35,313.92**	**20,641.09**	**12,279.71**	**2,624.85**	**0**	-
	2010	**1,47,229.17**	**2,38,479.17**	**91,250.00**	**28,672.53**	**14,007.71**	**31,134.76**	**17,557.38**	
	2017	**2,38,478.42**	**2,78,216.77**	**39,738.35**	**17,262.49**	**8,286.53**	**25,235.85**	**0**	

Appendix-2.2

Variation in quantities executed over and above the quantities approved in the DPR (revised in 2011-12) of Lahchura Dam Project

(Reference: Paragraph no. 2.3.1)

Item of Work	C-Civil Work	Arjun Feeder Canal Head Regulator	Dhasan Head Regulator	Afflux Bund	Construction of Link Channel	Total Qty. as per last revised DPR-2011-12	Qty. Executed Up-to-date	Qty. Executed Excess Over Last Revised DPR (2011-12)	Qty.	Rate	Amount (₹)
Site Clearance	69000	0	0	0	0	69000	87033.5	**18033.5**	18033.5	162	2921430.24
										Total	**2921430.24**
RCC 1:1:2	50360	0	0	0	0	50360	56853.8	**6493.76**	4206.9	4024.3	16929827.67
									2286.86	3656.3	8361446.22
										Total	**25291273.89**
1:2:4 in wearing coat	360	0	0	0	0	360	7357.4	**6997.4**	1056.17	2458.2	2596277.09
									2154.82	2859.7	6162138.75
									132.54	3152.4	417819.1
									1230.29	3327.8	4094159.06
									2163.03	3447.5	7457045.93
									260.55	3804	991132.2
										Total	**21718572.13**
Earth Work in Embankment	4.72	0	0	209550	0	209555	1422181	**1212626**	103799	230.6	23936093.21
									49165.1	169.8	8348240.77
									290266	209.4	60781595.7
									129249	216.3	27956645.22
									219374	221.9	48679157.17
									157401	252.8	39791073.92
									249535	243.1	60661958.5
									13836	265	3666540
										Total	**273821304.5**
										Grand Total	**323752580.8**
											Or say ₹ 32.38 crore

(Source: DPR and final bill)

Appendix-2.3

Appurtenant works of Lahchura Dam project executed at higher rates

(Reference: Paragraph no. 2.3.1)

Item of work	Rates as per estimate of Modernisation of Lahchura Dam (₹)	Rates as per execution of appurtenant works (₹)	Difference in rates (₹)	Quantity executed for appurtenant works	Avoidable payment to contractor for appurtenant works (₹)
Earth work in common excavation	203.60	226.30	22.70	108915 cum	2472370.50
Drilling 75 mm dia hole	751.00	1,688.00	937.00	210 RM	196770.00
C.C. 1:2:4	3,732.90	3,967.25	234.35	6303.30 cum	1477178.36
Back filling	221.90	277.60	55.70	235368.40 cum	13110017.65
				Total	**1,72,56,336.51**
					Or say ₹ 1.73 crore

(Source: DPR and final bill)

Appendix-3.1

Year-wise allotment and expenditure thereagainst under BCP

(Reference: Paragraph no. 3.2.1.1)

(₹ in lakh)

Year	Provision	Allotment	Release	Expenditure
1996-97	10,014.26	10,909.39	10,909.39	10,909.39
1997-98	6,024.00	6,024.00	6,024.00	6,024.00
1998-99	4,420.00	4,420.00	4,420.00	4,420.00
1999-2000	3,072.00	3,072.00	3,072.00	3,072.00
2000-2001	6,870.72	6,870.72	6,870.72	6,870.72
2001-2002	5,260.37	5,260.37	5,260.37	5,260.37
2002-2003	5,262.98	5,262.98	5,262.98	5,262.98
2003-2004	6,009.87	6,009.87	6,009.87	6,009.87
2004-2005	5,321.15	5,321.15	5,321.15	5,321.15
2005-2006	16,057.22	16,057.22	16,057.22	16,057.22
2006-2007	24,634.98	24,634.98	24,634.98	24,634.98
2007-2008	27,605.64	27,605.64	27,605.64	27,605.64
2008-2009	36,836.20	36,836.20	36,836.20	36,836.20
2009-2010	24,006.75	24,006.75	24,006.75	24,006.75
2010-2011	44,060.00	11,040.00	11,040.00	11,040.00
2011-2012	27,500.00	27,500.00	27,500.00	27,500.00
2012-2013	13,742.25	13,742.25	13,742.25	13,742.25
2013-2014	25,000.00	13,400.00	13,400.00	13,400.00
2014-2015	24,800.00	16,519.00	16,519.00	16,519.00
2015-2016	20,000.00	11,000.00	11,000.00	11,000.00
2016-2017	30,000.00	19,700.00	19,700.00	19,700.00
2017-2018	30,000.00	19,698.48	19,698.48	19,698.48
2018-2019	12,200.00	18,200.00	18,200.00	18,076.00
2019-2020	12,200.00	5,050.00	5,050.00	5,050.00
2020-2021	9,057.00	3,920.00	3,920.00	3,920.00
Total		**3,42,061.00**	**3,42,061.00**	**3,41,937.00**
		or say	**₹ 3,420.61 crore**	**₹ 3,419.37 crore**

(Source: Information collected from CE, BCP, Prayagraj)

Appendix-3.2

Details of additional quantities/new item of works included in the new Bill of Quantity in BCP

(Reference: Paragraph no. 3.3.1)

(₹ in crore)

Sl. No.	Old agreement no.	BoQ in new agreement	Total no. of items	Extra value of work awarded	Total no. of items more than 10 *per cent*	In *per cent*
1.	05/SE/2006-07	11000/BS/02/LNG	18	2.92	10	14 to 539
2.	46/SE/2007-08	46200/MJ/05/AQD	18	0.28	09	17 to 150
3.	47/SE/2007-08	67800/MJ/05/AQD	14	0.15	08	11 to 100
4.	54/SE/2007-08	44800/MJ/05/DRX	18	0.05	06	20 to 116
5.	09/SE/2008-09	54530/MJ/11/DRX	02	0.19	02	61 to 196
6.	15/SE/2008-09	55175/MJ/11/DRX	06	0.93	06	14 to 188
7.	02/SE/2009-10	59018/MJ/11/DRX	08	0.76	08	26 to 838 & 5712
Total				**5.28**		

(Source: Information collected from divisions)

Appendix-3.3

Non-forfeiture of security deposit in rescinded contracts in BCP

(Reference: Paragraph no. 3.3.1.1)

(₹ in lakh)

Sl. No.	New BoQ No.	New BoQ Cost	Details of old agreement							
			Old BoQ no.	Old BoQ Cost	Scheduled date of start	Scheduled date of completion	Date of resigning the agreement	Security Deposit details		
								Security deposited by the contractor	Security forfeited by the Dept.	Security released by the Dept.
1.	44800/MJ/05/SPG	58.15	54/SE/ 07-08	75.50	25.02.2008	24.02.2009	12.07.2012	7.6	NA	NA
2.	42800/MJ/05/DRX	481.53	01/SE/ 08-09	302.60	19.04.2008	18.04.2009	12.07.2012	30.6	NA	NA
3.	43200/MJ/05/DRX	160.56	02/SE/ 08-09	90.53	15.09.2008	14.09.2009	12.07.2012	9.05	NA	9.05
4.	47200/MJ/05/PRB	239.27	03/SE/ 08-09	172.46	15.09.2008	14.09.2009	12.07.2012	11	NA	11.00
5.	54530/MJ/11/DRX	87.04	09/SE/ 2008-09	43.74	02.03.2009	01-03-2010	06-11-2012	6.00	Nil	Nil
6.	55175/MJ/11/DRX	242.13	15/SE/ 2008-09	97.95	02.03.2009	01-03-2010	06-11-2012	7.00	Nil	Nil
7.	59018/MJ/11/DRX	139.45	02/SE-2009-10	95.20	10.06.2009	09-06-2010	06-11-2012	6.80	Nil	Nil
8.	64400/MJ/11/DRX	104.82	03/SE/ 2009-10	57.33	20.06.2009	19-06-2010	06-11-2012	4.87	Nil	Nil
9.	11000/BS/02/LNG	--	06/SE/ 06-07	516.95	01.10.2006	30.09.2007	20.04.2013	51.70	NA	NA
10.	NA	--	15/SE/ 08-09	83.11	28.02.2009	27.08.2009	02.05.2013	32.91	NA	NA
11.	NA	--	12/SE/ 08-09	94.81	28.02.2009	27.06.2009	02.05.2013	6.75	NA	NA
Total								**174.28**		

(Source: Information collected from divisions) (NA-Not Made Available)

Appendix-3.4

Irregular grant of secured advance paid to RPPL

(Reference: Paragraph no. 3.4.4)

(in ₹)

Sl. No.	Name of work	Amount of secured advance	Voucher no. and date of secured advance paid	Amount of secured advance recovered
EE, BCCD-5, Mirzapur				
1	Construction of lining from Km. 64.600 to Km. 71.130 of MJLC	63,27,766.00	135/28.02.2015	63,27,766.00
2	Construction of lining from Km. 00.000 to Km. 14.500 of AMLC	3,53,39,718.00	01/02.07.2013	3,53,39,718.00
3	Construction of Lining from Km 11.000 to Km 23.675 of BSFC	1,43,37,587.25	07/22.12.2014	1,43,37,587.25
4	Construction of Lining from Km 11.000 to Km 23.675 of BSFC	1,51,97,026.95	01/03.10.2015	1,51,97,026.95
	Total	**7,12,02,098.25**		
EE, BCCD-7, Mirzapur				
5	Construction of aqueduct at Km. 67.800 MJLC	3,73,900.00	05/26.06.2015	3,73,900.00
6	Construction of canal X-ing at Km. 68.180 of MJLC	1,51,034.00	NA	1,51,034.00
7	Lining of MJLC from Km 19.500 to Km 26.500	24,30,000.00	63/28.02.2015	24,30,000.00
8	Lining of MJLC from Km 19.500 to Km 26.500	48,69,742.00	62/30.03.2015	48,69,742.00
9	Lining of BSFC from Km. 39.950 to Km. 44.915	1,12,52,394.00	22/30.03.2015	112,52,394.00
10	Construction of lining from Km. 5.765 to Km. 9.330 of MJLC	16,71,307.00	59/31.03.2015	16,71,307.00
11	Construction of lining from Km. 2.215 to Km. 5.765 of MJLC	57,16,505.00	110/31.03.2015	57,16,505.00
	Total	**2,64,64,882.00**		
EE, BCCD-8, Mirzapur				
12	RCC lining from Km. 1.475 to Km. 2.655 of Meja Kota (MK) Dy.	52,00,000.00	12/28.12.2017	52,00,000.00
13	RCC lining from Km. 0.000 to Km. 3.577 of Meja Kota Feeder Channel (MKFC)	21,00,000.00	30/03.02.2018	21,00,000.00
14	Construction of VRB at Km. 70.095 of MJLC	32,50,000.00	530/31.03.2017	32,50,000.00
15	Construction of escape and escape channel at Km. 9.950 of MJLC	38,50,000.00	57/28.02.2015	38,50,000.00
16		58,00,000.00	528/31.03.2017	58,00,000.00
17	RCC lining from Km. 55.600 to Km. 64.600 of MJLC	1,50,00,000.00	234/31.03.2015	1,50,00,000.00
18	RCC lining between Km. 9.330 to Km. 13.008 of MJLC	92,00,000.00	45/25.02.2015	92,00,000.00
19	RCC lining from Km. 13.000 to Km. 19.500 of MJLC	35,00,000.00	156/23.02.2016	35,00,000.00
20	RCC lining between Km. 10.400 to Km. 11.000 of MJLC	72,00,000.00	46/25.02.2015	72,00,000.00
	Total	**5,51,00,000.00**		
	Grand Total	**15,27,66,980.25 Say ₹ 15.28 crore**		

(Source: Data collected from divisions)

Appendix 3.5

Details showing variations in quantities in BCP

(Reference: Paragraph no. 3.5)

(₹in)

