

Chapter II

Performance Audit

This chapter includes the performance audit of Irrigation potential created in Narmada Canal Project.

Water Resources Department

2.1 Irrigation potential created in Narmada Canal Project

Executive Summary

The Narmada Canal Project in Rajasthan was approved (January 1996) by Government of India with March 2003 as stipulated date of completion. The Culturable Command Area was taken as 1.35 lakh hectares. On the basis of findings of the Water and Power Consultancy Services Limited, pressure irrigation using sprinkler/drip irrigation system was made mandatory and Culturable Command Area was increased from 1.35 lakh hectares to 2.46 lakh hectares. The plantation along canal for bio-drainage and conjunctive use of surface and ground water were also proposed to prevent water logging.

The irrigated area was shown as 2.15 lakh hectares (87.40 *per cent*) whereas only 1193 *diggies* (55 *per cent*) were electrified till March 2016. It showed that the command area shown as irrigated was not actually irrigated through sprinkler or drip irrigation system. The area irrigated by farmers by taking water from minors by arranging their own water pumps instead of micro irrigation system was incorrectly included in the achievement of Culturable Command Area irrigated. The land acquired for construction of canal, distributaries, minors and sub-minors was not mutated in the name of the Water Resources Department.

Out of 2236 Water User Associations to be formed, only 2145 Associations were formed and 1885 Associations were handed over assets like *diggies*, pipelines and mono block pumps. The Distributary and Project Committees were not formed in any of the water user areas. In absence of electrification of *diggies* (45 *per cent*) and collection of water charges, the Water User Associations remained largely non-functional. Necessary amendments in rules framed under 'Rajasthan Farmers' Participation in Management of Irrigation Systems Act, 2000' were not carried out to strengthen Participatory Irrigation Management. Absence of recovery/less recovery of water charges indicated lack of monitoring by the Water Resources Department. The Narmada Main Canal and its distributaries and minors suffered the problem of water theft by nearby cultivators who lifted water from canals to irrigate their fields by using their own water pumps.

Due to lesser plantation and planting of species other than the species mentioned in the project report, the objective of providing bio-drainage in the command area suffered. Further, no action was taken by the Department to ensure the conjunctive use of ground and surface water for drainage of low lying areas.

Introduction

The Narmada Canal Project (NCP) is an inter-state project shared by the States of Gujarat and Rajasthan. The annual share of water for Rajasthan was fixed by the Narmada Water Dispute Tribunal as 0.5 Million Acre Feet (MAF) water out of total 28 MAF utilisable quantity of water in Narmada Canal. The storage reservoir 'Sardar Sarovar Dam' is located in Gujarat from where the Narmada Canal starts and after traversing 458 km in Gujarat enters in Rajasthan near Silu village in Sanchore Tehsil of Jalore district. The discharge capacity of the canal at the border of Rajasthan is 73.5 m³/second. The total length of main canal in Rajasthan is 74 km. There are nine major distributaries and the total length of the main canal, distributaries and secondary canal system is 1792.67 km. The NCP has some unique features in comparison to other projects:

- Irrigation water is to be delivered to farmer groups through Water User Associations (WUAs) and not to individual farmers.
- WUAs are responsible for the operation and maintenance of field water channels.
- Micro-irrigation system such as drip and sprinkler irrigation system has been envisaged for efficient water usage.

The NCP in Rajasthan was approved (January 1996) by Government of India (GoI) at an estimated cost of ₹ 467.53 crore with stipulated date of completion as March 2003. The Culturable Command Area (CCA) was taken as 1.35 lakh hectares. The method of irrigation adopted was flow irrigation system. Under this system, the water allowance was taken as 7.41 cusecs¹ per one thousand acres.

According to the suggestions made by the Ministry of Environment and Forests (MoEF), GoI an environment action plan should be prepared and implemented *pari-passu* with the construction work. Water and Power Consultancy Services Limited (WAPCOS) conducted the study for environment impact assessment, ground water quality and drainage design and submitted (September 1998) its report which envisaged that:

- (i) the static groundwater table was high and still higher in the 'Ned'² area where sweet groundwater flows as a sheet of narrow thickness above saline ground water underneath,
- (ii) the soil in the area was saline/alkaline, and
- (iii) the canal irrigation might lead most of the command area to get water logged in few years which might render fertile land unfit for agriculture.

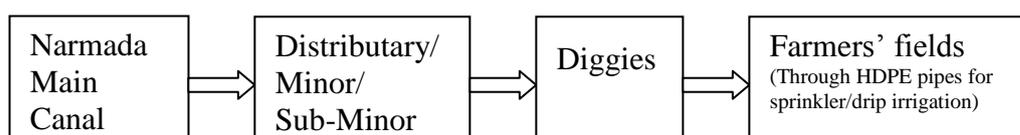
Necessitated by the findings of the WAPCOS, pressure irrigation by using sprinkler/drip irrigation system was made mandatory in the entire command area to prevent water logging. The CCA was increased from 1.35 lakh hectares to 2.46 lakh hectares and water allowance for irrigation was reduced to 1.31-2.51 cusecs against 7.41 cusecs per thousand acres. The plantation along canal for bio-drainage and conjunctive use of surface and ground water were also proposed to prevent water logging.

