Chapter-II
Performance Audit

This Chapter presents the Performance Audits of *'Efforts to popularize and strengthen Ayurveda in Rajasthan', 'Management of Drinking Water in Rajasthan*' and *'Phase-I of Jaipur Metro'*.

Department of Ayurveda and Indian Medicine

2.1 Efforts to popularize and strengthen Ayurveda in Rajasthan

Executive summary

Indian Systems of Medicine comprise Ayurveda, Unani, Siddha, Yoga and Naturopathy, of which Ayurveda is widely practiced in Rajasthan. The Ayurveda Department (Department) has an extensive network of 118 hospitals and 3,577 dispensaries in the State and during 2012-17, Government of Rajasthan (GoR) incurred ₹ 2,655.89 crore for Ayurveda Healthcare Services and Ayurveda Education.

Though the Department prepared State Public Health Standards for standardization of facilities in Ayurveda dispensaries and hospitals in May 2014, they were still pending approval of GoR as of October 2017. The Department's decision in September 1994 to establish a dispensary for minimum population of 2,000 persons was not followed and there was imbalanced distribution of dispensaries in rural areas. Further, in absence of an effective awareness programme, the utilisation of the vast network of Ayurveda healthcare facilities could not be ensured in the State. Even the specialty clinics for key diseases had not been established.

Basic infrastructural facilities were inadequate as electricity was not available in 46.88 per cent and drinking water in 74.17 per cent of the Ayurveda healthcare centers. Further, in seven test checked districts, toilets were not available in 75.38 per cent healthcare centers and most healthcare centers did not have all essential equipment. There was shortage of manpower at all levels and disproportionate deployment of Medical Officers and Nurse/Compounders was also noticed. Further, efforts for filling up the vacant posts on contractual basis were also not initiated.

There was no significant growth in number of Ayurveda patients during last decade in spite of the fact that Department had inflated the number of beneficiary patients. The number of hospitals having nil bed occupancy increased from 60 in 2012-13 to 79 in 2016-17 and no patient was admitted consecutively for five years in 40 hospitals, four years in 48 hospitals and three years in 49 hospitals. In spite of this trend, no review to reduce/relocate the staff was conducted.

The performance of the departmental pharmacies was dismal as the achievement in drug production vis-à-vis targets during 2012-17 was only 39.12 per cent. Further, the cost of drugs manufactured by the departmental pharmacies was 1.23 to 3.92 times higher the price of Indian Medicines Pharmaceutical Corporation Limited. Distribution of drugs was done without ascertaining demand and there were instances of delay in distribution of drugs, distribution of expired drugs to the patients and failure to distribute drugs in small hygienic packaging. The quality of drugs produced was also not tested adequately to maintain standards.

No new Post Graduate courses could be started in Government Ayurveda College, Udaipur after 1986 due to non-availability of qualified teachers. Further, practical training in Surgery and Gynecology was not being provided to the students as the Ayurveda colleges did not have facilities for delivery and surgery cases.

The financial management was also weak as the Department failed to monitor the delays in submission of UCs resulting in the deprival of central assistance of ₹ 52.96 crore. As 91.78 per cent of total available funds during 2012-17 were spent on pay and allowances, a very small percentage of funds was available for strengthening and upgradation of healthcare facilities, which adversely impacted the quality of healthcare services provided in the State.

The Department thus was not able to provide effective and quality Ayurveda healthcare services to the public despite having the largest number of Ayurveda dispensaries/hospitals in the country. Considering the existence of large number of professionals, dispensaries and hospitals in the State, there is an urgent need for GoR to review and improve the prevalent deficiencies in the Ayurveda healthcare services by adopting a suitable policy and standards.

2.1.1 Introduction

Indian Systems of Medicine (ISM) comprise Ayurveda, Unani, Siddha, Yoga and Naturopathy, of which Ayurveda[1] is widely practiced in Rajasthan. Ayurveda is one of the ancient and comprehensive systems of preventive, promotive and curative healthcare. Ayurveda has its origins in India and has extended to various parts of the world due to its accessibility, public awareness about adverse effects of chemical based drugs and comparatively low cost of Ayurveda drugs. The Ayurveda Department (Department) has an extensive network of 118 hospitals and 3,577 dispensaries in the State and during 2012-17, Government of Rajasthan (GoR) incurred ₹ 2,655.89 crore for Ayurveda Services and Ayurveda Education.

National Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy (AYUSH) Mission (Mission) was launched (September 2014) by Government of India (GoI) to provide cost effective AYUSH services and universal access by upgrading hospitals and dispensaries. National AYUSH Mission has four components i.e. AYUSH Health Services, AYUSH Educational Institutions, Quality Control of Drugs and Medicinal plants. The funds for implementation of

[1] Ayurveda means "the science of life" (in Sanskrit '*Ayur*' means "Life" and '*Veda*' means "Science").

the Mission were to be shared by GoI and GoR in the ratio of 75:25 (2014-15), which was revised to 60:40 during 2015-16.

The Rajasthan State AYUSH Society (RSAS) was also constituted by GoR during March 2015 for planning, supervision and monitoring of the National AYUSH Mission. RSAS submit State Annual Action Plan (SAAP) to GoI for release of funds for all components of the Mission. GoR also established Dr. Sarvapalli Radha Krishnan Rajasthan Ayurveda University during 2003 in Jodhpur for efficient and systematic teaching, research and development in Ayurveda and other Indian systems of medicine in the State.

2.1.2 Organisational Setup

Principal Secretary, Ayurveda and Indian Medicine Department is the overall in-charge of the AYUSH health services and AYUSH education in the State. The Director of the Ayurveda Department exercises overall control over the Government Ayurveda hospitals and dispensaries. The District Ayurveda Officers oversee administration of respective hospitals and dispensaries in the districts. The Department has five Departmental Pharmacies[2], for manufacture of medicines. The Vice Chancellor of the University exercises administrative control over the Ayurveda University.

The Governing Body (GB) of Rajasthan State AYUSH Society (RSAS) is headed by the Ayurveda Minister and the Executive Committee (EC) is headed by the Principal Secretary, Ayurveda and Indian Medicine Department.

2.1.3 Audit Objectives

The Performance Audit was conducted to assess whether:

(i) adequate planning was done to popularize and strengthen Ayurveda in the State;

(ii) adequate infrastructure, equipmentand human resources were available for delivery of quality services;

(iii) policy for manufacturing, procurement and supply of quality Ayurveda drugs to the patients was formulated and implemented effectively;

(iv) Ayurveda educational institutions in the State were imparting quality education and promoting research and development activities; and

(v) effective systems of financial management and internal control/monitoring existed.

[2] Ajmer, Bharatpur, Jodhpur, Kelwara and Udaipur.

2.1.4 Audit Criteria

The criteria used for the assessment of performance of efforts to popularize and strengthen Ayurvedain Rajasthan included:

- National Policy on Indian Systems of Medicine and Homoeopathy 2002;
- The Drugs and Cosmetics Act 1940 and relevant Rules and Orders;
- Indian Medicine Central Council Act 1970, relevant Rules and Regulations;
- Rajasthan Ayurveda University Act,2002 and the Statues of the University;
- National AYUSH Mission-Framework for implementation; and
- Departmental manual, orders, circulars.

2.1.5 Scope and Methodology

The Performance Audit was carried out during April to August 2017 covering the period of 2012-17 in the seven District Ayurveda Offices[3] (out of 34), four pharmacies[4] (out of five), 16 District hospitals/hospitals[5](out of 118) and 36 dispensaries[6] (out of 3,577) selected by *'Simple Random Sampling without Replacement*' method for test check of records. Records of Ayurveda University Jodhpur along with one Government Ayurveda College[7] and four Nurse/Compounder Training Centers[8] were examined. Records of the Drug Testing Laboratory, Ajmer; Assistant Drug Controller, the Rajasthan State Medicinal Plant Board and Rajasthan State AYUSH Society were also test checked. Apart from examination of documents, joint physical inspections and cross verifications of records wherever necessary, were carried out.

An Entry Conference was held with Principal Secretary, Ayurveda and Indian Medicine Department on 28 March 2017 in which audit objectives, audit criteria, audit scope and audit methodology were discussed. The audit findings were discussed with the Secretary in an exit conference held on 30 November 2017 and the responses were considered while finalising the Report.

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3 Ajmer, Alwar, Bharatpur, Bikaner, Jodhpur, Kota and Udaipur.

4 Ajmer, Bharatpur, Jodhpur and Udaipur.

5 **District hospitals:** (1) Longia, Ajmer (2) Alwar (3) Kota (4) Khanda Phalsa, Jodhpur (5) Moti Chhotha, Udaipur and (6) Bikaner.
Hospitals: (1) Madanganj Kishangarh (2) Khairtal (3) Rajgarh (4) Bharatpur (5) Kumher (6) Aayad (7) Beawar (8) Dadiya (9) Masuriya and (10) Mavli.

6 **Dispensaries:** (1) Sampla (2) Arai (3) Dabrela (4) Haldina (5) Harsora (6) Hatoondi (7) Ismailpur (8) Nagola (9) Roda (10) Shahpur (11) Silora (12) Todanagar (13) Ullahedi (14) Geeta Bhawan (15) Nanan (16) Rohicha Khurd (17) Kundai (18) Peelwa (19) Sarsaina (20) Tehralodha (21) Nithar (22) Helak (23) Siras (24) Pangoor (25) Undwa (26) Kurad (27) Shekhsar (28) Sadhasar (29) Gusaisar (30) Dhanmandhi (31) Nandeshama (32) Kathar (33) Khempur (34) Jawar (35) Khudala and (36) Nayawas.

7 Shri Madanmohan Malviya Government Ayurveda College, Udaipur.

8 Situated at Karwad and Punjla (Jodhpur), Chittorgarh and Ajmer.

Audit Findings

Audit Objective 1: To assess whether adequate planning was done to popularize and strengthen Ayurveda in the State.

2.1.6 Planning

The Ayurveda Department has 118 hospitals and 3,577 dispensaries in the State to provide Ayurveda healthcare services to the people. These healthcare centers lacked basic infrastructure like electricity, drinking water and toilets due to budget constraints and 1,677 dispensaries (46.88 *per cent*) were functioning without electricity and 2,653 (74.17 *per cent*) without drinking water.

The Department did not have consolidated status of availability of essential equipment in the healthcare centers. None of 52 test checked healthcare centers has all the essential equipment. Though the Department adopted the norms for sanction of the posts of Medical Officers and nursing staff in December 1998 but against the requirement of 12,166 posts as per norms GoR sanctioned only 11,025 posts (90.62 *per cent*). Further, there was shortage of manpower at all levels i.e. District hospitals (25.18 *per cent*), hospitals (25.15 *per cent*) and dispensaries (22.90 *per cent*) against the sanctioned posts. The number of hospitals having nil occupancy of beds increased from 60 during 2012-13 to 79 during 2016-17.

In the backdrop of existing infrastructure available for delivery of Ayurveda healthcare services the planning done by GoR to popularize and strengthen Ayurvreda in the State is discussed in subsequent paragraphs.

2.1.6.1 Policy to popularize Ayurveda in the State

It was observed that National Policy on Indian Systems of Medicine and Homoeopathy introduced by GoI during 2002 for the development of Ayurveda, Sidhha, Unani, Yoga and Naturopathy and Homoeopathy was not implemented in the State. Later, the Department prepared the Rajasthan State AYUSH Policy only in March 2015 to popularize and strengthen Ayurveda in the State. This too had not been approved by GoR as of October 2017.

While accepting the facts, GoR stated (October 2017) that State AYUSH Policy, 2015 was under finalisation.

Thus, in the absence of a policy framework to deliver Ayurveda healthcare services, efforts to popularize Ayurveda in the State could not be effectively planned by the Department. Further, considering the fact that Rajasthan has established the maximum number of dispensaries/hospitals in the country, there is an urgent need to popularize Ayurveda to effectively utilize these facilities.

2.1.6.2 Non-approval of State Public Health Standards for Ayurveda

To maintain uniformity in providing Ayurvedic healthcare services across the State, standards like Indian Public Health (IPH) Standards for Allopathic

medicine, were required to be adopted for Ayurvedic system of medicine also. It was observed that no such standards existed/prevailed in the Department.

The State Public Health Standards for Ayurveda (SPHSA) dispensaries and hospitals formulated in May 2014 awaited approval by GoR as of October 2017.

GoR, while accepting the facts stated (October 2017) that the Department was following its own norms regarding land and building for construction of dispensaries and hospitals, within the budgetary constraints. GoR however, did not offer comment/assurance regarding approval of the proposed SPHSA.

Thus, in absence of the Standards, the infrastructure and other facilities in the healthcare centers (hospitals and dispensaries) could not be standardized.

2.1.6.3 No increase in Ayurvedic healthcare facilities in the State

In the 'Five year plan 2012-17' of the Department, it was proposed to upgrade five dispensaries to hospitals and add 20 new dispensaries every year, during 2012-17.

It was, however, observed that the Department did not identify places to establish new dispensaries or upgrade old dispensaries. The Department also did not prepare any action plan for the same. Further, the Department did not arrange the finance for upgradation of dispensaries, as very small percentage of funds were available for core activities of the Department as discussed in **paragraph 2.1.15.1.** As a result, no new hospital/dispensary was established during 2012-17 and the number of hospitals (118) and dispensaries (3,577) continued to be the same during this period.

GoR, while accepting the facts stated (October 2017) that 595 Ayurveda healthcare centers have been established under National Rural Health Mission (NRHM). Further, the Department also followed the camp based approach to extend Ayurveda healthcare services.

The reply is not convincing as the Department proposed to upgrade five dispensaries to hospitals and add 20 new dispensaries every year during 2012-17.It did not, however, identify places for their establishment and resorted to camp based approach to extend Ayurveda healthcare services.

The fact remains that the Department could not establish even a single hospital/dispensary as per its five year plan during 2012-17.

2.1.6.4 Imbalance in distribution of Ayurveda facilities

The Department decided (September 1994) that a dispensary should be established to provide healthcare services to minimum population of 2,000 persons. However, the Department is yet to adopt standards for establishment of hospitals.

The State has 9,891 Gram Panchayats (GPs) and currently the Department had established only 3,389 dispensaries at GP level leaving a large number of GPs

out of coverage of Ayurveda healthcare services in spite of population being above 2,000 in most of these GPs.

It was further observed that out of total 2,623 GPs in seven test checked districts, only 880 GPs had dispensaries. Thus, 1,743 GPs did not have dispensaries to provide Ayurveda healthcare facilities to the rural population, whereas14GPs[9] of three test checked districts had two dispensaries in each GP. Further, 121 dispensaries were established in villages having population below 2,000 in Ajmer, Alwar and Bharatpur districts.

GoR, while accepting the facts stated (October 2017) that the dispensaries which do not fulfill the population norms would be relocated to suitable locations after detailed review.

Thus, imbalance persisted in the establishment of dispensaries in rural areas.

2.1.6.5 Preparation of Annual Plans without following bottom up approach

Departmental Manual stipulated that District Ayurvedic Officers (DAOs) would evaluate the requirements of hospitals/dispensaries for furniture, equipment and drugs etc. for supply on priority basis.

It was, however, observed that during 2012-17, DAOs did not assess the requirement of hospitals/dispensaries and the Directorate procured furniture and equipment without consolidating the demands from DAOs, as brought out in **paragraphs 2.1.7.3 (ii)**.

GoR stated (October 2017) that the demands for furniture, equipment and drugs were obtained from the DAOs. The reply is not acceptable as no proposal was sent to the Directorate by any of DAOs in seven test checked districts.

