



Report of the Comptroller and Auditor General of India

Performance Audit on Outcomes in Surface Irrigation in Rajasthan



लोकहितार्थं सत्यनिष्ठा
Dedicated to Truth in Public Interest

Government of Rajasthan

Report No. 6 of the year 2021

**Report of the
Comptroller and Auditor General of India**

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Outcomes in Surface Irrigation in Rajasthan**

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Preface

This report for the year ended 31 March 2020 has been prepared for submission to the Governor of the State of Rajasthan under Article 151 of the constitution of India for being laid before the State Legislature.

The report contains significant results of the Performance Audit of “Outcomes in Surface Irrigation” relating to Water Resources Department of the Government of Rajasthan for the period 2014-15 to 2019-20. The audit has been carried out under the provisions of the Comptroller and Auditor General’s (Duties, Powers and Conditions of Service) Act, 1971 and the Regulations on Audit and Accounts, 2007 (amended in 2020) issued there under by the Comptroller and Auditor General of India.

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

Executive Summary

Rajasthan has one tenth of land area and five per cent of population of the country. However, its share in surface water resources is below two per cent. Agriculture remains a major occupation for the population of the state. Out of the total irrigated land of State, 69 per cent is irrigated through tube wells and open wells, placing enormous stress on ground water. In contrast, the share of surface irrigation in total gross irrigated area was only 31 per cent. Optimum use of surface water, therefore, assumes tremendous importance in the State. A performance audit on “Outcomes in Surface Irrigation” was conducted to assess the outcomes achieved in Surface Irrigation Projects being implemented in the State.

We noticed deficiencies in planning of projects. Inaccurate surveys led to modifications in designs after commencement of work with significant financial implications. Delayed acquisition (three to 19 years) of land resulted in avoidable expenditure of ₹ 33.62 crore.

(Paragraphs 3.1.1 to 3.1.2)

Projects were delayed by three to 39 years. There were cost overrun in all the selected projects which ranged between 2 to 3,536 per cent.

(Paragraphs 3.2 to 3.3)

Three projects became unviable due to deficient pre-construction survey and investigation.

(Paragraph 3.4)

In five projects, water released for irrigation was far less than that envisaged and reserved, and benefit of drinking water could also not be provided up to the level envisioned in the DPRs. In two projects, the water was released in excess than required leading to possibility of water logging and salinity.

(Paragraphs 3.5.2.2 and 3.5.2.3)

Unauthorised lifting of water from canal by nearby cultivators was noticed.

(Paragraph 3.5.2.4)

Rajasthan state was a pioneer in introducing, Participatory Irrigation Management by formulating Water Users’ Associations. However, the WUAs did not function as per the expectations which led to inefficient maintenance and management of the projects. Seepages from dams, damages in canals, vegetation and silting in canals were noticed which caused significant hindrance in providing intended benefits.

(Paragraphs 4.2 to 4.3)

Coordination among the line departments to monitor the progress of projects was not ensured. There was no formal mechanism in place for coordination between departments or regular oversight of the project outcomes.

(Paragraph 4.9)

Audit attempted an analysis of impact of the projects and assessment of what the projects achieved.

Four projects could not create any irrigation potential even after investment of ₹ 455.76 crore. Three projects could not utilise any IP created while the utilisation of created IP in rest of the projects ranged between 2.28 to 68.21 per cent. Thus, the projects could not provide the benefits envisaged while the cost increased manifold.

(Paragraph 5.1)

National Water Policy stipulates that water resource development projects should as far as possible be planned and developed as multi-purpose projects, with the provision for drinking water. Audit observed that only in three out of seven projects, drinking water was provided to intended beneficiaries. No water was provided to beneficiaries in respect of one project and only a part of beneficiaries were covered in respect of other three projects.

(Paragraph 5.2)

The cropping patterns were not ensured as per projections to achieve the intended yield. Project specific training/guidance about cropping pattern/technology/upgraded seeds etc. proposed in DPR was not provided.

(Paragraphs 5.3)

Only 65 per cent physical target for plantation was achieved.

(Paragraphs 5.5)

Key information such as preliminary survey records, data in respect of ground water and revenue for the period prior to DPR and project specific crop yield were not provided to audit. In the absence of availability of data and desired records with the Department, audit could not ascertain the project-wise comprehensive outcome precisely.

(Paragraph 5.7)

Chapter-I

Introduction

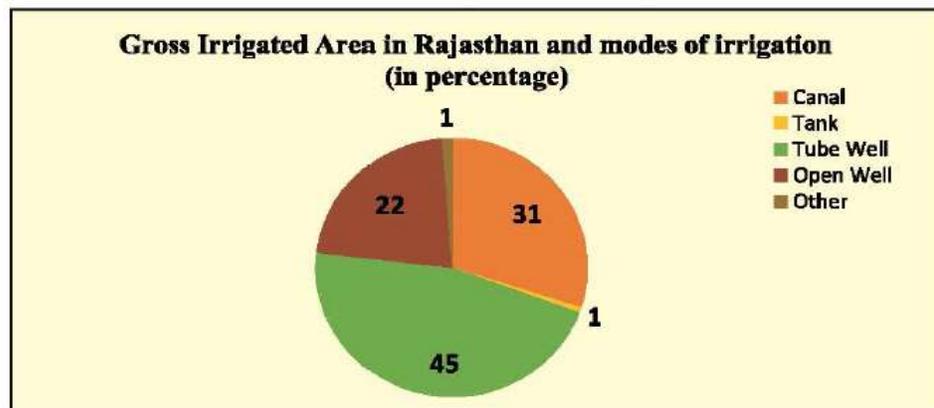
Chapter-I

Introduction

Rajasthan is the largest state of India in terms of area. It has one tenth of land area and five *per cent* of population of the country. However, its share in India's surface water resource is below two *per cent*. The state produces several agriculture products and agriculture remains a major occupation for the population of the state despite being a desert state. The major agriculture products of the state are wheat, soybean, mustard, bajra, maize, gram, groundnut etc. Out of the total area of 342.67 lakh hectare (*ha*) of Rajasthan, 272.11 lakh *ha* is cultivable. The State has Net Cropped Area of 254.37 lakh *ha*, out of which approximately 151.72 lakh *ha* (59.64 *per cent*) is rain fed and only 102.65 lakh *ha* (40.36 *per cent*) is irrigated.

In Rajasthan, primary source of water is scanty and rainfall is uncertain and confined to two months of the year. Nearly two thirds of the State is arid or semi-arid land. The uncertainty of the monsoon affects the agriculture production in the state. Optimum utilisation of the available water through irrigation network, thus plays a vital role in agrarian development of the state. Irrigation is the process of applying controlled amount of water to plants at needed intervals. Irrigation helps to grow agricultural crops and revegetate disturbed soils in dry areas and during periods of less than average rainfall. Irrigation sources are broadly divided into: surface water, ground water, and rainfed or a combination of any of the sources. As depicted in the chart below, in Rajasthan even now 69 *per cent* of irrigated land is irrigated through tube wells and open wells using ground water. This dependence on tube wells and open wells places enormous stress on ground water. In contrast, the share of surface irrigation in total gross irrigated area as per annual progress report of WRD was only 31 *per cent*.

Chart.1- Details¹ of Irrigated Area in Rajasthan



Source: Annual progress report of WRD 2019-20

¹ Canal-31.80 lakh *ha*, Tank-0.69 lakh *ha*, Tube well 49.00 lakh *ha*, open well-23.32 lakh *ha* and other source-1.22 lakh *ha*.

In this context, the development of efficient network of surface irrigation assumes great importance for the State. Surface irrigation involves distribution of water over the soil surface by gravity. Surface water is more reliable and prevails over the remaining two kinds of irrigation sources. Surface irrigation system draws water from natural rivers or tanks as source. The surface irrigation network broadly consists of:

- (i) Reservoirs including balancing reservoirs
- (ii) Main Canals
- (iii) Minors & sub-minors
- (iv) Distributary network

Irrigation projects are designated as major, medium and minor on the basis of command area they serve i.e. larger than 10,000 *ha*, between 2,000 to 10,000 *ha* and less than 2,000 *ha* respectively. At the time of independence there was one major, 43 medium and 2,272 minor irrigation projects and irrigation potential was only four lakh hectare in the State.

The Water Resources Department (WRD) (erstwhile Irrigation Department) was set up in the State with the objective of optimum utilization of surface water and inter-state river basin water for the purpose of agriculture and flood control. The department has created irrigation potential of 38.81 lakh *ha* up to March 2020. The position of surface irrigation projects is given in **Table 1.1**.

Table-1.1: Irrigation projects

S.No.	Category	Completed	Ongoing	Total
1	Major	10	06	16
2	Medium	110	06	116
3	Minor	3,339	45	3,384
	Total	3,459	57	3,516

1.1 Main Outcomes Identified

The following broad outcomes were envisaged as outcome in Detailed Project Reports (DPR) and Administrative Reports for the surface irrigation Projects in the state:

- 1) Increase in crop yield through
 - (i) Creation of enhanced irrigation potential (IP)
 - (ii) Change of cropping pattern
- 2) Improving availability of water for human consumption.
- 3) Ecological and Environmental Preservation.
- 4) Participatory Irrigation Management through Water Users Association (WUA)

1.2 Roles and Responsibilities

The following departments are involved in achieving the intended outcomes:

- (i) **Water Resources Department:** Nodal agency to execute the works related to establishment of suitable irrigation system to facilitate the cultivators and providing drinking water facility to people.
- (ii) **Agriculture Department:** To give inputs regarding estimation of the crop wise benefits and cropping pattern of the projects. As per the Guidelines for preparation of Detailed Project Report (DPR) of irrigation projects, Agriculture Department is consulted for Benefit Cost Ratio (BCR) calculation and deciding the cropping pattern.
- (iii) **Public Health Engineering Department:** Responsible for providing drinking water along with drawing and design for projects, where outcome included provision of drinking water.
- (iv) **Forest Department:** Responsible for sanctions/conversion of forest land to non-forest land and plantation work in the project area, on the basis of request furnished by the WRD.
- (v) **Revenue Department:** Responsible for Girdawari, i.e. documentation to record name of owner, name of cultivator, land/khasra number, area, kind of land, cultivated and non- cultivated area, source of irrigation, name of crop and its conditions, revenue and rate of revenue, to be conducted at least twice in a year. The department is also responsible for revenue collection.

1.3 Previous coverage in Audit Reports

Audit of **Surface Irrigation with outcome focus** has not been conducted earlier. However, one of the major irrigation project viz. Narmada Canal Project was periodically audited as part of Compliance Audit. A Performance Audit on the subject 'Irrigation potential created in Narmada Canal Project' was conducted in the year 2016. Status of Major findings and PAC recommendations thereon is given in **Appendix-I**.

Chapter-II

Audit Approach

Chapter-II

Audit Approach

This performance audit focuses specifically on the Outcomes in Surface Irrigation. The benefits envisaged in the DPR of major/medium irrigation projects and Administrative Estimates of minor irrigation projects were taken as the criteria for the purpose of identification of tangible outcomes and their assessment. Audit sought to analyse the gaps in achievement of outcomes (if any) and the underlying causes & factors behind such under-achievement.

2.1 Audit objectives

The audit objectives were to assess whether:

- (i)** The Irrigation Projects deliverables were planned, executed and managed in accordance with the intended objectives;
- (ii)** Coordination with all stakeholders was ensured at all stages for sustainable extension of benefits and achievement of intended outcomes.

2.2 Audit criteria

The Performance Audit derived the criteria from the following sources:

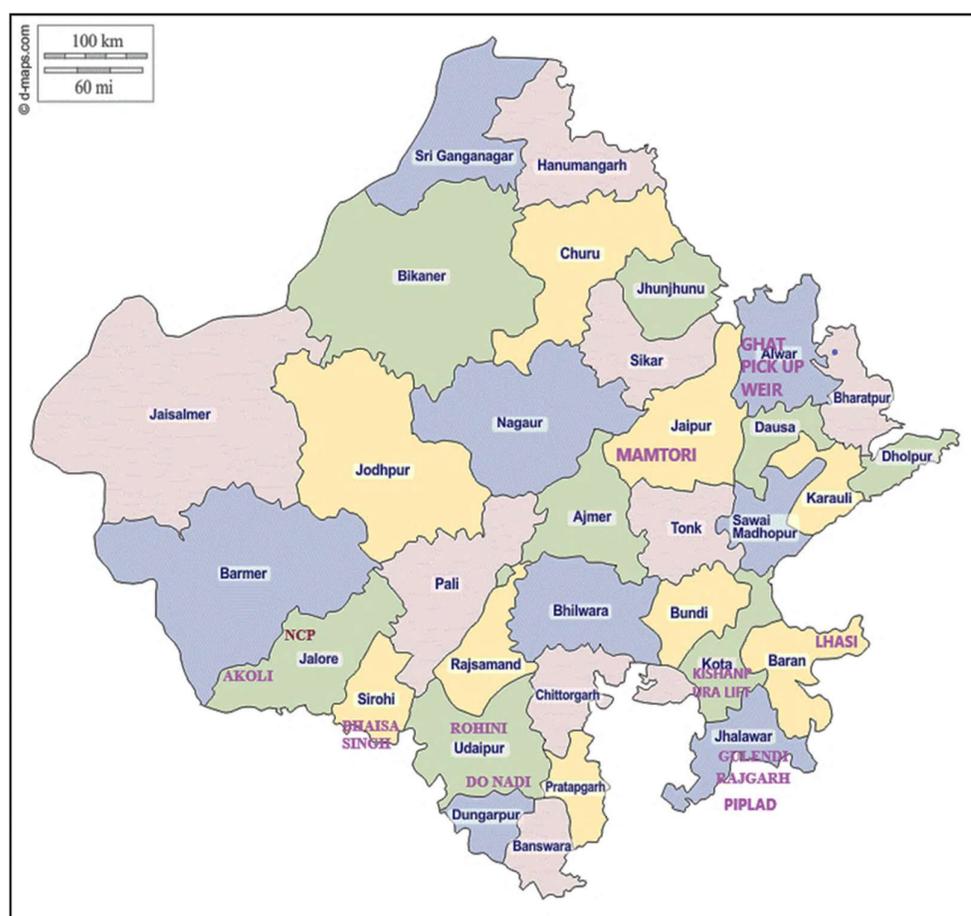
- (i)** Irrigation Manual
- (ii)** Public Work Finance and Accounts Rules (PWF&AR)
- (iii)** Guidelines issued by Central Water Commission (CWC) for preparation of DPRs 2010 and DPRs of selected projects
- (iv)** Forest Conservation Act, 1980
- (v)** Environment (Protection) Act, 1986 and Environment Impact Assessment Notification, 1994 and subsequent amendments
- (vi)** Land Acquisition Act, 1894 and subsequent orders
- (vii)** Government Resolutions and Instructions/Orders
- (viii)** CWC guidelines, 2002 for Performance evaluation of irrigation system
- (ix)** National Resettlement and Rehabilitation Policy
- (x)** Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013
- (xi)** National and State Water Policy

2.3 Audit scope and selection of projects for scrutiny

The field study covered period from April 2014 to March 2019. Performance Audit was conducted during the period November 2019 to February 2020 of selected ongoing/completed projects. However, on the basis of replies and information, this was updated up to March 2020. The PA covered the activities executed in the projects since their inception.