Sl. No.	Name of work	Estimated cost	Agreement Cost	Work Done Amount	Variation	Extra Item	Variation + extra item	Total variation in Percent	Total no. of BOQ
1	28065 MJ/07/SPG	162.4	165.78	1610.71	1448.31	0	1448.31	892	
2	45845/MJ/05/CLX	13.12	13.11	71.15	58.03	10.19	68.22	520	
3	25025 AM/02/AQD	229.58	229.68	1117.37	887.79	209.78	1097.57	478	
4	19000 AM/02/LNG	2,090.67	2,027.93	2027.93	-62.74	7171.82	7109.08	340	
5	11000BS/02/LNG	3,142.91	3,418.96	4586.8	1443.89	3402.87	4846.76	154	
6	01445 MK/06/GLX	16.64	17.15	40.16	23.52	0	23.52	141	12
7	51200/MJ/10/FAL	26.25	27.93	24.79	-1.46	37.78	36.32	138	
8	00000MJ/05/LNG	140.64	133.4	60.39	-80.25	262.89	182.64	130	
9	52715/BS/05/LNG	253.51	261.79	560.55	307.04	0	307.04	121	
10	47585/MJ/05/GLX	13.67	13.88	29.64	15.97	0	15.97	117	
11	42940/MJ/05/VRB	136.16	142.05	288.32	152.16	0	152.16	112	
12	47340/MJ/05/CLX	159.68	158.04	325.17	165.49	4.06	169.55	106	
13	13025 /MJ/08/EWK	172.19	171.29	341.5	169.31	0	169.31	98	
14	59915BS/08/LNG	523.07	593.13	591.43	68.36	406.99	475.35	91	
15	25600 AM/02/TFL	1649.6	1,665.34	3021.53	1371.93	6.24	1378.17	84	
16	64600/MJ/05/LNG	614.1	592.88	667.46	53.36	457.91	511.27	83	
17	16700 AM/04/LNG	761.05	755.11	755.11	-5.94	635.18	629.24	83	
18	10400BS/01/LNG	237.64	218.92	244.99	7.35	184.82	192.17	81	
19	00000 MK/06/LNG	907.01	910.27	1199.17	292.16	389.94	682.1	75	12
20	38320/MJ/05/VRB	35.1	34.85	57.03	21.93	2.17	24.1	69	
21	09950MJ/01/ESC	485.42	486.41	808.62	323.2	1.17	324.37	67	
22	68000/MJ/05/EWK	279.44	280	417.9	138.46	29.87	168.33	60	
23	36105/MJ/05/LNG	749.84	733.57	993.29	243.45	167.95	411.4	55	
24	59018 MJ/11/DRX	138.56	139.44	165.6	27.04	42.34	69.38	50	
25	00300 MK/06/GLX	19.35	19.83	27.36	8.01	1.09	9.1	47	
26	40905/MJ/05/VRB	63.85	62.8	91.56	27.71	1.81	29.52	46	
27	42000/MJ/05/EWK	1,208.04	1,221.78	1759.27	551.23	0	551.23	46	
28	39950 BS/07/LNG	1,646.67	1,775.63	1948.15	301.48	408.12	709.6	43	
29	00150 MK/06/GLX	20.22	21.06	27.57	7.35	1.31	8.66	43	19
30	10540MJ/01/EWK	20.84	20.8	28.27	7.43	0	7.43	36	
31	29930 MJ/07/VRB	66.79	67.42	83.76	16.97	0.55	17.52	26	
32	32060 MJ/07/AQD	302.97	323.47	312.93	9.96	61.99	71.95	24	
33,	14470/MJ/08/GLX,	25.2	27.81	31.15	5.95	0	5.95	24	

34, 35	16350/MJ/08/GLX, 16149/MJ/08/GLX								
36	43200/MJ/05/DRX	163.56	160.56	201.82	38.26	0	38.26	23	
37	00000/MJ/05/HRG	347.43	358.12	280.46	-66.974627	141.23	74.255373	21	
38	44915 BS/06/LNG	1,023.98	1,111.86	1203.38	179.4	39.36	218.76	21	
39	44605/MJ/05/VRB	112.21	111.57	135.94	23.73	0	23.73	21	
40	47200/MJ/05/PRB	244.78	239.27	276.58	31.8	18.58	50.38	21	
41	65280/MJ/05/VRB	65.24	65.12	71.47	6.23	5.2	11.43	18	
42	00000 AM/03/LNG	3,184.88	3,158.72	3432.39	247.51	230.66	478.17	15	
43	69000/MJ/05/DRX	48.7	47.2	54.06	5.36	0	5.36	11	
Total		**21,502.96**	**21,983.93**	**29,972.73**	**8469.765**	**14333.87**	**22803.64**	**892 to 11**	**43**
					Say	**Say**	**Say**		
					₹ 84.70	**143.3**	**228**		

Appendix 3.6

Details of variations in quantities in appurtenant works of Lahchura Dam project

(Reference: Paragraph no. 3.5)

Item No. of BOQ of Contract Bond	Name of Item	Unit	Bonded Qty.	Executed Qty.	Rate	Difference in Qty.	Amount (₹)	% Variation
1	Earth work in common excavation in all type strata excluding hard rock & granite rock including disposal all lead and lift & T & P etc. for proper completion of job.	Cum	48461	108915	226.30	60454	1,36,80,740.20	125
2	Anchoring above 25 mm dia steel bar in 100 mm/75 mm dia holes with 1:2 cement and grout assuming cement consumption of 13.75 bags/cum including washing of holes with water jet, cutting grouting and fixing steel bar including cost of all material, labour and T&P.	Mt	1	1.26	60021.00	0.26	15,605.46	26
3	Drilling 75 mm/100 mm dia holes including cost of all material, labour and T&P.	Rm	113	210	1688.00	97	1,63,736.00	86
6	Earth work in common filling in embankment including mechanical compaction & dressing & watching with weighted average land 2.00 km & all lift for proper compaction of job excavation in all type strata excluding hard rock & granite rock including disposal all lead and lift & T & P etc. for proper completion of job.	Cum	156161	235368	277.60	79207.36	2,19,87,963.14	51
40	Earth work in cutting filling/ levelling in Mar, Kabar rankar and kankar mixed soil lead upto 195 mm and initial lift including cost of all material, labour and T&P.	Cum	31083	43570	120.80	12487.03	15,08,433.224	40
						Total	**3,73,56,478.02**	
						or say ₹ 3.74 crore		

(Source: Information collected from divisions)

Appendix 3.7

Details showing variation in quantities in the work of Adwa Barrage in BCP

(Reference: Paragraph no. 3.5)

Variation in value of work (in *per cent*)	**Increase in payment for minus variation** (in *per cent*)	**Decrease in payent for plus variation** (in *per cent*)
Above 20 upto 25	2.50	1.25
Above 25 upto 30	5.00	2.50
Above 30 upto 35	6.25	3.13
Above 35 upto 60	8.00	4.00
Above 60 upto 100	10.00	5.00

(Source: Information collected from divisions)

Appendix 3.8 (A)

Details of year-wise testing of samples

(Reference: Paragraph no. 3.7)

Year	Types of test	Total number of samples tested	No. of failed sample
2013-14	Cube test	1283	174
	Sieve test	78	11
	Soil test	15	0
2014-15	Cube test	852	97
	Sieve test	35	5
	Cement test	2	0
	Soil test	6	0
2015-16	Cube test	420	9
	Sieve test	26	0
2016-17	Cube test	387	33
	Soil test	12	0
	Brick test	4	2
	Sieve test	14	0
2017-18	Cube test	1697	21
	Cement test	1	0
	Soil test	18	0
	Sieve test	23	12
2018-19	Cube test	804	3
	Sieve test	23	0
	Soil test	11	0
	Cement test	2	0
	Brick test	2	2
2019-20	Cube test	160	0
	Sieve test	3	0
Total	**Cube test**	**5603**	**337**
	Sieve test	**202**	**28**
	Cement test	**05**	**00**
	Soil test	**62**	**00**
	Brick test	**06**	**04**

(Source: Data collected from EE,QCD, Prayagraj)

Appendix 3.8 (B)

Details of Cube test conducted by Quality Control Division, BCP

(Reference: Paragraph no. 3.7)

Sl. No	Name of work	Quantity of concrete work (M^3)	No. of samples to be taken as per norm	No. samples taken & tested	Short fall	Short fall in *per cent*
1	Lining of AMLC from Km 0.000 to 14.500	214130.653	4285	60	4225	98.6
2	CC lining from Km 5.765 to 9.330 of MJLC	52945.795	1062	30	1032	97.18
3	Lining of BSFC from Km 11.000 to 23.675	162631.46	3255	103	3152	96.84
4	Lining between Km 27.898 to 28.790 &lining between Km 28.790 to 29.150 of B.S.F.C.	12215.98	247	9	238	96.36
5	CC lining from Km 39.950 to 42.450 of BSFC	78994.257	1582	63	1519	96.02
6	CC lining from Km 19.000 to 25.600 of AMLC	149175.51	2986	120	2866	95.98
7	CC lining from Km 9.330 to 13.008 of MJLC	53680.198	1076	48	1028	95.54
8	Construction of barrel Aqueduct at Km 25.025 of AMLC	9225.516	187	12	175	93.58
9	CC lining from Km 48.230 to 55.555 of MJLC	40943	821	57	764	93.06
10	Construction of remaining lining of BSFC from Km 44.915 to 46.415 & from Km 46.915 to 52.715	67133	1345	113	1232	91.6
11	CC lining from Km 2.215 to 5.765 of MJLC	18157.309	366	33	333	90.98
12	CC lining from Km 19.500 to 26.500 of MJLC	15676.44	316	30	286	90.51
13	R/slope Adwa Meja link channel from Km.16.700 to 19.000	59089.87	1184	120	1064	89.86
14	Construction of head regulator at Km 0.000 of MJLC	5638.999	115	21	94	81.74
15	Lining work of Meja Kota Feeder Channel Km 0.00 to 3.577	48405.054	971	243	728	74.97
16	Construction of Drainage Crossing at Km. 59.018 of M.J.L.C.	1554.53	34	9	25	73.53
17	Construction of Adwa Barrage	65865.73	1320	351	969	73.41
18	Lining of MJLC between Km 26.500 to 36.000 and construction of super passage at Km 35.845	21731.96	437	119	318	72.77
19	Construction of fall at Km 25.600 of AMLC	23872.61	480	180	300	62.5
20	Construction of wild animal Xing at Km 24.600 of AMLC	882.25	20	9	11	55
21	Construction of DRB at Km 25.340 of AMLC	539.31	13	6	7	53.85
22	Construction of Drainage Crossing at Km. 44.800 of M.J.L.C.	416.65	11	6	5	45.45
23	Construction of escape work at Km 9.950 of MJLC	8240.678	167	96	71	42.51
24	Construction of D Xing at Km 45.845 of MJLC	895.46	20	12	8	40

(Source: Data collected from EE, QCD, Prayagraj)

Appendix-3.9

Requirement of fund for operation and maintenance of canals

(Reference: Paragraph no. 3.8)

Sl. No.	Name of Canal System	Category of canal	Total PPA (in ha.)	Requirement of fund as per norm (₹ in lakh)
	Bansagar Canal Project, Uttar Pradesh			
1	Belan Canal System	Main	45925	449.51
		Branch		
		Dy.		
		Minor	49387	448.85
2	Lower Khajuri Canal System	Main	1060	10.38
		Branch		
		Dy.		
		Minor	1450	13.18
3	Baraudha Dy. Command	Main	10006	97.94
		Branch		
		Dy.		
		Minor	10107	91.86
4	Adwa Sukhara Canal System	Main	7259	71.05
		Branch		
		Dy.		
		Minor	8512	77.36
5	Harrai Canal System	Main	965	9.45
		Branch		
		Dy.		
		Minor	620	6.07
6	Jirgo Canal System	Main	2846	27.86
		Branch		
		Dy.		
		Minor	10098	91.78
7	Garai Canal System	Main	6552	64.13
		Branch		
		Dy.		
		Minor	10043	91.28
8	Tons Pump Canal System	Main	18339	179.50
		Branch		
9	Yamuna Pump Canal System	Dy.		
		Minor	29730	270.20
			Total	**2000.39**
1	Dhasan Canal System	Main	17655	172.81
		Branch		
		Dy.		
		Minor	17034	154.81
			Total	**327.62**