Thus, the Department did not follow the bottom up approach for procurement of furniture, equipment and drugs.

2.1.6.6 Non-establishment of specialty clinics

The Department prior to 2007-08 planned to establish specialty clinics[10]each for Diabetes, Liver, Skin disease and High Blood Pressure in all 33 districts in a phased manner.

It was, however, observed that none of the specialty clinics were established during 2012-17 as no administrative sanction and funds were obtained from GoR in this regard.

The Department also proposed (in the five year plan 2012-17) to establish 45 *Panchkarma Kendras*, 45 *Aanchal Prasuta Kendras* and 45 *Jaravasta Nivaran Kendras* in phased manner. The Department though established 33 *Panchkarma*

[9] Ajmer: Jiwana, Kushoyta and Vijay Nagar; Bharatpur: Ibrahimpur, Astawa, Baben, Bhootoli, Ghatri, Hatoondi, Kamalpura, Moloni, Dehgaon and Khootkhera; and Kota: Nimola.

[10] Specialty clinics are those where specified treatments, to cure of specified diseases like diabetes, skin disease, liver, piles and high blood pressure, etc., is provided as they are more effective than other medicine systems.

Kendras, 33 *Aanchal Prasuta Kendras* and 33 *Jaravasta Nivaran Kendras* (73.33 *per cent*) as of March 2017, however, deficiencies noticed in functioning of specialty clinics are discussed **in paragraph 2.1.7.5 (iv).**

Thus, the Department could not achieve the target to establish specialty clinics and *Panchkarma Kendras*, *Aanchal Prasuta Kendras* and *Jaravasta Nivaran Kendras*.

GoR, while accepting the facts stated (October 2017) that the proposals to open specialty clinics could not be implemented due to non-availability of funds.

The reply is not convincing as there was saving of funds against the budget allotment almost every year during 2012-17.

2.1.6.7 Information, Education and Communication

GoI launched Information, Education and Communication **(**IEC) policy in 2011 for creation of awareness amongst the citizens about the efficacy of the AYUSH systems, their cost effectiveness and the availability of herbs used for prevention and treatment of common ailments at their doorsteps. The policy envisaged multimedia IEC campaign including print media. The print material included small handbooks, brochures, booklets and CDs/DVDs containing details about various diseases, their prevention and treatment. This material was required to be published for distribution through fairs/melas/exhibitions. The Department was also required to distribute audio visual material. It was, however, observed that the Department did not prepare action plans for implementation of IEC policy in the State. Further, the budget allotted for IEC activities was only ₹ 47.00 lakh (0.02 *per cent* of the total budget on Ayurveda) in five years.

Scrutiny of IEC activities carried out by the Department revealed that:

- The Department published a quarterly magazine of its achievements, organized one day State level workshop on *Dhanwantri Jayanti* and seven days district level workshop during *Arogya* week.

- Only hoardings and flex banners were displayed at hospitals/dispensaries.

- Small handbooks, brochures, booklets and CDs/DVDs were not prepared and distributed.

- Audio visual material was neither produced nor distributed.

GoR, while accepting the facts stated (October 2017) that even though no separate IEC policy existed, the Department had made efforts for creation of awareness about the efficacy of the AYUSH system.

However, considering the fact that the GoR had established a vast network of healthcare centers across the State and the utilisation of these facilities was low, the amount allotted and spent on IEC activities, was very meagre.

Planning and Public Awareness

The Ayurveda Department has an extensive network of 118 hospitals and 3,577 dispensaries in the State. Though the Department prepared State Public Health Standards for standardization of facilities in Ayurveda dispensaries and hospitals in May 2014, the standards were still pending approval of the GoR as of October 2017. The Department neither identified dispensaries for upgradation nor prepared action plan for establishment of new dispensaries.

The Department's decision in September 1994 to establish a dispensary for a minimum population of 2,000 persons was not followed and there was imbalanced distribution of dispensaries in the rural areas.

The Department also did not follow the bottom up approach for procurement of furniture and equipment. Though the Department planned to establish specialty clinics for Diabetes, Liver, Skin disease and High Blood Pressure, none of them could be established.

Further, in the absence of an effective awareness programme, utilisation of the vast network of Ayurveda healthcare facilities could not be popularized in the State.

Recommendations:

1. *The Department should prepare a policy to popularize and strengthen Ayurveda in the State and adopt standards for balanced distribution of facilities in dispensaries and hospitals.*

2. *The Department should improve its planning process by following a bottom up approach so that the procurement, distribution and utilization of furniture, equipment and drugs are based on actual requirements.*

3. *Considering the huge investment in Ayurveda infrastructure in the State, the budget for Information, Education and Communication activities should be enhanced so that Ayurveda is popularized in the State.*

Audit Objective 2: To assess whether adequate infrastructure, equipment and human resources were available for delivery of quality services.

2.1.7 Physical Infrastructure

2.1.7.1 Non-availability of basic facilities at healthcare centers

The Department has setup 118 hospitals and 3,577 dispensaries in the State as of March 2017 but these lacked basic infrastructure like electricity, drinking water and toilets as detailed below:

- Out of 3,577 dispensaries in the State, 1,677 dispensaries (46.88 *per cent*) were functioning without electricity and 2,653 (74.17 *per cent*) without drinking water.

- Out of the total 926 healthcare centers in seven test checked districts, electricity was not available in 454 healthcare centers (49.03 *per cent*), drinking water was not available in 747 healthcare centers (80.67 *per cent*) and toilets in 698 healthcare centers (75.38 *per cent*).

Thus, only 92 healthcare centers (9.93 *per cent*) had all the basic facilities of electricity, water and toilets and none was available in 379 healthcare centers (40.93 *per cent*).

This is substantiated by physical verification of availability of basic infrastructure facilities carried out (April-August 2017) with the departmental representatives in 52 healthcare centers in seven test checked districts. The verification revealed deficiencies like boundary wall not constructed/damaged (14 healthcare centers), electricity connection not available (14 healthcare centers), drinking water facility not available (19 healthcare centers), toilet facility not available (18 healthcare centers), healthcare unit not accessible by road (six healthcare centers), healthcare unit not accessible by public transport (15 healthcare centers) and ramp not available (26 healthcare centers) as detailed in ***Appendix 2.1***.

GoR, while accepting the facts stated (October 2017) that the basic facilities could not be provided at the healthcare centers due to budget constraints. Further, necessary directions have been issued for construction of ramps at the healthcare centers.

The fact remains that there was saving of funds against the budget allotment almost every year during 2012-17, which was not utilized for providing basic facilities.

2.1.7.2 Efforts for upgradation of infrastructure

The Department received funds through State budget and Central Sponsored Schemes (CSS) for upgradation of infrastructure facilities in the Ayurveda healthcare centers.

Scrutiny of records revealed that construction of buildings for 145 AYUSH dispensaries[11] including 138 Ayurveda dispensaries was approved (August 2015 and June 2016) at a cost of ₹ 21.60 crore[12] in State Annual Action Plans (SAAPs) 2015-17 under National AYUSH Mission. The works were stipulated to be completed by May 2017.

Of these, only five buildings were completed and handed over as of October 2017 and the work of 104 buildings was under progress. For the remaining 36 buildings, the construction could not be started due to land dispute (nine buildings), non-finalisation of tenders (14 buildings) and non-completion of formalities of work orders (13 buildings).

Further, 11 building works[13] (sanctioned during 2007-09) were not started by the executing agency PWD even after lapse of eight years despite availability of

[11] Ayurveda (138), Unani (four) and Homoeopathy (three).
[12] 2015-16: 74 (₹ 11.07 crore) and 2016-17: 71 (₹ 10.53 crore).
[13] Under a Centrally Sponsored Scheme for AYUSH hospitals.

funds of ₹ 2.64 crore. Reasons for non-commencement of these works by PWD were not available with the Department.

GoR stated (October 2017) that the sanctioned works for construction/ renovation of buildings could not be started due to encroachment/land disputes and not having sanction for demolition of non-useable buildings. GoR did not state reasons for delay in release of funds to the construction wing of Medical and Health Department. GoR also intimated that details had been called for from PWD for not starting construction of 11 building works sanctioned during 2007-09.

It was also observed that out of 129 buildings works sanctioned during 2009-11 under NRHM[14], 30 works costing ₹ 15 crore could not be started by the executing agency due to non-availability of land and unutilised amount of ₹ 1.29 crore was refunded to GoI in July 2016.

GoR, while accepting the facts stated (October 2017) that necessary precaution would be taken in future to avoid such lapses.

Thus, the Department did not take concerted efforts to upgrade infrastructure facilities at the healthcare centers, despite having shortage of own buildings for dispensaries. This was compounded by poor monitoring efforts of the Department.

2.1.7.3 Equipment in healthcare centers

(i) Non-availability of equipment in healthcare centers

Paragraph 5.5.19 of the Departmental Manual stipulated that 32 types of medical equipment should be available in each healthcare center. The information regarding availability of 32 essential equipment in most of the healthcare centers was not available/collected by the Department. The software for this purpose was being developed (October 2017) by National Informatics Center Services Incorporated[15] (NICSI).

Scrutiny of records of 52 test checked healthcare centers[16]in seven selected districts revealed that none of the healthcare centers has all the essential equipment as shown in **Table 1.**

Table 1

S. No.	Availability of essential equipment (in *per cent*)	Number of healthcare centers (*per cent* of total test checked)
1	75 to 100	Nil
2	50 to 75	32 (61.54%)
3	25 to 50	18 (34.62%)
4	0 to 25	2 (3.84%)

Source: Information provided by the Department.

[14] Under a CSS for mainstreaming of AYUSH under National Rural Health Mission.
[15] A GoI enterprise under National Informatics Center.
[16] District hospitals: six, hospitals: 10 and dispensaries: 36.

Of the 52 healthcare centers, dispensaries mainly catering to the rural area had greater shortage of equipment as compared to Hospitals and District Hospitals.

GoR, while accepting the facts stated (October 2017) that all the essential equipment/furniture would be supplied on priority basis and in consonance with the availability of the budget.

(ii) Procurement and distribution of furniture/equipment

The Directorate issued 16 purchase orders worth ₹ 11.79 crore for centralised purchase of various equipment and furniture during 2012-14. The suppliers were directed to deliver the equipment and furniture directly to District Ayurveda Officers (DAOs). DAOs were further required to distribute them to healthcare centers under their jurisdiction as per requirement.

It was, however, observed that demands from DAOs were not called for by the Directorate and equipment and furniture were supplied to DAOs without assessing the actual requirements and without considering the number of healthcare units falling there under. This resulted in disproportionate supplies of Stethoscope, Weighing Machine, Suturing Needle and Thread, Office Table and Patient Examination Table to DAOs for further distribution to healthcare units.

It was also observed that in three test checked DAOs (out of seven), the undistributed equipment and furniture were lying in the stores of DAOs offices, as enumerated in **Table 2**.

Table 2

S. No.	Name of DAO	Name of equipment/furniture lying in store of DAOs							
		Needle holder	Dressing forceps	BP Instrument	Bed side Screens	IR lamp	Patient Examination Table	Magnifying glass	Racks
1.	Bikaner	30	12	3	49	16	26	1	-
2.	Udaipur	78	76	74	-	24	4	-	3
3.	Jodhpur	-	-	-	-	-	-	28	26
	Total	**108**	**88**	**77**	**49**	**40**	**30**	**29**	**29**

Source: Information provided by the Department.

Further, 3,140 Infra-Red Lamps (IRLs) were procured during 2013-14 for supply of one unit to each healthcare center for use in therapy for joint pain. As electricity was not available in 1,677 dispensaries, IRLs supplied could not be utilised. Also in 11 (30.56 *per cent*) out of 36 test checked dispensaries, IRLs were lying unutilised as they did not have electricity. On being pointed out, Medical Officers of the concerned healthcare centers intimated that IRLs were supplied by DAOs without any demand.

GoR, while accepting the facts stated (October 2017) that the matter would be reviewed at the Directorate level for proportionate distribution of equipment and furniture.

Thus, procurement of equipment and furniture without assessing the requirement resulted in their disproportionate distribution and their non-utilisation.

2.1.7.4 Manpower management

GoR appointed Administrative Reforms Committee during 1994, which recommended for reforms in the Department. Following the recommendation, the Department amended the norms for sanction of the posts of Medical Officers and nursing staff in December 1998.

GoR further directed (December 1998) that the status of utilisation of beds in the hospitals should be reviewed annually and the staff should be deployed accordingly. Further, deployment of excess staff than norms could only be allowed by GoR.

(i) Shortage of manpower in healthcare centers

The position of the requirement of manpower in healthcare centers according to the norms decided (December 1998) by GoR, posts sanctioned as of March 2017 and men in position is given in **Table 3**.

Table 3

S. No.	Healthcare centers	Number of Health care centers	Manpower[17] required as per norms	Number of posts sanctioned by the GoR	Men in position	Shortage(-) / Excess(+) as per norms*(per cent)*	Shortage(-) /Excess(+) *as per* sanctioned post *(per cent)*
1	**District hospitals**	18	338	405	303	(-)35 (10.35)	(-)102 (25.18)
2	**Hospitals**	100	1097	855	640	(-)457 (41.66)	(-)215 (25.15)
3	**Dispensaries**	3,577	10,731	9,765	7,529	(-)3,202 (29.84)	(-)2,236 (22.90)
4	**Total (*per cent*)**	**3,695**	**12,166**	**11,025 (*90.62*)**	**8,472 (*69.64*)**	**(-)3,694 (*30.36*)**	**(-)2,553 (*23.16*)**

Source: Data provided by the Department.

GoR though sanctioned more posts in district hospitals than the norms, however, only 11,025 posts (90.62 *per cent*) were sanctioned against the overall requirement of 12,166 posts as per the norms as of March 2017.

There was shortage of manpower at all levels i.e. District hospitals (25.18 *per cent*), hospitals (25.15 *per cent*) and dispensaries (22.90 *per cent*) against the sanctioned posts as discussed in **paragraphs 2.1.7.4 (iii), 2.1.7.5 (ii) and (iii)**.

GoR, while accepting the facts stated (October 2017) that the Department has assessed creation of 1,209 new posts (nurse-compounder: 314 and *paricharaks*: 895 posts) to meet the shortage of manpower and their creation was under consideration.

(ii) Review of bed occupancy was not done in district hospitals/hospitals

GoR directed (December 1998) to annually review the occupancy of beds in the hospitals for appropriate deployment of staff.

It was, however, observed that the number of hospitals having nil bed occupancy increased during 2012-17, as discussed in **paragraph 2.1.7.5 (ii).** The

[17] Manpower includes Medical Officer, Nurse/Compounder, Clerk, *Paricharak*, etc.

Department however, did not review the position of bed occupancy to reduce the staff accordingly as per the directions.

GoR, while accepting the facts stated (October 2017) that the rationalisation of bed occupancy was under process and necessary action would be taken in accordance with the observation of audit.

(iii) Disproportionate deployment of manpower

Scrutiny of deployment of manpower in healthcare centers in the State as of March 2017 revealed that the deployment was disproportionate as enumerated below:

- ***District hospitals/hospitals***

In five District hospitals[18] (DHs) seven Medical Officers (MOs) were deployed in excess whereas in eight DHs[19] there was shortage of 18MOs compared to the norms. Similarly, 50 Nurses were deployed in excess in 11 DHs[20], whereas 48 Nurses were short in six DHs[21] against norms as of March 2017.

Further, against the requirement of at least one clerk in each DH, no clerk was posted in four DHs[22] as of March 2017 and nursing staff was deployed for clerical work.

Similarly, out of total 100 hospitals (other than DHs), no MO was posted in five hospitals[23]and no nurse/compounder was posted in 10 hospitals[24].