For detailed scrutiny, the Performance Audit covered a sample of one Major¹, three Medium² and eight Minor³ irrigation projects ongoing/completed during January 2011 to March 2017. Presently, eight projects are completed⁴ and four are ongoing. The major project (NCP) was selected on the request of Secretary (WRD) during the entry conference. The other projects were selected through random sampling using IDEA software.

The locations of the selected projects are depicted in the following map:



¹ Narmada Canal Project.
² Piplad, Lhasi and Rajgarh.
³ Akoli, Bhaisa Singh, Do Nadi, Gulendi, Ghat Pick up Weir, Kishanpura, Mamtori and Rohini.
⁴ Piplad, Akoli, Do Nadi, Gulendi, Ghat Pick up Weir, Kishanpura, Mamtori and Rohini.

Table 2.1: Details of the Selected projects

Name of Projects and components	Project Commencement and Completion month	Source of water and Location	Sanctioned Project cost (₹ in crore)	Expected outcomes i.e. creation of IP in ha (based on the DPR)	Project area (CCA in hectare)
Narmada Canal Project	03/1996, Ongoing	Narmada River (Jalore)	3,124	1.51 lakh	2.46 lakh
Lhasi Medium Irrigation Project	05/2007, ongoing	Lhasi River (Baran)	204.23	2,609	2,539
Piplad Medium Irrigation Project	08/2006 and 12/2018	Piplad River (Jhalawar)	91.21	3,549	4,688
Rajgarh Medium Irrigation Project	06/2012, ongoing	Ahu & Kanthari River (Jhalawar)	386.82	8,568	6,827
Akoli Minor Irrigation Project	12/2011 and 09/2017	Bandi River (Jalore)	21.81	458	539
Bhaisa Singh Minor Irrigation Project	10/1978, ongoing	Sukdi River (Sirohi)	18.18	350	419
Do Nadi Minor Irrigation Project	09/1996 and 06/2010	Som River (Udaipur)	9.09	547.12	316
Ghat Pick up Weir Minor Irrigation Project ⁵	09/2007 and 04/2014	Ruparail River (Alwar)	15.03	0	0
Gulendi Minor Irrigation Project	11/2000 and 11/2011	Gulendi River (Jhalawar)	30.21	2,535	1,950
Kishanpura Minor Irrigation Project	07/1999 and 02/2012	Chambal River (Kota)	7.20	1,455	1,938
Mamtori Minor Irrigation Project	08/2008 and 02/2019	Banganga River (Jaipur)	1.14	64	78
Rohini Minor Irrigation Project	07/1999 and 10/2013	Local Nallah (Udaipur)	9.53	365.94	276

2.4 Audit Methodology

The field study was conducted for the period April 2014 to March 2019. Audit scrutinised the records at the offices of the Chief Engineer/Zone offices⁶/Circle

⁵ For flood irrigation, during rainy season.

⁶ Kota, Jaipur, Udaipur and Jodhpur.

Offices^{7/} Executive Engineers⁸ of WRD and line departments (i) Deputy Directors, Agriculture⁹, (ii) Executive Engineers¹⁰ of Public Health Engineering Department (PHED) and (iii) Tehsils¹¹ of Revenue Department. Further, joint site visits/physical verification of the selected projects was also conducted by audit.

An entry conference was held with Secretary WRD on 17 September 2019, in which the audit methodology, scope, objectives and criteria were discussed. An exit conference was held with Principal Secretary WRD and his team on 05 March 2021 wherein the findings of the Performance Audit and reply given by the Department were discussed. In respect of some points, the officers of the Department put forth certain additional facts and desired to give supplementary reply. Accordingly, the supplementary reply was also furnished on 10 March 2021. The reply given by the Department has been factored in drafting the Report. Audit acknowledges the cooperation and assistance extended by the Departments and test checked units visited in conducting the performance audit.

2.5 Audit approach to assess outcomes in Surface Irrigation

Outcomes are generally measured in terms of achievement of the long-term goals of a project. For any irrigation project, creation and utilization of the contemplated irrigation potential is the primary objective. This would increase the agricultural production and yield, provide water for drinking purpose and pisciculture, increase tourism etc.

Audit assessed the outcomes in surface irrigation by scrutinizing the Detailed Project Report (DPR), which is prepared before commencement of the project. The quantifiable benefits arising from Benefit-Cost Ratio (BCR) bench marks, change in cropping patterns and establishment of Participatory Irrigation Management were scrutinized in the project executing agency (WRD) and line departments i.e. Agriculture Department and PHED through applicable rules, regulations and records.

2.6 Audit Constraints

During the course of study of outcomes in surface irrigation, audit requested for some basic information/records from the department. However, even after repeated requests, the following information were not provided to audit.

- (i) Preliminary surveys were necessary for preparing the proposals for the projects. Records related to preliminary survey, proposals and correspondences were not made available.

⁷ Baran, Bharatpur, Jaipur, Jhalawar, Jodhpur, Kota, Sanchore and Udaipur.

⁸ Jaipur, Alwar, Kota, Jhalawar, Chhabra, Bhawani Mandi, Sanchore (I to V), Jalore, Sirohi, Salumbar, Udaipur and Aklera.

⁹ Baran, Jaipur, Jalore, Jhalawar, Kota and Udaipur.

¹⁰ Sanchore, Bhawani Mandi, Abu Road, Chhabra, Jhalawar and Salumbar.

¹¹ Kota, Bhawani Mandi, Aklera, Kotra, Kherwada, Jalore and Sanchore.

- (ii)** Data in respect of ground water and revenue for the period prior to DPR was not made available.
- (iii)** Data of project specific crop yield were not captured by the Agriculture Department.

In order to assess outcome of projects, project wise data were necessary. However, project wise performance data were not maintained by the Department. The data was maintained for individual districts as a whole, from which the outcome derived from the individual project cannot be identified. In absence of availability of data and desired records with Department, audit could not ascertain the project-wise comprehensive outcome precisely.

State Government replied (March 2021) that all the relevant documents were submitted. Reply is not factual as the information mentioned above was not made available to audit.

Chapter-III
Planning, Execution and
Financial Management of
Irrigation Projects

Chapter-III

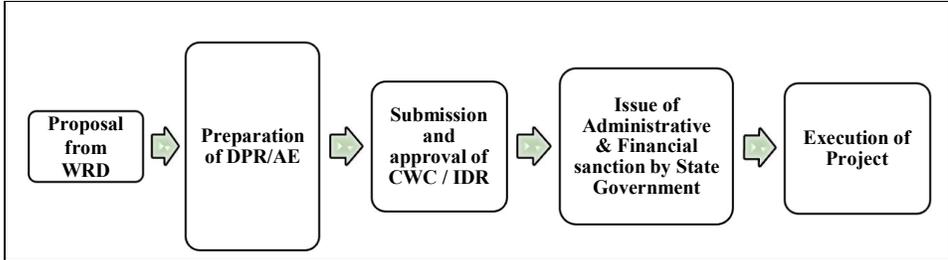
Planning, Execution and Financial Management of Irrigation Projects

Irrigation projects are essentially long term projects and involve huge investment not only in terms of financial resources but also as regards technicalities of work execution, maintenance plan and monitoring systems. The planning of the project depends on various factors including the outcomes intended, stakeholders involved, the geographical location of the project etc.

While enhancement of irrigation potential (IP) was a common objective for all irrigation projects, there were various other sub objectives included in the plans. Some of the projects had provision for supply of drinking water to villages and towns also in their plans. Out of the selected projects Narmada, Lhasi, Piplad, Rajgarh, Do Nadi, Bhaisa Singh and Gulendi Projects were executed for both irrigation and drinking water purposes. The remaining projects viz. Akoli, Ghat Pick up Weir, Kishanpura, Mamtori and Rohini Projects were developed solely for irrigation purpose.

Irrigation projects planning process generally includes a proposal from WRD, preparation of Detailed Project Report (DPR) ¹/Administrative Estimate, scrutiny of major and medium projects' DPR by Central Water Committee (CWC) for determining the techno-economic viability of the project, issue of administrative and financial sanction for the project by State Government after clearance of project from CWC. Minor irrigation projects were approved by Investigation, Design and Research (ID&R) Unit of State Water Resources Planning Department. The process flow chart for the same is given below:

Process flow chart showing summary of Irrigation Projects Planning Process



In all selected projects, funds were provided through the regular budget of the department under various Central/State schemes. This was followed by planning the work execution and establishing the monitoring system. A

¹ The DPR/Administrative Estimate contains the detailed justification of the project, area affected by it, steps involved in execution, estimated cost and benefits etc. During finalization of DPR, feedback/comments were also taken from other stakeholder line departments like Agriculture and Public Health Engineering Department. DPR preparation was to be followed by land acquisition and taking statutory clearances like environment and forest. This has to be initiated by nodal department (WRD).

successful execution of project and effective delivery of outcome required detailed planning at each stage of project.

3.1 Deficiencies in Planning of Projects

Preparation of Detailed Project Report (DPR) includes data of surveys, geological investigations, seismic investigation, hydrology, design etc. and these DPRs were approved by CWC (Major and Medium Projects). Typically, preparation of Administrative Estimates for Minor Irrigation Projects was done departmentally.

During audit, we noticed several basic planning deficiencies which had a cascading effect on completion of projects and led to time and cost over- run. The details are as follows:

3.1.1 Deficiencies in Preparation of DPR

As per CWC Guidelines for submission, appraisal and clearance of irrigation and multipurpose projects, DPRs submitted by State Government are subjected to techno-economic scrutiny by CWC. Block-wise information on command area, conjunctive use of ground water, participatory irrigation management, benefits other than irrigation (like pisciculture, tourism etc.) are also required to be furnished for each project.

Survey was an important tool to assess the requirements of the project and had to be completed before commencement of work. If a survey is not done accurately, it can lead to change in design at the execution stage, delay in completion of the project and increase in cost.

Rule 285 of PWF&AR stipulates that after working out all technical and working details and on completion of surveys and investigation, formulation of working drawing/designs, detailed technical estimates should be done and got sanctioned.

During audit, following deficiencies were noticed in preparation of DPRs and conducting surveys:

(i) As mentioned in para 2.6, data in respect of preliminary surveys conducted for preparing the proposals were not provided to Audit. Thus, in absence of key details, specific deficiencies could not be pointed out in audit. However, in all the selected projects, Audit noticed changes in quantities of items, modifications in scope of work and structural engineering and designs after commencement of work with significant financial implication. Hence, audit is of the view that preliminary surveys were either not conducted or not conducted properly leading to revisions in costs of the selected projects as detailed in **Table 3.3**.

For instance, in case of Narmada Canal Project (NCP) initially the cost was sanctioned (March 1996) as ₹ 467.53 crore, which was revised to ₹ 3,124 crore i.e. increased by 568 *per cent* of initial cost, due to modifications proposed in the project. Pisciculture benefits from these projects were neither ascertained

nor taken into consideration in planning, although fisheries potential was seen in Piplad, Lhasi and Gulendi.

State Government stated (March 2021) that the project cost of NCP was revised to ₹ 1,541.36 crore in August 2007 due to introduction of pressure irrigation technique due to which the irrigated area increased from 1.35 Lakh ha to 2.46 lakh ha. Further, the original proposal was for intensive irrigation which was changed to extensive irrigation. Hence, the increase in cost was only by ₹ 1,582.64 crore i.e. only 102.68 *per cent* instead of 568 *per cent*. Reply is not tenable as initially the cost was sanctioned as ₹ 467.53 crore and later due to changes in the project, the cost was increased by 568 *per cent*.

(ii) Deficiencies in planning were also seen in Lhasi and Rajgarh projects as project proposals did not include provision of water course/field channel which was essential component of any irrigation project. Lack of planning of water course/field channel has resulted in non-execution of these works in respective projects.