¹ Cubic feet per second

² Deltaic region of Luni river

Due to revision in the scope (from 1.35 lakh hectares to 2.46 lakh hectares) and introduction of additional items of works like construction and electrification of *diggies*³; laying of pipelines and installation of pumps; construction of wells and plantation along canal side; the cost of the project was revised (August 2007) to ₹ 1541.36 crore. The stipulated date of completion was decided as March 2014. The cost of the project was further revised (July 2010) to ₹ 2481.49 crore on account of abnormal increase in cost of labour, material, fuel, etc. and the stipulated date of completion was advanced to March 2013. Against the revised cost of ₹ 2481.49 crore, an amount of ₹ 2368.90 crore had been incurred up to March 2016. The Department has sought further extension up to March 2017 for completion of the project.

Flow chart of the project



Organisational Set-up

At State level, the Secretary is the administrative head of the Water Resources Department (WRD). At Department level, the Chief Engineer (CE) WRD functions as an Additional Secretary for technical matters. There is a CE for NCP at Sanchore at the field level. There are six⁴ divisions headed by Executive Engineers (EEs) which are supervised by two Superintending Engineers (SEs).

Audit objectives

The performance audit of irrigation potential created in Narmada Canal Project in Rajasthan was conducted to assess whether:

- the irrigation potential through sprinkler/drip irrigation system as envisaged was created and utilised;
- participatory irrigation management activities were able to achieve the objectives of 'Rajasthan Farmers' Participation in Management of Irrigation Systems Act, 2000';
- the activities like bio-drainage and conjunctive use of ground and surface water were implemented effectively; and
- the financial control and monitoring was effective.

³ Water storage tanks.

⁴ Executive Engineer, NCP Division-I, NCP Division-II, NCP Division-III, NCP Division-IV, NCP Division-V and Regional Workshop, NCP, Sanchore

Audit Criteria

The audit criteria were derived from:

- Detailed Project Report of NCP
- Public Works Financial and Accounts Rules
- Rajasthan General Financial and Accounts Rules
- Annual Progress Report of the WRD/NCP
- Rajasthan Farmers' Participation in Management of Irrigation Systems Act, 2000.

Scope and Methodology

The field study of the Performance Audit for the period from 2011-12 to 2015-16 was conducted in the offices of the CE, WRD Jaipur, NCP, Sanchore and EEs, NCP, Sanchore. Apart from these, records of Deputy Conservator of Forests (DCFs) at Jalore and Barmer were also scrutinized as funds for the plantation were allotted to these DCFs.

The broad audit objectives, scope and methodology of Performance Audit were discussed in the Entry Conference held (April 2016) with the Secretary, WRD, Rajasthan, Jaipur. The audit findings were discussed in the Exit Conference held (October 2016) with the Additional Secretary cum Chief Engineer, WRD. The replies of the State Government received (October 2016) have been considered while finalising the Performance Audit Report.

Audit Findings

2.1.1 Irrigation through sprinkler/drip irrigation system

Originally, flow irrigation system was adopted in the NCP. On the basis of findings of WAPCOS, as discussed above, pressure irrigation by using sprinkler/drip system was made mandatory in the entire command area.

2.1.1.1 Non-utilisation of irrigation potential in Culturable Command Area as envisaged in project report

One of the unique features of the NCP was to adopt micro-irrigation system such as drip and sprinkler irrigation system. This was envisaged in the project report for efficient water usage. The area was to be considered as CCA on completion of all civil and mechanical works relating to construction of canal, *diggies* and installation of micro-irrigation system.

The progress reports of the divisions selected disclosed that the civil works⁵ up to the extent of 97.32 *per cent* and mechanical works⁶ up to the extent of 88.06-96.02 *per cent* were completed as of March 2016. The CCA irrigated was shown as 2.15 lakh hectares (87.40 *per cent*) against the total command area of 2.46 lakh hectares. The fact that the 2.15 lakh hectares area shown as irrigated was not correct as out of 2183 *diggies* completed, only 1193 *diggies*

⁵ Construction of *diggies*, pump room, sump well, boundary wall, etc.

⁶ Supplying, laying, jointing, testing and commissioning of pipeline and installation of mono block pumps.

(55 per cent) were electrified till March 2016. The area irrigated by farmers by taking water from minors by arranging their own water pumps instead of sprinkler/drip irrigation system was also incorrectly included in the CCA irrigated. The irrigation potential created, therefore, could not be utilized as envisaged in the project report because of non-electrification of *diggies* (45 per cent).

The State Government stated that the irrigated area had increased from 0.18 lakh hectares in 2006 to 1.60 lakh hectares in 2016 but target of electrification of *diggies* could not be achieved due to educational and economic backwardness and lack of understanding and faith among the cultivators. It was also stated that utmost efforts at departmental level were being made to accelerate the pace of electrification of *diggies*. The reply of the State Government contradicts with the facts mentioned in the progress report that the CCA of 2.15 lakh hectares was irrigated. The actual area irrigated only through drip and sprinkler irrigation system was to be adopted in the CCA irrigated. In the absence of electrification of *diggies*, the CCA was being irrigated through flow system. It had the serious risk of water logging due to excessive recharge of ground water by overdrawal of water thereby defeating the objective of economic use of water and preventing of water logging.

It is recommended that electrification work should be executed simultaneously with the canal works. The remaining diggies (45 per cent) should be electrified on priority basis.