- ***Dispensaries***

Out of total 3,577 dispensaries no MO was posted in 645 dispensaries (18.03 *per cent*), whereas two MOs were posted in 40 dispensaries against the requirement of one MO in each dispensary.

Similarly, against the requirement of one Nurse/Compounder in each dispensary, no Nurse/Compounder was posted in 410 dispensaries (11.46 *per cent*) dispensaries. Four Nurse/Compounders each were posted in three dispensaries, three were posted in three dispensaries and two in 80 dispensaries. No MO or Nurse/Compounder was posted in 195 dispensaries (5.45 *per cent*).

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18 Bikaner, Sriganganagar, Laxminarayanpuri, Khanda Phalsa and Kota.

19 Longia, Bhilwara, Chittorgarh, Dholpur, Jalore, Pali, Sirohi and Moti Chhotha.

20 Alwar, Banswara, Bhilwara, Bikaner, Chittorgarh, Dholpur, Dungarpur, Laxminarayanpuri, Khanda Phalsa, Kota and Sikar.

21 Longia, Sriganganagar, Jaisalmer, Jalore, Sirohi and Moti Chhotha.

22 Bhilwara, Dholpur, Khanda Phalsa and Pali.

23 Dhambola and Khageda (Dungarpur), Nana (Pali), Pipalkhunt (Pratapgarh) and Ummedabad (Jalore).

24 Sawar (Ajmer), Mandal (Bhilwara), Ummedabad and Bhinmal (Jalore), Manoharthana (Jhalawar), Ladariya and Khajwana (Nagaur), Ghanerao and Gudha Andela (Pali) and Bhinder (Udaipur).

In 52 test checked healthcare centers, the similar position of irrational deployment of manpower was observed during detailed audit of these healthcare centers ***(Appendix 2.2)***.

It was also observed that in spite of shortages of MOs in the Department itself, 21 MOs were allowed to go on deputation to the Women and Child Development Department and Panchayati Raj Department.

GoR, while accepting the facts stated (October 2017) that the issue would be addressed by rationalization of sanctioned posts of MOs and nurse/compounders and there after the necessity for creation of posts will be reviewed.

(iv) Proposal for appointment of contractual staff was not sent

Principal Secretary, Ayurveda and Indian Medicine directed (November 2014) to submit proposals for filling up the vacant posts of MOs and Nurse/Compounders on contractual basis. It was, however, observed that the Department did not submit proposals for appointment of staff on contractual basis during 2014-17, despite the fact that 23.16 *per cent* of the posts were vacant in healthcare centersas of March 2017.

GoR stated (October 2017) that proposal for filling of 944 posts of nurse/compounders was under process. GoR did not furnish the reasons for not considering engagement of MOs on contract basis.

The fact, however, remains that 645 dispensaries were functioning without MOs and 410 dispensaries were functioning without Nurse/Compounders in the State, as of March 2017.

2.1.7.5 Healthcare Services

(i) Incorrect method for calculation of number of outdoor patients

The number of patients availing the services in dispensaries/hospitals was shown against two categories i.e. new patients and old patients. For example a patient first visiting a healthcare center and provided medicines for five days, is shown in the records, as one ‘new patient’ and four ‘old patients’. On a subsequent visit, if the patient comes with prescription slip, the treatment days are counted as ‘old patient’. In case a new prescription/treatment is given on subsequent visit, then first day of treatment is recorded again as new patient and remaining treatment days as old patients.

The Department has been adopting this method of calculation of total number of patients, and accordingly the year wise breakup of outdoor and indoor patients benefitted during2012-17 is given in **Table 4**.

Table 4

(in lakhs)

Year	Outdoor patients			Indoor patients		
	New	Old[25]	Total	New	Old	Total
1	2	3	4 (2+3)	5	6	7 (5+6)
2012-13	154.07	363.47	517.54	0.03	0.17	0.20
2013-14	161.13	412.65	573.78	0.04	0.18	0.22
2014-15	166.51	431.35	597.86	0.04	0.19	0.23
2015-16	159.97	437.81	597.78	0.03	0.21	0.24[26]
2016-17	164.09	483.43	647.52	0.05	0.22	0.27

Source: Information provided by the Department.

From the above table, it could be observed that there was a nominal increase of 6.50 *per cent* in the number of outdoor patient (new) during 2012-17, however, registering a decline of 7.77 *per cent* in 2016-17 (164.09 lakh patients) as compared to 2006-07 (177.91 lakh patients). Thus, no significant growth in number of patients was noticed during last decade in the State.

It was also observed that by treating a new patient being prescribed medicines for five days as five patients (one new and four old), the Department is inflating the number of patients benefitting through Ayurveda. This method also does not match with the procedure adopted by the National Institute of Ayurveda, Jaipur, which is GoI run institute where new patient, old patient and total medicine days are recorded separately.

GoR agreed (October 2017) to review the policy of calculating the number of patients actually benefitted.

(ii) Indoor patients

GoR issued (December 1998) standing instructions to annually review the status of occupancy of beds in the hospitals for appropriate deployment of staff.

It was, however, observed that out of 118 DHs/hospitals,no patient was admitted in 60 hospitals during 2012-13, in 66 hospitals during 2013-14, in 72 hospitals during 2014-15, in 75 hospitals during 2015-16 and in 79 hospitals during 2016-17. The number of hospitals having nil occupancy of beds thus, increased from 60 in 2012-13 to 79 in 2016-17.

Further, no patient was admitted consecutively for five years in 40 hospitals, four years in 48 hospitals and three years in 49 hospitals during 2012-17.Therefore, the continuance of these hospitals with indoor patient facility needs to be reviewed.

GoR attributed (October 2017) the reason for shortfall in the number of patients to the shortage of manpower and further stated that efforts would be made to increase the number of indoor patients.

The fact, however, remains that the need of continuance of these hospitals should be reviewed with regard to the continuous shortage of manpower and budget constraints.

[25] Patients visiting on first day treated new patients. Old patient number equals the days for which drugs were given excluding first day to the patients.

[26] Excluding the figures of patients relating to Yoga hospital of Bundi district.

(iii) Outdoor patients

During 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17 there were no patients in 113, 82, 122, 110 and 52 healthcare centers respectively.

GoR, accepted the facts and stated (October 2017) that due to the shortage of MOs in healthcare centers, the number of outdoor patients was nil and efforts would be made to increase the number of outdoor patients.

However, the fact remains that no analysis was available as to the reasons and remedies for no patients using these healthcare centers.

(iv) Specialty centers

Some ailments such as anorectal diseases and old age related diseases have proven and specific treatment in Ayurveda and the Department established specialty centers for their treatment. The specialty centers included *Ksharsutra Kendra, Panchkarma Kendra, Jaravasta Nivaran Kendra* and *Aanchal Prasuta Kendra*.

Scrutiny of records revealed deficiencies in management of specialty clinics, which are discussed in the succeeding paragraphs:

(a) Ksharsutra Kendra

Ksharsutra is a para-surgical intervention using an alkaline thread for cauterization in anorectal diseases.Audit scrutiny revealed the following:

- During 2008-09, GoR decided to establish *Ksharsutra Kendra* at all seven divisional headquarters, however, *Ksharsutra Kendras* were not established at two divisional headquarters (Bharatpur and Jodhpur).

- Two *Ksharsutra* centers established at divisional headquarters Bikaner and Udaipur were non-functional due to non-availability of equipment (at Bikaner) and non-availability of *Ksharsutra* specialist and other staff (at Udaipur).

- The construction work was lying incomplete in Beawar hospital since 2008-09 for want of additional funds, however the MO managed to continue operations in old operation room.

It was further observed that the *Ksharsutra* (an alkaline thread) which is prime necessity for operating was not being procured by the Department centrally and provided to the healthcare centers. In absence of any departmental arrangement, the MOs of healthcare centers had to arrange the *Ksharsutra* at their own level. Considering the importance and success of *Ksharsutra* as an alternative procedure for curing anorectal disease, the procurement and distribution of *Ksharsutra* needs streamlining.

GoR stated (October 2017) that after budget allocation, the purchase of equipment and completion of building would be carried out.

(b) Panchkarma Kendra

Panchkarma is a unique therapeutic procedure of five treatments for the radical elimination of disease causing factors and to maintain equilibrium of *tridosha*[27]. The *Panchkarma* therapy minimizes the chances of recurrence of the diseases and promotes health by rejuvenating tissues and bio-purification. During 2012-17, the Department has set up 33 *Panchkarma Kendras* in the State. Test check of six *Panchkarma Kendras* revealed the following:

- *Panchkarma* required 42 essential drugs for treatment, however 10 to 26 drugs were not procured since establishment of these *Kendras* and only seven to 28 drugs were available as of March 2017.

- *Panchkarma Kendras* required 26 essential equipment for therapy, however, only nine to 20 equipment were available in test checked *Kendras*.

- out of 25 prescribed treatments under *Panchkarma* therapy, only 10 to 13 therapies were provided in three *Kendras* at Longia, Alwar and Bharatpur.

Though the Department established *Panchkarma Kendras* in 33 districts, their performance was dismal as essential drugs and equipment were not available and all prescribed treatment were not given to the patients. This resulted in registration of only 7,636 patients during 2016-17 in six test checked *Kendra*[28], whereas 24,292 patients visited the hospital attached to the Ayurveda University at Jodhpur for this therapy during 2016.

GoR stated (October 2017) that the drugs were locally purchased by the respective center incharges as per their requirement. Further, necessary therapy was given to the patient according to the diagnosis.

The reasons for dismal performance of *Panchkarma Kendras* due to non-availability of essential drugs, equipment and all prescribed treatments were however, not furnished.

(c) Jaravasta Nivaran Kendra

The Department established 33 *Jaravasta Nivaran Kendras* for treatment of old age related ailments and to increase their immunity. Scrutiny of the six test checked *Jaravasta Nivaran Kendras*[29]revealed that:

- Of the 139 essential drugs, in three test checked *Jaravastha Nivaran Kendrasat* Longia, Bharatpur and Bikaner, 45 to 75 drugs were not procured since their establishment during 2014-16. Further, 23 to 52 drugs were not available in *Kendras* for more than one year during 2014-17.

- The Department did not undertake IEC activities for wide publicity of *Jaravastha Nivaran Kendras*. Only during 2016-17 the Department prepared

[27] In Ayurveda, there are three basic types of energy, universal principles known as the *doshasvata*, *pitta,* and *kapha*.
[28] Ajmer, Alwar, Bikaner, Bharatpur, Jodhpur and Kota.
[29] Ajmer, Alwar, Bikaner, Bharatpur, Jodhpur and Kota.

flex banners for display at the *Kendras*. Owing to low publicity, the number of patients visiting these *Kendras* was very low during 2016-17 and in 15 *Kendras*, there was an average of only one patient per day.

GoR stated (October 2017) that no separate fund was available with the Department to popularize *Jaravastha Nivaran Kendras.* However, efforts would be made to increase the number of beneficiaries.

(d) Aanchal Prasuta Kendra

The Department planned to establish 45 *Aanchal Prasuta Kednras* (APKs) in all the districts for reducing Infant Mortality Rate (IMR) and Maternal Mortality Rate (MMR) in the State. APKs were to be established at healthcare centers situated in districts preferably in the SC/ST majority areas. The main objective of APK was to provide healthcare facilities to women during pregnancy and after delivery. Audit scrutiny of test checked seven *Aanchal Prasuta Kendras*[30] revealed that:

- the Department did not identify healthcare centers existing in SC/ST majority areas for establishment of APKs. Only six APKs were established in SC/ST majority areas during 2013-15. The Department intimated (April 2017) that after 2014-15, APKs were established on the priority decided by the Government.

- the Department prescribed (January 2015) 26 essential equipment for examination of pregnant women for each APK. However, in seven test checked APKs, only six to 24 essential equipment were available during 2015-17.

- even though delivery facilities were not to be made available at APKs, it was observed that four test checked APKs at Longia, Beawar, Mavli and Alwar procured equipment for delivery such as Labour Table, Autoclave, Radiant Baby Warmer, and ECG machine during 2013-17, resulting in these equipment lying unutilized in the store as no delivery was performed at these centers.

GoR stated (October 2017) that APKs were being opened in a phased manner and equipment procured within the budgetary allocation. Further, the list of equipment related to delivery has been sought from all APKs.

(v) Mobile Medical Unit

The Department established Mobile Medical Units (MMUs) to provide Ayurveda healthcare facilities in the backward, remote, tribal and rural areas. Seven MMUs were functional during 2012-17. Further, GoR sanctioned (October 2011) posts of one MO, two Nurse/Compounder and two *Paricharaks* for each MMU and allotted a target of 15 camps per month per MMU. Scrutiny of records of MMUs revealed:

[30] Ajmer, Alwar, Beawar, Bikaner, Jodhpur, Kota and Mavli (Udaipur).

- Against monthly targets of 15 camps per MMU (180 camps annually), the achievement of six MMUs[31]ranged only from 7.96 to 15.71 *per cent* during 2012-17.

- Against requirement of one MO, two nurses and two *paricharaks*, three MOs, three Nurse/Compounders and three *paricharak* were deployed in MMU Ajmer, whereas, posts of MO and Nurses/Compounders were lying vacant in MMU Sirohi since June 2015.

Further, the Department closed seven MMUs[32] during 2012-15, however, two MOs (Dholpur and Karauli), three Nurse/Compounders (Karauli, Sriganganagar and Kota) and one *Paricharak* (Dungarpur) were not diverted to other functional MMUs as of March 2017.

Thus, MMUs were not conducting specified number of camps and staff was disproportionately allotted thereby defeating the purpose of their establishment.

GoR stated (October 2017) that the targeted camps could not be organised due to vacant posts in MMUs and the revision of manpower would be done after review of requirement.

Infrastructure, equipment, human resources& delivery of quality services

Basic infrastructure like electricity was not available in 46.88 per cent and drinking water in 74.17 per cent of all the Ayurveda healthcare centers in the State. Further, in seven test checked districts, toilets were not available in 75.38 per cent healthcare centers. The Department did not make concerted efforts for upgradation of buildings.

The Department did not collect information of availability of essential equipment in healthcare centers and as a result many test checked healthcare centers did not have all essential equipment. Supply of equipment and furniture to DAOs without assessing the actual requirement, resulted in their disproportionate distribution to DAOs. Instances of supply of excess equipment were noticed in test checked DAOs where they were lying unutilized in stores.

As per its own norms issued in 1998, against the requirement of 12,166 posts as of March 2017, GoR sanctioned only 11,025 posts (90.62 per cent) of which only 8,472 (69.64 per cent) were appointed. Further against the sanctioned posts, there was shortage of manpower at all levels such as District hospitals (25.18 per cent), hospitals (25.15 per cent) and dispensaries (22.90 per cent). Disproportionate deployment of Medical Officers, Nurse/Compounders was also noticed. Efforts for filling up the vacant posts of Medical Officer and Nurse/Compounders on contractual basis were also not initiated by the Department.

[31] Banswara, Baran, Barmer, Bikaner, Chittorgarh and Sirohi except Ajmer.

[32] 2012-13: Jaisalmer, Dungarpur, Karauli and Pratapgarh; 2013-14: Kota and 2014-15: Dholpur and Sriganganagar.

There was no significant growth in number of Ayurveda patients during last decade in the State despite the fact that Department had inflated the data of beneficiary patients. The number of hospitals having nil bed occupancy increased from 60 in 2012-13 to 79 in 2016-17, and no patient was admitted consecutively for five years in 40 hospitals, four years in 48 hospitals and three years in 49 hospitals. In spite of this trend, no review to reduce/relocate the staff was conducted.