State Government stated (March 2021) that in Rajgarh project, the construction of water Course and on-field development activities were conducted by the Command Area Development Department. The fact, however, remains that water course and field development activities were not executed till now. Consequently, the intended benefits could not be achieved.

(iii) In NCP, it was noticed that the construction of Surachand minor of Bhimguda Distributary was completed in September 2011. The Cultivable Command Area (CCA) proposed for the minor was 6,369.31 ha and 51 *diggies*² in the command area were to be constructed.

During the period May 2011 to January 2012, Department found that 3,391.04 ha of CCA to be covered by 25 *diggies* were under government *padat* land³. *Padat* land in command area was not suitable for developing of network for irrigation purposes. Consequently, 25 *diggies* were removed from the umbrella of CCA. In the remaining CCA of 2,978.27 ha, the work of laying of pipeline, installation of pump set and construction of remaining 26 *diggies* was executed (May 2015), with a delay of 320 days due to inaccurate survey and consequential revision in drawing and design.

State Government stated (March 2021) that the area of 25 *diggies* was lying either under forest land or was saline. The reply confirms the audit contention that proper survey was not done during the period of planning and owing to this, project was delayed.

3.1.2 Planning for land acquisition and clearances

For any project of this magnitude, land acquisition is one of the major steps. According to section 4 to 11A of Land Acquisition Act, 1894, whenever, it appears to the appropriate Government that land in any area is required or likely

² Water Storage tank.

³ *Padat* land- un-cultivated or fallow land.

to be required for any public purpose, a notification to that effect along with details of the land to be acquired in rural and urban areas shall be published. Further, as per Rule 298 of the Public Works Financial & Accounts Rules, where land has to be acquired for a particular work, a notification for the acquisition of the land under Land Acquisition Act should invariably be issued before the administrative approval is given.

Delay in land acquisition and transfer of land in the name of department can lead to delays and litigation at the later stage. Cases noticed in audit are detailed below:

(i) Delay in acquisition of land

Scrutiny of records revealed that Administrative and Financial (A&F) sanctions of Akoli, Rajgarh, Piplad, Lhasi and NCP irrigation projects were accorded during the years 1996 to 2011. However, the department delayed acquisition of land from 3 to 19 years from date of issue of A&F sanctions. For example, in Piplad Medium Irrigation Project, A&F sanction was issued in August 2006, however, payment of land acquisition was made, after a delay of 11 years, in May 2017. This resulted in avoidable expenditure of ₹ 33.62 crore due to payment to land holders at increased rates as per new Act⁴. Details of avoidable expenditure due to delay in land acquisition are given in **Appendix-II**. Audit sought the reasons for delay in acquisition of land, however, reasons for same, were not made available to audit. Further, no reasons were found on record relating to the delayed process of land acquisition.

State Government stated (March 2021) that in respect of Lhasi, the land compensation was made for canals, which were sanctioned in the year 2017. Reply was not tenable as the project was sanctioned in the year 2007 and DPR of the project had provision of land acquisition for canal works. However, department acquired land after ten years for canal.

In respect of Rajgarh, it was stated that final awards were prepared and issued as per provisions of new Act. Reply is not tenable as the compensation of land should have been awarded before the new Act came in force as A & F of the project was approved in September 2012.

In respect of NCP it stated that the land for a particular canal is acquired only after detailed survey and L-section of the canal was got approved. Land compensation is paid as per rates approved in the award sanctioned by the competent authority. Reply is not acceptable as A&F of the work was accorded in the years 1996 & 2010 and payment was made in the year 2015, up to which new land acquisition act came in force which led to avoidable expenditure.

For Akoli it was stated that there had been no delay in land acquisition and all procedural steps to acquire land were adopted but rates were changed. Reply is

⁴ Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013, effective from 1 April 2014.

not acceptable as A&F of the work was accorded in the year 2011 and payment was made in the year 2015 which led to avoidable expenditure.

(ii) Non-mutation of land

Scrutiny of records of selected projects revealed that the department had acquired land for construction of dam, canal/ distributaries/ minors/ sub-minors. However, mutation of all the acquired land in the name of the department had not been executed as per details given in **Table 3.1**.

Table 3.1: Non-mutation of Land

S. No.	Name of Project	Area of land acquired (in ha)	Mutation of Land (in ha)
1	Narmada Canal Project	4,830	Nil
2	Lhasi	646.96	604.57
3	Piplad	800	215
4	Ghat Pick Up Weir	4.00	Nil
5	Kishanpura Lift	0.05	Nil
6	Do Nadi	28.53	Nil

Thus, in absence of mutation, department had not obtained clear title of the acquired land. State Government stated (March 2021) that efforts are being made for mutation.

(iii) Incorrect certification regarding non-involvement of forest land

The Rohini Minor Irrigation Project was initially sanctioned (July 1999), based on a certificate to the effect that no forest land was involved. However, it was noticed that project had 4.32 ha forest land. Subsequently, department applied (December 2004) for forest clearance in the submergence area. The forest clearance was received in December 2007. The revised Administrative & Financial (A&F) approvals were received in July 2011. The work was finally completed in October 2013. Thus, sanctioning of project based on incorrect certification regarding non-involvement of forest land has delayed the project from July 1999 till receipt of forest clearance (December 2007).

State Government accepted that the project got delayed due to delay in forest clearance and delay in revision of A&F.

3.2 Time overrun of Projects

Timely completion of any project involving public money is crucial for success of project. This is more so for projects directly affecting food production and development of an area. Delays can not only deprive the intended beneficiaries but also result in increased cost to public exchequer. Delays can also add to the complexities of project as project parameters can change with passage of time.

None of the selected projects was completed within stipulated time period. Out of the 12 projects it was found that eight projects had been completed with delays ranging from three to 12 years and four projects were not yet completed, even after a period ranging from six to 39 years. The time overrun in respect of selected projects is depicted in **Chart 2** below:

Chart 2: Time overrun of selected Projects

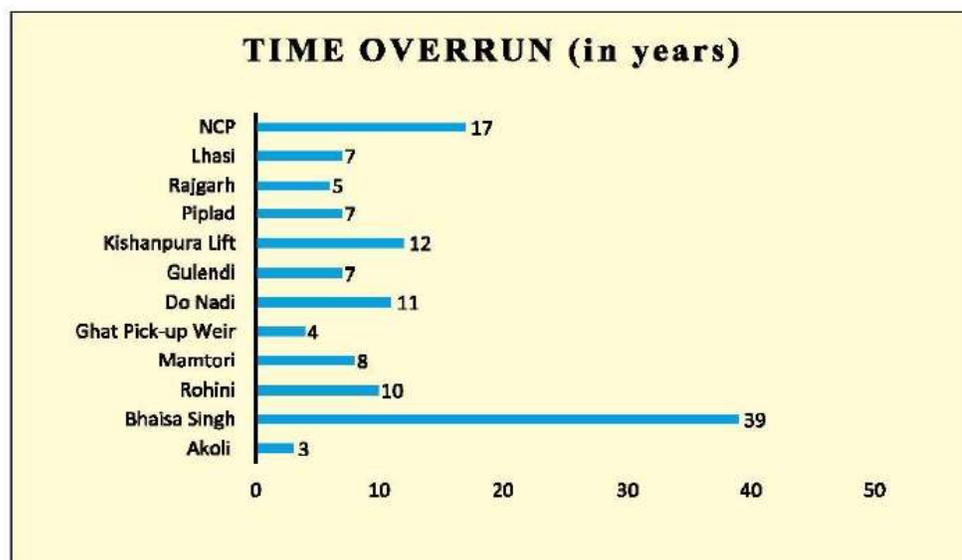


Table 3.2: Statement showing the detail of time over-run in projects as on 31 March 2020

S. No.	Name of Project	Date of Commencement	Schedule completion	Actual completion	Time Over-run (in Years)	Reasons for delay
1	Narmada Canal Project	March 1996	March 2003	WIP	17	Non award of civil work and mechanical work simultaneously.
2	Lhasi Medium Project	May 2007	May 2013	WIP	07	Delay in land acquisition, change in design, non-awarding of canal works simultaneously with dam work.
3	Piplad Medium Project	August 2006	June 2011	December 2018	07	Delay in land acquisition, non-awarding of canal works simultaneously with dam work.
4	Rajgarh Medium Project	June 2012	June 2015	WIP	05	Non-awarding of canal works simultaneously with dam work, delay in land acquisition.
5	Akoli MIP	December 2011	March 2014	September 2017	03	Change in drawing and design of dam, delay in sanction of extra excess works.
6	Bhaisa singh MIP	October 1978	January 1981	WIP	39	Acquisition of land by RIICO and non-construction of canal
7	Do-nadi MIP	September 1996	March 1999	June 2010	11	Dispute with contractor, inadequate allotment of funds and interruption in works by Forest Department.

S. No.	Name of Project	Date of Commencement	Schedule completion	Actual completion	Time Over-run (in Years)	Reasons for delay
8	Ghat Pick UP MIP	September 2007	March 2010	April 2014	04	Delay in finalisation of drawing and design.
9	Gulendi MIP	November 2000	December 2004	November 2011	07	Delay in land acquisition, dispute with contractor and change in design.
10	Kishanpura Lift MIP	July 1999	July 2000	February 2012	12	Delay in finalisation of drawing and design, non-award of civil work and mechanical work simultaneously.
11	Mamtori MIP	August 2008	March 2011	February 2019	08	Delay in starting of work, dispute with Forest Department.
12	Rohini MIP	July 1999	March 2003	October 2013	10	Delay in Forest clearance.

Major reasons that led to delay in completion and consequent time overrun included planning deficiencies such as delay in finalization of design of dam, non-awarding the canal work simultaneously with dam work, lack of coordination between civil and mechanical work etc. In some cases, CCA could not be created in time due to delay in land acquisition, dispute with contractors and inadequate allotment of fund.

State Government accepted the facts (March 2021).

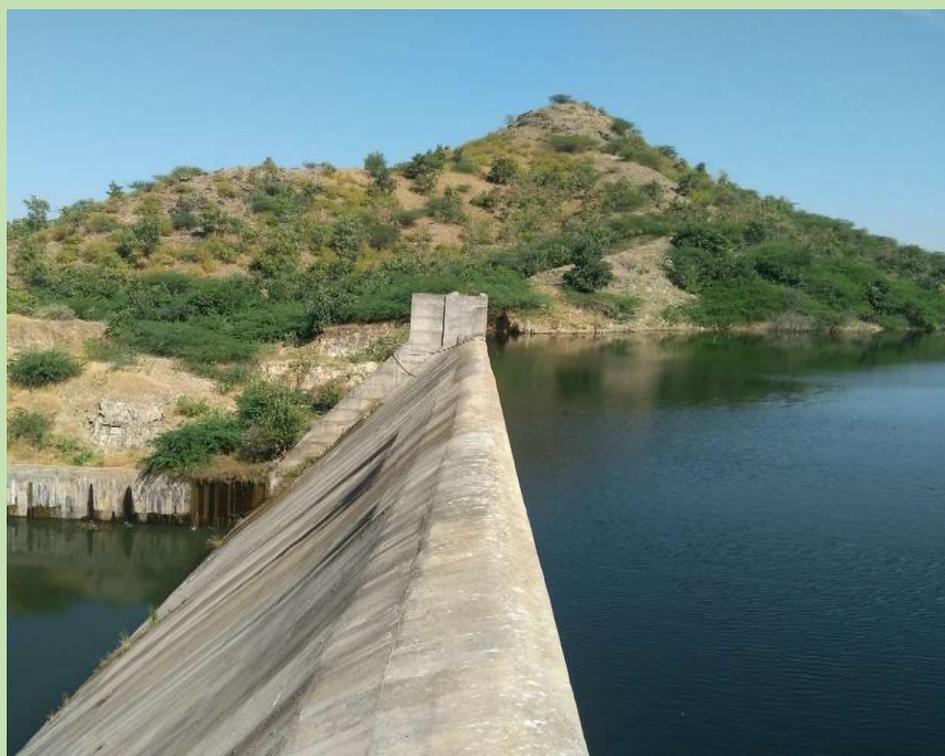
During our audit we came across a case of Bhaisa Singh Irrigation Project where the project continued to be executed for 42 years and yet no outcome could be achieved. Details are given in the case study below:

Case Study- Bhaisa Singh Irrigation Project

An administrative sanction amounting to ₹ 0.50 crore was issued (1978) under Tribal Area Development, for construction of a dam near village Bhaisa Singh in Tehsil Abu Road for irrigation purpose with water storage capacity of 216 Mcft. The project was executed for both irrigation purpose with planned IP of 350 ha and provision of drinking water.

Contracts for construction of dam, were executed in the year 1978-79. The work was to be completed in the year 1981. However, the work was left incomplete in the year 1979-80 by the contractor due to dispute between Contractor and department. Subsequently, due to acquisition of 931 acre land by Rajasthan State Industrial Development & Investment Corporation (RIICO) from total command area of 2,095 acre and additional provision of drinking water for Abu Road town, a revised administrative approval of ₹ 8.23 crore was accorded (2001). There was a part of forest land coming under submergence, however the work was started in the year 2002 without clearance under the Forest (Conservation) Act, 1980. This resulted in suspension of the work in the month of March 2003. Finally, Government applied for environment clearance (February 2006) and got the same in December 2008. Meanwhile, Hydrology of the dam was revised by WRD and revised administrative sanction of ₹ 18.18 crore was accorded (December 2010) by the State Government.