(Source :- Data collected form divisions)

Appendix-3.10

Status of operation and maintenance of selected canals

(Reference: Paragraph no. 3.8)

(₹In lakh)

Sl. No.	Name of canal system	Name of selected canals	Category of canals	Total length of canals (In Kms)	Total CCA of the canals (In Ha.)	Total PPA of the canals (In Ha.)	Yearly requirement of fund for O&M as per norm	Status of operation and maintenance of selected canals													
								2014-15		2015-16		2016-17		2017-18		2018-19		2019-20		2020-21	
								Length of canals	Expenditure	Length of canals	Expenditure	Length of canals	Expenditure	Length of canals	Expenditure	Length of canals	Expenditure	Length of canals	Expenditure	Length of canals	Expenditure
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	Belan Canal System	Umri	Minor	2.200	405	476	4.33	0.000	0.00	0.000	0.00	0.345	3.86	NA	0.36	0.090	2.14	2.200	0.91	2.200	0.44
2		Badhwari	Minor	2.600	162	272	2.47	NA	0.17	NA	0.16	NA	0.36	NA	0.57	NA	0.33	3.200	1.25	2.600	0.50
3		Sipaua	Minor	3.700	225	264	2.40	0.000	0.00	NA	0.17	NA	0.13	NA	0.16	NA	0.16	3.590	0.95	3.700	0.77
4		Mahuli	Minor	1.300	122	206	1.87	NA	0.18	0.000	0.00	NA	0.16	NA	0.18	0.000	0.00	2.400	0.63	0.000	0.00
5		Dasauti	Minor	2.100	208	260	2.36	0.000	0.00	0.000	0.00	0.000	0.00	NA	0.17	0.000	0.00	2.100	0.61	2.100	0.20
6		Barethi	Minor	5.100	587	496	4.51	NA	0.18	NA	0.16	5.100	6.85	0.000	0.00	NA	0.14	5.100	1.18	0.000	0.00
7		Garan	Minor	1.600	243	144	1.31	0.000	0.00	0.000	0.00	0.000	0.00	NA	0.17	NA	0.14	1.600	0.52	1.600	0.32
8		Belwania	Minor	22.200	4030	4726	42.95	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
9	Lower Khajuri Canal System	Bharuhana	Minor	1.000	74	55	0.50	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	1.000	0.21	0.000	0.00
10	Dhasan Canal System	Bilgaon	Minor	2.815	500	219	1.99	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	2.800	0.66	0.000	0.00
11		Beera	Minor	6.236	662	292	2.65	0.000	0.00	0.000	0.00	0.000	0.00	4.200	0.77	4.000	1.19	2.000	1.86	0.000	0.00
12		Gugarwara	Minor	1.600	231	104	0.95	0.000	0.00	0.000	0.00	1.000	0.99	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
13		Masoodpura	Minor	1.400	187	95	0.86	1.600	0.35	0.000	0.00	0.000	0.00	1.100	0.37	0.000	0.00	1.400	0.28	1.400	0.49
14		Dhanauri	Minor	2.800	570	230	2.09	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	2.800	0.90	2.800	1.49	0.000	0.00
15		Itailia	Minor	4.260	536	172	1.56	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
16	Harrai Canal System	Veerpur	Minor	5.700	489	392	3.56	0.000	0.00	5.700	1.38	5.700	1.55	0.000	0.00	3.900	1.10	0.000	0.00	0.000	0.00
17	Adwa Sukhra Canal System	Barahula	Minor	3.080	361	288	2.62	3.200	0.68	3.200	0.79	0.000	0.00	3.200	0.83	3.200	0.85	3.200	0.40	0.000	0.00
18		Banwa	Minor	2.500	91	73	0.66	0.000	0.00	2.048	0.51	2.048	0.78	0.000	0.00	2.048	0.51	2.048	0.37	2.048	0.48
19	Baraundha Dy.	Jhingha	Minor	2.011	305	245	2.23	0.000	0.00	2.110	0.51	2.110	0.66	2.100	0.34	2.000	0.55	2.000	0.32	2.000	0.29

Sl. No.	Name of canal system	Name of selected canals	Category of canals	Total length of canals (In Kms)	Total CCA of the canals (In Ha.)	Total PPA of the canals (In Ha.)	Yearly requirement of fund for O&M as per norm	Status of operation and maintenance of selected canals													
								2014-15		2015-16		2016-17		2017-18		2018-19		2019-20		2020-21	
								Length of canals	Expenditure	Length of canals	Expenditure	Length of canals	Expenditure	Length of canals	Expenditure	Length of canals	Expenditure	Length of canals	Expenditure	Length of canals	Expenditure
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
20	Command	Mahular	Minor	2.100	155	125	1.14	0.000	0.00	0.000	0.00	2.200	0.51	2.200	0.31	2.200	0.78	2.200	0.35	2.200	0.44
21	Jirgo Canal System	Gharwaspur	Minor	2.010	241	241	2.19	0.000	0.00	0.000	0.00	0.900	1.75	2.100	4.37	2.100	2.17	2.010	0.41	2.000	0.42
22		Gaurahi	Minor	2.100	174	174	1.58	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	2.100	1.55	0.000	0.00	0.900	1.32
23	Garai Canal System	Chandratali	Minor	3.000	81	81	0.74	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	3.000	2.70	0.000	0.00	0.000	0.00
24		Kakrahi	Minor	1.600	138	138	1.25	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	1.600	0.35
25	Tons Pump Canal System	Siddhtiket	Minor	1.407	206	200	1.82	0.00	0.00	0.00	0	0.00	0	0.00	0	0.00	0	NA	0.49	NA	0.35
26		Garaiya 1	Minor	2.000	194	189	1.72	0.00	0.00	0.00	0	0.00	0	NA	0.69	0.00	0	NA	0.74	0.00	0
27		Bansi	Minor	1.609	156	152	1.38	0.00	0.00	0.00	0	NA	0.2	NA	0.41	NA	2.47	NA	0.71	NA	0.36
28		Lotadh	Minor	3.400	302	24	0.22	NA	0.15	NA	0.12	0.00	0	NA	0.00	NA	1.97	NA	1.24	NA	2.43
29	Yamuna Pump Canal System	Niriya	Minor	4.800	910	1001	9.10	0.00	0	0.00	0	0.00	0	0.00	0.00	0.00	0	NA	1.22	0.00	0

(Source: Data collected from divisions), NA-Not available

Appendix 4.1 (A)

Details showing insufficient release of water in test checked canals of BCP (Kharif)

(Reference: Paragraph no. 4.4.3)

Year	Name of the system	Name of selected Minor	Area Irrigated (Ha)	Water Flow worked out by Audit (Mcft)	Height of water (inch)
2014-15	Jirgo Canal System	Gharwaspur Minor	207	16.38	8.82
	Garai Canal System	Kakrahi Minor	129	13.07	11.29
		Chandratali Minor	121	12.76	11.75
	Lower Khajuri Canal System	Bharuhana Minor	32	2.61	9.09
	Tons Pump Canal System	Sidhtikat Minor	178	17.96	11.25
	Belan Canal System	Umri Minor	220	11.44	5.80
		Badwari Minor	134	16.27	13.54
		Dasauti Minor	169	4.53	2.99
		Barethi Minor	498	30.20	6.76
		Garan Minor	133	12.30	10.31
2015-16	Jirgo Canal System	Gharwaspur Minor	207	16.75	9.02
	Garai Canal System	Kakrahi Minor	128	4.61	4.02
		Chandratali Minor	120	4.50	4.18
	Lower Khajuri Canal System	Bharuhana Minor	29	2.06	7.92
	Tons Pump Canal System	Sidhtikat Minor	178	19.44	12.18
	Belan Canal System	Umri Minor	209	13.73	7.32
		Mahuli Minor	179	14.63	9.11
		Badwari Minor	132	13.95	11.78
		Dasauti Minor	163	5.35	3.66
		Barethi Minor	495	23.42	5.27
		Garan Minor	132	11.62	9.81
2016-17	Jirgo Canal System	Gharwaspur Minor	208	12.28	6.58
	Garai Canal System	Kakrahi Minor	129	3.33	2.88
		Chandratali Minor	122	3.25	2.97
	Lower Khajuri Canal System	Bharuhana Minor	42	3.29	8.75
	Tons Pump Canal System	Sidhtikat Minor	179	17.96	11.18
	Belan Canal System	Umri Minor	210	11.90	6.32
		Badwari Minor	142	11.62	9.13
		Dasauti Minor	172	9.47	6.14
		Barethi Minor	496	30.20	6.79
		Garan Minor	133	12.98	10.88
2017-18	Jirgo Canal System	Gharwaspur Minor	207	18.61	10.02
	Garai Canal System	Kakrahi Minor	129	16.66	14.40
		Chandratali Minor	121	16.26	14.98
	Tons Pump Canal System	Sidhtikat Minor	179	17.96	11.18
	Belan Canal System	Umri Minor	211	19.22	10.16
		Mahuli Minor	184	22.09	13.39
		Badwari Minor	139	10.85	8.70
		Dasauti Minor	172	8.24	5.34
		Barethi Minor	499	40.67	9.09
		Garan Minor	138	12.30	9.94
2018-19	Jirgo Canal System	Gharwaspur Minor	205	13.59	7.39
	Garai Canal System	Kakrahi Minor	129	11.02	9.52
		Chandratali Minor	119	10.76	10.08
	Adwa Sukhra Canal System	Banwa Minor	105	11.31	12.01
	Tons Pump Canal System	Sidhtikat Minor	180	17.96	11.12
	Belan Canal System	Umri Minor	211	16.02	8.46
		Mahuli Minor	185	22.72	13.69

Year	Name of the system	Name of selected Minor	Area Irrigated (Ha)	Water Flow worked out by Audit (Mcft)	Height of water (inch)
		Badwari Minor	137	11.62	9.46
		Dasauti Minor	173	6.18	3.98
		Barethi Minor	496	30.20	6.79
		Garan Minor	138	13.67	11.04
2019-20	Jirgo Canal System	Gharwaspur Minor	220	13.40	6.79
	Garai Canal System	Kakrahi Minor	129	6.41	5.54
		Chandratali Minor	120	6.25	5.81
	Adwa Sukhra Canal System	Banwa Minor	115	10.98	10.65
	Tons Pump Canal System	Sidhtikat Minor	180	17.96	11.12
	Belan Canal System	Umri Minor	218	19.22	9.83
		Mahuli Minor	187	21.78	12.99
		Badwari Minor	137	16.27	13.24
		Dasauti Minor	64	6.18	10.76
		Barethi Minor	481	28.96	6.71
		Garan Minor	137	12.98	10.57
2020-21	Jirgo Canal System	Gharwaspur Minor	218	16.75	8.57
	Garai Canal System	Kakrahi Minor	177	9.99	6.29
		Chandratali Minor	119	9.76	9.14
	Lower Khajuri Canal System	Bharuhana Minor	41	1.37	3.73
	Adwa Sukhra Canal System	Banwa Minor	116	14.61	14.04
	Belan Canal System	Mahuli Minor	188	20.85	12.36
		Dasauti Minor	178	14.41	9.03
		Barethi Minor	363	41.29	12.68
		Garan Minor	138	16.74	13.53

(Source: Data collected from divisions)

Details showing insufficient release of water in test checked canals of BCP, (Rabi)