2.1.1.2 Actual availability of culturable command area not ensured before construction of canal

The construction of Surachand minor of Bhimguda Distributary having discharge capacity of water of 0.715 cumecs⁷ was completed in September 2011 at a cost of ₹ 3.71 crore. The CCA proposed for the minor was 6369.31 hectares and 51 *diggies* in the command area were to be constructed.

To utilize the water of this minor for irrigation, the work of laying, jointing, testing and commissioning of distribution network was awarded (February 2011). The work was scheduled to be completed by 4 March 2012. The contractor when submitted the drawing and design for laying pipeline in the command area, it was found that 3391.04 hectares of CCA covering the area of 25 *diggies* were Government land. In the command area of these *diggies*, sprinkler irrigation system was not developed. In the remaining area (2978.27 hectares), the work of laying of pipeline, installation of pump set and construction of 26 *diggies* was executed by incurring an expenditure of ₹ 4.93 crore up to October 2015.

It showed that proper survey was not conducted before preparing the Detailed Project Report (DPR) for assessing the actual availability of CCA at site and the Surachand minor was constructed without proper planning and assessing the actual requirement of *diggies*. This resulted in avoidable expenditure on construction of canal of higher discharge capacity. The avoidable expenditure on the minor could not be worked out in Audit since the minor was constructed long back.

⁷ Cubic metre per second

The State Government stated that in the sanctioned DPR of the project, CCA of each *diggi* was taken as determined by the consultancy firm⁸. In the instant case, when the work of laying of High-Density Polyethylene (HDPE) pipeline was taken up as per the alignment fixed by the Consultant, the Department for the first time noticed that the area of 25 *diggies*, out of 51 was lying either under forest land or was saline but prior to this, the construction of Surachand minor had been completed.

2.1.1.3 Award of civil and mechanical works separately resulted in deprivation of irrigation benefit to farmers for more than five years

Para 14 (vi) of the revised guidelines (1998) of Central Water Commission for environment monitoring of water resources projects envisaged that Command Area Development (CAD) plan should be prepared and implemented in such a manner that gap between irrigation potential created and utilized was minimized. This was meant to ensure that the outlay on the project was converted into enduring outcome in the form of assured and sustainable irrigation benefits to farmers.

It was noticed that the civil works of various minors/sub-minors were awarded between February 2007 and October 2009 and completed in 2011. The mechanical works were, however, not completed (May 2016) due to awarding of the works separately to other contractors during the period between December 2007 and November 2008. This resulted in blocking of funds of ₹ 72.11 crore⁹ incurred on civil works and depriving the farmers of assured and sustainable irrigation benefits for more than five years. It was also noticed that in compliance to the order issued (July 2010) by WRD, the civil and mechanical works were being awarded simultaneously to the single bidder on turnkey basis. Keeping in view the CWC guidelines, had the decision to award the civil and mechanical works simultaneously to single bidder been taken earlier by WRD, blocking of funds on the civil works could have been avoided and could have provided the benefit of irrigation to the farmers side by side.

The State Government stated that awarding of civil and mechanical works separately resulted in lack of coordination between civil and mechanical contractors and therefore, composite civil and mechanical works were awarded from 2010-11. It was also stated that during 2008-12, available canal water was utilized because of the completion of civil works. The fact remained that the farmers utilized the water using their own water pumps and timely benefit of irrigation to the farmers as envisaged in the project report was not provided.

2.1.1.4 Non-acquisition of land before awarding of work resulted in non-completion of works

Rules 298 and 351 of Public Works Financial and Accounts Rules (PWF&AR) provide that the availability of land is a pre-requisite and it should be acquired well in advance. No work should commence on land which has

⁸ M/s Tahal Consultancy

⁹ Division-I ₹ 17.29, II- ₹ 15.24, III- ₹ 21.06, IV- ₹ 11.26, V- ₹ 7.26

not been physically in possession or has not been duly made over by the responsible civil officer.

It was observed that the works of execution of earth work, single precast cement concrete (PCC) block lining, *pucca* structure, *diggies*, pump room, sump well and boundary wall of Malwar sub-minor and Karawadi minor were awarded (February 2010) to the contractor for ₹ 1.33 crore. The stipulated date of completion was November 2010. The work of Karawadi minor could not be completed within stipulated time, as owner of the land created obstacles and obtained a stay order from the Court. As the matter could not be finalized, the work was withdrawn (April 2011) under clause 32 of the Agreement. The contractor was paid ₹ 1.12 crore for 84 *per cent* completion of work. Subsequently, after a gap of five years, the remaining work of Karawadi minor was awarded (June 2015) to another contractor for ₹ 20.88 lakh with scheduled date of completion as 19 September 2015. The contractor was paid ₹ 11.95 lakh (March 2016).

Due to not following the governing rules for ensuring the availability of land before commencement of work, the work was delayed for more than five years. This also postponed the benefit of irrigation to the farmers.

The State Government stated that the works were allotted after issuance of land award but due to court stay and non-vacating of land by a cultivator till September 2016, the works remained incomplete. The fact remained that works were allotted without ascertaining clear title of land.

2.1.1.5 Non-mutation of land

The Department had acquired 4833.353 hectares land for construction of various canals/distributaries/minors/sub-minors, etc. The compensation of ₹ 65.45 crore was paid up to March 2016 but mutation of the land in the name of the Department was not done. As a result, the land acquired had not come under the clear title of the Department.