The dam was completed in June 2014 at a cost of ₹ 15.12 crore. No irrigation facility could be achieved from the dam due to reduction in command area as RIICO acquired approximately 45 per cent of land required and canals were not constructed. After two years of the completion of dam, it was decided to hand over the project to PHED for providing drinking water to Abu Road Town (October 2016). However, water supply to Abu Road Town was not started till March 2020. On enquiry, the executive agency Rajasthan Urban Infrastructure Development Project replied (January 2021) that work order was issued for water supply and distribution network improvement and work would be completed in the year 2024. Thus, neither irrigation facility nor drinking water facility could be provided (March 2020) though the work was taken up 42 years ago. Further, an investment of ₹ 15.12 crore along with efforts of various agencies for more than four decades came to a naught and the intended outcomes could not be achieved till date. The State Government accepted the facts (March 2021).



Dam of Bhaisa Singh Irrigation Project

3.3 Cost overrun

For any major project involving public money, keeping the expenditure under budgeted amount is one of the major challenges before project management. In a complex irrigation project, inadequacies in planning or inefficiencies in execution can lead to manifold increase in costs and in turn, can even create an obstacle in completion of project. For all these irrigation projects, the project cost was estimated in DPR and accordingly funds were provided in the departmental budget on yearly basis. The details of project cost in the selected projects were as given in **Table 3.3**.

Table 3.3: Details of cost of the Projects

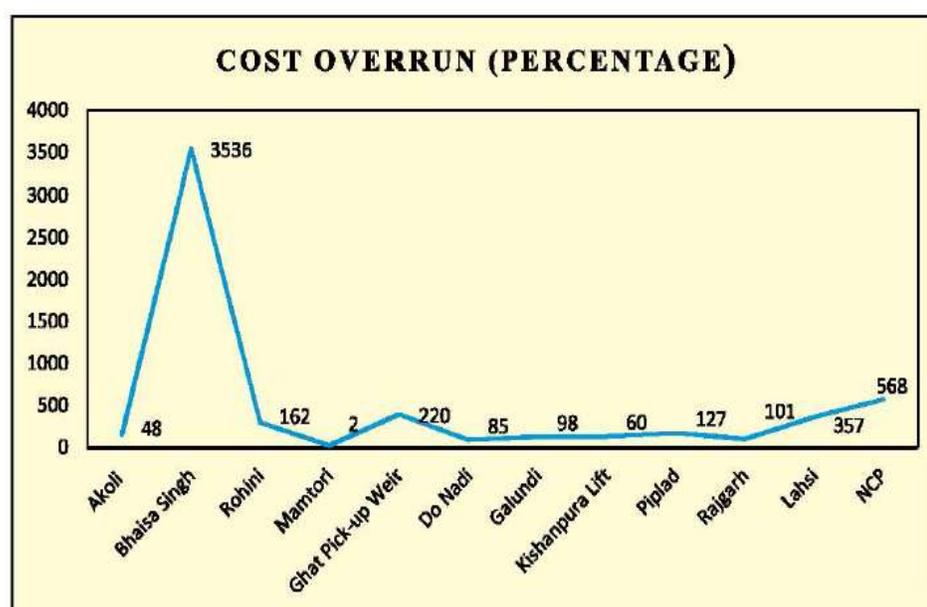
(₹ in crore)

Project	Original sanction	Revised sanction	Actual Expenditure	Cost increase (in percentage)	Status
NCP	467.53	3,124	2,969.74	568	Incomplete
Lhasi	44.73	204.23	215.38	357	Incomplete, even after excess expenditure
Piplad	33.64	91.21	76.49	127	Completed
Rajgarh	192.13	386.82	429.78	101	Incomplete, even after excess expenditure
Akoli	8.84	21.81	13.13	48	Completed
Bhaisa Singh	0.50	18.18	15.12	3,536	Incomplete, handed over to PHED
Do Nadi	4.91	9.09	9.10	85	Completed
Ghat Pick up Weir	3.10	15.03	9.91	220	Completed
Gulendi	13.46	30.21	26.62	98	Completed
Kishanpura	3.44	7.20	5.50	60	Completed
Mamtori	0.93	1.14	0.95	2	Completed
Rohini	2.43	9.53	6.36	162	Completed

* In cases where projects have been completed, percentage of cost increase has been calculated on the basis of actual expenditure. In other cases, where projects are in process, cost increase percentage has been calculated on the basis of revised sanction.

It is apparent from the table, that all the projects had significant cost overrun. The cost overrun of the projects is depicted in **Chart 3** below:

Chart 3: Cost Overrun percentage of selected projects



The cost overrun is indicative of planning deficiencies such as non-award of civil and mechanical works simultaneously, clearance of forest land, timely land acquisition etc. and absence of professional project management.

State Government accepted (March 2021) the facts in all projects except Rajgarh for which it was stated that the total expenditure was ₹ 393.52 crore up to January 2020. The total expenditure shown in the reply was not factual as in fact expenditure of ₹ 429.78 crore was incurred as per monthly accounts of the division.

3.4 Construction of unviable projects

(a) Akoli MIP

As per category of catchment area and run off, 27.583 Mcum, 0.591 Mcum and 9.401 Mcum water was to be received in the dam at 956 mm, 211 mm and 594 mm rainfall at Jalore during 2017, 2018 and 2019 respectively. However, water was received for full storage capacity (1.72 Mcum) for four months in the year 2017 and after that no water was received during the years 2018 and 2019. Non/short receipt of water in the newly constructed project despite good rainfall, reflects deficient pre- construction survey.

State Government replied that the rainfall received in catchment area was meagre during 2018 & 2019 and site selection is unquestionable as a flood lift of 1.6 meter in 2017 shows enormous inflow in dam. The Government's reply is not tenable as 594 mm rainfall was received during 2019 against 330.75 mm yearly rainfall estimated for achieving full storage capacity and still no water was received.

(b) Ghat Pick up Weir MIP

The project was constructed with an anticipation of receiving 64.577 Mcum water at 484.50 mm rainfall. However, no water was stored in 2014 to 2019 except a little water in 2016 despite rainfall of 353 mm to 734 mm⁵ during these years. Thus, proper catchment area was not envisaged in survey & investigation conducted prior to construction of the project.

State Government stated (September 2020) that due to less intensive and scattered rainfall in the catchment, runoff could not be generated. Reply is not tenable as in DPR the yield was evaluated as per annual rainfall of 484.50 mm whereas rainfall during the period 2014 to 2019 had ranged between 353 mm to 734 mm, which was sufficient to fill the pickup weir.

(c) Mamtori MIP

As per the quantum of rainfall received during 2013 to 2019, 0.11 Mcum to 2.85 Mcum water was to be received in the dam. However, no water was received in

⁵ 430.5 mm (2014), 513 mm (2015), 734.5 mm (2016), 391 mm (2017), 353.5 mm (2018) and 548 mm (2019).

these years. Non-receipt of water in the dam reflects that the hydrology of the dam was decided without proper survey & investigation.

State Government accepted the facts (March 2021).

3.5 Execution

Making water available for irrigation and drinking purposes to the intended beneficiaries is the central purpose of all the envisaged benefits under the projects. Hence, planning and distribution of water was to be effectively managed for the optimum and sustainable use.

Effective water management included creation of IP as envisaged, release of water as planned, provision of water for drinking purpose to intended beneficiaries and making water available round the year to facilitate changes in cropping pattern for the farmers.

3.5.1 Irrigation Potential achieved so far

The main deliverable of an irrigation project is the creation and utilisation of contemplated IP. Irrigation potential created is the total area which can be irrigated from a project on its full development and irrigation potential utilised is the actual irrigated area from a project during the period under consideration.

Targets were set in each project for creation of IP. Achievement of these targets was crucial for meeting the overall objectives of projects. The position of the targets fixed, I.P. created and utilized by the cultivators in respect of the selected projects is detailed as given in **Table 3.4**.

Table 3.4: IP targeted, created and utilization of Project

Name of Project (a)	IP target (ha) (b)	IP Creation (ha) (c)	Gap in IP creation (per cent) (d)	IP Utilized ⁶ (ha) (e)	Gap in IP utilized (ha) (f)	Percentage of IP utilized against created (g)
Narmada Canal Project	1.51 lakh	1.51 lakh	0	1.03 lakh	0.48 lakh	68.21
Lhasi	2,609	1,800	31	0	1,800	0
Piplad	3,549	3,549	0	81	3,468	2.28
Rajgarh	8,568	0	100	0	0	NA
Akoli	458	458	0	0	458	0
Bhaisa Singh	350	0	100	0	0	NA
Do Nadi	547.12	547.12	0	30.73	516.39	5.62
Ghat Pick up Weir (for flood irrigation)	0	0	NA	0	0	NA
Gulendi	2,535	2,535	0	239.25	2,295.75	9.44
Kishanpura Lift	1,455	1,455	0	776	679	53.33
Mamtori	64	0	100	0	0	NA
Rohini	365.94	365.94	0	0	365.94	0

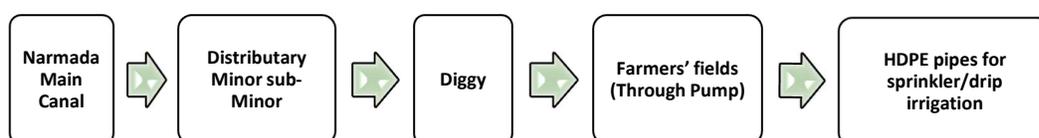
Source: Information provided by the Water Resource Department

⁶ As per Revenue Department record.

It can be seen from the table above that four projects could not create any IP and only seven projects achieved the targeted IP creation in full. In respect of utilisation of IP created, no IP created could be utilised in three projects while in other projects the utilisation ranged between 2.28 *per cent* to 68.21 *per cent*.

The Project wise analysis of reasons and issues with IP creation and utilisation are as follows:

(i) Narmada Canal Project: In NCP, the area was to be considered as Cultivable Command Area (CCA)⁷ on completion of all civil⁸ and mechanical⁹ works relating to construction of canal, *diggies* and installation of micro-irrigation system.



Against the total IP of 1.51 lakh ha (*Kharif* 0.48 lakh ha + *Rabi* 1.03 lakh ha), 1.03 lakh ha of IP could be utilised for *Rabi* season, whereas water was not provided for *Kharif* season. Further, against total 2,231 *diggies*, only 2,032 *diggies* were electrified till September 2020. Thus, IP utilisation for *Rabi* of 1.03 lakh ha also could not be treated as fully utilized as claimed by the department because of non-electrification of 199 *diggies* till September 2020.

State Government stated (March 2021) that full IP created has been utilised in *Rabi* and *Kharif* seasons. It depends on rainfall condition of that year and irrigation intensity used by the cultivator in the *Rabi* season. Reply is not tenable as IP for *Rabi* 1.03 lakh ha could not be treated as fully utilized as envisaged in the project report because of non-electrification of *diggies*. Further, no document regarding utilization of IP in *Kharif* was made available to Audit.

(ii) Lhasi Project: Lhasi project was proposed to create IP of 2,609 ha by the year 2013-14. However, only 1,800 ha IP could be created as of February 2021 as canal network was not constructed. The main reason was non-allotment of canal work simultaneously with dam work and delay in land acquisition.

State Government accepted the facts (March 2021).

⁷ The area which can be irrigated from a scheme and is fit for cultivation.

⁸ Construction of *diggies*, pump room, sump well, boundary wall, etc.

⁹ Supplying, laying, jointing, testing and commissioning of pipeline and installation of mono block pumps.

(iii) Rajgarh project: As per DPR (2011), the project was to be completed in 2015. However, the project is yet to be completed. Rajgarh project could not achieve desired IP¹⁰ because the dam and canal network was not completed due to inordinate delay of four years in land acquisition. Land was finally acquired in 2015.

State Government stated (March 2021) that against total IP of 8,568 ha, IP created and utilised was 2,500 ha up to year 2019-20. However, the fact remains that project got delayed, envisaged IP of 8,568 ha could not be achieved till date. Further, no documents were made available to audit in support of irrigation of 2,500 ha.

(iv) Akoli Project: Akoli project could not utilise the created IP despite good rainfall. Non/short receipt of water in the project reflects that hydrology of dam was not accurate. No water was stored in the dam after completion of the project (September 2017).

(v) Do Nadi project: In Do Nadi project against the created IP of 547.12 ha, only 30.73 ha IP could be utilised due to poor maintenance of distributaries system.

State Government stated (March 2021) that during the period 2015-16 to 2019-20 irrigated area ranged between 235 ha and 379 ha whereas as per revenue department data it was only 30.73 ha. The department did not make available any document/data in support of the claimed irrigated area to Audit.

(vi) Ghat Pick UP Weir: Ghat Pick UP Weir was constructed (2007) to utilise the water of Ruparail River, with the objective of flood irrigation during rainy season for *Kharif* crops and recharging of surrounding wells. However, water was not received since 2014 except a little water in 2016 due to inappropriate catchment area. Hence, the achievement was nil.

(vii) Gulendi Project: Gulendi was to utilise 2,535 ha of created irrigation potential. However, only 239.25 ha i.e. 9.44 per cent could be achieved due to non equitable water supply for irrigation.

State Government stated (March 2021) that Revenue Department was not keeping correct and complete records of revenue Girdawari and IP target was fully achieved. Reply was not tenable as only 239.25 ha was irrigated in *Rabi* season as per Revenue record and WRD could not provide any document substantiating achievement of full IP target.