The performance of the specialty clinics like Ksharsutra Kendra, Panchkarma Kendra, Jaravasta Nivaran Kendra andAanchal Prasuta Kendra were not effective due to non-availability of adequate equipment and drugs.

Recommendations:

4. *Considering the absence of medical manpower in centers, low bed occupancy in hospitals, non-functioning of dispensaries due to shortage of staff, a high level committee should be formed to review the need for healthcare centers at all levels i.e. Gram Panchayat, Block and District levels on need basis and consider relocation, merger or opening/closure of healthcare centers. Thereafter, the case for additional manpower may be considered, if required.*

5. *The Department may initiate upgradation of infrastructure facilities and ensure provision of essential equipment in all the centers so that quality healthcare services are provided to the patients.*

Audit Objective 3: To assess whether the policy for manufacturing, procurement and supply of quality Ayurveda drugs to the patients was formulated and implemented effectively.

There was no regulation to ensure the quality of drugs sold by retailers in the market. Department established five departmental pharmacies for manufacturing of quality drugs to be provided to patients. During 2012-17, departmental pharmacies could achieve only 39.12 *per cent* of their overall targets despite an expenditure of ₹ 29.51 crore.

There were deficiencies in functioning of departmental pharmacies such as procurement of raw material without use, non-adherence to the norms for leakages and wastage and non-utilization of machinery. Other deficiencies such as distribution of drugs without ascertaining demand, delay in distribution of drugs, distribution of expired drugs to the patients, non-distribution of drugs in small hygienic packaging, shortfall of inspections of pharmacies and samples lying untested are discussed in the succeeding paragraphs.

2.1.8 Supply chain and Sources of the drugs

Government Ayurveda hospitals and dispensaries were required to provide free drugs to all patients and accordingly five pharmacies[33] were established to

[33] Ajmer, Jodhpur, Udaipur, Bharatpur and Kelwara.

manufacture drugs. Rajasthan State AYUSH Society/Directorate also procures drugs from the open market through centralised purchase system and supplies it to healthcare centers.

GoI had prescribed a list of 277 essential drugs to be provided for indoor and outdoor patients free of cost at the healthcare centers. Though, the States were expected to decide the required medicines out of the medicines listed in the Essential Drug List (EDL) as per the prevalence of diseases and needs of the patients, no EDL was prepared by GoR.

GoR stated (October 2017) that the State followed EDL of GoI and EDL medicines would be procured within the available budget.

Considering the budget constraints, GoR may prioritise EDL so that at least the most essential drugs could be provided across all healthcare centers.

2.1.9 Role of Departmental Pharmacies in providing drugs

The Department has five Government Ayurveda pharmacies for manufacturing 63 types[34] of drugs for distribution to hospitals and dispensaries in the form of kits through DAOs. The total expenditure to maintain these pharmacies during 2012-17 was ₹ 29.51 crore of which ₹ 19.68 crore was on account of Pay & Allowances and the remaining amount of ₹ 9.83 crore was on account of purchase of raw material etc., for drug manufacture. Scrutiny of records of four test checked pharmacies revealed the following deficiencies:

2.1.9.1 Target and achievement for production of drugs

The year wise targets for production of drugs (consolidated quantity) and achievements in four test checked pharmacies during 2012-17 is given in the **Table 5**.

Table 5

Year	Unit	Jodhpur Pharmacy			Udaipur Pharmacy			Ajmer Pharmacy			Bharatpur Pharmacy		
		Target	Achievement	%	Target	Achievement	%	Target	Achievement	%	Target	Achievement	%
2012-13	Kg	38,600	21,305	55.19	32,500	5,641	17.36	34,000	11,420	33.59	22,180	3,423	15.43
	Litre	0	0	0	30,000	7,850	26.17	7,000	2,364	33.77	6,000	0	0
2013-14	Kg	38,600	10,725	27.79	32,500	2,500	7.69	34,000	12,948	38.08	22,180	5,304	23.91
	Litre	0	0	0	30,000	1,864	6.21	7,000	0	0	6,000	2,070	34.50
2014-15	Kg	38,600	33,206	86.03	27,500	21,450	78.00	34,000	1,145	33.68	22,180	3,013	13.58
	Litre	0	0	0	25,000	12,057	48.23	7,000	0	0	6,000	0	0
2015-16	Kg	38,600	17,718	45.90	35,000	25,707	73.45	34,000	7,405	21.78	22,180	13,999	63.11
	Litre	0	0	0	25,000	5,287	21.15	7,000	1,015	14.50	6,000	1,499	24.98
2016-17	Kg	38,600	29,107	75.41	35,000	17,758	50.74	34,000	8,155	23.99	22,180	7,408	33.40
	Litre	0	0	0	25,000	27,085	108.34	7,000	2,680	38.29	6,000	4,452	74.20
Total	Kg	**1,93,000**	**1,12,061**	**58.06**	**1,62,500**	**73,056**	**44.96**	**1,70,000**	**41,073**	**24.16**	**1,10,900**	**32,747**	**29.53**
	Litre	**0**	**0**	**0**	**1,35,000**	**54,143**	**40.11**	**35,000**	**6,059**	**17.31**	**30,000**	**8,021**	**26.74**
Total consolidated achievement: 39.12 *per cent*													

Source: Information provided by the Department.

[34] Ajmer (14), Udaipur (13), Jodhpur (13), Bharatpur (12) and Kelwara (11).

During 2012-17, the achievement *vis-à-vis* targets for drug production was only 39.12 *per cent*. This table shows that the year wise achievement against the targets of production of drugs ranged between 27.79 to 86.03 *per cent* in Jodhpur, 6.21 to 108.34 *per cent* in Udaipur, zero to 38.29 *per cent* in Ajmer and zero to 74.20 *per cent* in Bharatpur during 2012-17.

GoR attributed (October 2017) the short achievements of the targets to budget constraints and non-availability of skilled labourers.

The reply is not convincing as there was saving of funds against the budget allotment almost every year during 2012-17.

2.1.9.2 Non-manufacturing of assigned drugs by the pharmacies

Each pharmacy was assigned the number of drugs to be manufactured (Ajmer-14 drugs; Jodhpur-13 drugs; Udaipur-13; Bharatpur-12 and Kelwara-11) and accordingly they obtained licenses from Drug Control Organisation.

Scrutiny revealed that only two to nine assigned drugs in Ajmer pharmacy, three to eight assigned drugs in Udaipur pharmacy, three to nine assigned drugs in Jodhpur pharmacy and three to six drugs in Bharatpur pharmacy were manufactured during 2012-17. Further, two drugs (*Kapoor Ras* and *Lavangadi Vati*) in Udaipur Pharmacy, three drugs (*Puspnug Churna*, *Talisadi Churna* and *Avipattikar Churna*) in Jodhpur Pharmacy and two drugs (*Chandraprabha Vati* and *Sajivani Vati*) in Bharatpur Pharmacy, were not manufactured during last five years (2012-17) and two drugs (*Tindook Vati* and *Dashanag Lape*) in Ajmer Pharmacy were not manufactured during last four years (2012-16).

GoR attributed (October 2017) non-manufacturing of the assigned drugs to absence of specialists, limited financial resources and non-availability of raw constituents.

The reply is not convincing as there was saving of funds against the budget allotment almost every year during 2012-17.

2.1.9.3 Higher costing of drugs manufactured in Departmental Pharmacies

As per Departmental Manual, valuation report for each job was to be prepared for calculation of the cost of manufactured drugs by including all overheads to arrive at the per unit issue cost. The drugs were required to be issued from pharmacies at the issue cost.

Scrutiny of records revealed that valuation report was not prepared by any of the test checked pharmacies and the drugs were issued at the rates tentatively decided during 1990-91. Thus, the issue rate of drugs was not realistic as per actual cost of manufacturing.

The comparison of cost of raw material and overheads charged in *per cent* of total cost of drugs manufactured in three test checked pharmacies during the period 2012-17 is given in the **Table 6**.

Table 6

(In *per cent*)

Year	Jodhpur Pharmacy		Udaipur Pharmacy		Bharatpur Pharmacy	
	Cost of raw material	Overhead cost	Cost of raw material	Overhead cost	Cost of raw material	Overhead cost
2012-13	24.22	75.78	35.53	64.47	Job not started	Job not started
2013-14	24.33	75.67	41.53	58.47	11.04	88.96
2014-15	16.90	83.10	39.14	60.86	15.80	84.20
2015-16	19.75	80.25	38.11	61.89	16.89	83.11
2016-17	18.87	81.13	32.36	67.64	20.84	79.16

Source: Information provided by the Department.

The table shows that the component of total overheads cost in total production cost ranged from 75.67 to 83.10 *per cent* (in Jodhpur pharmacy), 58.47 to 67.64 *per cent* (in Udaipur pharmacy) and 79.16 to 88.96 *per cent* (in Bharatpur pharmacy) during 2012-17.

Further, cost comparison of drugs manufactured in the Departmental pharmacies with rate list of the same drugs available in Indian Medicines Pharmaceutical Corporation Limited, Uttarakhand[35] (IMPCL), revealed that the drugs manufactured by the Departmental pharmacies were much costlier than the rates of IMPCL. The comparison of the rates of Departmental pharmacies and IMPCL is given in the **Table 7**.

Table 7

Name of Drug	Packing	Cost of drug manufactured in Departmental pharmacies (in ₹ per unit kg/litre)	Rate of the drug as per rate list of IMPCL as on 01.12.2016 (in ₹ per unit kg/litre)	Cost comparison in multiple of unit cost of IMPCL
Godanti Bhasma	250gm	631.20	287.20	2.19
Kapardika Bhasma	250 gm	2,914.52	793.10	3.67
Shankh Bhasma	250gm	1,482.44	377.60	3.92
Ashwagandha Churna	500 gm	1,340.00	694.90	1.92
Avipattikar Churna	500gm	990.00	451.60	2.19
Dashana Sanskar Churna	500gm	1,580.00	648.90	2.43
Haritaki Churna	500gm	210.00	145.50	1.44
Dashmool Kvatha	500gm	330.00	268.00	1.23
Jatyadi Taila	450ml	1,223.76	387.55	3.15

Source: Information provided by the Department.

The table shows that the rates prevailing since 1990-91 for the drugs manufactured by Departmental pharmacies was higher in the range of 1.23 to 3.92 times the rates of IMPCL as on December 2016.

Though the medicine manufactured in Departmental pharmacies were much higher than market rates, the Department did not initiate any action to make them cost effective.

[35] A Government of India undertaking unit.

GoR stated (October 2017) that the efforts would be made to reduce the overhead charges and to bring efficiency and economy in the production of drugs.

2.1.9.4 Non-adherence to the norms for leakages and wastages of raw material

During June 1988, the Department prescribed norms for loss of one *per cent* of raw material during process of manufacturing the drugs.

It was observed that during 2012-17, pharmacies at Ajmer and Jodhpur were maintaining the prescribed norms of loss of raw material whereas pharmacy at Udaipur was maintaining loss of zero *per cent*. In contrast, the wastage in the pharmacy at Bharatpur was abnormally high during 2012-17.The pharmacy lost 63.76 *per cent* and 15.04 *per cent* raw material to manufacture *Shubhara Bhasma*and *Karpad Bhasma* respectively. This resulted in lesser production of drugs valuing ₹ 44.13 lakh.

GoR stated (October 2017) that the wastage norms decided in the year 1988 were not practical and new norms were under consideration. Further, it was stated that efforts would be made to bring down the losses.

2.1.9.5 Procurement of raw material without immediate use

Scrutiny of procurement of raw material for manufacture of drugs in Bharatpur pharmacy revealed that:

- 11 raw materials weighing 623.79 kg were purchased prior to April 2012, which were lying unutilized for more than five years as of March 2017.

- Even though 23.98 quintals of raw material '*small seep'* was available in the store, 10.81 quintals was procured during 2012-13. The entire quantity of 34.79 quintals of '*small seep'* was lying unutilised in the store as of March 2017. When this was pointed out by Audit, the whole quantity was utilized in August 2017 after delay of more than five years in manufacturing of drugs.

- Even though 15.92 quintals of raw material '*shankh nabhi'* was available in the store, 7.22 quintal and 15.26 quintal was procured during 2012-13 and 2016-17 respectively. Thus,38.40 quintals of '*shankh nabhi'* was lying unutilised in the store as of March 2017. When this was pointed out by Audit, quantity 15.00 quintals of '*shankh nabhi'* was utilized in May 2017 leaving 23.40 quintals of *shankh nabhi* unutilized as of October 2017.

- 28 types of raw material weighing 82.03 quintal procured prior to April 2012 and 15.29 quintal semi processed '*bhasmas'*, not usable in Bharatpur pharmacy were transferred to Ayurveda College Udaipur during April 2016 for utilisation. It was observed that Ayurveda College Udaipur utilized only 0.64 quintal of raw material during 2016-17.

GoR stated (October 2017) that *bhasmas* would be utilized at the earliest in Ayurveda College Udaipur.

The fact however, remains that inventory management in the manufacture of drugs in Departmental pharmacies was not effective and required improvement.

2.1.9.6 Non-utilisation of machinery

Scrutiny of utilisation of machineries in test checked pharmacies revealed that:

- Machines/equipment (worth ₹ 73.49 lakh) *viz.* bottle line machine, rotary tablet machine, sugar coating machine, etc., installed in Ajmer (two machines) and Bharatpur (17 machines) pharmacies were lying unutilised since their installation during 2003-07.

- Other 21 machines/equipment worth ₹ 44.11 lakh installed in pharmacies Ajmer (12) and Udaipur (09) also remained idle during 2012-17 due to non-availability of related jobs, want of repair and non-deployment of technician for operating new type of machine.

- Two air compressors used for drying the bottles to be attached with bottle line machine were purchased in March 2007 for Ajmer and Udaipur pharmacies. One air compressor installed in Ajmer pharmacy could not be utilised as the bottle line machine was not commissioned in the pharmacy. The air compressor purchased for Udaipur pharmacy was not even sent there and was lying in stores of Ajmer pharmacy.

- Only two posts of machine operators were sanctioned for Jodhpur and Udaipur pharmacies against requirement[36] of seven operators in five pharmacies. Only one operator was posted in Jodhpur pharmacy. In absence of qualified machine operators, departmental labour was operating the machines without any formal training.

It was observed that though a proposal for imparting training to the deployed technicians and assistants was sent to the Department in April 2012, the same was not approved as of March 2017.

GoR stated (October 2017) that the purchased machines were not utilized due to lack of specialised operators and proposals for filling the vacancy of machine operators and imparting training would be considered.

2.1.10 Procurement of drugs

There was no system in place at the Directorate office to assess the annual requirement of drugs based on consumption pattern in field units after adjusting the available stock. The proposals for procurement of medicines were prepared at Directorate/RSAS at their own level without consolidating the demands of healthcare centers.

[36] Ajmer-1, Bharatpur-1, Jodhpur-2, Kelwara-1 and Udaipur-2.

Audit scrutiny revealed the following:

2.1.10.1 Non-utilisation of funds for procurement of drugs

National AYUSH Mission launched during September 2014 by GoI envisaged submission of State Annual Action Plan (SAAP) for implementation of Mission in the State. RSAS prepared and submitted SAAP to GoI for approval and release of funds for implementation.

It was observed that RSAS submitted SAAP for procurement of drugs and received ₹ 39.30 crore during 2014-17, of which an amount of only ₹ 13.42 crore was utilized during 2014-15 and amount of ₹ 25.88 crore (65.85 *per cent*) remained unutilised as of March 2017. Thus, funds received from GoI during 2014-17 could not be fully utilised.