The State Government stated that the process of mutation of acquired land was in progress.

It is recommended that land acquired should be mutated in the name of the Department as early as possible to avoid any possible encroachment and legal complications.

2.1.2 Participatory Irrigation Management activities

The Rajasthan Farmers' Participation in Management of Irrigation Systems Act, 2000 (RFPMIS Act) was introduced (July 2000) to govern the distribution of water among the farmers. Accordingly, farmers' organizations had to be constituted in the command area of any irrigation project. For operation and management of irrigation system, elected bodies of farmers namely WUAs at primary level¹⁰; Distributary Committee at secondary

¹⁰ For preparing plan for maintenance, extension, improvement, renovation and modernization of irrigation system including distributary and field drains

level¹¹; and the Project Committee at project level¹² had to be formed. The Government of Rajasthan (GoR) also framed Rules, 2002 under the Act.

2.1.2.1 Lack of Participatory Irrigation Management

According to Section 4 of RFPMIS Act (Act), there shall be one WUA for every water user area, consisting of all the water users who are land owners in such area as members. Section 17 of the Act stipulates that the WUA shall prepare and implement a plan of maintenance, extension, improvement, renovation and modernization of irrigation system; regulate the use of water among the various outlets; promote economy in use of water; monitor flow of water in irrigation, etc. Similarly, under Section 6 and 8 of the Act, one Distributary Committee for two or more water user areas and one Project Committee for the project area shall be formed for execution of the functions as given in section 18 and 19 of the Act.

It was observed that against the requirement of 2236 WUAs to be formed, only 2145 WUAs were formed (March 2016) and only 1885 WUAs were handed over the assets. It was also observed that in absence of electrification of *diggies* (45 per cent) and collection of water charges, the WUAs were largely not functional. Similarly, no Distributary and Project Committees were formed in any of the water user areas. As a result, the work to be assigned to these committees under the Act could not be performed.

Section 17 of Act stipulates that WUAs shall prepare and implement a *warabandi* schedule¹³ for each irrigation season. For this, WUAs were also required to maintain certain registers, inventory of irrigation system, accounts, etc. It was observed that no *warabandi* schedule had been prepared by any of the WUAs formed and no mechanism existed in the Department for verification of records, registers, inventory of irrigation system, etc.

The State Government stated that WUAs were not supposed to prepare the *warabandi* schedules but had to implement the *warabandi* schedules. The Department had prepared the *warabandi* schedules according to the HDPE pipeline design and capacity of motor pumps. The reply was not tenable as section 17 of RFPMIS Act stipulated that WUAs should prepare and implement *warabandi* schedule. The *warabandi* schedules were not implemented by WUAs even in areas where *diggies* were electrified. The State Government did not address on the formation of Distributary and Project Committees.

The Department should ensure formation of Water User Associations, Distributary and Project committees and transfer of assets to the Water User Associations according to provisions of RFPMIS Act.

¹¹ For preparing operational plan for the extension, improvement, renovation, modernization and annual maintenance of both distributaries and medium drains and to regulate the use of water among various WUAs

¹² For approving plan for the extension, improvement, renovation, modernization and annual maintenance of irrigation system including major drains.

¹³ *Warabandi* schedule is a system of water allocation to water users by turn according to an approved schedule indicating the day, duration and time of supply.

2.1.2.2 Lifting of irrigation water from canals by farmers by using motor pumps

One of the consequences of lack of participatory irrigation management was the problem of water theft from the main canal, distributaries and minors.

In the NCP, compulsory pressure irrigation was adopted by using sprinklers or drip. It was observed that the Narmada Main Canal and its distributaries and minors suffered the problem of water theft by nearby cultivators who lifted water from canals to irrigate their fields by using motor pumps. A campaign was launched (28 April to 30 April 2016) to remove motor pumps and other encroachments from Narmada Main Canal and a number of motor pumps/engines and pipes were seized. It was observed that no such campaign was undertaken for checking drawal of water from distributaries and minors, although these also suffered the problem of water theft.

The Government stated that utmost efforts were being made to remove all encroachments from the canal system.

The Department should develop monitoring mechanism to prevent lifting of irrigation water from canals by farmers till the Water User Associations become fully functional.

2.1.2.3 Collection of Water Charges

Section 17 of RFPMIS Act stipulates that the WUAs should prepare demand and collect water charges. Section 32 stipulates that all the amount payable or due to farmer's organization, if not paid on demand, should be recovered as arrears of land revenue.

It was noticed that against an outstanding demand of ₹ 18.75 lakh and ₹ 60.80 lakh raised by Divisions-II and IV, NCP, Sanchore, only ₹ 0.17 lakh and ₹ 1.65 lakh respectively were recovered from farmers during 2011-2015. Division-V did not even raise the demand of water charges and Division-I and III did not have the information of collection of water charges.

According to section 24 of the Act, the funds of the farmer's organisation would comprise grants received from the Government as a share of water tax collected in the area of operation. It was observed that no mechanism was developed to make available the share of water tax to the WUAs. In addition, as per the data pertaining to Narmada Main Canal, 227.63 mcum¹⁴ to 597.01 mcum water was received during July 2011 to June 2015 and 0.80 lakh to 2.15 lakh hectares area was irrigated. No demand for water charges was, however, raised by Division-V and only an amount of ₹ 1.82 lakh was collected by Divisions-II and IV.