(viii) Rohini dam: The Rohini dam was constructed (2013) as reserve dam for Sei Pick Up Weir project. The Sei Pick Up Weir project was constructed in the year 1960. The water of the Rohini dam was proposed to be released in the upstream of Sei Pick Up Weir. In the meanwhile, the canal system of Sei Pick Up Weir got damaged due to ageing and poor maintenance. The age gap between both projects was not considered in planning. Consequently,

¹⁰ Planned IP was 8,568 Ha.

276.41 *ha* command area of the project could not be benefitted and project proved to be unfruitful.

State Government stated (March 2021) that water stored is utilized through Seepick up weir and its canal system since 2013 and now Rohini Dam has been handed over to Panchayati Raj Department (2019). The reply is not tenable as according to Revenue Department no irrigation activity was executed. It was also observed by audit during joint inspection with the departmental representatives (December 2019) that no irrigation activities were carried from the dam. Blockages/silting/ vegetation in the canal and leakage in the dam were also found as shown below:



Leakages in the Rohini dam

(ix) **Piplad Project:** Piplad project was proposed to create 3,549 *ha* IP by the year 2011-12 and was to take about four years (2014-15) for full development. Against targeted IP of 3,549 *ha*, 1,445 *ha* (40.71 *per cent*) IP was created in the year 2014-15 and remaining 2104 *ha* in the year 2018-19. As per information provided by Revenue Department, IP utilised was only 81 *ha* during 2014-15 to 2018-19 (2.28 *per cent* of target IP). WRD had not maintained the IP utilisation records.

State Government stated (March 2021) that WRD was not responsible for Revenue Department data. The reply was not tenable as department did not provide any data/document regarding IP utilised.

(x) In **Kishanpura** project, out of the 1,455 *ha* of IP created, the IP utilized was only 776 *ha* (53.33 *per cent*) as no water was released in Kharif season.

State Government accepted (March 2021) the facts.

(xi) **Mamtori project:** Mamtori project could not achieve any target due to non-construction of outlets and canal work in complete length. Further, no water was stored in the dam after its completion due to defective hydrology.

State Government accepted (March 2021) the facts.

3.5.2 Water allocation and release

As per the DPRs of the projects, water requirement in Kharif and/or Rabi season could be made easily available from their respective project and accordingly, the irrigation was expected throughout the year in the projects. However, following deficiencies were noticed.

3.5.2.1 Non maintenance of Water Release Data

The data of water release is a crucial parameter to assess the impact of the project and successful delivery of its outcomes. However, this information could not be made available to audit even for the Major irrigation project- NCP. According to DPR of NCP, water available for irrigation was estimated as 573.26 Mcum for total CCA of 2.46 lakh *ha*. Department has not provided information of year wise water release including available groundwater in the command area to audit. In the absence of this data, the availability of water to intended beneficiaries as well as compliance with the release orders could not be assessed.

State Government stated (March 2021) that data of annual water released in command area and ground water were available as per project report. Reply was not tenable as in the absence of actual data, the availability of water to the intended beneficiaries as well as compliance with the release orders could not be assessed in audit.

3.5.2.2 Deficient Release of water

In five projects water released for irrigation was far less than what was envisaged and reserved. The major reasons for this were non construction of canal system and non-maintenance of canals and dam.

Table 3.5: Status of Water Release

Project	Water release envisaged/ stored	Status of water release
Lhasi	Irrigation: 10.353 Mcum Drinking Water: 7.3 Mcum Thermal Power plant: 8.5 Mcum	No water was released for irrigation till March 2020. During 2016-20, 1.18 to 1.42 Mcum per annum was utilised for drinking water and 4.17 to 6.45 Mcum per annum was utilised for Chhabra Thermal Power Plant during 2018-20. State Government accepted the facts (March 2021).
Rajgarh	Irrigation 43.43 Mcum	Only 22.60 Mcum water was stored during the year 2019-20. However, no water was released for irrigation. State Government stated (March 2021) that the stored water was utilized in IP creation of 2500 <i>ha</i> and supply of drinking water to PHED. Reply was not tenable as the canal work was not completed

Project	Water release envisaged/ stored	Status of water release
		and no documents were made available to Audit in support of irrigation of 2500 <i>ha</i> .
Akoli	Irrigation 1.72 Mcum	No water was released in 2017. No water was stored since completion of the project (September 2017), though sufficient rain-fall was recorded in catchment and run-off.
Rohini	Irrigation 1.93 Mcum	No water was released for irrigation. This fact was verified during the joint physical verification.
Mamtori	Irrigation 0.472 Mcum	No water was released or stored due to non-construction of outlets and canal system in complete length. State Government accepted the fact (March 2021)

3.5.2.3 Excess release of water

(i) In Piplad, 14.79 Mcum and 5 Mcum water was reserved for irrigation and drinking purpose respectively. As per DPR, to irrigate the created IP of 1,445 *ha*, 6.02 Mcum water was sufficient whereas 8.23 and 14.69 Mcum water was released during 2015-16 and 2016-17. Thus, 2.21 and 8.67 Mcum excess water was released.

State Government stated (March 2021) that water was released as per cultivators' demand. The reply is not tenable as the water was to be released as per IP created rather than as per cultivators' demands. Further, no document was furnished along with the reply substantiating that the water was released on the basis of demand received from cultivators.

(ii) Similarly, in Gulendi MIP, out of total IP 2,535 *ha*, cultivators sown only an average area of 239.25 *ha* during 2015 to 2019. Crop-wise water requirement for area of 239.25 *ha* was assessed as 0.850 Mcum but actual annual average water released during this period was 8.028 Mcum. Thus, on an average excess water of 7.178 Mcum was released during these years. Due to releasing excess water than required, the possibility of increase in water logging and salinity cannot be ruled out.

State Government stated (March 2021) that the water was being provided in total command area of 1,950 *ha*. The reply is not acceptable as only 239.25 *ha* area was sown according to revenue records and WRD had neither maintained nor provided any records of irrigated area on its own.

3.5.2.4 Unauthorised lifting of water

Compulsory pressure irrigation i.e use of sprinkler and drip was adopted in the entire command area of NCP so as to reduce seepage of irrigation water to groundwater and to control the rise of ground water table. It was observed in joint physical inspection that the Main Canal, its distributaries and minors/sub-minors suffered from the problem of water theft by nearby cultivators who lifted water by using motor pumps and pipes, conveying water to that part of their land holding which was not covered under *diggy* system. Due to these activities

waterlogging and salinity increased in some villages (e.g. Chimadi, Agaawa, Bhaleti, Padaradi, Manki, Surawas, Arniyali of command area and adjoining villages). State Government accepted (March 2021) the facts.



Unauthorised water lifting in NCP as water was taken directly from canals

3.5.3 Provision of Drinking Water

National Water Policy stipulates that water resource development projects should as far as possible be planned and developed as multi-purpose projects, with the provision for drinking water.

The project wise details about drinking water facility envisaged in DPRs and actually provided, are given in **Table 3.6**.

Table 3.6: Irrigation Projects and number of villages/ towns to be benefitted

S. No.	Name of Project	No. of villages/town to be benefitted from the scheme	No. of villages/ town actually benefitted from the scheme
1	Narmada Canal Project	874 villages and three towns of Jalore District; 667 villages of Barmer district.	446 villages of Jalore District
2	Lhasi Medium Irrigation Project	21 villages and two towns of Baran District.	Two towns of Baran District
3	Piplad Medium Irrigation Project	16 villages/towns of Jhalawar district.	Water provided to all villages/ towns
4	Rajgarh Medium Irrigation Project	54 villages and 15 other habitations of Pachpahar tehsil and 157 villages of Jhalarapatan tehsil and Jhalarapatan town.	54 villages and 15 other habitations of Pachpahar Tehsil
5	Bhaisa Singh Minor Irrigation Project	In 2016 dam was handed over to PHED for providing drinking water to Abu Road Town.	Supply of drinking water has not been started till March, 2020

S. No.	Name of Project	No. of villages/town to be benefitted from the scheme	No. of villages/town actually benefitted from the scheme
6	Do Nadi Minor Irrigation Project	Project feed the Som Kagder dam for providing drinking water to Rishabdev town and enroute villages.	Water provided to all villages/ towns
7	Gulendi Minor Irrigation Project	77 villages and Aklera town	Water provided to all villages/ towns

During scrutiny, following were noticed:

(i) In Lhasi, water supply scheme for two towns of Baran district had been completed (August 2016) in Ist Phase with delay of 24 months and in IInd Phase, planning for supply of water to the village area was in process.

State Government stated (March 2021) that action was to be taken by the PHED.

(ii) In Piplad, work of water supply scheme for projected area was delayed by 20 months. State Government accepted (March 2021) the facts and stated that it was due to delay in site selection of filter plant.

(iii) In Rajgarh, water supply scheme has been completed with delay of seven months. Information regarding drinking water for Jhalarapatan tehsil and town was not provided to audit. State Government stated (March 2021) that action was to be taken by PHED.

(iv) In Do Nadi, dam work was completed in August 2007, however, PHED started supply of drinking water in June 2017 with delay of more than ten years.

State Government accepted the facts (March 2021).

3.6 Non-realization of Share cost, compensation and undue payment of price variation

Audit test checked the status of payment of share cost by other departments, details of compensation for not maintaining the pro-rata progress of work and payment of price variation to the contractor.

Deficiencies noticed in respect of above issues are commented below:

3.6.1 Short/non realization of share cost

(i) In Lhasi, the BCR of the project was evaluated as 1.52:1 by considering the cost to be shared by the Rajasthan Vidyut Utpadan Nigam Limited (RVUNL) and PHED as ₹ 68.75 crore and ₹ 59.12 crore respectively. However, while sanctioning the Administrative Estimate, the share cost to be borne by RVUNL and PHED was revised to ₹ 59.40 crore and ₹ 51.09 crore. Accordingly, RVUNL had deposited the share cost amount. However, PHED did not deposit the share cost as of date and as per the view of Finance

Department, it is not necessary to sanction the share cost now as the dam work had been completed. Due to share cost not being deposited by PHED, the capital cost becomes higher to this extent and BCR comes to only 1.06:1.

State Government stated (March 2021) that share cost of RVUNL and PHED was ₹ 68.75 crore and ₹ 59.12 crore respectively and demand for difference amount is being made continuously. Reply is not tenable as after representation of RVUNL, department had recalculated the share cost amount as ₹ 59.40 crore (RVUNL) and ₹ 51.09 crore (PHED) which was deposited by RVUNL.

(ii) Other projects

The project reports of selected seven projects envisaged share of cost, as given in the table below, to be payable by PHED for utilization of water for drinking.

Scrutiny of the records revealed that the envisaged share of cost was not paid by the PHED in four projects as given in **Table 3.7**.

Table 3.7: Share of cost

(₹ in crore)				
S. No	Name of Project	Share to be paid by PHED	Share paid by PHED	Balance
1	Narmada Canal Project	296.71	216.33	80.38
2	Piplad Irrigation Project	22.80	17.49	5.31
3	Bhaisa Singh MIP	15.11	-	15.11
4	Gulendi MIP	7.24	3.89	3.35

State Government stated (March 2021) that the recovery was in process.

3.6.2 Non recovery/levy of compensation

According to clause 2 and 3 (c) of the contract, the contractor was liable to pay compensation for not maintaining the *pro-rata* progress of the work and extra cost incurred on balance work executed by another contractor at the risk and cost of the original contractor.

Scrutiny of records of selected divisions of NCP, Lhasi, Piplad, Ghat Pick up Weir, Kishanpura Lift, Bhaisa Singh, Gulendi and Do Nadi projects revealed that in 10 cases, contractors neither maintained *pro-rata* progress nor taken responsibility for extra cost. The divisions failed to recover the compensation amount of ₹ 2.42 crore as detailed in **Appendix-III**.

State Government stated (March 2021) that in seven cases efforts are being made for recovery. However, in remaining three cases, State Government has recovered less amount as final adjustment from the contractor than was liable to be recovered, in contravention of Clause 2 and 3 (c) of the contract.

3.6.3 Undue benefit to contractor

The work for construction of main dam of Rajgarh Project was awarded to the contractor on turnkey basis for ₹ 87.04 crore with stipulated dates of commencement and completion as 7 July 2013 and 6 January 2016 respectively.

Clause 18 of General conditions of contract stipulates that price variation clause shall be applicable in case of lump sum contracts estimated to exceed ₹ 100 crore with stipulated completion period exceeding 18 months. Further, Clause 21.1 of special conditions of the contract stipulates that the contractor shall, on the written order of the owner, suspend the progress of the works or any part thereof for such time and in such manner as the owner may consider necessary, and shall properly protect and secure the works so far as is necessary in the opinion of the owner during such suspension. The extra cost, including that occasioned by the subsequent resumption of work, incurred by the contractor in giving effect to the owner's instructions shall be borne and paid by the owner.

Scrutiny of records revealed that the contractor executed the work for ₹ 1.69 crore up to October 2013 and thereafter left the work whereas it was stipulated in the contract that contractor shall pay special attention as regards achieving mile stones on schedule. The contractor resumed the work in September 2014 without any condition and the work was still in progress as on March 2020.

Deputy Secretary, WRD ordered (May 2018) that payment should be made as per clause 21.1 of special conditions of the contract. However, the Divisional Officer made payment of ₹ 2.77 crore (May 2018) to the contractor on the basis of price variation clause despite the fact that price variation was not payable.

State Government stated (March 2021) that the contractor in line with clause 21.1 has informed (October 2013) the department about hindrances caused by the displaced persons of the project and department advised (January 2014) the contractor to suspend the work to safeguard the men and machineries at site till the matter is resolved. Payment in terms of price variation was found to be the most rational and reasonable method of working out extra cost due to the contractor because of suspension of work for reasons not attributable to contractor. Meanwhile, the honorable High Court also directed status *quo* (December 2013) to be maintained. The stay was vacated in May 2016.