GoR stated (October 2017) that delay in procurement of drugs occurred due to delay in tender process.

The fact, however, remains that the failure of the Department in full utilisation of funds disbursed by GoI for drugs, deprived the patients of free medicines to that extent.

2.1.11 Distribution of drugs to the hospital and dispensaries

Drugs manufactured in any departmental pharmacy were distributable among the other pharmacies at a pre-determined ratio (Ajmer: 28 *per cent*, Jodhpur: 25 *per cent*, Udaipur: 23 *per cent* and Bharatpur: 24 *per cent*) on the basis of number of healthcare centers falling under jurisdiction of the pharmacies, for further distribution to healthcare centers.

In case of medicines to be procured from market, RSAS decides the number of medicines and quantity of each medicine within the budget available for a healthcare center (₹ 30,000 for dispensary and ₹ 50,000 for hospital) at the prevailing market rate. The medicines are delivered in number of uniform kits in departmental pharmacies for distribution to healthcare centers as per their jurisdiction through DAOs.

2.1.11.1 Irrational/delayed distribution of drugs

The pharmacies distributed manufactured drugs through DAOs to all dispensaries/hospitals in uniform kits containing the same quantity of medicines, without considering the patient load or demand or need of a healthcare centers.

It was observed that the Bharatpur pharmacy was required to distribute the manufactured drugs to10 DAOs. Scrutiny of records revealed that the pharmacy however, distributed 11 drugs to only two to eight DAOs during 2015-17 and other DAOs were deprived of medicines as detailed in ***Appendix 2.3***.

It was further revealed that the Bharatpur pharmacy distributed drugs to DAOs with the delays ranging from one month to 16 months, even though the shelf life of drugs was only two years, thereby reducing the scope for utilisation of the drugs as detailed in ***Appendix 2.4.***

2.1.11.2 Distribution of expired drugs to the patients

GoI prescribed (October 2009) shelf life for various Ayurveda drugs and directed that drugs should not be distributed after their date of expiry.

Scrutiny revealed that one to 14 expired drugs were kept in stock of eight test checked healthcare centers[37], of these, six centers (except DH Bikaner and Dispensary Shahpur) even distributed expired drugs to the patients in number of cases.

2.1.11.3 Failure in distribution of drugs in small hygienic packaging

GoI issued (January 2013) orders for distribution of drugs in suitable packaging like paper bags, pouches, etc., under hygienic conditions. It was observed that drugs manufactured by the Departmental pharmacies were packed in sizes like 1 kg, 500 gm (dried drugs) and 400 ml, 200 ml (liquid drugs) and distributed to healthcare centers. Further, test checked healthcare centers did not have paper bags, pouches in their store for packaging of drugs in small quantities useful to the patients and were distributing them in pieces of newspapers and empty bottles. Thus, the direction of GoI for distribution of drugs in small packaging under hygienic condition was not followed by healthcare centers.

GoR accepted the facts and stated (October 2017) that from 2017-18, drugs were procured on the basis of requisition from dispensaries and selected drugs were being distributed in small hygienic packaging.

The fact however, remains that drugs manufactured in the Departmental pharmacies also required to be distributed in suitable small packaging, which was not being done. Further no reply was furnished regarding distribution of expired drugs.

2.1.12 Shortfall of inspection of drugs manufacturing units

Drugs and Cosmetic Rules 1945 provided Drug Inspectors (DIs) would inspect the premises of the licensee of manufacturing the Ayurveda drugs, at least twice a year. There are 302 licensees including five departmental pharmacies to manufacture Ayurveda drugs in the State as of March 2017. The Department has deployed three DIs under the supervision of Assistant Drug Controller for inspection of manufacturing units.

During 2012-17, as against a total target of 2,918 inspections to be conducted, the DIs could only conduct 1,647 (56.44 *per cent)* inspections. Further during 2014-17, the number of annual inspections decreased from 66.49 *per cent* in 2014-15 to 41.39 *per cent* in 2016-17. It was also observed that no inspection was carried out by DIs during 2015-17 in 16 districts of Udaipur, Ajmer, Bharatpur and Kota regions. The details of inspection conducted by DIs during 2012-17, are given in ***Appendix 2.5***.

[37] DH, Longia, Ajmer (14), DH, Alwar (six), DH, Bikaner (three), Hospital, Dadiya (one), Hospital, Khairtal (six), DH, Kota (one), Hospital, Rajgarh (five) and Dispensary, Shahpur (two).

GoR, while accepting the facts stated (October 2017) that the inspection could not be done twice a year due to shortage of DIs.

2.1.12.1 Shortfall in taking of samples by Drug Inspectors

Drug Controller fixed the target of five samples of raw material/drug per month for each DI. It was, however, observed that all three DIs did not achieve the annual targets of 180 samples[38] during 2012-17, as enumerated in the **Table 8**.

Table 8

Division	Number of samples taken by the Drug Inspectors				
	2012-13	2013-14	2014-15	2015-16	2016-17
Jaipur	06	10	11	27	25
Jodhpur	00	32	16	-	20
Udaipur	00	7	8	21	23
Ajmer	57	-	-	-	-
Bharatpur/Kota	-	-	-	-	-
Total samples taken (*per cent*)	**63** (*35.00*)	**49** (*27.22*)	**35** (*19.44*)	**48** (*26.67*)	**68** (*37.78*)

Source: Data provided by the Drug Control Organisation, Rajasthan.

It can be seen from the table that shortfall in taking samples of the drugs ranged between 62.22 to 80.56 *per cent*. Further, DIs did not take any samples from the manufacturing/retail units established in Bharatpur and Kota regions during 2012-17.

GoR stated (October 2017) that collection of sample from every region could not be carried out due to shortage of DIs. It was also stated that proposals for sanction of new posts was under process.

2.1.12.2 Non-performance of Ayurvedic Drug Testing Laboratory

Ayurvedic Drug Testing Laboratory (ADTL) was established during 2005-06 at Ajmer to improve access to drug testing facilities and expand the services and support system.

A mention was made in the CAG's Audit Report (Civil) for the Government of Rajasthan for 2010-11 that ADTL could not be put to operation due to non-deployment of technical staff thereby rendering the entire expenditure of ₹ 0.78 crore unproductive. GoR intimated (October 2012) the Public Accounts Committee (PAC) that the laboratory was started and all the equipment installed in the laboratory were utilised after engagement of contractual manpower. Scrutiny of records of ADTL, Ajmer was carried during May 2017 and it was observed that:

- ADTL tested 97 samples during 2012-13 through the contractual staff. No sample was tested in the laboratory during 2013-17, as regular technical staff was not deployed. The sample testing was done only once through contractual staff to give assurance to the PAC about the functioning of ADTL.

[38] 5 samples x 3 DIs x 12 Months= 180.

- One MO as Officer in-charge, one clerk and one peon were posted without any work load during 2013-17.

GoR stated (October 2017) that ADTL was not functioning due to shortage of staff.

2.1.12.3 Samples lying without testing in laboratory

Due to non-functioning of ADTL, samples taken by DIs were forwarded to Drug Testing Laboratory (DTL), Jaipur of Medical and Health Department for their testing. DTL was not testing the samples within reasonable time period and 39 samples (81.25 *per cent*) of total 48 taken during 2015-16 and all 68 samples (100 *per cent*) taken during 2016-17 were not tested by DTL, Jaipur as of March 2017.

GoR stated (October 2017) that the creation of new posts of Assistant Drug Controller, Officers and DIs was under process for testing facility in ADTL Ajmer.

The fact remains that in spite of the assurance given to PAC about its functionality, ADTL Ajmer remained non-functional during 2013-17. Thus, the quality of drugs manufactured was not ensured.

2.1.12.4 No regulation over Ayurveda drugs sold in retail

A license was essentially required to be obtained before establishment of premises by wholesalers and retailer for selling of Allopathic medicine in terms of provisions of the Drugs and Cosmetics Rules, 1945. However, it was observed that similar dispensation was not available for the Ayurveda retailers, though provisions were made for regulation of manufacturing units of Ayurvedic medicines.

In absence of any control or regulation for selling of Ayurvedic drugs by retailers it cannot be assured that no spurious Ayurvedic drugs were being sold by the retailers.

GoR, while accepting the facts stated (October 2017) that proposals in this regard were under process with the Government.

2.1.13 Role of Rajasthan State Medicinal Plant Board

Rajasthan State Medicinal Plants Board (RSMPB) was mandated with role of (a) obtaining demand and supply of medicinal plants, (b) identification, preparation of inventory and quantification of medicinal plants, (c) promotion of ex-situ and in-situ cultivation and conservation of medicinal plants and (d) encouraging the protection of Patents and Intellectual Property Rights.

Scrutiny of records of RSMPB revealed that:

- Though Rajasthan has 1,911 species of medicinal plants, RSMPB had prepared database of only 55 medicinal plants as of March 2017. RSMPB, however, not conducted baseline survey and feasibility study for ascertaining the

condition of medicinal plants.

GoR stated (October 2017) that the National Medicinal Plants Board has already prepared an exhaustive database of medicinal plants with active participation of RSMPB.

The reply was not convincing as RSMPB has prepared database of only 55 medicinal plants as of March 2017.

- RSMPB did not develop policy for cultivation/utilisation of plants, development of local market for products and availability of trained manpower/equipment.

GoR stated (October 2017) that a draft Herbal Policy of Rajasthan was made in January 2008. However, the subsequent development as regards to approval of the policy was not available with RSMPB.

- Neither were new herbal gardens established under Public Private Partnership mode nor were herbal gardens developed in 17 nominated locations under the possession of RSMPB/Department as on March 2017.

GoR stated (October 2017) that development of herbal gardens at these 17 sites would require substantial financial aid and RSMPB would take initiative in this regard.

Manufacture, procurement and distribution of quality drugs

Though Central Government has prescribed 277 essential drugs for indoor and outdoor patients and the states were expected to decide the required essential drugs as per prevalence of diseases and needs of the patients, GoR failed to do so.

During 2012-17, the achievement in drug production vis-à-vis targets by the Departmental pharmacies was only 39.12 per cent. The reasons attributed for the low production was shortage of labour, short supply of raw materials etc. Further, the cost of drugs manufactured by the Departmental pharmacies was 1.23 to 3.92 times higher the rates of Indian Medicines Pharmaceutical Corporation Limited, Uttarakhand.

Distribution of drugs was done without ascertaining demand. There were instances of delay in distribution of drugs, distribution of expired drugs to the patients and failure to distribute drugs in small hygienic packaging.

During the period 2012-17, the Drug Inspectors could only conduct 56.44 per cent of the prescribed 2918 inspections. Ayurveda Drug Testing Laboratory, established during 2005-06 at Ajmer was not functional. Even the samples sent to DTL Jaipur remained untested. Thus, the quality of drugs manufactured was not ensured.

Recommendations:

6. *Considering the poor performance of the Departmental pharmacies in terms of low production rates, high costs and shortage of trained technical staff, Government should review the need for the continuation of these pharmacies and consider either running them on PPP mode, if viable, or close them down and relocate the manpower within the Department, if found feasible.*

7. *The system of assessment of demand and timely distribution of Ayurvedic drugs needs to be streamlined so that drugs can be procured, supplied and used within their shelf life.*

8. *As there are no provisions of the Drugs and Cosmetics Act/Rules, for licensing of retailers of Ayurvedic drugs, like in the case of Allopathic drugs, there is a need to propose amendment to the Act/Rules to ensure that spurious/adulterated Ayurvedic drugs are not sold by retailers.*

9. *There is an urgent need to strengthen the Drug Control Organisation/Drug Testing Laboratory so that the prescribed inspections of manufacturing units are conducted and all the samples are tested in time to ensure supply of quality drugs.*

Audit Objective 4: To assess whether the Ayurveda educational institutions in the State were imparting quality education and promoting research and development activities.

2.1.14 Availability of Ayurveda education institutions and courses in the State

Dr. Sarvapalli Radha Krishnan Rajasthan Ayurveda University was established during 2003 at Jodhpur for efficient and systematic instruction, teaching, research and development in Ayurveda and other Indian systems of medicine in the State.

There were nine Ayurveda Colleges[39] including six private colleges in the State as of March 2017 with an annual intake capacity of 632 Under Graduate (UG) students in Bachelor of Ayurveda Medicine and Surgery (BAMS). Further, Post Graduate (PG) courses were available in only three colleges as on March2017withan annual intake capacity of 149 students[40]. Ayurveda University also has two centers at Jodhpur for Ayurveda Nurse and Compounder Training. In addition, 26 other AYUSH Nursing Training Centers with an annual intake capacity of 1,180 students, were also affiliated to Ayurveda University.

[39] One Constituent College: University College of Ayurveda , Jodhpur (100), One Central Government Aided College: National Institute of Ayurveda, Jaipur (92), One GoR College: Shri Madanmohan Malviya Government Ayurveda College, Udaipur (60), Six Private College: Shri Bhanwar Lal Duggad Ayurveda Vishva Bharti, Sardar Shahar, Churu (50), Punjab Ayurveda Medical College and hospital, Sriganganagar (60), Shekhawati Ayurveda College, Pilani, Jhunjhunu (60), Shirdi Sai Baba Ayurveda College and hospital, Renwal, Jaipur (50), Mahatma Jyotiba Phoole Ayurveda College, Chomu, Jaipur (100) and Kala Ashram Ayurveda College, Gogunda, Udaipur (60).

[40] University college of Ayurveda, Jodhpur (30), National Institute of Ayurveda, Jaipur (104), Shri Madanmohan Malviya Government Ayurveda College, Udaipur (15).

2.1.14.1 Delay/non-commencement of Post Graduate courses in Ayurveda

As per Central Council of Indian Medicine (CCIM) regulations[41], PG courses can be offered in 14 subjects[42]. Regulation 6(2) of the CCIM Regulations specifies the eligibility criteria including availability of qualified teachers for PG classes. Government Ayurveda College, Udaipur was functioning since 1944, which initially offered only UG course. PG courses were started from 1973 in three subjects *viz. Rasa Shastra* (1973), *Dravya Guna* (1982) and *Kayachikitsa* (1986) with intake capacity of five seats in each subject.

It was, however, observed that permission to admit students in existing PG courses during 2008-15 (except five seats in *Kayachikitsa* during 2012-14) was not accorded by GoI due to non-availability of adequate numbers of qualified teachers as per the eligibility conditions of CCIM. Further, no PG course in any new subject was started in Government Ayurveda College, Udaipur by GoR.

GoR stated (October 2017) that the permission for PG courses in three subjects (*Shalya Tantra, Sharir Rachana* and *Sharir Kriya*) was under consideration of CCIM for approval.

2.1.14.2 Non-provision of practical training to UG students

As per syllabus for BAMS course, students were required to be imparted training in Surgery and Gynecology. For imparting such training facilities of adequate infrastructure, faculty of modern medicine, live cases for delivery and surgery were required to be available in the hospital attached to the colleges.

Scrutiny revealed that though adequate infrastructure was available in the hospital attached to the colleges but other facilities for study of delivery cases and surgery cases required for training of Surgery and Gynecology were not available thereby adversely impacting on the quality of practical training. The colleges also did not initiate action for convergence with any allopathic hospitals or National Institute of Ayurveda at Jaipur, where such training could be imparted.

GoR stated (October 2017) that the Ayurveda colleges do not have facilities to handle emergency situations in delivery/surgery procedures, therefore they do not provide delivery/surgery service to the patients. Hence imparting practical training to the students was not possible in Ayurveda colleges. Further, the proposals were sent for convergence to provide practical training in Government/private medical hospitals by the Ayurveda College, Udaipur.