The State Government stated that due to presence of mistrust and politics among the cultivators, the recovery of water charges for elected body was a very difficult job. It further added that *patwaris* were not available in the project for recovery of water charges. The reply of the State Government indicated the lack of persuasion and monitoring by the Department as the collection of water charges was an important element in participatory

¹⁴ Million cubic metre

management. Absence of recovery/less recovery also had an adverse impact on the upkeep and sustainability of the project.

2.1.2.4 Necessary amendments in rules were not carried out to strengthen Participatory Irrigation Management

The RFPMIS Rules, 2002 were framed for flow system of distribution of water. In NCP, drip/sprinkler irrigation system was adopted under which water was to be distributed through *diggies* and WUAs were to manage the distribution of water from *diggies*. Therefore, some amendments as suggested in project report (*Appendix-2.1*) like *diggi*-wise formation of WUAs, responsibility of WRD for maintenance and repair of pre-*diggi* canals till formation of Distributary Committees, formation of Consultancy Committee for providing all nature of consultations, etc. required to be made in the rules were not carried out. The State Government accepted the facts.

The State Government may carry out necessary amendments in Rajasthan Farmers' Participation in Management of Irrigation Systems Rule, 2002 for strengthening of Water User Associations.

2.1.3 Bio-drainage and conjunctive use of ground and surface water to prevent water logging

Plantation of trees along canal system and on the boundaries of the fields of farmers had been proposed in the project report. This was required for bio-drainage to drain out any excessive ground water. Besides, for vertical drainage, conjunctive use of surface and ground water had been proposed in the project command to prevent water logging.

2.1.3.1 Non achievement of target of plantation

Pursuant to the suggestions of the MoEF, GoI stipulated that environment action plan be prepared, a study was conducted (September 1998) by WAPCOS. WAPCOS found that introduction of flow irrigation¹⁵ might lead to water logging in most of the command area in a few years. This might pose a serious threat to agriculture. One of the measures to be adopted for drainage in the low lying area was planting of trees of certain species¹⁶ along canal system. These species have deep roots and provide adequate bio-drainage to drain out the excessive ground water. For the purpose of planning for plantation, an average consumptive tree water use of 30 litre per day/per tree in the flow area and 20 litre per day/per tree in the Ned area was proposed. A provision of ₹ 74.88 crore for plantation along canal side was made in the project report.

It was observed that against the allotted budget of ₹ 9.57 crore for Barmer and ₹ 37.46 crore for Jalore between the period December 2010 and January 2016, ₹ 5.11 crore and ₹ 17.75 crore respectively were utilized for plantation. The physical targets for plantation along the main canal, distributaries and minors were fixed (July 2011) in 3941 running km for DCF, Barmer and DCF Jalore

¹⁵ It is a method of irrigation in which water is transported by natural flow.

¹⁶ *Arjun, Babul, Jangli keekar, Farash, Khejri* etc.

which were to be achieved up to 2012-13. Against the target fixed, the plantation was done in only 1977 running km (50.67 *per cent*) up to March 2016. In addition, plantation of species other than the species mentioned in project report was done.

Due to lesser plantation and planting of species other than the species mentioned in project report, the objective of providing bio-drainage in the command area suffered. The project authorities had also not monitored the plantation of species of plants with reference to the aim of bio-drainage.

The CE NCP, Sanchore stated (May 2016) that budget allotment for plantation work was directly made to the Forest Department. Therefore, the number of plants and species were decided by Forest Department. The DCF, Jalore stated (June 2016) that plantation was done as per budget allotted. The replies were not convincing as the very purpose of planting specific species was to ensure bio-drainage. By shifting the onus in this regard to the Forest Department, the WRD abdicated its responsibility of monitoring and supervising the project. Besides, only 47 *per cent* of the budget allotted for plantation was utilized by DCF, Jalore which indicated inadequate plantation done. The reply of the State Government was awaited (October 2016).

2.1.3.2 Conjunctive use of ground and surface water not ensured

There was a great possibility of water logging within a few years because of the high static ground water table; saline/alkaline soil in the command area and with the introduction of canal irrigation. It was, therefore, proposed (August 2007) by WAPCOS that one of the measures to be adopted for drainage of low lying area may be conjunctive use of surface and ground water. This would drain out the entire annual ground water recharge including the water recharged due to irrigation application. A mandatory provision of conjunctive use of ground and surface water (30:70 ratio) was proposed in the command area. Ground water was to be used by the farmers with surface water for vertical drainage and to prevent rise in ground water table. It was also stated in the project report that the cultivators would have wells in their fields for ground water and would be taking surface water from *diggies* through sprinkler pipes. As per project report, the position of existing Dug cum Bore (DcB) well against required number of wells for pumping out ground water was as under:

Particular	Flow area ¹⁷		Lift area ¹⁸	Total
	Normal	Ned		
Number of required DcB well in zone area	5063	3428	9134	17625
Number of existing wells	3068	87	3694	6849
Difference in number of required wells	1995	3341	5440	10776

Source: Project report and information provided by CE, NCP, Sanchore.

The above position indicated that large numbers of wells were required to be dug. It was envisaged in the project report that motivation would be provided to the farmers to dig more wells and make greater use of ground water.

¹⁷ Area in which water is transported by natural flow.

¹⁸ Area in which water is lifted from lower level to higher level with the help of pumps.