The reply is not acceptable as at various times¹¹, department itself communicated to the firm that department has given the advice but it had never directed firm to stop the work. Being an "EPC single responsibility contract" firm was responsible for sorting out the hindrance. As 60 *per cent* of the area was Government land and hindrance free, department wanted work to be continued. The matter before High Court was only for a specific area (cultivators' land). Hence the extra payment made under clause 21.1 was irregular.

3.7 Summary of findings

Audit observed that deliverables of irrigation projects were not planned, executed and managed in accordance with the intended objectives. The achievement of intended outcomes was marred by several issues. Audit found deficiencies in preparation of DPR and survey work which shows that the initial planning was not proper. There were cases of delay in acquisition of land and

¹¹ July 2014, August 2014 and September 2014.

forest clearance, time and cost overrun of projects, construction of unviable projects, non-maintenance of data/records and undue benefit to contractors. All these had cascading effect on timely execution of the projects. Four projects could not create any IP. Three projects could not utilise any IP created while the utilisation of IP created ranged between 2.28 to 68.21 *per cent* in other projects.

3.8 Recommendations

- *Department may develop detailed guidelines for planning, execution and monitoring of medium and minor irrigation projects. Intended outcomes and responsibility to achieve those should be clearly assigned at the planning stage.*
- *Department should ensure maintenance of water release data, monitoring of excess release of water and establishment of adequate control mechanism to counter water theft.*

Chapter-IV
Monitoring and Maintenance
of Projects and Coordination
Among Stakeholders

Chapter-IV

Monitoring and Maintenance of Projects and Coordination among Stakeholders

Monitoring of irrigation projects

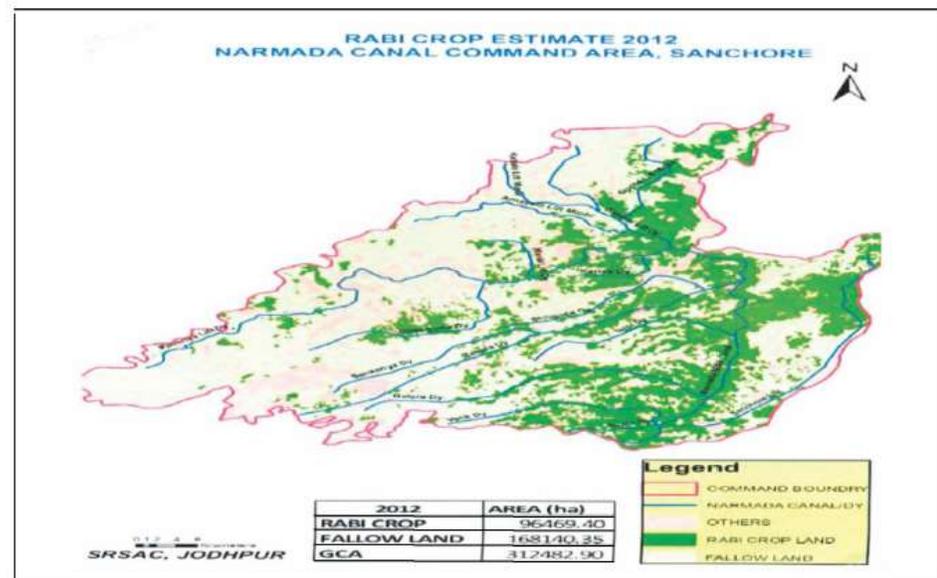
Monitoring is the systematic approach to track the project’s progress towards reaching its objectives. The project objectives could not be achieved without the coordination among line departments. However, instances of non-coordination among line departments and lack of monitoring were noticed as discussed below:

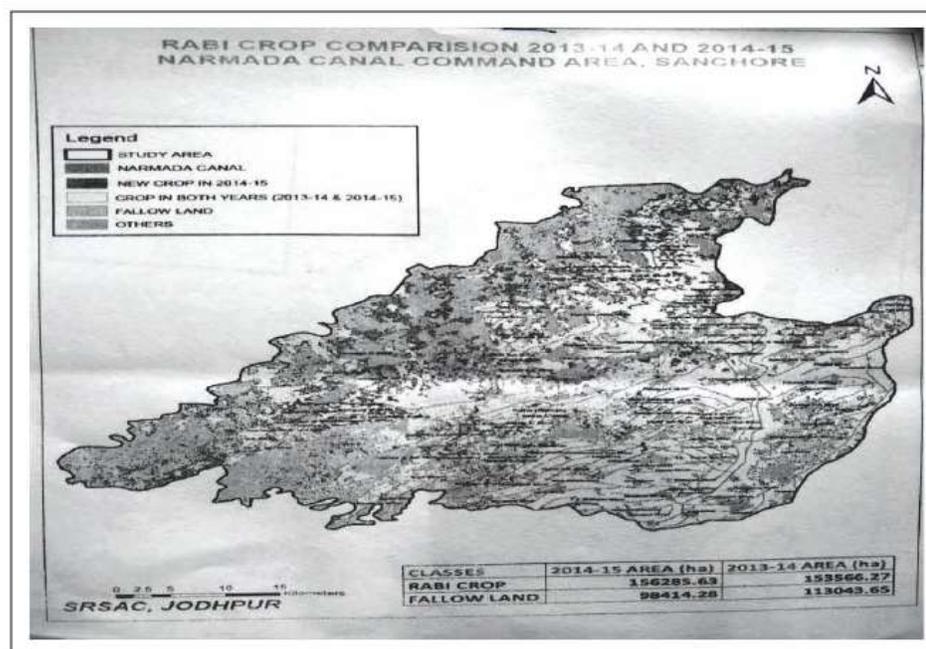
4.1 Lack of monitoring the release of water from canal

The WRD obtained imageries of command area of NCP during the years 2012 to 2015 from State Remote Sensing Application Center Jodhpur for analyzing the Rabi crop estimate. Review of these imageries validate that Rabi crops were increased from 39 per cent to 63 per cent of the command area, although the canal water was not released upto the quantity envisaged because the *diggies* were only partly electrified till then as mentioned in *paragraph 3.5.1 (i)*.

This indicates that farmers irrigated the fields by taking water directly from canal by arranging their own motor pumps although water was to be supplied from the *diggies* to each *chack* from distribution system. Images from 2017 to 2020 were not available with the department to assess the achievements.

State Government while accepting the facts stated (March 2021) that department made efforts for stopping the water theft.





4.2 Participatory Irrigation Management activities

Rajasthan Farmers' Participation in Management of Irrigation System Act, 2000 (RFPMIS Act) was introduced (July 2000) to govern the distribution of water among the farmers. RFPMIS Act stipulates that elected bodies of farmers namely Water Users Association (WUA) at primary level; Distributary Committee at secondary level; and the Project Committee at project level had to be formed. These committees were to exercise the powers and perform the functions to regulate the use of water among the various WUAs. The Government of Rajasthan (GoR) also framed Rules, 2002 under the Act.

4.2.1 Formation of WUA, Distributary Committee and Projects Committee

Section 4 of the RFPMIS Act, 2000 stipulates that there shall be one WUA for every water user area, consisting of all the water users, who are landowners in such area as members.

Scrutiny of records revealed that in Piplad, Akoli, Gulendi, Mamtori and Rohini WUAs were not formed. In Do Nadi WUA was formed; however, no activity was being performed by WUA. Further, Distributary and Project Committees were not formed in any of the water user areas except NCP.

State Government stated (March 2021) that in respect to Piplad and Gulendi formation of WUAs was under process. In Do Nadi, WUA was formed but not fully functional and Rohini and Mamtori projects were transferred to Panchayati Raj Department. State Government stated that formation of these committees at various level was under progress.

4.2.2 Warabandi

Warabandi is a rotational system of equitable water distribution, which is adopted according to a predetermined schedule clearly specifying the “Day, Time and Duration” of supply of water to each farmer. Section 17(a) of the RFPMIS Act stipulates that WUAs shall prepare and implement a *warabandi* schedule for each irrigation season.

Scrutiny of records revealed that even where the WUAs were formed the irrigation water was being provided without *warabandi* schedule.

State Government stated (March 2021) that in NCP a detailed timetable (*warabandi*) for operating each *diggi* has already been prepared and water was being released in all canals of the project for irrigation as per work plan. Reply is not tenable as no evidence was made available to audit in support of existence of *warabandi*. It was further stated that in Lhasi, Pilad and Gulendi *warabandi* would be started after constitution of WUA.

4.2.3 Demand and collection of irrigation service fees and water tax

The collection of Irrigation Service Fee (ISF) is important to ensure the maintenance and improvement of irrigation system, while reducing excess use of water in practicing flood irrigation. Effective operation and maintenance of the projects is possible only if WUAs are allotted a significant proportion of ISF. Section 17(e) of RFPMIS Act stipulates that the WUAs should prepare demand and collect ISF.

According to section 24 of the Act, the funds of the farmers’ organization would comprise grants received from the Government as a share of water tax collected in the area of operation. Further, Rule 54 (k) of RFPMIS Rules stipulates that ISF will be recovered by user associations and deposited into Government fund. Fifty *per cent* of deposited amount will however, be returned to respective WUA on submission of claim. All these WUAs have not received any grant or any other fund from Government or any other financial agency. Hence, WUAs were not involved in operation and maintenance activities effectively in the selected projects

Scrutiny of records revealed that ISF was estimated in B C Ratio. However, ISF was not recovered in Piplad, Akoli, Rohini, Mamtori, Ghat Pick Up Weir and Bhaisa Singh. In NCP, Do Nadi and Gulendi ISF was short recovered by 4.5 *per cent* to 34.71 *per cent*¹ of the targets. In Kishanpura Lift MIP, during

(₹ in lakh)

Name of project	NCP	Gulendi MIP	Do Nadi
Target	188.81	3.11	0.58
Achievement	65.54 (34.71%)	0.14 (4.5%)	0.05 (8.6%)

2012-13 to 2018-19, total ISF of ₹ 199.67 lakh was recovered by WUA. However, the same was not deposited in Government Fund. The collected amount was directly utilized in operation and maintenance of scheme by WUA in contravention of the rule mentioned *ibid*.

State Government accepted (March 2021) the facts.

4.2.4 Non-maintenance of records by WUAs

Various records/ registers which were required to be maintained by WUAs under RFPMIS Act/Rules were not being maintained (*Appendix-IV*). Further, rule 48 (6) stipulates that at the end of each season the respective farmers' organization shall prepare a report of water received and utilized along with quantity of water supplied and area under different crops. The report is to be submitted to the Project Authority. No such report was either prepared/ submitted or demanded.

4.3 Joint physical verification

During joint physical verification and beneficiary survey of WUAs/farmers conducted along with the representative of the department, audit observed the following:

(i) In Piplad, Mamtori and Ghat Pick Up Weir, canals were in damaged position at some places. In Mamtori, the broken portion was being used as a path.



LMC Piplad Project near Amlı Kurd village

State Government stated (March 2021) that canal has not been running due to non-availability of water in tank since long time.

(ii) In NCP some *diggies* e.g. Sukdi Minor (11 *diggies*) were not operational. Similarly, in Akoda Minor (11 *diggies*) and Dhingpura Minor (14 *diggies*) neither the electric pumps were installed nor electric connections were taken. Moreover, the farmers were taking water directly from canal by using their own pumps in unauthorized way as farmers have also taken unauthorized electric connections. There was heavy silt deposited and

vegetation and algae grown in canal causing blockage/decreased flow velocity of water through canal and hence the water could not reach to the tail end.



State Government stated (March 2021) that the work of removal of silt, etc. is carried out by WUAs from time to time, particularly before start of Rabi season. Reply is not tenable as heavy silt deposition, vegetation and algae were found during joint physical inspection.

(iii) In Do Nadi, it was seen during physical verification that there were seepages in dam and accumulation of silt and vegetation in some reaches of canal, causing loss of water flow.



Vegetation/silting in the Do Nadi canal

State Government stated (March 2021) that seepages in dam sluice well have been repaired. Jungle and silt clearance had been done before Rabi crop. Reply is not tenable as department had not made available any evidence in this regard.

(iv) During joint physical inspection, it was found that the Head sluice of the Ghat Pick Up Weir was not in working position as gate of sluice was jammed due to heavy deposition of silt (almost one feet).



Head sluice at Ghat Pick Up Weir

4.3.1 Assessment of deliverables of project and WUA/ farmers survey NCP

According to the Niti Aayog's- Water Index Report, June 2018, the Government of Rajasthan has implemented a comprehensive package of solutions in Sanchore along the Narmada river. There has been a huge push towards actualization of Participatory Irrigation Management (PIM) by formation of WUAs and state having the highest score on this indicator. However, during joint physical inspection with departmental representative of 227 WUAs out of total 2231, following were observed:

- (i)** Warabandi schedule was not being implemented in any of the WUAs and farmers had no knowledge of Warabandi.

State Government stated (March 2021) that most of the WUAs were following *Warabandi* schedule and training was being imparted about adopting *Warabandi* schedule regularly. Reply is not tenable as neither *Warabandi* schedules were found adhered during joint physical verification nor the Government made available any evidence in support of existence of *Warabandi*.

- (ii)** 65 WUAs were not collecting Irrigation service fee from farmers. 162 WUAs collected ISF, however the collected amount was not transferred to the Government account.

State Government stated (March 2021) that water charges are being collected from the cultivators regularly. The reply is not tenable as no documents regarding commented WUAs was made available to Audit.