The fact however, remains that efforts to ensure practical training which was part of the UG course designed as per CCIM norms, were not made.

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[41] Establishment of New Medical College, opening of New or Higher Course of Study or Training and Increase of Admission Capacity by a Medical College Regulations 2003.

[42] Kayachikitsa, Sharir Kriya, Maulik Siddhanta, Kaumar Bhritya, Rasa Shastra, Panchakarma, Dravya Guna, Swastha Vritta, Rog and Vikriti Vigyan, Prasuti and Stri Roga, Sharir Rachana, Shalakya Tantra, Shalya Tantra and Agad Tantra.

2.1.14.3 Non-functioning of Rajasthan Nursing Ayurveda Council

Section 38 of Rajasthan Ayurveda Nursing Council Act, 2012 provided for mandatory registration of Ayurveda nursing professionals. Further, GoR was required to make rules under the Act.

It was noticed that though Rajasthan Ayurveda Nursing Council (RANC) was constituted by the GoR during September 2013 but the Rules and Regulations were not formulated by the GoR. During 2012-16, total 3,785 nurse/compounder students passed out from the Nursing colleges affiliated with the University but none of them could be registered by RANC.

GoR stated (October 2017) that rules and regulations drafted by RANC was under consideration for approval.

2.1.14.4 Non-availability of faculty/teaching staff in Ayurveda colleges

CCIM Regulations stipulates that appointment of minimum 30 full time regular teachers for 60 UG students and 45 teachers for more than 60 UG students in Ayurveda Colleges. Further for PG course, one Professor or Reader and one Lecturer of the concerned subject was additionally required over and above the teachers stipulated for UG courses.

In this regard, shortages in the availability of faculties/other staff were observed in the University and Government College, Udaipur as discussed below:

- Only three Professors, 14 Readers and 18 Lecturers were deployed in University College, Jodhpur against the requirement of 14 Professors, 19 Readers and 22 Lecturers, as per regulations, as of March 2017.

- No faculty was available in University College, Jodhpur for *Swasthavritta* and *Yoga*, against requirement of three as per norms. Further, five PG courses were running but only one Professor of *Shalya Tantra* was appointed as of March 2017.

- As per CCIM norms eight consultants of modern medicine on part time basis were required, however, only three consultants were engaged in the University, as of March 2017.

- Only four Laboratory Technicians against nine posts were appointed in University College, Jodhpur while no Laboratory Technician was appointed against nine posts in Ayurveda College, Udaipur.

- Against the requirement of one person for each post of Bio Chemist, Pharmacologist, Bio-Statistician and Microbiologist in Government College, Udaipur and University College, Jodhpur, no person was appointed as of March 2017.

GoR stated (October 2017) that required staff was not deployed due to non-availability of eligible candidates. Further, it was stated that recruitment was

under process for both the colleges, however, arrangement to appoint retired persons as per norms were also made in Ayurveda College, Udaipur.

The fact however, remains that faculties/teaching staffs were not available as per CCIM Regulations in the University and Government College, Udaipur.

2.1.14.5 Inadequate Hostel facility for students

Inadequacy of hostel facility was observed in the Ayurveda University, Jodhpur and Government College, Udaipur as enumerated below:

- No hostel was provided to PG students in Ayurveda University, Jodhpur and in Government College, Udaipur.
- 138UG/PG girl students were residing in the hostel of capacity of 96 students during 2016-17 in Jodhpur.
- In three test checked nurse/compounder training institutes[43], no hostel facility was provided for the students. For construction of hostel of 100 beds capacity at Nursing Training Center Punjla, Jodhpur, sanction of ₹ three crore was accorded under 'Member of Parliament Local Area Development' Scheme during 2014-15, but work could not be started as the financial sanction was not issued by Rural Development Department. On being pointed out, the University stated that they had requested (July-October 2017) District Collector for release the funds but no funds were released as of October 2017 to start the construction of the hostel building.

GoR stated (October 2017) that construction of PG girls/boys hostels were under progress in Jodhpur University and separate Girls hostel in Ayurveda College, Udaipur, would be proposed in the budget for 2017-18.

Thus, concerted efforts were lacking in ensuring hostel facilities for UG/PG students in Ayurveda Colleges/ Training Institutes in the State.

Availability of Ayurveda education institutions and courses in the State

No new Post Graduate courses could be started in Government Ayurveda College, Udaipur after 1986 due to non-availability of qualified teachers in adequate numbers. Practical training in Surgery and Gynecology was not being provided to the students as the Ayurveda colleges did not have facilities for delivery and surgery cases.

Rajasthan Ayurveda Nursing Council was constituted during September 2013 but Rules and Regulations were not formulated by the GoR resulting in 3,785 nurse/compounder students not being registered with the Council during 2012-16.

Only 3 Professors, 14 Readers and 18 Lecturers were deployed in University College Jodhpur, against the requirement of 14 Professors, 19 Readers and 22 Lecturers, as per regulations as on March 2017.

[43] Karwad and Punjla (Jodhpur) and Ajmer.

Recommendations:

10. *GoR should appoint adequate number of qualified teaching faculties in Colleges/University to ensure quality education in existing courses as well as to start new Post Graduate Courses.*

11. *Rules and Regulations should be formulated by the GoR to ensure registration of Ayurveda nursing/compounders in the State.*

Audit Objective 5: To assess whether there was an effective systems of financial management and internal control/monitoring.

2.1.15 Financial Management

2.1.15.1 Availability of funds

The Department received funds from the State budget and GoI assistance under the National AYUSH Mission (Mission). The ratio of Central and State assistance under the Mission was 75:25 (upto 2014-15) which was changed to 60:40during 2015-16. The central assistance was transferred to Rajasthan State AYUSH Society (RSAS), as per approved SAAP. Total Grants of ₹ 82.75 crore including the State matching share of ₹ 25.92 crore were received by the RSAS during 2014-17.

The year wise budget allocation and expenditure incurred on Ayurveda is given in the **Table 9**.

Table 9

(₹ in crore)

Year	Budget Allotment for Ayurveda and Ayurveda Education	Expenditure	Expenditure on pay and allowances as *per cent* of total expenditure
2012-13	483.19	431.97	402.42 (*93.15%)*
2013-14	540.52	472.29	440.32 (*93.23%)*
2014-15	551.62	515.09	491.88 (*95.49%)*
2015-16	596.21	604.57	531.85 (*87.97%*)
2016-17	642.97	631.97	571.14 (*90.37%*)
Total	**2,814.51**	**2,655.89**	**2,437.61(*91.78%*)**

Source: Information provided by the Department.

It can be seen from the table that:

- during 2012-17, the expenditure on pay and allowances was very high and ranged between 87.97 to 95.49 *per cent* of total expenditure, thereby leaving very small percentage for core activities of the Department like equipment, infrastructure, drugs and IEC activities.

- though, there was an increase of 246.59 *per cent* in total budget allocation (total budget during 2012-17 was ₹ 36,555.00 crore)[44] for the Medical and

[44] 2012-13: ₹ 3,868 crore; 2013-14: ₹ 5029 crore; 2014-15: ₹ 8703 crore; 2015-16: ₹ 9,417 crore and 2016-17: ₹ 9,538 crore. Total during 2012-17: ₹ 36,555 crore.

Family Welfare Department in 2016-17 as compared to the year 2012-13, yet the increase in budget allocation for Ayurveda was only 133.07 *per cent* during the same period in the State. It was also observed that the budget allocation for the Ayurveda was only 7.70 *per cent* of the total Health Budget of the State for the period 2012-17.This indicates that Ayurveda was given lower priority by GoR as compared to modern medicine.

- the Department also prescribed (February 1995) norms of ₹ 2 and ₹ 6 per patient per day for distribution of free drugs to outdoor and indoor patients respectively. The Department proposed (August 2000) for revision of norms to ₹ 10 and ₹ 30 per patient per day for outdoor patient and indoor patient respectively on the recommendation of the Estimate Committee of Vidhan Sabha. GoR did not approve (January 2001) the proposal due to poor financial position of the State and thereafter the Department never proposed for increase in rates till October 2017.

Thus, a very small percentage of the funds were available for strengthening and upgradation of healthcare facilities, which adversely impacted on the quality of healthcare services provided in the State.

GoR stated (October 2017) that efforts would be made to get more funds from State and Central Government to improve the Ayurveda healthcare facilities.

2.1.15.2 Non-utilisation of GoI assistance

For upgradation of AYUSH hospitals and dispensaries including procurement of medicines, engagement of personnel and supply of drugs in the State, GoI releases funds as per approved Programme Implementation Plans (PIPs) of the State. While approving the PIP for the year 2011-12, GoI stated that funds would be released subject to clearance of the pending UCs for funds released upto 2009-10.

As of March 2011, it was observed that UCs for ₹ 66.07 crore released during earlier periods were pending for submission to GoI. For want of pending UCs, GoI did not approve PIP for further period 2011-14, which deprived the State of central assistance of ₹ 47.03 crore[45].

Though the pending UCs were sent in subsequent years, the fact remained that the much needed central assistance of ₹ 47.03 crore was not received due to non-submission of UCs in time.

Further, out of central share of ₹ 7.93 crore for construction of new infrastructure such as Auditorium, Stadium, *Panchkarma* center, kitchen, etc., in the Ayurveda University, GoI released first installment of ₹ 2.00 crore during March 2012 and GoR also released state share of ₹ 1.65 crore during 2012-14. As the University submitted UCs for first installment only in March 2016 after a delay of four years, GoI did not release the remaining grant of ₹ 5.93 crore due to this delay. Though the University requested (August 2016) GoI for release of second installment, GoI stated that the project was merged into National AYUSH

[45] 2011-12: ₹ 13.25 crore; 2012-13: ₹ 16.28 crore and 2013-14: ₹ 17.50 crore.

Mission and the University should submit separate proposal under the Mission.

GoR stated (October 2017) that the proposal for construction of new infrastructure has since been sanctioned by GoI and funds would be released to RSAS.

Thus, failure to monitor the delay in submission of UCs indicates weaknesses in the financial management systems in the Department and deprival of financial assistance from GoI.

2.1.15.3 Delay in release of funds to State AYUSH Society

GoI released funds to GoR through the treasury for further transfer to RSAS including matching State share for implementation SAAP. It was observed that during 2014-17, GoR released funds including its own matching share with delays ranging from 44 days to 261 days.

GoR stated (October 2017) that during 2014-15the delay in release of funds was attributable to the procedure involved in sanction and release of funds from Finance Department.

The fact remains that there was delay of 44 to 261 days in transfer of funds during 2015-17 and no effort to improve the procedure to avoid the abnormal delays involved in release of funds.

2.1.16 Internal control

2.1.16.1 Non-formulation of Rajasthan Ayurveda Advisory Board

GoR formulated Rajasthan Ayurveda Advisory Board (Advisory Board) in May 1986 to suggest measures for development of Indian Systems of Medicine for three years and was to be reconstituted every three years. It was observed that the Advisory Board was not reconstituted after May 2003 despite repeated requests (December 2011 and July 2013) of the Directorate. In the absence of a High Level Advisory Board, valuable inputs and advice on the major deficiencies that plague the Department could not be discussed.

GoR stated (October 2017) that the Advisory Board has been constituted and meeting was held. However, the outcome of the meetings and their follow-up by the Department were not intimated.

2.1.16.2 Non-achievement of targets by District Ayurveda Officers

The Department fixed (June 2012) targets for each District Ayurveda Officer (DAO) of six inspections per month for ensuring the availability of drugs, equipment and compliance of orders by the hospitals and dispensaries.

Though the 34 DAOs conducted overall inspections more than the prescribed targets for the period 2013-17 in State, however, there was a shortfall of 26.92 *per cent* and 8.16 *per cent* in achievements of targets during 2015-16 and 2016-17 respectively.

Audit further observed that no inspection was conducted in six districts (17.65 *per cent*) during 2015-16,while in four districts (11.76 *per cent*) during 2013-14, in six districts (17.65*per cent*) during 2014-15,in four districts (11.76 *per cent*) during 2015-16 and in seven districts (20.59*per cent*) during 2016-17, less than 50 *per cent* of the prescribed inspections were conducted.

Even the inspection reports of DAOs were of routine nature and could not serve any purpose for rationalisation of resources to ensure quality healthcare facilities. Thus there is a need to improve the quality of inspection.

GoR attributed (October 2017) non-availability of vehicles for non-achievement of targets of inspection. Further, necessary directions for conducting inspections as per norms had now been issued (June 2017).

2.1.16.3 Improvement in service delivery through public participation

GoR decided (March 2001) to form *Rogi Kalyan Samiti* (RKS) to improve the management of healthcare facilities through public participation in the healthcare centers. Hospital management, senior citizens and voluntary organisations were required to fix the rates for healthcare services provided in the hospitals/ dispensaries. The funds collected were to be spent for the purpose of developing dispensary and other facilities for the patients.

It was observed that out of 118 District hospitals/hospitals, RKSs were formed in 75 hospitals. No RKS was formed in any of 3,577dispensaries as of March 2017. Further, of the five test checked RKSs at Beawar, Jodhpur, Alwar, Bharatpur and Udaipur College, three (Alwar, Bharatpur and Udaipur College) did not utilize the funds amounting to ₹ 7.89 lakh and was lying unutilised in bank accounts. As a result, the intention of GoR to improve the management of healthcare facilities through regular monitoring by RKSs was not fulfilled.

GoR, while accepting the fact stated (October 2017) that efforts would be made to form RKSs in hospitals/dispensaries and activities pertaining to RKSs would be compiled at the Directorate level.

2.1.16.4 Evaluation of Aanchal Prasuta Kendras

GoR directed Evaluation Organisation[46] to evaluate *Aanchal Prasuta Kendras* established as specialty centers by the Department. The organisation submitted its report during November 2015. It was, however, observed that the Department did not follow up on the recommendations mainly regarding non establishment of APKs in SC/ST majority areas, non-utilization of equipment, inadequate availability of diet etc. made by the Organisation and these deficiencies continue.

GoR, while accepting the fact stated (October 2017) that the necessary action would be taken.

[46] An organisation of GoR under the Planning Department.

Financial Management

As 91.78 per cent out of total available funds during 2012-17 were incurred on pay and allowances, a very small percentage of funds were available for strengthening and upgradation of healthcare facilities, which adversely impacted on the quality of healthcare services provided in the State.

The norms for allocation of budget for drugs to the patients at healthcare facilities per day were very low at ₹ 2 and ₹ 6 for outdoor and indoor patients respectively. These limits have not been revised since 1995.

Failure of the Department to monitor the delays in submission of UCs resulted in the deprival of central assistance of ₹ 52.96 crore. Instances of delay in release of funds by GoR to Rajasthan State AYUSH Society were also noticed.

Recommendations:

12. *Considering the significant role of Ayurveda in preventive and curative healthcare, GoR should allocate sufficient funds for improvement and upgradation of Ayurveda healthcare facilities and drugs to the patients so that the poor state of infrastructure and facilities in the Ayurveda dispensaries and hospitals are improved.*

13. *The financial management systems in the Department needs to be strengthened to ensure that UCs are submitted in time to avoid deprival of central assistance.*

2.1.17 Conclusion

The Department was not able to provide effective and quality Ayurveda healthcare services to the public of the State despite having the largest network of 118 hospitals and 3,577 dispensaries in the country and incurring an expenditure of ₹ 2,655.89 crore during 2012-17, on Ayurveda Services and Ayurveda education. As 91.78 per cent of the funds available were spent only on pay and allowances, a very small percentage of funds were available for strengthening and upgrdation of healthcare facilities and Ayurveda education, which adversely impacted the quality of healthcare services provided in the State.