It was also observed that no action was taken by the Department to ensure the conjunctive use of ground and surface water.

The State Government stated that due to availability of limited staff in the project, the data regarding number of wells existing in the project area was not available. The reply indicated lack of action by the department to ensure implementation of conjunctive use of ground and surface water to prevent water logging.

It is recommended that conjunctive use of ground and surface water as per provisions of the project report should be ensured besides the plantation of specified species of trees.

2.1.3.3 Recharge and quality of ground water not monitored

Paragraph 17.23 of the project report envisaged establishment of piezometer wells for regular monitoring of quality and recharge of ground water in the project area. For this purpose, a provision of ₹ 2.14 crore was taken in the project report for establishing 277 piezometer wells in the project command but no piezometer wells were established.

The State Government stated that the level of ground water was being measured by the Ground Water Department. The Department, however, intimated (June 2016) that no piezometer wells were established. The reply did not mention that in the absence of establishing piezometer wells, how the quality and recharge of ground water in the project area was being monitored by the Department.

2.1.4 Contract Management

2.1.4.1 Avoidable expenditure on construction of additional lamina

The technical estimate of work for construction of additional lamina¹⁹ on Arniyali Lift Minor at km 16.700 to 17.000 was sanctioned (July 2014) by EE, NCP Division-IV, Sanchore for ₹ 38.64 lakh. As per its technical report, the reason for providing additional lamina was that the canal portion in this particular reach was in heavy filling²⁰ and strong winds blowing in the region damaged the banks of the canal. The work of additional lamina was completed (December 2014) and payment of ₹ 38.34 lakh was made (February 2015) to contractor.

It was observed that as per communication (14 June 2013) of the SE, NCP Circle-II to CE, NCP, Sanchore, the reasons stated for providing additional lamina in the project report were not based on facts. The main reason for taking additional lamina was that the net head difference calculated for canal syphon²¹ was worked out as 0.640 metres²² whereas at site, it was only 0.380 metres. This caused that the designed discharge of water could not pass through the canal syphon. It was also noticed that the decision taken for

¹⁹ A layer of sedimentary rock, organic or other material.

²⁰ Filling of earth by more than three meters.

²¹ A tube used for drawing liquid from one container to another on a lower level

²² Difference between full storage level of canal at km 17.000 (45.555 metres) and at km 18.850 (44.915 metres)

construction of additional lamina was a temporary solution of the problem and for remedial measures, an estimate of ₹ 3.70 crore submitted (August 2014) to SE, NCP Circle II, Sanchore. The approval of the same was pending (October 2016) for approval. Had the canal been designed properly, it would have avoided an expenditure of ₹ 38.34 lakh incurred as a temporary measure. Besides, action to fix responsibility for faulty design of the canal was not taken.

The State Government stated that the work of additional lamina was taken up to keep the canal banks stable and safe. The reply was not tenable as stated above, additional lamina would not have been required if canal banks were constructed after proper design.

2.1.4.2 Lack of action under clause 2 and 5 of the Agreement

Under clause 2 of the Contract Agreement, the contractor was liable to pay compensation for not maintaining the *pro-rata* progress of the work. Under clause 5, on the ground of unavoidable hindrance in execution of work, the contractor should apply for extension of time for completion of work to the engineer-in-charge within 30 days of the date of the hindrance. The competent authority would grant such extension within a period of 30 days from the date of receipt of application from contractor and should not wait for finality of work.

It was observed that 18 works (*Appendix-2.2*) were in progress even after expiry of the stipulated date of completion. The Department, however, had neither taken action under clause 2 of the Agreement against the contractors for not maintaining the *pro-rata* progress of the works nor was any time extension granted under clause 5 of the Agreement.

The State Government stated that 12 out of 18 works were pending due to not providing electricity for testing. In five works, civil works were in progress along with mechanical works and in respect of one work, time extension was under consideration. The reply was not tenable as span-wise time extension was to be granted as per provision of the Agreement or the contractor had to be penalized for not maintaining the progress of work accordingly.

Similarly, the execution of works²³ of the different minors, sub-minors of Balera Distributary (off taking from km 16) and Basan sub-minor of Vank Distributary (off taking from 7.88 km) of NMC was awarded (December 2011) on turnkey basis to a contractor²⁴ for ₹ 12.48 crore. The stipulated dates of commencement and completion were 22 December 2011 and 21 December 2012 respectively. The contractor, despite issuance of several notices by the Department, failed to commence the work. As a result, compensation of ₹ 1.25 crore was imposed (August 2012) on the contractor under clause 2 of the Agreement. The action to get the work completed at the risk and cost of the contractor under clause 3(c) of the Agreement was also taken by the Department. It was observed that recovery of only ₹ 7.65 lakh had been made on account of compensation out of the earnest money and the remaining

²³ Earth work, single PCC block lining, *pucca* structure, pump room, sump well and supplying, laying, jointing, testing and commissioning of distribution network including designing and layout of mechanical works.

²⁴ M/s Banco Construction, Gwalior

amount of ₹ 1.17 crore was yet to be recovered from the contractor (October 2016).

The State Government stated that action under Public Demand Recovery (PDR) Act was being taken for recovery of balance amount of ₹ 1.17 crore from the contractor.