Year	Name of the system	Name of selected Minor	Actual Irrigation (Ha)	Actual Water Flow (Mcft)	Height of water (inch)
2014-15	Jirgo Canal System	Gharwaspur Minor	214	3.97	2.07
		Gaurahi Minor	168	8.63	5.73
	Garai Canal System	Kakrahi Minor	129	2.05	1.77
		Chandratali Minor	115	2.00	1.94
	Tons Pump Canal System	Sidhtikat Minor	184	17.96	10.88
	Belan Canal System	Umri Minor	238	13.73	6.43
		Sipaua Minor	137	10.03	8.16
		Mahuli Minor	186	17.74	10.63
		Badwari Minor	128	10.85	9.45
		Dasauti Minor	153	3.29	2.40
		Barethi Minor	469	11.09	2.64
		Garan Minor	114	10.93	10.69
2015-16	Jirgo Canal System	Gharwaspur Minor	212	3.97	2.09
		Gaurahi Minor	174	8.63	5.53
	Tons Pump Canal System	Sidhtikat Minor	185	18.12	10.92
	Belan Canal System	Mahuli Minor	185	17.11	10.31
2016-17	Jirgo Canal System	Gharwaspur Minor	212	3.77	1.98

Year	Name of the system	Name of selected Minor	Actual Irrigation (Ha)	Actual Water Flow (Mcft)	Height of water (inch)
		Gaurahi Minor	176	8.20	5.20
	Garai Canal System	Kakrahi Minor	128	5.64	4.91
		Chandratali Minor	110	5.50	5.58
	Lower Khajuri Canal System	Bharuhana Minor	7	0.27	4.37
	Tons Pump Canal System	Sidhtikat Minor	185	20.26	12.21
	Belan Canal System	Umri Minor	231	14.64	7.07
		Sipaua Minor	135	14.21	11.74
		Mahuli Minor	186	18.67	11.19
		Badwari Minor	142	10.07	7.91
		Dasauti Minor	176	7.83	4.96
		Barethi Minor	482	11.71	2.71
		Garan Minor	147	1.07	0.81
2017-18	Jirgo Canal System	Gharwaspur Minor	200	3.77	2.10
		Gaurahi Minor	147	8.20	6.22
	Garai Canal System	Kakrahi Minor	129	2.05	1.77
		Chandratali Minor	105	2.00	2.12
	Tons Pump Canal System	Sidhtikat Minor	184	17.96	10.8
	Belan Canal System	Umri Minor	233	15.56	7.78
		Sipaua Minor	143	8.36	6.52
		Mahuli Minor	187	9.34	5.57
		Badwari Minor	129	9.30	8.04
		Dasauti Minor	170	4.12	2.70
		Barethi Minor	472	12.94	3.06
		Garan Minor	117	1.15	1.10
2018-19	Jirgo Canal System	Gharwaspur Minor	213	4.96	2.59
		Gaurahi Minor	147	10.79	8.18
	Garai Canal System	Kakrahi Minor	129	7.94	6.87
		Chandratali Minor	112	7.76	7.72
	Adwa Sukhra Canal System	Banwa Minor	109	5.82	5.95
		Barhula Minor	256	22.64	9.86
	Tons Pump Canal System	Sidhtikat Minor	185	17.96	10.82
	Belan Canal System	Umri Minor	137	13.73	11.17
		Sipaua Minor	150	11.28	8.39
		Mahuli Minor	190	14.94	8.76
		Badwari Minor	131	10.07	8.57
		Dasauti Minor	157	4.94	3.51
		Barethi Minor	466	13.56	3.24
		Garan Minor	120	1.07	0.99
2019-20	Jirgo Canal System	Gharwaspur Minor	200	3.97	2.21
		Gaurahi Minor	149	8.63	6.46
	Garai Canal System	Kakrahi Minor	128	3.08	2.68
		Chandratali Minor	108	3.00	3.10

Year	Name of the system	Name of selected Minor	Actual Irrigation (Ha)	Actual Water Flow (Mcft)	Height of water (inch)
	Adwa Sukhra Canal System	Banwa Minor	107	4.72	4.92
		Barhula Minor	133	18.37	15.39
	Tons Pump Canal	Sidhtikat Minor	184	16.47	9.98
	Belan Canal System	Umri Minor	249	18.30	8.20
		Sipaua Minor	151	9.20	6.79
		Mahuli Minor	192	8.71	5.06
		Badwari Minor	131	10.85	9.23
		Dasauti Minor	167	5.77	3.85
		Barethi Minor	464	18.49	4.44
		Garan Minor	103	0.99	1.07
2020-21	Jirgo Canal System	Gharwaspur Minor	199	4.16	2.33
		Gaurahi Minor	150	9.07	6.74
	Garai Canal System	Kakrahi Minor	126	4.61	4.08
		Chandratali Minor	105	4.50	4.78
	Adwa Sukhra Canal System	Banwa Minor	107	4.83	5.03
		Barhula Minor	133	18.79	15.75
	Baraundha Dy Command	Jhingha Minor	87	10.89	13.95
		Mahular Minor	105	10.76	11.42
	Belan Canal System	Umri Minor	220	29.75	15.07
		Sipaua Minor	148	9.20	6.93
		Mahuli Minor	192	10.27	5.96
		Dasauti Minor	173	11.53	7.43
		Barethi Minor	467	16.64	3.97
		Garan Minor	121	0.91	0.83

(Source: Data collected from divisions)

Appendix 4.1 (B)

Supply of insufficient water in test checked canals of Dhasan Canal System

(Reference: Paragraph no. 4.4.3)

Year	Sl. No.	Name of the canal system	Name of the selected canals	Actual irrigation (Ha)	Actual water flow from outlets (in mcft)	Height of water (inch)
2014-15	1	Dhasan Canal System	Masoodpur Minor	87	5.46	7
	2		Gugrawara Minor	73	7.31	11
	3		Bira Minor	0	0	0
	4		Dhanauri Minor	0	0	0
	5		Italiya Minor	0	0	0
2015-16	1		Masoodpur Minor	89	5.46	7
	2		Gugrawara Minor	78	7.31	10
	3		Bira Minor	0	0	0
	4		Dhanauri Minor	0	0	0
	5		Italiya Minor	0	0	0
	6		Bilgaon Minor	0	0	0
2016-17	1		Masoodpur Minor	130	9.10	8
	2		Gugrawara Minor	172	12.19	8
	3		Bira Minor	336	15.30	5
	4		Dhanauri Minor	20	2.75	15
	5		Italiya Minor	77	0	0
	6		Bilgaon Minor	64	1.47	3
2017-18	1		Masoodpur Minor	79	5.46	8
	2		Gugrawara Minor	95	7.31	9
	3		Bira Minor	148	5.10	4
	4		Dhanauri Minor	0	0	0
	6		Bilgaon Minor	32	1.10	4
2018-19	1		Masoodpur Minor	82	9.10	12
	2		Gugrawara Minor	121	12.19	11
	3		Bira Minor	307	15	6
	4		Dhanauri Minor	55	3.30	7
	5		Italiya Minor	0	0	0
	6		Bilgaon Minor	52	1.84	4
2019-20	1		Masoodpur Minor	99	9.10	10
	2		Gugrawara Minor	121	12.19	11
	3		Bira Minor	495	16.15	4
	4		Dhanauri Minor	73	4.95	8
	5		Italiya Minor	144	4.10	3
	6		Bilgaon Minor	100	2.57	3
2020-21	1		Masoodpur Minor	119	5.46	5
	2		Gugrawara Minor	105	7.31 (8)	8
	3		Bira Minor	418	14.45 (4)	4
	4		Dhanauri Minor	63	4.40 (8)	8
	5		Bilgaon Minor	84	5.88 (8)	8

(Source: Data collected from division)

Appendix 4.2

(I) Position of tail feeding of test checked canals in BCP

(Reference: Paragraph no. 4.4.3)

Kharif Season								
Name of the system	**Total Selected Minors**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**
Jirgo Canal System	2	2	2	2	2	2	2	2
Garai Canal System	2	0	2	2	2	2	2	1
Lower Khajuri Canal System	1	0	0	1	0	0	0	1
Adwa Sukhra Canal System	2	2	2	2	2	2	2	2
Baraundha Dy. Command	3	1	1	1	1	1	1	1
Harrai Canal System	1	0	0	0	0	0	0	0
Belan Canal System	7	6	6	6	6	7	7	7
Tons Pump Canal System	4	4	4	4	4	4	4	4
Yamuna Pump Canal System	1	1	1	1	1	1	1	1
Total	**23**	**16**	**18**	**19**	**18**	**19**	**19**	**19**
Rabi Season								
Name of the system	**Total Selected Minors**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**
Jirgo Canal System	2	2	2	2	2	2	2	2
Garai Canal System	2	0	0	2	2	2	2	2
Lower Khajuri Canal System	1	0	0	0	0	0	0	0
Adwa Sukhra Canal System	2	2	2	2	2	2	2	2
Baraundha Dy. Command	3	1	1	1	1	1	1	1
Harrai Canal System	1	0	0	0	0	0	0	0
Belan Canal System	7	6	0	6	7	6	7	7
Tons Pump Canal System	4	4	4	4	4	4	4	4
Yamuna Pump Canal System	1	1	1	1	1	1	1	1
Total	**23**	**16**	**10**	**18**	**19**	**18**	**19**	**19**
Tail feed in *per cent*	**23**	**Range 10-19; 43 to 83 *per cent***						

(II) Position of tail feeding of test checked canals in DCS

Name of canal	**No. of minor**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**
Masoodpura minor	1	0	0	0	0	0	0	0
Gugrawara minor	1	1	1	1	1	1	1	1
Bira minor	1	0	0	0	0	0	0	0
Dhanauri minor	1	0	0	0	0	0	0	0
Italiya minor	1	0	0	0	0	1	1	0
Bilgaon minor	1	0	0	0	0	0	0	1
Total	6	1	1	1	1	2	2	2
Tail feed in *per cent*	6	**Range one to two; 17 to 33 *per cent***						

(Source: Data collected from division)

Appendix 4.3

Canal system-wise irrigation intensity against the target in BCP

(Reference: Paragraph no. 4.6.1)

Name of the system	Year	CCA of the canal system (in ha)	PPA (Target)			Actual Irrigated Area		
			Kharif	Rabi	Total	Kharif	Rabi	Total
Jirgo Canal System	2014-15	13791	9161	1815	10975	9530	9981	19511
	2015-16	13791	9161	1815	10975	9523	9281	18804
	2016-17	13791	9161	1815	10975	9428	8823	18251
	2017-18	13791	9161	1815	10975	9493	8603	18096
	2018-19	13791	13636	11149	24785	9673	9386	19059
	2019-20	13791	13636	11149	24785	9084	8255	17339
	2020-21	13791	13636	11149	24785	8983	8836	17819
Garai Canal System	2014-15	17878	12198	6155	18353	12224	11111	23335
	2015-16	17878	12198	6155	18353	12024	1253	13277
	2016-17	17878	12198	6155	18353	12058	11354	23412
	2017-18	17878	12198	6155	18353	12068	10534	22602
	2018-19	17878	17663	12991	30654	11908	10508	22416
	2019-20	17878	17663	12991	30654	12060	11234	23294
	2020-21	17878	17663	12991	30654	11742	11096	22838
Lower Khajuri Canal System	2014-15	4547	3665	1778	5443	1163	29	1192
	2015-16	4547	3665	1778	5443	1382	28	1410
	2016-17	4547	3665	1778	5443	1742	901	2643
	2017-18	4547	3665	1778	5443	1537	28	1565
	2018-19	4547	4297	3719	8016	1449	26	1475
	2019-20	4547	4297	3719	8016	1428	804	2232
	2020-21	4547	4297	3719	8016	1615	170	1785
Adwa Sukhra Canal System	2014-15	25003	6991	8591	15582	14510	14000	28510
	2015-16	25003	6991	8591	15582	12316	10580	22896
	2016-17	25003	6991	8591	15582	12926	13774	26700
	2017-18	25003	6991	8591	15582	12952	13805	26757
	2018-19	25003	14900	20606	35505	12975	14213	27188
	2019-20	25003	14900	20606	35505	11833	13534	25367
	2020-21	25003	14900	20606	35505	12965	13412	26377
Baraundha Dy. Command	2014-15	29766	12811	12891	25702	8260	13839	22099
	2015-16	29766	12811	12891	25702	6297	1214	7511
	2016-17	29766	12811	12891	25702	10354	13453	23807
	2017-18	29766	12811	12891	25702	9930	14169	24099
	2018-19	29766	22453	28223	50677	10148	15295	25443
	2019-20	29766	22453	28223	50677	10582	14770	25352
	2020-21	29766	22453	28223	50677	10673	14566	25239
Harrai Canal System	2014-15	2615	1945	943	2888	160	175	335
	2015-16	2615	1945	943	2888	0	0	0
	2016-17	2615	1945	943	2888	184	216	400
	2017-18	2615	1945	943	2888	185	209	394
	2018-19	2615	2497	2119	4616	186	349	535
	2019-20	2615	2497	2119	4616	183	351	534
	2020-21	2615	2497	2119	4616	185	355	540