Healthcare centers lacked basic infrastructure like building, electricity, drinking water and toilets. There was a nominal increase of 6.50 per cent in number of new outdoor patient during 2012-17. No significant growth in number of patients was noticed during last decade in the State. The department inflated the number of patient benefited by Ayurveda by treating a new patient being prescribed for five days as five patients.

There was no regulation to ensure the quality of drugs sold by retailers in market. The Departmental pharmacies did not achieve the targets of production of drugs as during 2012-17 due to shortage of labours, raw materials etc. The pharmacies were also issuing the drugs at the higher rate. There was shortfall in achievements of targets of inspections of pharmacies and in taking of samples of

drugs. The quality of drugs manufactured in government pharmacies was not ensured.

Considering the existence of large number of professionals, dispensaries and hospitals in the State, there is an urgent need for the GoR to review and improve the prevalent deficiencies in the Ayurveda healthcare services by adopting a suitable policy and standards.

GoR assured (October 2017) that it will review the resources for strengthening the Department and to remove the deficiencies as indicated in the report and necessary action will be taken for providing quality healthcare services to public.

Public Health Engineering Department

2.2 Management of Drinking Water in Rajasthan

Executive summary

Rajasthan is the largest State in the country covering more than 10.40 per cent of the total geographical area of the country. It is the driest State and total surface water resources in the State are only about one per cent of the total surface water resources of the country, which has to support 5.66 per cent of the country's population. Rajasthan is largely dependent on ground water for drinking purpose due to scanty rainfall and limited surface water sources. Excessive use of ground water for irrigation and drinking purposes has caused depletion of ground water.

The available water also suffers from chemical contamination such as fluoride, nitrate, salinity etc., which makes water unsafe for drinking purposes. Fast depletion in available ground water reserves has resulted in deteriorating the water quality on chemical parameters. Therefore, the management of safe drinking water is a critical challenge for the State.

Government of Rajasthan (GoR) adopted the State Water Policy in February 2010 through which it accorded top priority to water for drinking purpose over all other water use requirements. The State Water Policy could not get translated into actionable goals and targets as Public Health Engineering Department (PHED) did not prepare any long term comprehensive/perspective plans. Though Annual Action Plans were being prepared and submitted to GoI, these plans continued to be driven from the top in the absence of distinct village and district level water security plans. Further, various institutional mechanisms were either not constituted as per guidelines or functioning effectively as envisaged.

There were various deficiencies observed in the implementation of the schemes/projects for drinking water supply. 37 out of 54 major drinking water supply projects (with a cost of ₹ 20,695.80 crore) and 119 out of 437 rural schemes (with a cost of ₹ 7,491.58 crore) could not be completed within the stipulated period due to various reasons like delay in taking possession of land, delay in obtaining necessary approvals of authorities, slow progress of contractors, delays by PHED in contracting etc.

Quality of drinking water could not be ensured as per the prescribed norms. During 2014-17, the total number of quality affected habitations reduced by only 13.82 per cent showing the slow progress in improving the quality of water in the habitations. In test checked districts the quality of water has improved except in Bharatpur, Kota and Nagaur where fluoride affected habitations have increased as on date (December 2017). As the biological and chemical contaminants could not be effectively tested and removed, the quality of drinking water could not be ensured. This resulted in exposing the population of the state to serious public health hazards.

The State and district laboratories were not equipped with all the required capability/equipment/manpower to conduct all the prescribed tests. During 2014-17, water sources were not tested in 65.31 per cent habitations. Further, the number of habitations where all sources were tested was only 1.17 per cent. The position of inadequacy in laboratory infrastructure, insufficient testing of water samples and shortfall in conducting sanitary survey for water sources continued despite being pointed out by CAG's Audit Report (G&SS) for the year ended 31 March 2014 and recommendations of PAC.

Reverse Osmosis plants installed at a cost of ₹ 15.45 crore in the several quality affected habitations were not functional due to absence of maintenance. Similarly, the Jalmani programme which aimed to provide quality drinking water to rural schools was unsuccessful, resulting in wasteful expenditure of ₹ 0.95 crore besides non-utilisation of ₹ 5.93 crore.

The coverage and extent of water supply was also not adequate. Beneficiary surveys of 810 beneficiaries in 278 habitations indicated that only 17.98 per cent habitations were supplied by Piped Water Supply Schemes and only 15.10 per cent with treated water. 46.17 per cent people were not satisfied with the quality of water and 37.78 per cent said that water samples were not collected from source/supply point for testing of quality. Further, beneficiary satisfaction in Bisalpur Dudu Water Supply Project revealed that water supply was stopped in 250 Public Stand Posts (PSPs) out of 437 PSPs surveyed (57.21 per cent) as water bills were not deposited by users. This defeated the very purpose of implementation of the scheme to provide potable drinking water to these villages. Further, PHED transferred only minor rural tube well schemes under 'Janta Jal Yojana' to Panchayti Raj Institutions and prepared no plan/target for progressive transfer of the management of water supply schemes to the people.

The system of Financial Management and Revenue Collection was weak as during 2014-17, PHED could not utilise ₹ 1,271.15 crore in water supply schemes. The Revenue Collection by PHED was abysmally low and only around 20 per cent of its overall O&M cost could be recovered in contravention of the State Water Policy. This was due to the fact that PHED was measuring its water supply from only around 40 per cent of functional meters and it did not have measure of how much water was flowing in rest of the water connections. Further no assessment was available for the Non-Revenue water supply in the State.

The above deficiencies are a pointer to the fact that Government needs to streamline and strengthen the implementation aspects to achieve the milestones.

2.2.1 Introduction

Rajasthan is the largest State in the country covering more than 10.40 *per cent* of the total geographical area of the country. It is the driest State and total surface water resources in the State are only about one *per cent* of the total surface water resources of the country, while the state has to support 5.66 *per cent* of the country's population. Rajasthan is largely dependent on ground water for drinking purpose due to scanty rainfall and limited surface water sources. Excessive use of ground water for irrigation and drinking purposes has

caused depletion of ground water and rise in levels in salinity, fluoride and nitrate etc., which makes it unsafe for drinking. Therefore, the management of safe drinking water is a critical challenge for the State.

Government of Rajasthan (GoR) adopted the State Water Policy in February 2010 and accorded top priority to water for drinking purpose over all other water use requirements. In rural areas drinking water was being supplied under National Rural Drinking Water Programme, a centrally sponsored scheme. For supplying drinking water to urban areas, the funding was mainly through GoR's Minimum Needs Programme.

2.2.2 Organisational Structure

Public Health Engineering Department (PHED) is responsible for supply of safe drinking water. The Principal Secretary, PHED is the Administrative Head, who is assisted by Chief Engineer (Administration), Chief Engineer {Urban & Non-Revenue Water (NRW)}, Chief Engineer (Rural) and Chief Engineer (Special Project). Chief Engineer (Urban & NRW) and Chief Engineer (Administration) are responsible for Urban Water Supply Schemes. Chief Engineer (Rural) supervises the Rural Water Supply Schemes and Chief Engineer (Special Project) supervises the activities of all the major urban and rural drinking water projects costing more than ₹ 25 crore. The State is divided into eleven regions[47], looked after by Additional Chief Engineers (ACEs). Regions are further divided into circles headed by Superintending Engineers (SEs) and they are assisted by Executive Engineers (EEs) at Divisional Offices.

The Public Health Engineering Laboratory branch is headed by Chief Chemist (CC) who is responsible for chemical and bacteriological testing of water supplied to the consumers and monitoring of the quality. All 33 districts have District Laboratories headed by Superintending Chemist/Senior Chemist/Junior Chemist.

2.2.3 Audit Objectives

The Performance Audit was conducted to assess whether:

(i) Comprehensive planning was done based on authentic data for ensuring availability of drinking water, commensurate with the present/future demand;

(ii) Implementation of the schemes/projects for drinking water supply in rural and urban areas was efficient and effective;

(iii) Quality of drinking water supply was ensured as per prescribed norms**;**

(iv) Coverage and extent of water supply was adequate, reflecting in beneficiary satisfaction and whether efforts were taken to promote beneficiary participation in water management; and

[47] Ajmer, Alwar (National Capital Region), Bharatpur, Bikaner, Churu, Kota, Jaipur-I, Jaipur-II, Jodhpur-I, Jodhpur-II and Udaipur.

(v) Systems for financial management, revenue collection, monitoring, evaluation and internal control were effective.

2.2.4 Audit Criteria

The sources of audit criteria inter alia included:

- State Water Policy, 2010.
- Rajasthan Water Supply Rules, 1967.
- Five Year Plans and Annual Plans of Government of Rajasthan.
- Budget Manual/General Financial & Accounts Rules (GF&ARs)/ Public Works Financial & Accounts Rules (PWF&ARs).
- Manual on Water Supply and Treatment issued by Central Public Health and Environment Engineering Organization (CPHEEO).
- National Rural Drinking Water Programme (NRDWP) Guidelines.
- Implementation manual on National Rural Water Quality Monitoring and Surveillance Programme (NRDWQM&SP).
- Orders, Circulars and Notifications issued by PHED from time to time.

2.2.5 Audit Scope and Methodology

The Performance Audit (PA) covered the activities carried out by PHED for management of drinking water in Rajasthan during 2014-17.

One district, having highest population, from each division[48] and one district falling under National Capital Region was taken to make the sample representative of the entire State. Further, 21 blocks[49] (20 *per cent* of the total blocks in each selected district), 42 *Gram Panchayats* (GPs) (Two GPs from each selected block) and 84 villages (maximum two villages from each selected GP) were also selected by *'Simple Random Sampling without replacement'* method.

The records in the offices of CEs (Administration/Head Quarters[50]/Rural/Special Project); Chief Chemist; Director, Water and Sanitation Support Organisation (WSSO); Chief Engineer, State Water Resources Planning Department (SWRPD); ACEs in respective regions; SEs in respective circles and EEs in respective divisions in selected districts were examined to collect the required

[48] Alwar, Bharatpur, Bikaner, Jaipur, Jodhpur, Kota, Nagaur and Udaipur district.

[49] Alwar: Behror, Kishangarh and Laxmangarh; Bharatpur: Bayana and Sewar; Bikaner: Bikaner and Nokha; Jaipur: Bassi, Phagi and Sambhar; Jodhpur: Lohawat, Mandore and Osian; Kota: Kherabad and Ladpura; Nagaur: Didwana, Mundawa and Kuchaman; and Udaipur: Kherwara, Kotra and Rishabhdev.

[50] Renamed as Chief Engineer, Urban and NRW from 1 July 2017.

information. Further, urban local bodies concerned and GPs were also visited to collect the information.

The audit objectives and methodology of PA were discussed with the Additional Chief Secretary, PHED along with departmental officers during the entry conference held on 23 March 2017. The audit findings were discussed in an exit conference held on 20 December 2017.

Audit Findings

Audit Objective 1: Whether comprehensive planning was done based on authentic data for ensuring availability of drinking water, commensurate with the present/future demand.

2.2.6 Long term planning

GoR adopted a State Water Policy 2010 (SWP), in order to develop water resources in a planned way, which aimed to adopt a radical shift from predominantly engineering based solutions to local community based water management solutions. The objective of SWP was to adopt an integrated and multi sectoral approach to water resources planning, development and management on a sustainable basis taking river basin/sub basin as unit.

GoR constituted State Water Resources Planning Department (SWRPD) for implementation of SWP and 17 other Departments including PHED were also responsible for implementation of SWP. PHED was to evolve long term and perspective plans for drinking water supply management. Paragraphs 14 and 15.1 of the guidelines of NRDWP also provided for preparation of a five year comprehensive water security plan. Further, the State was also required to prepare a State Specific Sector Policy Framework. Audit scrutiny however, revealed that:

- SWP had stated only broad policy intentions for integrated management of water by giving top priority to drinking water supply among all uses of water. Therefore, PHED was required to design specific policies and plans to implement SWP. It was observed that neither did PHED prepare long term comprehensive plans nor did it prepare perspective plans and as a result SWP could not get translated into actionable goals and targets.

- Further, in compliance with Asian Development Bank loan agreement executed for policy reform matrix, GoR was to prepare an Urban Water Policy. Accordingly, draft Urban Water Policy covering important aspects[51] of drinking water management in urban area, was prepared by Rajasthan Urban Infrastructure Development Project (RUIDP) in 2015. But the draft policy was not finalised by PHED as of June 2017. Thus, no drinking water policy was in place for the urban population (constituting 25 *per cent)* living in 297 towns/cities of the State.

[51] Water management and source sustainability, metering, NRW reduction, tariff adjustment, water quality monitoring systems, billing and collection efficiency, etc.

- As required for NRDWP, PHED only prepared Annual Action Plans (AAPs) for rural water supply schemes, for approval of GoI.

2.2.7 Annual Planning

Scrutiny of the planning mechanism for rural water supply revealed the following:

2.2.7.1 District and Village Water Security Plan

SWP envisaged decentralized management of drinking water supply by strengthening Panchayati Raj Institutions (PRIs), creation and promotion of Water User Groups (WUGs) and giving community level assistance to WUGs and to plan and execute water related solution within Integrated Water Resource Management (IWRM) framework[52]. Further, NRDWP guidelines envisaged that District Water Security Plan (DWSP) and Village Water Security Plan (VWSP) were to be prepared.

CE (Rural) awarded work of preparation of VWSPs including Detailed Project Reports (DPRs) for 5,455 villages to four consultant firms[53] in August 2010 for ₹ 12.74 crore and the work was to be completed within three months. It was observed that an amount of only ₹ 1.29 crore was paid to the consultant firms.

Neither Director (WSSO) nor CE (Rural) provided any details about the number of VWSPs so prepared and any further use of VWSPs thereof. However, as per AAP 2015-16, PHED claimed to have developed 3,035 VWSPs. The claim of PHED appears incorrect as 56 *per cent* VWSPs were prepared even though payment of only 12 *per cent* was made to the consultant firms. Further, during the field audit, it was observed that none of the eight test checked districts had any VWSPs with them. Further, as VWSPs were not prepared in test checked districts, DWSPs could also not be prepared.

Thus, the fact remained that even after lapse of seven years DWSPs and VWSPs were not prepared. Also, District Water and Sanitation Missions (DWSMs) and Block Resource Centers[54] (BRCs) were not formed (as discussed in **paragraphs 2.2.8.3 and 2.2.8.4**), which were supposed to consolidate VWSPs first at block level and subsequently at district level into DWSP.

2.2.7.2 District Water Security Plan

District Water Security Plan was to be prepared by DWSMs by analysis and consolidation of VWSPs at District Level. As VWSPs were not prepared in test checked districts, DWSPs could not be prepared.

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[52] State Water Policy-Introduction and paragraph no. 2.1.1, 2.1.2, 2.1.3 and 2.1.6.

[53] IIHMR, Jaipur, Advantage India, New Delhi, PDCOR Limited and Ramky Environ Engineers Pvt. Ltd.

[54] As per paragraph 12.6 of NRDWP guidelines, Block Resource Centers were to be set up at the block level to provide continuous support to GPs/VWSCs and to act as a link between them and DWSM.

2.2.7.3 Annual Action Plan

Paragraph 14 of NRDWP Guidelines envisages preparation of Annual Action Plan (AAP), which included broad direction/thrust and tangible targets to be achieved in the financial year. Scrutiny of AAPs submitted to GoI for 2014-17, revealed the following:

- For the 12th Five Year Plan period, the working group on domestic water and sanitation recommended the need to increase drinking water supply service level from 40 Litre Per Capita Per Day (LPCD) to 55 LPCD in rural areas. Further, in the meeting held for finalisation of AAP for 2014-15, even GoI directed (February 2014) GoR to devise new schemes with 55 LPCD service level. It was, however, observed that PHED continued to prepare the rural schemes/projects for the service level of 40 LPCD as of August 2017.