- (iii)** 217 WUAs were not preparing plan for the maintenance of irrigation systems including distributary and minor system at the end of each crop.

- (iv) Basic infrastructure like office for WUAs etc. were not made available in any of the *diggies*.

State Government accepted (March 2021) the facts in respect of point (iii) and (iv) above.

- (v) 175 WUAs stated during survey that water level had risen after introduction of the project which led to increase in water logging and adversely impacted the agriculture.

State Government did not agree (March 2021) about the rise in water level because of conjunctive use of water by canal and wells. Reply is not tenable as conjunctive use of water is not being done in NCP.

4.4 Non-conducting of social audit

Rule 52 of RFPMIS Rules stipulates that at the end of each crop season the farmers' organization shall arrange social audit and competent authority shall render all assistance in conduct of social audit. However, no social audit was conducted in selected projects.

State Government stated (March 2021) that WUAs were instructed and were being motivated for conducting social audit in future.

4.5 Water Auditing

According to CWC water auditing is a systematic & scientific examination of water accounts of the project. Comprehensive Water Audit can give a detailed profile of distribution system & water users for facilitating easier and effective management of resources. Water auditing was not found conducted in any of the projects.

In respect of NCP, Piplad and Gulendi projects, State Government stated (March 2021) that water auditing work will be conducted in future.

4.6 Operation and maintenance

In order to properly maintain and operate an irrigation structure, it is necessary that a detailed O & M guideline for each irrigation structure may be prepared. Scrutiny of records revealed that O & M manual was not prepared/provided in any of the project.

State Government stated (March 2021) that the maintenance work of project was executed every year on priority basis. Reply was not tenable as no O&M manual for maintenance of project was prepared in any of the project.

4.7 Non-updation of WRD Manual

WRD Manual was published long back and last revised in 1982. A number of government orders have since been issued by the Department, but the WRD Manual has not been revised and updated since last 38 years. Due to this many of its provisions have become irrelevant and many important provisions are missing.

4.8 Non-rectification of defects

Rohini dam was completed in October 2013 and there was provision of three years defect liability period in the contract. There was leakage in the dam and due to this, discharge of water from dam became uncontrollable. Although this fact was in the notice of WRD, it handed over the dam to Panchayati Raj Department in April 2018 in damaged condition. Hence, irrigation was not being provided from the project.

State Government stated (March 2021) that rectification was done by the contractor at his cost and security deposit kept with department will be released only after removal of the defects. Reply was not tenable as no documentary evidences were submitted by the department. Further, it is pertinent to mention that the dam was handed over to Panchayat Raj Department in April 2018.

4.9 Coordination among Stakeholders

Effective co-ordination among the related line departments was necessary for effective planning and execution of the projects. Besides the nodal department WRD, the irrigation projects had other stakeholders i.e. PHED (for drinking water), Agriculture Department (for increasing crop yield) and Forest Department (for plantation along the canal).

4.9.1 Absence of formal mechanism for coordination

A committee of WRD, Agriculture Department and Revenue Department was to be formed with the main objective of preparing irrigation programme and cropping pattern in accordance with the availability of water in the irrigation project. However, committees were not formed in all selected projects and no meetings were held among the line departments.

State Government stated (March 2021) that the committees were being formed and regular consultations were held with the line departments. The reply was not tenable as no evidence of any higher level department coordination could be seen during audit. The reply also did not provide any proof of line department consultation.

4.9.2 Deficiencies in Role of line departments

The Agriculture Department was involved in formulation of DPRs in working out BCRs and cropping patterns. Hence, their continuous involvement was

necessary to ensure proper execution and monitoring of the projects. However, the Agriculture Department stated that neither they conduct any project specific awareness program for the beneficiaries nor they monitor it command area wise. Regular programs held by the Agriculture Department in each district cover these areas in normal course. In the absence of project specific data collection by the Agriculture Department, audit could not assess the increase in crop yield, change in cropping patterns etc. This resulted in inefficient monitoring of projects to ensure achievement of intended objectives.

State Government accepted (March 2021) the facts.

4.10 Summary of findings

Audit observed that there was absence of formal mechanism for coordination in line departments, WUAs were either not formed or were not working effectively, social and water audit was not conducted, O&M guidelines were not prepared, Manual was not updated, defects were not rectified timely, and heavy slits/vegetation deposited/grown in canal blocked the flow of free water in canal.

4.11 Recommendations

- *Department should enhance use of technology for monitoring the progress of irrigation projects for timely completion, regular maintenance and proper management.*
- *The WUAs may be strengthened with required infrastructure, financial means and training to play their defined roles.*
- *Department may ensure periodic maintenance of canals to facilitate free flow of water.*
- *Department may devise a joint monitoring mechanism for all line departments concerned (viz. WRD, Agriculture, PHED, Revenue and Forest) for all ongoing and future irrigation projects to ensure effective and regular coordination.*

Chapter-V
Impact and Achievement of
Outcomes

Chapter-V

Impact and Achievement of Outcomes

The audit attempted an analysis of impact of the projects and assessment of what the projects achieved. We have discussed the achievement in respect of Irrigation Potential and provision of Drinking water in Chapter-III in detail. The performance of the projects in respect of all aspects including these parameters is discussed below:

5.1 Irrigation Potential

The main deliverable of an irrigation project is the creation and utilisation of contemplated IP. Targets were set in each project for creation of IP. Achievement of these targets were crucial for meeting the overall objectives of projects. However, audit observed that four projects could not create any IP and only seven projects achieved the targeted IP creation in full. In respect of utilisation of IP created, no IP created could be utilised in three projects while in other projects the utilisation ranged between 2.28 *per cent* to 68.21 *per cent* (*paragraph 3.5.1*).

Bhaisa Singh project was executed for both irrigation and drinking water purpose and planned IP for this project was 350 *ha*. However, despite completion of the dam work, no IP could be created and Bhaisa Singh Dam was handed over (October 2016) to PHED for drinking water facilities. Thus, the initial planning to create 350 *ha* IP could not be achieved at all.

5.2 Drinking Water

National Water Policy stipulates that water resource development projects should as far as possible be planned and developed as multi-purpose projects, with the provision for drinking water. The project wise details about drinking water facility envisaged in DPRs and actually provided are given in **Table 3.6**. Audit observed that only in three out of seven projects, drinking water was provided to intended beneficiaries. No water was provided to beneficiaries in respect of one project and only a part of beneficiaries were covered in respect of other three projects (*paragraph 3.5.3*).

5.3 Achieving Diversity in Cropping Pattern

The cropping pattern in the projects was decided by considering various parameters like: water availability, existing cropping under cultivation, climatic conditions, nature of soil, groundwater conditions, newly introduced modern farming techniques, studies and researches. The viability of a project was decided on the basis of data of cropping pattern and projected yield of crops by WRD.

Depending upon the quality of soil and availability of water, cropping pattern in entire command area should be prescribed on the recommendations of

Agriculture Department. Under the prescribed pattern, some crops may be less water intensive and some may be more water intensive. Accordingly, water was being envisioned to be drawn from the source. Audit however observed that no special efforts were taken to make farmers aware about the benefit of diversity of cropping pattern and how water could be used optimally. Thus, in most cases farmers continued to use the traditional cropping patterns

Audit observed that the Agriculture Department did not ensure the actual cropping pattern as per projections. The actual cropping pattern under the command area of selected projects was different than that proposed in DPR in terms of variety of crops and cultivable area. Scrutiny of records revealed that:

(i) Cropping pattern of NCP had been proposed (by Agriculture Department) separately for Flow (Ned/Normal) and Lift areas. The main consideration for allocation of percentage area for different crops included crop which had low water requirement, higher economic returns and tolerant to salinity. Details of actual cropping pattern was not provided by the department.

(ii) In Piplad, the cropping pattern proposed in DPR was not followed by the cultivators due to lack of awareness about projected cropping pattern. This could be seen from the fact that the mustard was proposed in 32.66 *per cent* CCA and against this cultivator sown it only in 10.88 *per cent* area. Similarly, the crops which were not taken in proposed cropping pattern were sown in 18.63 *per cent* area. Further, the projected yield could also not be achieved as the yield of wheat, gram, mustard and coriander was 34.13, 8.74, 12.08 and 9 quintals/ha against anticipated 40, 17.5, 20 and 13 quintals/ha respectively. In Joint physical survey with departmental authorities, it was noticed that cultivators were not aware about the proposed cropping pattern and no training/guidance about cropping pattern/ technology/upgraded seeds etc. was provided by Agriculture Department or WRD.

(iii) In Do Nadi, cropping pattern was different in terms of area sown and type of crops from that proposed in DPR.

(iv) In Gulendi, cropping pattern was different in terms of area sown and type of crops from that proposed in DPR.

(v) In Kishanpura Lift Project, the cropping pattern actually adopted by cultivators was different from that proposed in the DPR. Cultivators sown coriander and garlic in 28.72 *per cent* area which was not proposed in the DPR. Further, wheat was sown in 355 ha against proposed 194 ha whereas the mustard was sown in 129 ha only against 388 ha. Joint physical survey with departmental authorities, revealed that cultivators were not aware about proposed cropping pattern and no training/guidance about cropping pattern/ technology/upgraded seeds etc. was provided by Agriculture Department or WRD.

In response to sub paras (i) to (v), State Government stated (March 2021) that selection of crop was done by cultivators themselves. Reply was not tenable as no efforts were made to make the cultivators aware about cropping pattern proposed in DPR and the benefits it entails.

5.4 Ecological and Environmental Preservation

According to National Water Policy, in the planning, implementation and operation of projects, preservation of the quality of environment and ecological balance should be a primary consideration. Section 2 of the Forest (Conservation) Act, 1980 provides that State Government shall not make, except with prior approval of the Central Government, any order directing that any forest land or any portion thereof may be used for any non-forest purposes. The development of irrigation project impacts adversely the environment of the area due to construction of reservoirs and submergence of land, displacement of inhabitants including the flora and fauna; resettlement in the surrounding catchment; denudation of forest; water logging and salinity and alkalinity of soil & water etc.

Audit noticed that in most minor and medium irrigation projects neither environmental issues were discussed in the DPRs/Administrative Estimates nor any separate environmental study of impact was carried out.

The environmental study of major irrigation project, NCP was however, carried out by Water and Power Consultancy Services Limited (WAPCOS) (1998), which suggested pressure irrigation by using sprinkler/drip irrigation system in the entire command area to prevent water logging & salinity, and plantation along canal. Tahal consultant prepared (2004) the comprehensive command area development plan, which also suggested pressure irrigation through sprinklers and method of *diggies*. It was, however, observed that after construction of the canal, water logging and salinity in command area had increased.

State Government stated (March 2021) that the problems of water logging and salinization have not occurred in NCP command area. Reply is not tenable because as per reports of WAPCOS and State Ground Water Department, water logging and salinity have occurred in some villages of command area of the project.

5.5 Achievement of plantation target

To prevent water logging in the command area, one of the measures to be adopted was planting of trees along the canal system.

In NCP, a provision of ₹ 55.13 crore for plantation along canal side was made in the DPR (2017). Against the provision, an amount of ₹ 9.57 crore was allotted to Deputy Conservator of Forest (DCF), Barmer and ₹ 37.46 crore to DCF Jalore during the period December 2010 and January 2016. Against the allotted amount, ₹ 6.42 crore and ₹ 20.55 crore respectively were utilized for plantation. The physical targets for plantation along the main canal, distributaries and minors were fixed (July 2011) as 3941 running kms. Against this, the plantation was done in only 2561 running kms (65 *per cent*) up to March 2020. Moreover, the plantation was done for the species other than the species mentioned in the project report.

State Government stated (March 2021) that plantation work was being carried out by the Forest Department. Reply is not tenable as due to lesser plantation and planting of species other than those mentioned in project report, the objective of providing bio-drainage in the command area was defeated.

5.6 Benefit Cost Ratio

The Benefit Cost Ratio (BCR) is the ratio between the annual additional benefit on account of irrigation to the annual cost of providing those benefits. The minimum BCR for approval of such projects in Drought Prone Areas was one and in other areas 1.5.

Details of project wise IP targeted, created and utilised has been discussed in para 3.6.1. Further, details of BCR and economic benefits of three projects out of eight projects are given in **Table 5.1**.

Table 5.1: BCR Details

S.No.	Name of Project	Audit observations
1.	Narmada Canal Project	<p>The department calculated BCR 1.61:1 by taking the gross value of produce for <i>rabi</i> and <i>kharif</i> crops. However, water was provided only for <i>rabi</i> crops. The net value of agriculture produce for the crops estimated during the <i>kharif</i> was ₹ 271.57 crore. However, water was not released during <i>kharif</i>. Hence, farmers lost the opportunity of earning income of ₹ 271.57 crore every year since 2014-15.</p> <p>State Government stated (March 2021) that the water was used for both Rabi and <i>kharif</i> crops. Reply is not tenable as water was provided only for <i>rabi</i> season.</p>
2	Akoli Project	<p>As per revised DPR (2018), the BCR was evaluated as 2.51:1. However, no water was stored in the dam during the years 2018 and 2019. As irrigation was not provided during <i>rabi</i> season, the cultivators lost the opportunity of earning income of ₹ 246.85 lakh every year since 2017-18.</p> <p>State Government stated (March 2021) that there was scattered rain fall in its catchment during 2018 and 2019 so cultivators could not be benefited. Reply is not tenable as the BCR could not be achieved.</p>
3	Gulendi Project	<p>As per revised DPR (2008), the BCR was evaluated as 1.64:1. As water for irrigation was not provided during <i>kharif</i> season, cultivators lost the opportunity of earning income of ₹ 203.74 lakhs every year since 2012-13.</p> <p>State Government stated (March 2021) that water was not provided due to absence of demand from the cultivators in <i>kharif</i> due to sufficient rain fall. This shows that proper demand based on rainfall pattern of the area was not assessed.</p>

5.7 Lack of mechanism to monitor outcomes

Either the information in the desired form was not maintained by the department or available information was not made available to audit. Key information such as preliminary survey records, data in respect of ground water and revenue for the period prior to DPR and project specific crop yield were not provided to audit. In the absence of availability of data and desired records with Department, audit could not ascertain the project-wise comprehensive outcome precisely (*paragraph 2.6*).