Name of the system	Year	CCA of the canal system (in ha)	PPA (Target)			Actual Irrigated Area		
			Kharif	Rabi	Total	Kharif	Rabi	Total
Belan Canal System	2014-15	71048	14209	33748	47957	38595	37558	76153
	2015-16	71048	14209	33748	47957	39165	529	39694
	2016-17	71048	14209	33748	47957	40403	38680	79083
	2017-18	71048	14209	33748	47957	41148	38444	79592
	2018-19	71048	36801	60328	97129	41071	37402	78473
	2019-20	71048	36801	60328	97129	41956	39454	81410
	2020-21	71048	36801	60328	97129	41388	40711	82099
Tons Pump Canal System	2014-15	34008	16154	17004	33158	13074	13176	26250
	2015-16	34008	16154	17004	33158	12046	13226	25272
	2016-17	34008	16154	17004	33158	13199	13364	26563
	2017-18	34008	16154	17004	33158	12955	13352	26307
	2018-19	34008	22633	28990	51623	13084	13429	26513
	2019-20	34008	22633	28990	51623	13171	13496	26667
	2020-21	34008	22633	28990	51623	13392	14169	27561
Yamuna Pump Canal System	2014-15	33785	16893	20271	37164	4047	4351	8398
	2015-16	33785	16893	20271	37164	3022	4353	7375
	2016-17	33785	16893	20271	37164	3803	4417	8220
	2017-18	33785	16893	20271	37164	3835	4412	8247
	2018-19	33785	19962	24388	44350	3926	4445	8371
	2019-20	33785	19962	24388	44350	3928	4468	8396
	2020-21	33785	19962	24388	44350	4108	4411	8519
Total	**2014-15**	**232441**	**94026**	**103196**	**197222**	**101563**	**104220**	**205783**
	2015-16	**232441**	**94026**	**103196**	**197222**	**95775**	**40464**	**136239**
	2016-17	**232441**	**94026**	**103196**	**197222**	**104097**	**104982**	**209079**
	2017-18	**232441**	**94026**	**103196**	**197222**	**104103**	**103556**	**207659**
	2018-19	**232441**	**154842**	**192512**	**347354**	**104420**	**105053**	**209473**
	2019-20	**232441**	**154842**	**192512**	**347354**	**104225**	**106366**	**210591**
	2020-21	**232441**	**154842**	**192512**	**347354**	**105051**	**107726**	**212777**

(Source: Data collected from divisions)

Appendix 4.4 (A)

Details of requirement and supply of certified seeds at district level

(Reference: Paragraph no. 4.7.1.1)

(In quintal)

Year	Total Requirement	Total received at Government Store (in *per cent*)	Total distribution through Govt. store (in *per cent*)	Total distribution through other than Govt. store (in *per cent*)	Total distribution (in *per cent*)
Bansagar Canal Project					
Rabi					
2014-15	351785.47	34102.98(10)	34102.98(10)	106091(30)	140193.98(40)
2015-16	342679.59	19375.82(6)	19375.82(6)	109376.4(32)	128752.22(38)
2016-17	382804.94	13949.03(4)	13949.03(4)	127442.6(33)	141391.63(37)
2017-18	361942.3	13395(4)	13395(4)	156601(43)	169996(47)
2018-19	350536.7	22907(7)	22907(7)	139696(40)	162603(46)
2019-20	344831.64	21173.45(6)	21173.45(6)	147560(43)	168733.45(49)
2020-21	349891.32	20510.4(6)	20510.4(6)	138786(40)	159296.4(46)
Total	**2484471.96**	**145413.68**(6)	**145413.7**(6)	**925553.0**(37)	**1070966.7**(43)
Kharif					
2014-15	41050.4	4986.18(12)	4708.46(11)	32341.43(79)	37049.89(90)
2015-16	42824.69	4421.98(10)	4421.98(10)	27103(63)	31524.98(74)
2016-17	45820.1	3804(8)	3793(8)	38948.1(85)	42741.1(93)
2017-18	45812.35	5149.48(11)	4364.48(10)	28627(62)	32991.48(72)
2018-19	47194.01	4798.6(10)	4798.6(10)	37040(78)	41838.6(86)
2019-20	44085.19	5097.67(12)	5097.67(12)	37371(85)	42468.67(96)
2020-21	48415.62	3733.65(8)	3733.65(8)	35306(73)	39039.65(81)
Total	**315202.36**	**31991.56**(10)	**30917.84**(10)	**236736.53**(75)	**267654.37**(85)
Dhasan Canal System					
Rabi					
2014-15	344075.14	17107(5)	17106.7(5)	91903.6(27)	109010.3(32)
2015-16	190010.79	13074.97(7)	13021.21(7)	45487.8(24)	58509.01(31)
2016-17	358775.01	9679.61(3)	9679.61(3)	120682.5(34)	130362.11(36)
2017-18	286578.97	7008.9(2)	7008.9(2)	76632(27)	83640.9(29)
2018-19	326563.02	12641.19(4)	12641.19(4)	90910.25(28)	103551.44(32)
2019-20	369955.81	11401.2(3)	11401.2(3)	113686.7(31)	125087.9(34)
2020-21	338309.18	8797.19(3)	8797.19(3)	113277.1(33)	122074.29(36)
Total	**2214267.92**	**79710.06**(4)	**79656**(4)	**652579.95**(29)	**732235.95**(33)
Kharif					
2014-15	28783.53	1197.9(4)	775.91(3)	9820(34)	10595.91(37)
2015-16	33423.75	884.07(3)	771.51(2)	5530.86(17)	6302.37(19)
2016-17	25572.66	743.07(3)	685.91(3)	6728.9(26)	7414.81(29)
2017-18	30408.72	787.25(3)	730.12(2)	12324(41)	13054.12(43)
2018-19	26946.98	755.35(3)	755.35(3)	8549.98(32)	9305.33(35)
2019-20	34544.43	715.8(2)	715.8(2)	8642(25)	9357.8(27)
2020-21	30632.85	375.69(1)	375.69(1)	9929.6(32)	10305.29(34)
Total	**210312.92**	**5459.13**(3)	**4810.29**(2)	**61525.34**(29)	**66335.63**(32)

(Source: Data collected from Agriculture Department)

Appendix 4.4 (B)

Details of requirement and supply of certified seeds at selected village level

(Reference: Paragraph no. 4.7.1.1)

(In qui ntal)

Name of crop	No. of test checked villages	Total requirement (in qtl.)	Total distribution (in qtl) (in *per cent*)
Bansagar Canal Project			
Wheat	90	63245	993.4 (2)
Paddy	90	9819	112.27 (1.14)
Gram	90	1487	102.95 (6.92)
Pea	90	284	5.08 (1.8)
Rai	90	30	1.49 (4.97)
Arahar	90	59	1.39 (2.35)
Dhasan Canal System			
Wheat	29	38518	739.00 (1.92)
Paddy	29	6.10	1.04 (17)
Gram	29	4342	491.69 (11.3)
Pea	29	10376	488.17 (4.7)
Rai/sarso	29	45.8	7.62 (16.6)
Arahar	29	198	15.08 (7.6)

(Source: Data collected from Agriculture Department)

Appendix 4.5 (A)

Details of delay availability of seeds at central seed store during 2014-21

(Reference: Paragraph no. 4.7.1.1)

District	Name of Seed	Scheduled date of receiving of seed at central store	Last date of sowing the seed	2014-21	
				Delay receipt after scheduled date at central store	Delay receipt after sowing date at central store
Bansagar Canal Project					
Mirzapur	Wheat	20th October	25th December	5 to 64 days	0
Prayagraj				4 to 54 days	0
Mirzapur	Gram	20th September	15th November	10 to 50 days	0
Prayagraj				10 to 51 days	0
Mirzapur	Pea	20th September	15th November	14 to 48 days	0
Mirzapur	Masoor	20th September	15th November	20 to 43 days	0
Prayagraj				16 to 72 days	17 days
Mirzapur	Rai/Sarso	20th September	15th October	16 to 40 days	15 days
Prayagraj				8 to 48 days	22 days
Mirzapur	Paddy	25th April	10th July	10 to 62 days	0
Prayagraj				12 to 57 days	0
Mirzapur	Arahar	15th May	15th July	43 to 56 days	0
Prayagraj				41 to 52 days	0
Dhasan Canal System					
Hamirpur	Wheat	20th October	25th December	11 to 53 days	0
Mahoba				3 to 76 days	10 days
Hamirpur	Gram	20th September	15th November	8 to 45 days	0
Mahoba				1to 97 days	42 days
Hamirpur	Pea	20th September	15th November	4 to 88 days	33 days
Mahoba				1 to 97 days	42 days
Hamirpur	Masoor	20th September	15th November	14 to 72 days	16 days
Mahoba				1 to 77 days	21 days
Hamirpur	Rai/Sarso	20th September	15th October	11 to 58 days	33 days
Mahoba				4 to 97 days	72 days
Hamirpur	Arahar	15th May	15th July	17 to 63 days	2 days
Mahoba				12 to 59 days	0 days
Hamirpur	Moong	15th May	10th August	19 to 49 days	0
Mahoba				2 to 65 days	0
Hamirpur	Urd	15th May	30th August	17 to 56 days	0
Mahoba				2 to 73 days	0
Hamirpur	Til	15th May	15th July	50 to 63 days	3 days
Mahoba				7 to 78 days	17 days

(Source: Data collected from Agriculture Department)

Appendix 4.5 B

Details of delay distribution of seeds after sowing period in test checked blocks

(Reference: Paragraph no. 4.7.1.1)

Name of District	No. of selected blocks	Name of seed (last date of sowing)	Delay distribution during 2014-2021
Bansagar Canal Project			
Prayagraj	6	Wheat (25 Dec.)	1 to 53 days
Mirzapur	5		1 to 181 days
Prayagraj	6	Gram (15 Nov.)	1 to 61 days
Mirzapur	5		1 to 64 days
Prayagraj	6	Pea (15 Nov.)	1 to 62 days
Mirzapur	5		3 to 70 days
Prayagraj	6	Masoor (15 Nov.)	3 to 69 days
Mirzapur	5		1 to 44 days
Prayagraj	6	Rai/Sarso (15 Oct.)	9 to 130 days
Mirzapur	5		1 to 250 days
Prayagraj	6	Paddy (10 July)	1 to 94 days
Mirzapur	5		1 to 41 days
Prayagraj	6	Arahar (15 July)	5 to 80 days
Mirzapur	5		2 to 80 days
Dhasan Canal System			
Hamirpur	2	Wheat (25 Dec.)	3 to 15 days
Mahoba	1		1 to 61 days
Hamirpur	2	Gram (15 Nov.)	1 to 45 days
Mahoba	1		1 to 101 days
Hamirpur	2	Pea (15 Nov..)	5 to 45 days
Mahoba	1		1 to 101 days
Hamirpur	2	Masoor (15 Nov.)	17 to 54 days
Mahoba	1		1 to 72 days
Hamirpur	2	Rai/Sarso (15 Oct.)	5 to 62 days
Mahoba	1		2 to 131 days
Hamirpur	2	Dhan (Paddy) (10 July)	5 to 40 days
Mahoba	1		1 day
Hamirpur	2	Arahar (15 July)	2 to 34 days
Mahoba	1		1 to 46 days

(Source: Data collected from Agriculture Department)

Appendix 4.6
Details of unapproved variety of seeds and their distribution
(Reference: Paragraph no. 4.7.1.2)

(Quantity in quintal)