2.1.4.3 Overpayment made due to adoption of wrong Basic Schedule of Rates

The work of construction of pumping stations at km 0.400 of Kothra Lift Minor and at km 17.100 of Gudamalani Lift Minor was awarded (August 2009) for ₹ 1.41 crore. The work was completed (November 2011) at a cost of ₹ 1.01 crore.

It was observed that during construction of pumping stations, payment of earthwork (29747.73 cum) was made on the basis of rates given in the Basic Schedule of Rates (BSR), 2008 of Public Works Department (PWD). The rates of earth work in BSR of PWD were higher in comparison to the BSR of WRD which resulted in extra payment of ₹ 25.12 lakh to the contractor.

The State Government stated that it had been clearly provided in the BSR of WRD that rates given in BSR of PWD would be applicable for building works and since the construction of pumping station was a building work, the rates of BSR of PWD were applied. It further stated that if BSR of WRD was adopted, the Department would have to allow extra lead for disposal of excavated earth. The reply was not tenable as in the case of pumping station, earthwork was done in large area and not in trenches as provided in BSR of PWD. Besides, there was uniform provision of initial lead in both BSRs and, therefore, application of BSR of PWD was not in order.

2.1.4.4 Mix design test not conducted for cement concrete works

Clause 4.5 of specific condition of contract provides that concrete mix shall be designed on the basis of preliminary test.

In the works²⁵ awarded to various contractors, the ratios of ingredients i.e. cement, water, sand and aggregate in concrete mix material were pre-determined in the estimates. Preliminary test was, however, not conducted and the concrete mix was not designed accordingly.

The State Government stated that in the contracts where cement concrete was in lesser quantity, the provision of design mix being impracticable was not included in the agreement. It was added that where minimum level of cement consumption per cubic metre was less than 250 kilograms, mix design was not to be conducted. The reply was not tenable as concrete mix was not designed despite inclusion of the above specification in the agreement. In absence of the concrete mix design, the right proportion of ingredients could not be determined and specific strength, workability and durability of concrete could not be ensured.

²⁵ Earth work, *pucca* structure and single PCC block lining of various distributaries/ minors/sub-minors and construction of *diggies*, pump room, sump well boundary wall, etc.

2.1.5 Financial control and Monitoring

Funds for NCP are provided through regular budget allotment by State Government under capital head of accounts. Funds under Accelerated Irrigation Benefit Programme are also received as central assistance from GoI.

2.1.5.1 Short realization of share cost from Public Health and Engineering Department

The project report envisaged that share cost of ₹ 246.65 crore was payable by Public Health and Engineering Department (PHED) for utilization of Narmada water for drinking water supply scheme. It was observed that against the share cost, only ₹ 10 crore was adjusted to NCP head, ₹ 100 crore was lying unadjusted under head 8443-Deposit-III in NCP Division-I, Sanchore since April 2013 and ₹ 136.65 crore had not been realized from PHED.

The Department stated that ₹ 5 crore had further been received from the PHED and efforts at the level of the State Government were being made for recovery of the remaining amount of ₹ 131.65 crore.

2.1.5.2 Diversion of funds

Expenditure on items without provision in project report

Provision of plantation of trees on either side of main canal, distributaries and minors had been taken under sub-head M-plantation of the project report with the objective of controlling the ground water recharge through bio-drainage.

It was observed that an expenditure of ₹ 1.22 crore was incurred from sub-head M-Plantation on construction of buildings such as residence of Assistant Conservator of Forest, Forest chowki, Forester's office, etc. and purchase of vehicles, computers and printers as detailed below for which no provision was made in the project report.

(₹ in lakh)

S.No.	Name of work	DCF Barmer	DCF Jalore
1	Building construction	12.52	53.21
2	Vehicles	14.02	29.96
3	Office and Communication Management	1.00	10.96
	Total	27.54	94.13

Source: Information provided by DCF, Barmer and Jalore.

Finance Department, GoR had directed (September 2014) the Department not to incur any expenditure on these items but prior to this, the above mentioned expenditure of ₹ 1.22 crore had already been incurred on the above items. This resulted in extra financial burden on the project.

2.1.5.3 Bank Guarantee expired due to lapse in monitoring

The work of execution of earth work, *pucca* structure and block lining of Bhimguda Distributary was awarded (December 2005) to a contractor²⁶ by EE, NCP Division-V, Sanchore for ₹ 19.67 crore. The work was to be completed by 18 June 2007. The contractor firm furnished (December 2006) Bank Guarantee of ₹ 75.00 lakh and ₹ 50.00 lakh (February 2007) issued by Bank of Baroda, KFTZ Branch (Kutch) in support of the security deposit. The bank guarantees were valid up to 18 June 2008.

The WRD extended (October 2007) the stipulated date of completion of work up to 28 February 2008. The contractor firm did not complete the work and as such, compensation of ₹ 35.17 lakh was imposed (January 2011) under clause 2 of the agreement and action to get the work completed at the risk and cost of the contractor under clause 3 (c) of the agreement was taken. The remaining work was allotted to another contractor for ₹ 9.33 crore.

The validity of the bank guarantees was, however, not extended beyond 18 June 2008. The bank denied encashment of bank guarantees stating that it was not its responsibility to make payment after expiry of validity of the bank guarantees. Had the bank guarantees been renewed, ₹ 1.25 crore could have been recovered out of the amount of compensation of ₹ 6.18 crore levied under clause 3 (c) of agreement.