Further, coordination among the line departments was not ensured to monitor the progress of projects. Detailed guidelines for planning, execution and monitoring the projects were not developed, there was no joint monitoring mechanism for all ongoing and future irrigation projects, maintenance of data for effective monitoring of the project outcomes was not ensured by nodal officers and WRD failed to monitor the release of water from canal. Thus, due to these constraints and lack of mechanism in the Government to monitor outcomes, the outcomes could not be assessed in audit.

5.8 Summary of findings

Audit observed that neither environmental issues were discussed in DPRs/Administrative Estimates nor any separate environmental study of impact was carried out. In case of NCP, after construction of the canal, water logging and salinity in command area had increased. Only 65 *per cent* physical targets for plantation along the main canal, distributaries and minors were achieved and the plantation was done for the species other than the species mentioned in the project report. Agriculture Department did not ensure the actual cropping pattern as per projections as the actual cropping pattern under the command area of selected projects was different than that proposed in DPR in terms of variety of crops and cultivable area. There were also lack of mechanism to monitor the outcomes.

5.9 Recommendations

- *Department should ensure consideration of environmental issues in DPRs/Administrative estimates.*
- *Department should make efforts to achieve the targets of plantations and ensure the plantation for the species given in project reports.*
- *Department should ensure adoption of project specific cropping pattern.*
- *Nodal Department (WRD) should ensure maintenance of project-wise data required for effective monitoring of the project outcomes.*
- *Department/State Government should evolve suitable mechanism to monitor the outcomes to ensure the effectiveness of the deployed resources.*

Chapter-VI

Conclusion

Chapter-VI Conclusion

Audit Objective 1

Whether Irrigation Projects' deliverables were planned, executed and managed in accordance with the intended objectives?

The achievement of intended outcomes was adversely affected by several factors. The projects already had long gestation periods and then suffered time and cost over-runs. There were planning deficiencies and delays in acquisition of land and clearances. All these had cascading effect on timely execution of the projects.

Audit observed that four projects could not create any irrigation potential even after investment of ₹ 455.76 crore. Three projects could not utilise any IP created while the utilisation of created IP ranged between 2.28 to 68.21 per cent in rest of the projects.

Bhaisa Singh project was executed for both irrigation and drinking water purpose. However, despite completion of the dam work, no IP could be created, and it was handed over (October 2016) to PHED for drinking water facilities. Thus, the initial planning to create 350 ha IP could not be achieved at all in more than four decades.

Rohini Dam created the projected IP of 365.94 ha, but it could not be utilised at all because of old and poorly maintained canal system and ultimately had to be handed over to Panchayati Raj Department.

Deficiencies were also noticed in monitoring of water release, maintenance of the projects and achieving cropping pattern as per projections.

Audit Objective 2

Whether coordination with all stakeholders was ensured at all stages for sustainable extension of benefits and achievement of intended outcomes?

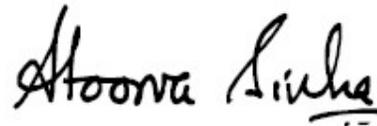
Coordination among the line departments to monitor the progress of projects was not ensured. There was no formal mechanism in place for coordination among departments.

Vital data to accurately assess project-wise outcomes were either not maintained by the department or not made available to audit. General data for the Districts/Tehsils were maintained, but in the absence of project-wise data, audit could not ascertain project-wise outcome precisely.

Audit observed that in five projects water released for irrigation was far less than that envisaged and reserved, while in two projects the water released was excessive causing water logging and salinity. In NCP, unauthorised water lifting was observed. Supply of drinking water was not up to the mark as only in three out of seven projects, drinking water was provided to intended beneficiaries. No water was provided to beneficiaries in respect of one project and only a part of beneficiaries were covered in respect of other three projects.

Rajasthan state was a pioneer in introducing, Participatory Irrigation Management by formulating Water Users' Associations. However, the WUAs did not function as per the expectations which led to inefficient maintenance and management of the projects.

Thus, the projects could not bring out intended objectives due to improper planning coupled with inefficient execution and management. The collection of vital data and coordination among stakeholders was also not ensured to monitor the outcomes and yield of sustainable benefits.



(ATOORVA SINHA)
Accountant General
(Audit-II), Rajasthan

JAIPUR,
The 03 January, 2022

Countersigned



(GIRISH CHANDRA MURMU)
Comptroller and Auditor General of India

NEW DELHI,
The 27 January, 2022

Appendices

Appendix-I

(Refer paragraph 1.3)

Status of Major findings and PAC recommendations thereon

CAG's Audit Report 2015-16 – Government of Rajasthan

S.No.	Observations	Recommendations
1	Non-utilisation of irrigation potential in CCA as envisaged in project report.	Electrification work of <i>diggies</i> should be done upto 2018-19 and scheme should adhere to sprinkler pattern.
2	Actual availability of culturable command area not ensured before construction of canal.	Department should ensure availability of actual culturable command area before construction of canal
3	Award of civil and mechanical works separately resulted in deprivation of irrigation benefits to farmers for more than five years.	No comments
4	Non-acquisition of land before awarding of work resulted in non-completion of works.	No comments
5	Non-mutation of land	Mutation of land may be expedited at the earliest.
6	Lack of participatory irrigation management.	Participatory irrigation management may be ensured.
7	Lifting of irrigation water from canals by farmers by using motor pumps.	No comments
8	Non achievement of target of plantation	Plantation work should be completed at the earliest.
9	Conjunctive use of ground and surface water not ensured.	No comments
10	Recharge and quality of ground water not monitored.	Ensure piezometer installation.

Appendix-II

(Refer paragraph 3.1.2 (i))

Statement showing delay in Land Acquisition

(₹ in crore)							
S.No.	Name of Division	Name of project	Year of A&F	Amount to be paid as per Land Compensation Act 1894	Year of payment of land compensation	Amount paid as per land compensation Act 2013	Avoidable expenditure (7-5)
1	2	3	4	5	6	7	8
1	EE, WRD, Rajgarh Medium Irrigation Project, Bhawani Mandi	Rajgarh Medium Irrigation Project, Bhawani Mandi	2012	37.11	2015	54.45	17.34
2	EE, WRD, Jalore	Akoli Minor Irrigation Project	2011	3.51	2015	7.48	3.97
3	EE, NCP, Dn.IV, Sanchore	NCP Sanchore	1996	1.92	2015	2.82	0.90
4	EE, WRD, Chauhi project canal Dn. Jhalawar Medium Irrigation Project, Pachpahar	Piplad Medium Irrigation Project, Pachpahar	2006	3.23	2017	5.23	2.00
5	EE, WRD, Dn.II, Chhabda, Baran Medium Irrigation Project, Chhipabarod	Lhasi Medium Irrigation Project, Chhipabarod	2007	9.29	2017	18.70	9.41
	Total			55.06		88.68	33.62

Appendix-III

(Refer Paragraph 3.6.2)

Non recovery/levy of compensation

S. No.	Name of division	Name of work	Agreement Number	Work order amount (₹ in lakh)	Stipulated date of		Actual date of completion	Expenditure (₹ in lakh)	Compensation levied/to be levied		Amount recovered	Amount to be recovered (₹ in lakh)
					Commencement	Completion			U/s 2	U/s 3		
1	EE, NCP Division-V Sanchore	Supply, laying, jointing and commissioning of Distribution network (main & sub-Main) of HDPE pipe for semi-permanent sprinkler system and electrically operated motor with horizontal centrifugal mono block pumping set of tail Minor Km 600 to Tail Minor Bhimgudha of NCP	07/2009-10	355.13	26.02.2010	25.11.2010	24.02.2012	190.27	3.39		0	3.39
2	EE, NCP Division-II Sanchore	Supplying, laying, jointing, testing and commissioning	5/2008/09	134.48	08/08/2008	07/12/2008	Not Done	91.02	13.45	48.76	0	62.21

S. No.	Name of division	Name of work	Agreement Number	Work order amount (₹ in lakh)	Stipulated date of		Actual date of completion	Expenditure (₹ in lakh)	Compensation levied/to be levied		Amount recovered	Amount to be recovered (₹ in lakh)
					Commencement	Completion			U/s 2	U/s 3		
		of distribution network (Main and Sub Mains) of high density Polyethylene (HDPE) pipes for semi-permanent sprinkler system of command area of Ranoder Minor including designing and layout on turnkey basis										
3	EE, NCP Division-I Sanchore	Supply, laying, jointing and commissioning of Distribution network (main & sub-Main) of HDPE pipe for semi-permanent sprinkler system. of command area of Vankdistry. Chak VNK 3(R) km 4.625 to Chak 5(L), Km 5.750	15/2007-08	177.81	05.08.2007	04.11.2007	Completed 15.01.2013	176.38	5.61	0	0.28	5.33

S. No.	Name of division	Name of work	Agreement Number	Work order amount (₹ in lakh)	Stipulated date of		Actual date of completion	Expenditure (₹ in lakh)	Compensation levied/to be levied		Amount recovered	Amount to be recovered (₹ in lakh)
					Commencement	Completion			U/s 2	U/s 3		
		Bhadwal Minor, BHWI(L) to BHW 10(T) and new minor Chak New 1(L) to New 5(T) total 18 Chak of NMC including design and lay plan (Ag. No. 15/2007-08) M/s Jain Irrigation System										
4	EE, NCP Division-I Sanchore	Supply, laying, jointing and commissioning of Distribution network (main & sub-Main) of HDPE pipe for semi-permanent sprinkler system of command area of Vank minors and Bhuwana minors and Vankdistry on Chak VNK 6 to 31 (R) and	20/2008-09	433.69	31.07.2008	31.01.2009	Completed 31.10.2013	400.58	15.33	0	4.49	10.84

S. No.	Name of division	Name of work	Agreement Number	Work order amount (₹ in lakh)	Stipulated date of		Actual date of completion	Expenditure (₹ in lakh)	Compensation levied/to be levied		Amount recovered	Amount to be recovered (₹ in lakh)
					Commencement	Completion			U/s 2	U/s 3		
		CCA 4651 ha of Vankdistry. system of NMC including design and lay plan (Ag. No. 20/2008-09) M/s Jain Irrigation System										
5	EE, WRD Sirohi	Construction of main dam and pakka work of out slues, construction of masonry west wear & construction of pick up wear of Bhaisa Singh Project	72/1978-79 73/1978-79 78/1978-79	38.59	01.09.1979	08.01.1981	Incomplete	14.88	3.62	0	1.07	2.55
6	EE, WRD Division Alwar	Repair & Restoration of Ghat Pickup Weir Irrigation Project	07/2011-12	878.99	02.09.2011	01.09.2013	05.04.2014	872.37	2.66	-	1.85	0.81
7	EE, Chavli Project Canal Division Jhalawar	Construction of Bakani Minor, Alwa Minor, of LMC	02/2015-16	69.30	31.05.2015	29.02.2016	Work rescinded	73.42	6.93	4.68	5.26	6.35

S. No.	Name of division	Name of work	Agreement Number	Work order amount (₹ in lakh)	Stipulated date of		Actual date of completion	Expenditure (₹ in lakh)	Compensation levied/to be levied		Amount recovered	Amount to be recovered (₹ in lakh)
					Commencement	Completion			U/s 2	U/s 3		
8	EE, Chavli Project Canal Division Jhalawar	Construction of Khorla & Tail Minor of LMC	03/2015-16	71.12	31/5/2015	29/02/2016	Work rescinded	55.38	7.11	8.98	6.37	9.72
9	EE, WR Division-II Chhabra (Baran)	Construction of main canal from RD 0 Mtr. to 10200 Mtr including structure of Lhasi MIP	02/2017-18	1423.99	17/5/2017	16/11/2018	WIP (02/2020)	651.44	123.60	0	0	123.60
10	EE, WRD Salumber (Udaipur)	Construction of Main Canal RD9 to 13.98 KM of Do Nadi MIP	6/2002-03	40.49	26.05.2002	25.09.2002	Rescinded Incomplete	32.90	0.66	19.69	3.54	16.81
		Total										241.61

Appendix-IV

(Refer paragraph 4.2.4)

Non-maintenance of records by WUAs

S.No.	Performa	Rule	Particulars of Performa
1	XIII	47 (2)(III)	Register of areas under lift command
2	XIV	47 (2) (IV)	Register of wells and tube-wells
3	XVI	47(2) (VI)	Register of culturable command
4	XVII	47(2) (VII)	Register of area irrigated and demand assessment (IDA-Register)
5	XVIII	47(2) (VIII)	Register of irrigation dues / realization
6	XIX	47(2) (IX)	Yearly summary of outstanding dues
7	XX	47(2) (X)	Property register
8	XXI	47(2) (XI)	Work register for the year
9	X(a)	47 (iv)	Inventory register (for Account & Article)
10	X(b)	47 (iv)	Yearly abstract of Inventory (Physical-verification)

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