Name of seed	Year	Approved variety of seeds	Total quantity of seeds distributed[1]	Distribution of unapproved variety of seeds	
				Unapproved variety (in no.)	Quantity
Prayagraj (Vindhya Region)					
Wheat	2014-15	K-8962, 9465 ,9351, 9107, 307, 9423, 9006, Malveey-468, 234, HD-2888, 2643, PBW-343, 373, UP-2338, 2382, 2425, HP-1731, 1744, NW-1012, 1014, 2036, 1076, 1067, WH-542, HUW-533, 510, 468, KRL-19, 210, 213, **(total 30)**	20439	PBW-502, PBW-550, DBW-17, CBW-38, DH-2967, W-711 **(6)**	17938
	2015-16		13076	PBW-550, DBW-621, HD-2967, DBW-17 (4)	11446
	2016-17		8790	HD-2967,DBW-17, PBW-550, PBW-509, PBW-644, DBW-39, RAJ-4120, HD-3034 **(8)**	8781
	2017-18		8624	DBW-621, PBW-550, HD-2967, DBW-107, HD-3086 (5)	8611
	2018-19		15139	HD-2967,CBW-38,WH-1105,HD-3086,K-1006, DBW-621, KRL-2, KRL-607, Raj-4120, HD-2059, DBW-590, HD-2985, K-402, PBW-644 **(14)**	14097
	2019-20		13112	HD-2967, CBW-38,WH-1105, HD-3086, K-1006, WB-02, HI-1563, AA1W-6, HD-3059, DBW-90, PBW-723 **(11)**	13123
	2020-21		13408	K-422, WH-1124, PBW-723, HD-2967, HD-3086 AAIW-6,AAIW-9, AAIW-10, AAIW-13 **(9)**	13229
Total			**92588**		**87225**
Paddy	2014-15	Narendra-97, 118, 80, 359, 3112, 2026, 2064, 2065, Saket-4, Varni Deep, Narendra Lalmati, Shushk Samrat, IR-36, Ta-3, Pant-12, 4 Sarju-52, PNR-381, Pusa Basmati-1, Basmati-370, Vallabh Basmati-22, Malveey Sughandha-105, 4-3, Narendra Sughandha **(total 24)**	2200	NA	
	2015-16		2803	Dhan Sahabhagi, Sambha Masuri, Sughandha-4, Swaran Sab-1 **(4)**	1159
	2016-17		2680	NA	0
	2017-18		3376	Dhan Sahabhagi, Shushk Samrat, DRR-44, MTU-7029, Swarn Sub-1, PAU-201 **(6)**	665
	2018-19		4000	Pant-24, Swarn Sub-1, Sahabhagi, Shuyatts **(4)**	833
	2019-20		3884	CO-51, HUR-4-3, Shuyatts-1, HUR-105, Sahabhagi, Sambha Sub-1 **(6)**	881
	2020-21		2735	Sambha Masuri, MTU-7029, Shuyatts-1, 2, 3, 4, 5, CSR-56, PR-121, CSR-43, Pant-24 **(11)**	940
Total			**21678**		**4478**
Mirzapur (Vindhya Region)					
Wheat	2014-15	K-8962, 9465 ,9351, 9107, 307, 9423, 9006,	11798	PBW-502, PBW-550, DBW-17, CBW-38, K-9423, HD-2967, UP-	10983

[1] Through government store (only Agriculture Department).

Name of seed	Year	Approved variety of seeds	Total quantity of seeds distributed[1]	Distribution of unapproved variety of seeds	
				Unapproved variety (in no.)	Quantity
		Malveey-468, 234, HD-2888, 2643, PBW-343, 373, UP-2338, 2382, 2425, HP-1731, 1744, NW-1012, 1014, 2036, 1076, 1067, WH-542, HUW-533, 510, 468, KRL-19, 210, 213, **(total 30)**		2425, K-307 **(8)**	
	2015-16		4907	PBW-550, PBW-502, DBW-621, HD-2967, UP-2572, DBW-17, CBW-38 **(7)**	4397
	2016-17		4226	HD-2967, DBW-17, PBW-502,K-307, DBW-621 **(5)**	4227
	2017-18		3046	K-307, DBW-110, HD-2967, HI-8737, DBW-17 **(5)**	3046
	2018-19		5669	HD-2967, PBW-590, CBW-38, PBW-644, HD-3086, HD-2987, DBW-90, HD-3059, DBW-502, HI-8737 **(10)**	5699
	2019-20		6059	HD-2967,RAS-4120, WH-3086, HUW-234, WB-02, PBW-443, HI-8737 **(7)**	6059
	2020-21		5130	PBW-723, DBW-17, HD-3086, HD-3059, WB-02, HD-2967 **(6)**	5130
Total			**40835**		**39541**
Paddy	2014-15	Narendra-97, 118, 80, 359, 3112, 2026, 2064, 2065, Saket-4, Varni Deep, Narendr Lalmati, Shushk Samrat, IR-36, Ta-3, Pant-12, 4 Sarju-52, PNR-381, Pusa Basmati-1, Basmati-370, Vallabh Basmati-22, Malveey Sughandh-105, 4-3, Narendra Sughandha **(total 24)**	1497	Dhan sahabhagi, Sambha masuri, CSR-30, Swaran Sab-1, MTU-7029 **(5)**	462
	2015-16		971	MTU-7029, Dhan Sahabhagi , Dughandha-4 **(3)**	228
	2016-17		712	HUR-105, Dhan Sahabhagi, MTU-7029 **(3)**	430
	2017-18		787	Sugandha-105, MTU-7029, Swaran Sab-1, Shushk Smarat, Sahabhagi, DRR-44, **(6)**	437
	2018-19		663	Swaran Sab-1, Dhan Sahabhagi, Shuyatts-1 **(3)**	147
	2019-20		1013	Shuyatts-1, Dhan Sahabhagi, MTU-7029, HDR-105, CSR-43, **(5)**	661
	2020-21		931	Shuyatts-1, MTU-7029, HUR-105, CSR-60, HUR-917, BPT-5204, PR-121, Pant-24, CO-51, **(9)**	811
Total			**6574**		**3176**
Hamirpur (Bundelkhand Region)					
Wheat	2014-15	K-9465, 9351, 8962, 9107, 9162, 9533, 7903, 9423 C-306, Mlveey-234, HW-2004, HD-2733, 2888, DL-803-3, 788-2, WH-147, UP-2338, 2425, RAJ-1555, PBW-343, HP-1633, HUW-510	4888	PBW-502, PBW-550, DBW-17, CBW-38, HD-2967, RAJ-3077, (6)	3959
	2015-16		5562	DBW-550, DBW-621, HD-2967, K-307, DBW-17, CBW-38, (6)	5549
	2016-17		2808	HD-2967, DBW-17, PBW-550, DPW-621, (4)	2200
	2017-18		1706	HD-2967, DBW-17, CBW-38, RAJ-4120, K-307, (5)	1667
	2018-19		4869	HD-2967, DBW-90, PBW-502, PBW-590, RAJ-4120, WH-1105, HD-3086, K-402, JW-3336, HD-3043, (10)	4868

Name of seed	Year	Approved variety of seeds	Total quantity of seeds distributed[1]	Distribution of unapproved variety of seeds	
				Unapproved variety (in no.)	Quantity
	2019-20	HI-8381, 8498, 784, GW-273, 322, 173, **(total 28)**	3480	HD-2967, RAJ-4120, WH-1105, HD-3086, PBW-107, WB-02, PBW-725, (7)	3480
	2020-21		1939	HD-2967, DBW-107, DBW-110, PBW-723, , RAJ-4238, WH-1124, HD-3086, K-402, (8)	1940
Total			**25252**		**23663**
Paddy	2014-15	Narendra-97, 80, 359, 2026, 2064, 3112, 2065, Saket-4, Malveey Sugandha-105, Sarju-52, Ballabh Basmati-22, Govind, Pusa Basmati-1, Ta-3, Malveey Sugandha 4-3, Basmati-370, Shushk Samrat **(total 17)**	3	Pant-12 (1)	3
	2015-16		3	Pant-12 (1)	3
	2016-17		5	Pusa Basmati (1)	5
	2017-18		5	Nil	0
	2018-19		5	Dhan Narendra (1)	5
	2019-20		15	Sugahandha-4 (1)	15
	2020-21		32	Pusa Basmati, Pant-24 (2)	32
Total			**68**		**63**
Mahoba (Bundelkhand Region)					
Wheat	2014-15	K-9465, 9351, 8962, 9107, 9162, 9533, 7903, 9423 C-306, Mlveey-234, HW-2004, HD-2733, 2888, DL-803-3, 788-2, WH-147, UP-2338, 2425, RAJ-1555, PBW-343, HP-1633, HUW-510 HI-8381, 8498, 784, GW-273, 322, 173, **(total 28)**	2022	PBW-502, PBW-550, DBW-17, HD-2967, RAJ-3077, (5)	1514
	2015-16		1814	PBW-550, UP-2572, HD2967, Halna, DBW-17, CBW-38, (6)	1626
	2016-17		3069	HD-2967, DBW-17, PBW-550, DPW-621, WH-1105, RAJ-4120, WHD-943, (7)	2952
	2017-18		797	PBW-550, HD-2967, CBW-38, DBW-17, RAJ-4120, (5)	797
	2018-19		1636	HD-2967, PBW-590, PBW-3086, WH-1105, HD-3086, CBW-38, DBW-90, (7)	1636
	2019-20		1578	HD-2967, DBW-110, HD-3043, HD-3086, WH-1105, RAJ-4120, WHD-943, HD-2967, DBW-107, WH-1105, (10)	1578
	2020-21		1406	DBW-107, DBW-110, HD-2967, HD-2967, HD-3086, WB-02, PBW-343, DBW-107, (8)	1406
Total			**12322**		**11509**
Paddy	2014-15	Narendra-97, 80, 359, 2026, 2064, 3112, 2065, Saket-4, Malveey Sugandha-105, Sarju-52, Ballabh Basmati-22, Govind, Pusa Basmati-1, Ta-3, Malveey Sugandh 4-3, Basmati-370, Shushk Samrat **(total 17)**	10	Pant (1)	10
	2015-16		7	Pant (1)	7
	2016-17		0	0	0
	2017-18		0	0	0
	2018-19		0	0	0
	2019-20		0	0	0
	2020-21		0	0	0
Total			**17**		**17**

(Source: Data collected from Agriculture Department)

Appendix 4.7 (A)

Yield in test checked villages

(Reference: Paragraph no. 4.8)

(in quintal/hectare)

No. of Village	Name of crop	Proposed Yield	Actual yield during 2015 -21 (*per cent*)
Bansagar Canal Project			
79	Wheat	40	5.49 to 46.29 (14 to 116)
15	Gram	18	2.44 to 18.69(14 to 104)
01	Pea	15	5.92 to 16.47(39 to 110)
0	Mustard	15	Data not available
0	Maize	23	Data not available
0	Arhar	16	Data not available
Dhasan Canal System			
19	Wheat	35	5.8 to 46.59 (17 to 133)
16	Gram	20	0.31 to 19.2 (2 to 96)
0	Paddy	40	Data not available

(Source: Data provided by Director, Agriculture Department)

Appendix 4.7 (B)

Details of village-wise productivity in test checked villages

(Reference: Paragraph no. 4.8)

(in quintal/hectare)