Note-1 below Rule 595 of PWF&AR provides that register of bank guarantees should be kept in Division office in the personal custody of the EE. He would review the register to take timely action for extension of the period or encashment of the bank guarantees, as required. The requisite action was not taken at the level of concerned officer.

The State Government stated that disciplinary action against officials at fault was in process.

2.1.5.4 Enquiry not conducted for damages due to flood

An administrative sanction was issued (October 2015) by Disaster Management and Relief Department, Rajasthan for immediate relief/rehabilitation of main canal/distributaries damaged due to heavy rains in monsoon season of 2015.

State Government allotted (March 2016) budget of ₹ 15.96 crore. Against the sanction issued, an expenditure of ₹ 15.87 crore was incurred during 2015-16 on immediate repair and rehabilitation of flood damaged canals.

As per Rule 21 of General Financial and Accounts Rules (GF&AR), an enquiry about the quantum and extent of loss should be conducted in case of flood; cyclone, fire, earthquake etc., and its report should be submitted to Department concerned/Government. It was, however, observed that no such enquiry had been conducted and the Department had not even taken action to probe the reasons of the flood and take remedial measures to prevent future recurrence.

The State Government accepted the facts.

²⁶ M/s Mepa Bhai Mandan (now MMC Project), Gandhi Dham

2.1.5.5 Administrative Inspection

Paragraphs 3.4.9 and 3.5.5 of Manual of Water Resources provide that SE and EE would inspect all important and major construction works. The Department issued (May 2009) a circular fixing the yearly norms²⁷ for inspection of works and night halts outside the headquarter. The details of achievements against norms are given in table below:

Table-1: Details of achievement against norms in respect of inspections and night halts

Year	Achievement (Inspection)			Achievement (Night halt)		
	EE-II (percentage of shortfall)	EE-IV (percentage of shortfall)	EE-V (percentage of shortfall)	EE-II (percentage of shortfall)	EE-IV (percentage of shortfall)	EE-V (percentage of shortfall)
2011-12	88 (8.33)	75 (21.88)	96 (-)	24 (66.67)	35 (63.54)	72 (-)
2012-13	91 (5.21)	81 (15.63)	96 (-)	22 (69.45)	56 (22.23)	72 (-)
2013-14	88 (8.03)	72 (25.00)	101 (-)	24 (66.67)	71 (1.39)	11 (84.73)
2014-15	86 (10.42)	48 (50.00)	113 (-)	30 (58.34)	40 (44.45)	52 (27.78)
2015-16	89 (7.30)	102 (-)	84 (12.5)	28 (61.11)	72 (-)	77 (-)

Source: Information provided by CE, NCP, Sanchore.

During 2011-16, the targets of inspections and night halts were not achieved by EEs. The shortage of night halts in Division-II was from 58.34 to 69.45 *per cent*; in Division-IV, the shortage was up to 63.54 *per cent*; and in Division-V, it was up to 84.73 *per cent*. The SEs and EE-I and EE-III did not provide the information.

The State Government stated that all the engineers were inspecting the works as per norms. The reply was not based on facts as record maintained in various NCP Divisions showed shortfall in inspections/night halts.

2.1.6 Conclusion

The change in scope of work resulted in extension in completion period from 2003 to 2013 and more than five times increase in overall cost. Various activities like civil work of distributaries, minors and sub-minors; land acquisition; earth work; mechanical works like supplying, laying, jointing, commissioning of pipeline and installation of mono block pump sets; and electric connection to *diggies* were, however, not fully completed as of March 2016.

The irrigated area was shown as 2.15 lakh hectares (87.40 *per cent*) whereas only 1193 *diggies* (55 *per cent*) were electrified till March 2016. It shows that the command area shown as irrigated was not actually irrigated through

²⁷ Norms for inspection of work CE-30, ACE-90, SE-90, EE-96 and for night halt CE-20, ACE-60, SE-60, EE-75.

sprinkler or drip irrigation system, which was the key element of the project. The areas irrigated by farmers by taking water from minors by arranging their own water pumps, instead of micro irrigation system, were incorrectly included in achievement of Culturable Command Area irrigated. The land acquired for construction of canal, distributaries, minors and sub-minors was not mutated in the name of the Water Resources Department.

Out of 2236 Water User Associations to be formed, only 2145 Associations were formed and 1885 Associations were handed over assets like *diggies*, pipelines and mono block pumps. The Distributary and Project Committees were not formed in any of the water user areas. In absence of electrification of *diggies* (45 per cent) and collection of water charges, the Water User Associations remained largely non-functional. Necessary amendments in rules framed under 'Rajasthan Farmers' Participation in Management of Irrigation Systems Act, 2000' were not carried out to strengthen Participatory Irrigation Management. Collection of water charges was an important element in participatory management and absence of recovery/less recovery indicated lack of monitoring by the Department. Besides, it would have an adverse impact on the upkeep and sustainability of the project. The Narmada Main Canal and its distributaries and minors suffered the problem of water theft by nearby cultivators who lifted water from canals to irrigate their fields by using motor pumps.

Due to lesser plantation and planting of species other than the species mentioned in the project report, the objective of providing bio-drainage in the command area suffered. The project authorities had not monitored the plantation of species of plants with reference to the aim of bio-drainage. There had no action been taken by the Department to ensure the conjunctive use of ground and surface water for drainage of low lying areas.