Village	Crop	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Bansagar Canal Project							
Gadaiya Kalan		6.51	11.38	11.72	13.8	10.36	12.18
Kundi		7.65	9.39	10.88	14.6	9.74	12.04
Gadaiya Khurd		NA	NA	NA	NA	NA	NA
Gauhani		NA	NA	NA	NA	NA	NA
Jariha atri		NA	NA	NA	NA	NA	NA
Khujhi		NA	NA	NA	NA	NA	NA
Kherhatkhurd		NA	NA	NA	NA	NA	NA
Dando		NA	NA	NA	NA	NA	NA
Pathertal		4.87	8.72	4.87	12.5	9.12	13.48
Mahuli		3.74	6.68	17.14	12.2	7.62	10.36
Pasana		3.6	5.44	9.91	12.2	8.1	11.43
Barhula Kalan		5.41	8.3	16.2	12.9	7.28	12.35
Belhat		5.3	5.44	8.78	13.6	9.52	12.18
Belvaniya		4.16	9.39	10.39	12.4	10.2	10.93
Latifpur		4.16	9.39	10.39	12.4	10.2	10.93
Jamohara		4.16	9.39	10.39	12.4	10.2	10.93
Sipaua		4.93	7.48	6.97	11.9	5.95	12.03
Saimha		NA	NA	NA	NA	NA	NA
Para		NA	NA	NA	NA	NA	NA
Badhwari Kalan		NA	NA	NA	NA	NA	NA
Khiri	Gram	NA	NA	NA	NA	NA	NA
Dihipatkha		NA	NA	NA	NA	NA	NA
Garan		NA	NA	NA	NA	NA	NA
Jadipur		NA	NA	NA	NA	NA	NA
Pathertal		NA	NA	NA	NA	NA	NA
Salaiya		NA	NA	NA	NA	NA	NA
Barhulakhurd		NA	NA	NA	NA	NA	NA
Kapuribadhaiya		NA	NA	NA	NA	NA	NA
Siryari		NA	NA	NA	NA	NA	NA
Sinkikalan		NA	NA	NA	NA	NA	NA
Sinkikhurd		NA	NA	NA	NA	NA	NA
Bakhar		NA	NA	NA	NA	NA	NA
Rampurtulapur		NA	NA	NA	NA	NA	NA
Salaiya Kala		2.44	8.8	14.09	10.6	11.67	NA
Sirhir		NA	NA	NA	NA	NA	NA
Bashara		NA	NA	NA	NA	NA	NA
Dasauti		NA	NA	NA	NA	NA	NA
Shidh Ticket		5.89	9.69	9.56	14.0	18.69	13.82
Telghana		NA	NA	NA	NA	NA	NA
Bansi		NA	NA	NA	NA	NA	NA
Kolkam Kala		5.87	13.48	9.7	9.6	10.21	12.82

Village	Crop	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Kolkam Khurd		5.87	13.48	9.7	9.6	10.21	12.82
Daultabad		NA	NA	NA	NA	NA	NA
Rampur		NA	NA	NA	NA	NA	NA
Shikarpur		NA	NA	NA	NA	NA	NA
No. of village		**15**	**15**	**15**	**15**	**15**	**14**
Gadaiya Kalan		13.39	31.58	25.05	32.6	34.46	28.22
Kundi		12.83	30.93	25.38	37.5	21.52	26.27
Dadura		22.41	33.23	27.00	32.4	21.29	26.83
Jariha atri		22.41	33.23	27.00	32.4	21.29	26.83
Gadaiya Khurd		13.39	31.43	25.05	27.8	36.87	26.92
Khujhi		15.91	32.22	27.40	29.6	22.08	24.8
Lotarh		22.41	28.63	27.28	31.4	24.26	26.57
Gauhani		NA	NA	NA	NA	NA	NA
Dharawara		25.1	24.33	37.12	46.3	30.93	33.14
Niriya		26.84	28.28	40.9	41.5	30.99	32.56
Rithaiya		20.23	26.9	29.65	43.7	32.55	NA
Badhwari Kalan		14.62	25.77	19.59	32.2	36.13	26.39
Garan		14.71	24.63	23.52	34.8	25.38	25.21
Jadipur		13.34	23.09	16.17	30.2	10.98	27.23
Pathertal		13	23.25	19.33	27.2	23.51	22.08
Saimha		10.17	22.3	19	33.0	16.94	21.79
Sipaua		16.59	23.15	19.84	26.1	9.03	21.35
Dihipatka		17.62	17.2	19.09	33.6	35.96	25.49
Paithakpur		15.24	22.8	19.67	40.3	25.86	NA
Kheri	Wheat	15.61	21.35	19.91	27.6	18.99	22.1
Koundi		8.63	24.12	16.76	38.3	26.28	24.09
Mahuli		11.82	29.96	21.96	46.0	22.19	27.4
Purarochai		14.18	24.54	28.46	37.3	8.29	25.21
Pasana		16.22	24.32	32.48	33.1	14.51	25.74
Barhula Kalan		10.48	23.25	22.3	26.4	25.27	28.18
Ghoongha		19.12	20.62	21.57	18.9	18.88	20.19
Barhula Khurd		13.81	21.29	21.35	34.8	13.95	23.37
Salaiya		15.07	22.62	31.66	26.4	23.8	37.65
Belhat		17.09	24.65	32.44	33.1	8.4	39.17
Belvaniya		9.13	20.12	20.73	32.6	22.13	15.18
Latifpur		9.13	20.12	20.73	32.6	22.13	15.18
Jamohara		9.13	20.12	20.73	32.6	22.13	15.18
Para		19.12	23.37	14.54	25.8	29.14	22.76
Babhan Patti		14.18	24.54	28.46	37.3	8.29	25.21
Kapuribadhaiya		NA	NA	NA	NA	NA	NA
Siryari		NA	NA	NA	NA	NA	NA
Sinkikalan		NA	NA	NA	NA	NA	NA
Rampurtulapur		NA	NA	NA	NA	NA	NA
Bakhar		5.49	20.28	11.84	35.4	26.25	24.71
Sinkikhurd		15.35	29.64	27.9	33.3	33.9	29.98

Village	Crop	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Sirhir		13.45	30.09	24.71	31.8	23.42	25.77
Dasauti		13.45	30.09	24.71	31.8	23.42	25.77
Salaiya Kala		19.12	30.82	15.69	33.4	25.19	26.83
Bashara		NA	NA	NA	NA	NA	NA
Bansi		18.10	35.02	26.13	33.1	22.08	NA
Shidh Ticket		18.43	31.77	25.38	32.8	20.73	NA
Telghana		16.87	28.21	23.98	24.1	20.62	NA
Kherhatkala		16.87	28.21	23.98	24.1	20.62	NA
Kherhatkhurd		16.87	28.21	23.98	24.1	20.62	NA
Dihwa		16.81	28.61	28.76	43.0	24.26	NA
Dado		16.81	28.61	28.76	43.0	24.26	NA
Banwa		11.32	24.77	25.1	23.3	13.95	27.85
Naugawan		14.57	21.29	26.67	25.3	5.66	32.57
Harsad		21.24	33.4	25.1	24.7	12.92	NA
Chakkotar		12.55	17.01	22.64	25.1	14.82	29.03
Kashihar		21.29	28.69	36.14	36.4	27.68	34.14
Kakrahi		17.73	31.5	38.27	38.1	32.67	40.01
Daultabad		29.25	27.85	39.5	37.9	38.1	NA
Gardbard		13.5	11.93	13.22	24.7	25.47	NA
Kolkam Kala		13.78	27.94	24.32	24.9	21.8	33.84
Kolkam Khurd		13.78	27.94	24.32	24.9	21.8	33.84
Kaparbathua		13.78	27.94	24.32	24.9	21.8	NA
Mahular		9.75	27.94	24.04	29.7	27.96	28.35
Jhigha		9.75	27.94	24.04	29.7	27.96	28.35
Nayagawan		9.75	27.94	24.04	29.7	27.96	28.35
Dhurakanda		17.73	25.21	23.81	27.8	23.45	28.36
Amoi		20.48	20.73	36.42	38.7	17.71	33.45
Tedhwa		20.48	20.73	36.42	38.7	17.71	NA
Bhorsar		22.58	24.04	33.84	30.0	15.18	NA
Bikna		21.46	20.06	35.86	39.5	17.76	NA
Birpur		20	20.28	35.75	36.8	16.92	NA
Katran		18.99	19.89	33.06	34.8	29.08	NA
Jayapur		18.99	19.89	33.06	34.8	29.08	NA
Chandaipur		19.11	27.94	33.79	30.1	17.51	NA
Ananantpur		19.11	27.94	33.79	30.1	17.51	NA
Itwa		19.11	27.94	33.79	30.1	17.51	NA
Dhaurupur		20.28	30.93	23.98	30.2	16.25	NA
Rajpur		18.63	29.92	36.59	43.3	12.21	NA
Tad		NA	NA	NA	NA	NA	NA
Bharuhana		NA	NA	NA	NA	NA	NA
Baraudha		NA	NA	NA	NA	NA	NA
Rampur		25.49	35.69	36.34	36.5	34.85	NA
Shikarpur		24.12	32.22	35.75	37.3	32.83	NA
Gharwaspur		24.12	32.22	35.75	37.3	32.83	NA
Noharipur		24.09	32.44	35.8	36.8	32.05	NA
Gaurahi		25.1	29.64	40.46	38.6	34.91	NA
Hausapur		19.14	21.24	36.53	36.8	29.47	NA

Village	Crop	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Puradurwasa		23.2	28.63	33.2	33.4	21.88	NA
No. of village		**79**	**79**	**79**	**79**	**79**	**48**
Mahular	**Pea**	**5.92**	**6.79**	**8.78**	**12.79**	**16.47**	**10.63**
Dhasan Canal System							
Name of Village	**Crop**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**
Bagipura	Gram	7.62	13.93	16.11	12.89	8.59	12.55
Itauragang		7.62	13.93	16.11	12.89	8.59	12.55
Musahi		NA	NA	NA	NA	NA	NA
Sikraudha-Rath		4.36	10.39	12.26	12.35	15.53	8.44
Gugarwara		4.36	10.39	12.26	12.35	15.53	8.44
Dhanaura		5.44	12.97	13.03	15.75	15.93	10.25
Dhanauri		5.44	12.97	13.03	15.75	15.93	10.25
Akauni		NA	NA	NA	NA	NA	NA
Dhagwan		7.93	10.30	10.42	8.13	15.18	15.18
Tolarawat		4.87	10.96	12.21	14.80	5.98	12.12
Jigani		NA	NA	NA	NA	NA	NA
Amarpurapatti		NA	NA	NA	NA	NA	NA
Itailiyaraja		NA	NA	NA	NA	NA	NA
Sirsa		NA	NA	NA	NA	NA	NA
Tolarkhagaran		NA	NA	NA	NA	NA	NA
Khajuri		0.31	11.62	19.20	16.31	12.91	15.04
Kachuakala		0.31	11.62	19.20	16.31	12.91	15.04
Beera		1.47	11.33	5.03	5.07	15.97	11.35
Pawai		4.93	8.26	8.33	7.76	12.53	NA
Bilgawan		NA	NA	NA	NA	NA	NA
Itailiyabaja		NA	NA	NA	NA	NA	NA
Jamangawan		NA	NA	NA	NA	NA	NA
masoodpura		1.33	9.91	10.42	15.80	18.97	14.7
Lidhaurakhurd		NA	NA	NA	NA	NA	NA
Nagaraghat		2.97	8.84	7.93	13.20	18.01	14.05
Alipura		NA	NA	NA	NA	NA	NA
Nekpura		NA	NA	NA	NA	NA	NA
Patha		2.97	8.84	7.93	13.20	18.01	14.05
Barano		2.97	8.84	7.93	13.20	18.01	14.05
No. of village		**16 villages**	**16 villages**	**16 villages**	**16 villages**	**16 villages**	**15 villages**
Bagipura	Wheat	23.98	34.07	40.10	37.51	31.13	35.97
Itauragang		23.98	34.07	40.10	37.51	31.13	35.97
Musahi		NA	NA	NA	NA	NA	NA
Sikraudha-Rath		24.21	36.11	36.48	35.47	36.70	NA
Gugarwara		24.21	36.11	36.48	35.47	36.70	NA
Dhanaura		19.72	28.91	36.36	36.14	40.90	29.91
Dhanauri		19.72	28.91	36.36	36.14	40.90	29.91
Akauni		NA	NA	NA	NA	NA	NA
Dhagwan		19.22	21.07	34.07	39.29	34.74	44.6
Tolarawat		24.88	35.33	35.69	35.30	26.14	NA
Tolakhagaran		NA	NA	NA	NA	NA	NA

Village	Crop	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Khajuri		22.52	41.83	42.19	41.10	41.16	32.36
Kachuakala		22.52	41.83	42.19	41.10	41.16	32.36
Jigani		NA	NA	NA	NA	NA	NA
Amarpurapatti		NA	NA	NA	NA	NA	NA
Itailiyaraja		NA	NA	NA	NA	NA	NA
Sirsa		NA	NA	NA	NA	NA	NA
Beera		25.44	34.24	24.71	15.30	37.54	35.89
Pawai		17.93	34.24	46.59	40.96	36.19	32.27
Bilgawan		NA	NA	NA	NA	NA	NA
Itailiyabaja		NA	NA	NA	NA	NA	NA
Jamangawan		NA	NA	NA	NA	NA	NA
Lidhaurakhurd		10.79	37.09	19.89	32.10	44.04	N.A
Alipura		10.79	37.09	19.89	32.10	44.04	N.A
Masoodpura		5.80	36.98	29.08	31.20	44.10	N.A
Nagaraghat		7.40	28.69	19.92	34.40	35.80	N.A
Patha		7.40	28.69	19.92	34.40	35.80	N.A
Barano		7.40	28.69	19.92	34.40	35.80	N.A
Nekpura		10.00	34.85	19.05	33.70	43.87	N.A
No. of village		**19 villages**	**19 villages**	**19 villages**	**19 villages**	**19 villages**	**9 villages**

(Source: Data provided by Director, Agriculture Department)

Appendix 4.8

Details of Production in selected villages in BCP

(Reference: Paragraph no. 4.9)

(in quintal)

District	Block	Gram Panchayat	Village	crop	Area (hect.)	Productivity (qt./hect.)	Production (qt.)	Area (hect.)	Productivity (qt./hect.)	Production (qt.)	Production decreased in comparison to 2018-19	Production decreased in *per cent*
					2018-19			2020-21				
Prayagraj	Koraon	Pathertal	Pathertal	Gram	4	12.5	50	3	13.48	40.44	-10	-19
Prayagraj	Koraon	Mahuli	Mahuli	Gram	126	12.2	1537.2	118	10.36	1222.48	-315	-20
Prayagraj	Koraon	Pasana	Pasana	Gram	17	12.2	207.4	9	11.43	102.87	-105	-50
Prayagraj	Koraon	Barhula Kalan	Barhula Kalan	Gram	13	12.9	167.7	11	12.35	135.85	-32	-19
Prayagraj	Koraon	Belhat	Belhat	Gram	11	13.6	149.6	10	12.18	121.8	-28	-19
Prayagraj	Koraon	Belvaniya	Belvaniya	Gram	21	12.4	260.4	18	10.93	196.74	-64	-24
Prayagraj	Koraon	Belvaniya	Latifpur	Gram	9	12.4	111.6	10	10.93	109.3	-2	-2
Prayagraj	Koraon	Belvaniya	Jamohara	Gram	13	12.4	161.2	11	10.93	120.23	-41	-25
Prayagraj	Koraon	Sipaua	Sipaua	Gram	81	11.9	963.9	78	12.03	938.34	-26	-3
			Total	**9**	**295.00**	**12.50**	**3609.00**	**268.00**	**11.62**	**2988.05**		
Prayagraj	Koraon	Badhiyari Kalan	Badhiwari Kalan	Wheat	504	32.2	16228.8	502	26.39	13247.78	-2981	-18
Prayagraj	Koraon	Ulda	Garan	Wheat	66	34.8	2296.8	65	25.21	1638.65	-658	-29
Prayagraj	Koraon	Jadipur	Jadipur	Wheat	287	30.2	8667.4	286	27.23	7787.78	-880	-10
Prayagraj	Koraon	Pathertal	Pathertal	Wheat	434	27.2	11804.8	435	22.08	9604.8	-2200	-19
Prayagraj	Koraon	Saimha	Saimha	Wheat	123	33.0	4059	139	21.79	3028.81	-1030	-25
Prayagraj	Koraon	Sipaua	Sipaua	Wheat	282	26.1	7360.2	281	21.35	5999.35	-1361	-18
Prayagraj	Koraon	Bashgarhi	Dihipatka	Wheat	169	33.6	5678.4	169	25.49	4307.81	-1371	-24
Prayagraj	Koraon	Kheri	Kheri	Wheat	451	27.6	12447.6	448	22.1	9900.8	-2547	-20
Prayagraj	Koraon	Koundi	Koundi	Wheat	381	38.3	14592.3	380	24.09	9154.2	-5438	-37
Prayagraj	Koraon	Mahuli	Mahuli	Wheat	237	46.0	10902	238	27.4	6521.2	-4381	-40
Prayagraj	Koraon	Babhan Patti	Purarochai	Wheat	6	37.3	223.8	6	25.21	151.26	-73	-32

District	Block	Gram Panchayat	Village	crop	Area (hect.)	Productivity (qt./hect.)	Production (qt.)	Area (hect.)	Productivity (qt./hect.)	Production (qt.)	Production decreased in comparison to 2018-19	Production decreased in *per cent*
Prayagraj	Koraon	Pasana	Pasana	Wheat	324	33.1	10724.4	349	25.74	8983.26	-1741	-16
Prayagraj	Koraon	Barhula Kalan	Barhula Kalan	Wheat	429	26.4	11325.6	424	28.18	11948.32	623	5
Prayagraj	Koraon	Ghoongha	Ghoongha	Wheat	215	18.9	4072.1	215	20.19	4340.85	269	7
Prayagraj	Koraon	Gohani	Barhula Khurd	Wheat	126	34.8	4384.8	124	23.37	2897.88	-1487	-34
Prayagraj	Koraon	Salaiya	Salaiya	Wheat	238	26.4	6285.58	238	37.65	8960.7	2675	43
Prayagraj	Koraon	Belhat	Belhat	Wheat	222	33.1	7350.42	224	39.17	8774.08	1424	19
Prayagraj	Koraon	Belvaniya	Belvaniya	Wheat	374	32.6	12173.7	372	15.18	5646.96	-6527	-54
Prayagraj	Koraon	Belvaniya	Latifpur	Wheat	33	32.6	1074.15	33	15.18	500.94	-573	-53
Prayagraj	Koraon	Belvaniya	Jamohara	Wheat	39	32.6	1269.45	38	15.18	576.84	-693	-55
Prayagraj	Koraon	Para	Para	Wheat	68	25.8	1751	69	22.76	1570.44	-181	-10
Prayagraj	Koraon	Babhan Patti	Babhan Patti	Wheat	195	37.3	7273.5	193	25.21	4865.53	-2408	-33
Prayagraj	Manda	Piyari	Bakhar	Wheat	38	35.4	1346.72	36	24.71	889.56	-457	-34
Mirzapur	Jamalpur	Jafarabad	Kashihar	Wheat	15	36.4	546.3	15	34.14	512.1	-34	-6
Mirzapur	Jamalpur	Dhelwaspur	Kakrahi	Wheat	119	38.1	4533.9	109	40.01	4361.09	-173	-4
			Total	**25**	**5375.00**	**32.39**	**168372.72**	**5388.00**	**25.40**	**136170.99**		

Details of Production in selected villages in DCS

(in quintal)

Village	Crop	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Dhasan Canal System							
Bagipura	Gram	53.24	208.95	322.20	335.40	111.67	200.80
Itauragang		15.24	83.58	128.88	206.40	85.90	37.65
Musahi		NA	NA	NA	NA	NA	NA
Sikraudha-Rath		187.48	342.87	588.48	358.15	419.31	211.00
Gugarwara		65.40	62.34	171.64	209.95	232.95	211.00
Dhanaura		43.52	116.73	104.24	393.75	430.11	194.75
Dhanauri		163.20	648.50	534.23	693.00	684.99	492.00

Village	Crop	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Akauni		NA	NA	NA	NA	NA	NA
Dhagwan		666.12	267.80	239.66	170.73	394.68	667.92
Tolarawat		107.14	416.48	512.82	488.40	125.58	290.88
Jigani		NA	NA	NA	NA	NA	NA
Amarpurapatti		NA	NA	NA	NA	NA	NA
Itailiyaraja		NA	NA	NA	NA	NA	NA
Sirsa		NA	NA	NA	NA	NA	NA
Tolarkhagaran		NA	NA	NA	NA	NA	NA
Khajuri		5.95	167.35	333.89	499.95	306.35	192.21
Kachuakala		10.49	377.36	1623.51	1020.52	491.87	434.51
Beera		199.07	599.45	271.13	268.30	881.06	601.66
Pawai		72.14	105.91	106.81	122.79	186.70	NA
Bilgawan		NA	NA	NA	NA	NA	NA
Itailiyabaja		NA	NA	NA	NA	NA	NA
Jamangawan		NA	NA	NA	NA	NA	NA
Masoodpura		11.04	262.05	571.13	277.01	223.94	173.53
Lidhaurakhurd		NA	NA	NA	NA	NA	NA
Nagaraghat		208.76	533.23	239.33	120.99	203.91	131.59
Alipura		NA	NA	NA	NA	NA	NA
Nekpura		NA	NA	NA	NA	NA	NA
Patha		18.26	16.31	26.17	23.76	9.01	11.24
Barano		27.59	84.70	77.24	9.53	9.71	3.41
Total		**1854.75**	**4293.61**	**5851.35**	**5198.63**	**4797.74**	**3854.16**
No. of village		**16 villages**	**16 villages**	**16 villages**	**16 villages**	**16 villages**	**15 villages**
Bagipura	Wheat	3812.82	5996.32	7258.10	6789.31	6755.21	6042.96
Itauragang		863.28	1226.52	1523.80	1387.87	1463.11	1079.10
Musahi		NA	NA	NA	NA	NA	NA
Sikraudha-Rath		1864.17	3105.46	2407.68	2482.90	3816.80	NA
Gugarwara		532.62	1661.06	1276.80	1241.45	1321.20	NA
Dhanaura		2819.96	2977.73	3817.80	6902.74	8180.00	5473.53
Dhanauri		8874.00	18502.40	24361.20	27502.54	32106.50	16988.88

Village	Crop	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Akauni		NA	NA	NA	NA	NA	NA
Dhagwan		5535.36	5541.41	9130.76	10647.59	9796.68	6868.40
Tolarawat		11992.16	18265.61	20271.92	18567.80	14324.72	NA
Tolakhagaran		NA	NA	NA	NA	NA	NA
Khajuri		5858.65	8586.95	9771.50	11020.76	9892.81	6413.10
Kachuakala		11320.80	19389.33	21859.69	22757.89	22069.58	14805.02
Jigani		NA	NA	NA	NA	NA	NA
Amarpurapatti		NA	NA	NA	NA	NA	NA
Itailiyaraja		NA	NA	NA	NA	NA	NA
Sirsa		NA	NA	NA	NA	NA	NA
Beera		11621.12	11069.86	9147.72	5405.52	13244.49	12819.19
Pawai		6895.93	13439.34	18714.83	17276.11	15224.41	10042.75
Bilgawan		NA	NA	NA	NA	NA	NA
Itailiyabaja		NA	NA	NA	NA	NA	NA
Jamangawan		NA	NA	NA	NA	NA	NA
Lidhaurakhurd		1315.94	4944.17	2651.38	4250.68	4919.58	N.A
Alipura		873.72	3081.21	1652.34	2666.55	3970.21	N.A
Masoodpura		757.71	4818.72	3358.19	4048.26	6740.73	N.A
Nagaraghat		552.60	6036.09	3402.54	15423.55	15871.29	N.A
Patha		53.39	279.81	242.78	354.32	554.90	N.A
Barano		241.80	1672.91	1199.76	2301.08	2524.11	N.A
Nekpura		503.20	1218.74	704.28	1221.69	2177.71	N.A
Total		**76289.24**	**131813.65**	**142753.07**	**162248.62**	**174954.02**	**80532.9**
Lidhaurakhurd	Paddy	NA	NA	NA	NA	NA	NA
Nagaraghat		NA	NA	NA	NA	NA	NA
No. of village		**19 villages**	**19 villages**	**19 villages**	**19 villages**	**19 villages**	**9 villages**

(Source: Data provided by Director, Agriculture Department and data collected from Chief Revenue Officer and Sub-Divisional Magistrate of test checked districts), NA-Not made available