- Community participation in preparation of AAP, as envisaged in the guidelines was not achieved in absence of Village Water Sanitation Committees (VWSCs), BRCs and DWSMs. Suggestions/proposals of elected public representatives were also not obtained during preparation of AAPs. AAPs were prepared on the basis of demands or proposals submitted by EEs through SEs at district level. Further, only 2,890 (2014-15: 610 and 2015-16: 2,280) VWSCs were set up in the State during 2014-16. As of June 2017, no VWSC was operational in test checked districts. As a result, the basic component for the success of 'bottom-up' planning i.e. VWSP was not prepared in the villages of the State.

- PHED did not take the help of the hydro-geo-morphological maps in formulation of AAPs to identify sites to ascertain the sustainability of source, which was prepared and readily available with GoI.

- The schemes/projects included in AAPs were not cleared by Source Finding Committee (SFC) before putting up to State Level Scheme Sanctioning Committee (SLSSC) for approval, as SFC was not formed at the first place.

Though AAPs were being prepared and submitted to GoI, these plans continued to be top down in the absence of distinct village and district level water security plans.

2.2.8 Institutional mechanisms for planning & monitoring

NRDWP guidelines prescribed for establishment of a robust institutional mechanism for planning and monitoring of rural water supply schemes to achieve effective implementation. Scrutiny of the institutional mechanisms for rural water supply revealed the following:

2.2.8.1 State Water and Sanitation Mission

GoR constituted (February 2010) an Executive Committee of State Water and Sanitation Mission (SWSM) under the chairmanship of Principal Secretary with CE (Rural) as Member Secretary and comprising 10 other members for providing

policy guidance on water supply and sanitation activities and management, monitoring and evaluation.

It was observed that only one meeting of Executive Committee of SWSM was held on 8 August 2016, which did not discuss any issue related to implementation of NRDWP. However, none of the items[55] discussed could be implemented in absence of approval by the Apex Committee headed by the Chief Secretary, which did not hold any meeting.

The NRDWP scheme guidelines visualized SWSM as a key institutional body for overall policy guidance for implementing the scheme. Further, all the finances of the scheme were to be routed through SWSM (till 2013-14). In not making SWSM operational, GoR failed to monitor the effective implementation of NRDWP in the State.

2.2.8.2 Water and Sanitation Support Organization

Water and Sanitation Support Organization (WSSO) was formed (June 2009) for the support activities required for implementation of NRDWP. Further, GoI earmarked 5 *per cent* of total annual allocation of NRDWP for the support activities.

Accordingly, GoR constituted (June 2009) General Body of WSSO comprising 15 members and a management committee of WSSO under the chairmanship of CE (Rural), Executive Director and five other members. Scrutiny of records related to WSSO revealed the followings:

- Members from reputed Civil Society Organisations (CSOs), academic institutions, representative of Gram Panchayat Water and Sanitation Committee (GPWSC)/VWSC were not nominated.

- Framing of the Rules and Regulations for working of WSSO were still under the process of approval even after eight years of its establishment.

- No meeting of General Body was held during 2014-17, against the norms of at least two meetings in a year.

- Full time regular Director for WSSO was not posted since October 2016 but additional charge was given to SEs working in PHED. This hampered the smooth functioning of WSSO which was demonstrated by the fact that WSSO committees did not meet as frequently as prescribed.

- Full autonomy, as envisaged in the guidelines, was not given to WSSO as the funds received from GoI under the support activity were not directly transferred to the 'support account' of WSSO and CE (Rural) was authorized for issue of funds received from GoI.

[55] Items like amendments to Memorandum of Association, conducting of regular meetings of committees of SWSM, finalization of Schedule of Powers, nomination of experts from various fields etc.

2.2.8.3 District Water and Sanitation Mission

As per paragraph 12.5 of NRDWP guidelines, District Water and Sanitation Mission (DWSM) headed by Chairman of *Zila Parishad* (ZP) was to be constituted for scrutiny/approval of schemes submitted by Blocks/GPs, formulation of District Water Security Plan (DWSP) and for monitoring the projects. Audit scrutiny of records revealed the following:

- DWSM was not established in any of the districts of the State.

- 77 consultants were engaged for one year on contractual basis in July 2011 for carrying out various technical and professional inputs at district level. However, 52 out of 77 consultants still continue to operate without the presence of its overseeing body i.e. DWSM. Further, the consultants were required to assist DWSM in two areas of its work i.e. in formulation of DWSP and implement the support activities[56] delegated by WSSO. Since DWSM did not exist, the role of consultants was limited to only carrying out support activities.

2.2.8.4 Block Resource Center

As per paragraph 12.6 of NRDWP guidelines, Block Resource Centers (BRCs) were to be set up at the block level to provide continuous support to GPs/VWSCs and to act as a link between them and DWSM. BRCs were responsible for preparation of annual activities calendar and its implementation, helping in preparation of VWSP, etc., among 13 specified activities.

It was observed that PHED appointed (November 2011) various NGOs (Non-Government Organizations) for setting up of BRCs with one Block Coordinator (BC) and one to three Cluster Coordinators (CCs) for ₹ 7.24 crore. Accordingly, the NGOs engaged 249 BCs and 667 CCs in the blocks. Audit scrutiny revealed that:

- Office space and computer facilities for preparation and implementation of Village Action Plan and updating habitation status on Integrated Management Information System (IMIS)[57], were not provided by WSSO/DWSM to BRCs.

- BRCs did not impart training to VWSCs, as WSSO did not appoint the agency for training.

- IEC activities like *nukkad nataks* and showing films on drinking water safety, making wall paintings and posters and organizing students and youth rally were also not carried out as agencies for the activities were not engaged.

- Field Test Kits were not provided by WSSO for carrying out water quality testing.

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[56] Information, Education and Communication (IEC), Human Resources Development (HRD), Management Information System (MIS) and Research and Development (R&D).

[57] Website of Ministry of Drinking Water and Sanitation.

Director, WSSO replied that Assistant Engineer (AE) in each block was responsible for coordinating the establishment of BRCs. The reply was not acceptable as support activities under NRDWP were to be exclusively carried out by WSSO and as it was receiving support funds under NRDWP, it was responsible for providing the necessary infrastructure to BRCs.

Thus, BRCs, which were supposed to be links between the DWSM and VWSCs were not operational in any of the blocks. Further, there was also no evidence of them contributing to the formulation of VWSPs in any of the villages.

2.2.9 Availability of database of habitations and population for planning

As per paragraph 15.5 of NRDWP guidelines 2013, while planning, all habitations were to be linked with Census 2011 data and national population growth factor indicated in Census 2011 was to be adopted to arrive at the present population. Thus, the present habitation names were to be linked to the names of Census villages. This exercise was to be carried out online by the states and updated on IMIS.

Audit scrutiny revealed that habitations on IMIS were not linked to Census villages entirely, as required in the guidelines. The comparative statement of population data of the Rajasthan (Rural) as per Census 2011 and website of NRDWP is given in **Table 1**.

Table 1

Particulars	Data As per Census 2011	As per NRDWP website	Difference
Number of villages	43,264	43,326	(-) 62
Number of households	94,94,903	93,00,373	(+)1,94,530
Population	5,15,00,352	5,08,06,731	(+) 6,93,621

Source: Information provided by Department.

From the table it can be seen that there was difference in the data of IMIS and Census 2011. It was also observed that out of 43,326 villages shown on IMIS, only 42,095 villages were mapped correctly with Census 2011 data, whereas 1,231 villages were not mapped at all.

Further, as per GoI's directions, the unique location codes for each habitation hosted on *Swachh Bharat* Mission (SBM), complete and accurate in every form, should be considered as master data for use by other Departments as standard directory. Accordingly, the data on IMIS should have been harmonized with that of SBM data through location codes. However, there was discrepancy between habitation wise data hosted in master directory of SBM and IMIS.

CE (Rural) confirmed (September 2017) that updation of households data was not done. He also stated that rural population of the State as on 1 April 2016 was 5,08,06,731, as per Census 2011 and the same was uploaded on IMIS. The reply is not tenable as the rural population of the State was 5,15,00,352 in Census 2011. IMIS continued to show total population of 5,08,06,731 till date without taking into account the population growth factor. This indicates that database uploaded on IMIS was not being updated regularly.

Further, as per Census 2011 the number of towns/cities (urban areas) in the State was 297 with the total population of 1,70,48,085. Whereas, PHED reported 222 number of urban areas with population of 1,61,90,531, in its Progress Report 2016-17.

This shows that mapping and updation of habitation wise data available with PHED was still incomplete even after six years of Census 2011. Thus, linking with Census data was essential in order to make correct population projections and thereby water demand projections.

2.2.10 Demand Assessment for planning for water supply schemes

SWP envisaged preparation of comprehensive inventory of potential and actual water resources. Estimating future demand has prime importance for planning water supply schemes.

The data of total water status i.e. total water available for all purposes from both ground and surface water sources was available with Water Resources and Ground Water Departments. As of March 2017, PHED did not have the consolidated data of current and future demand of drinking water supply for the entire State. At present, the demand projections of PHED were limited to only individual water supply schemes and based on water available from immediate sources.

As per paragraph 2.2.8.1 of CPHEEO Manual, piped water supplies for the community should be provided adequately for all basic needs[58].

Scrutiny of records of 10 water supply schemes in five[59] out of eight test checked districts, revealed that while calculating water demand for execution of projects/schemes, demand of institutional needs, public purposes, industrial and commercial uses, fire fighting and requirement for livestock were not included. Thus, PHED failed to calculate the demand for these public utilities but continued to supply water for all such needs.

2.2.11 Integrated use of surface and ground water

Paragraph 1.2.4 of SWP envisaged that urban and rural drinking water schemes would be planned on the basis of conjunctive use of surface and ground water so that minimum surface water is required to transport.

It was observed that no guidelines were issued by PHED for conjunctive use of surface and ground water in rural/urban areas.

CE (Rural) intimated (May 2017) that planning for integrated use of ground and surface water was not prepared by PHED. CE (Special Project) intimated (May 2017) that under water grid consultancy, the consultant would propose demand for year 2051 with surface water sources keeping minimum ground water

[58] Such as drinking, cooking, washing; institutional needs; public purposes viz. street watering, flushing of sewers, watering of public parks; industrial and commercial uses, fire fighting, livestock and minimum permissible unaccounted for water (UFW).

[59] Alwar: one, Bikaner: one, Jaipur: two, Kota: two and Nagaur: four.

dependability. While CE (Urban & NRW) intimated (May 2017) that in urban areas, where ground water was not potable on chemical quality parameters, blending with surface water was being done to meet the deficit demand.

In absence of comprehensive plan and guidelines regarding conjunctive use of surface and ground water, compliance of SWP and judicious use of water resources could not be validated in Audit.

Planning

The State Water Policy could not get translated into actionable goals and targets as PHED did not prepare any long term comprehensive/perspective plans. Though Annual Action Plans were being prepared and submitted to GoI, these plans continued to be driven from the top in the absence of distinct village and district level water security plans.

Though institutional mechanisms like State Water & Sanitation Mission and Water & Sanitation Support Organisation were formed, they were neither constituted as per guidelines nor functioning effectively as envisaged. Further, District Water and Sanitation Mission, Block Resource Centers and Village Water & Sanitation Committee were not even formed. As such the institutional mechanism for planning and monitoring was weak.

The database of urban and rural areas was not updated as per Census 2011 leading to incorrect population projections and thereby water demand projections. Further, PHED did not have consolidated data of current and future demand of drinking water supply for the entire State.

Recommendations:

1. *Long term comprehensive/perspective plans need to be prepared so that the State Water Policy can get translated into actionable goals and targets.*

2. *There is a need to strengthen Village, Block and District Level Water and Sanitation Committees so that Annual Action Plans submitted to GoI are bottom-up driven rather than top-down driven.*

Audit Objective 2: Whether there was efficient and effective implementation of the schemes/projects for drinking water supply in rural and urban areas.

2.2.12 Implementation of Water Supply schemes

There were 54 major drinking water supply projects with a cost of ₹ 25,790.61 crore and 437 rural water supply schemes costing ₹ 14,491.40 crore, sanctioned by PHED at various stages of completion as of March 2017.

Various deficiencies were observed in the implementation of the schemes/ projects for drinking water supply. out of 54 major drinking water supply projects, 37 projects with a cost of ₹ 20,695.80 crore and 119 out of 437 rural schemes with a cost of ₹ 7,491.58 crore could not be completed within the

stipulated period due to various reasons like delay in taking possession of land and obtaining necessary approvals, slow progress of work, delay in tendering etc. Design deficiencies were also noticed in urban water supply projects, which are discussed in the succeeding paragraphs.

2.2.12.1 Delay in implementation of drinking water projects

Major projects: There were 54 major drinking water supply projects[60] with a cost of ₹ 25,790.61 crore, sanctioned by PHED and were at various stages of completion as of March 2017 ***(Appendix 2.6)***.

It was observed that 37 out of 54 major drinking water supply projects ***(Appendix 2.6)*** were still in progress and were not completed within the stipulated period as of 31 March 2017 as detailed below:

- Five projects were delayed due to delay in obtaining necessary clearances from concerned departments,
- 13 projects were delayed due to delay in taking possession of land before commencement of the work,
- Six projects were delayed due to both reasons of delay in obtaining necessary clearances and taking possession of land,
- 13 projects were delayed for various other reasons like slow progress by contractors, paucity of funds, water source related problems, power connections etc.

Thus, up to 31 March 2017, delay in completion of major projects led to depriving people from the benefits of drinking water despite expenditure of ₹ 8,831.87 crore in these 37 projects.

Rural schemes: Rural water supply schemes include all the measures taken to satisfy the demand for water in predominantly rural areas and comprise piped water schemes, tube wells, hand pumps and *diggies* (small ponds). As per data updated on IMIS, there were 437 rural water supply schemes costing ₹ 14,491.40 crore as of August 2017 ***(Appendix 2.7)***. It was observed that out of 437 schemes, 119 schemes costing ₹ 7,491.58 crore, were delayed due to various reasons as detailed below:

The delay noticed in 48 schemes were due to land issues and 21 schemes were delayed due to delay in obtaining statutory clearances/permissions from concerned authorities. Thus, 69 schemes (57.98 *per cent*) were delayed due to delays in land acquisition and in obtaining necessary clearances/permissions from concerned departments. This shows that PHED violated the provisions of Public Works Financial & Accounts Rules (PWF&ARs) and did not ensure the availability of land and obtain necessary clearance from the concerned authorities before taking up the works which resulted in delay in execution of water supply schemes.

[60] Projects implemented by CE (Special Projects) with estimated cost of more than ₹ 25 crore.

In 15 schemes delay was due to source related problems. In eight schemes delay was due to delays in obtaining power connections and three schemes were delayed due to paucity of funds. Further, 24 schemes were delayed due to various reasons like, contractual problems, arbitration and litigations, public unrest/ protests, etc.

In eight test checked districts there were 19 major projects, out of which 13 projects remained incomplete as of March 2017. Further, there were 132 rural schemes, out of which 76 schemes remained incomplete as of March 2017. Audit scrutinized six[61] out of the 13 ongoing major projects (covering both urban and rural areas) and 76 out of 132 rural schemes[62] and irregularities noticed are discussed in succeeding paragraphs.

2.2.12.2 Unfruitful expenditure on RWSS Borabas-Mandana Water Supply Project

The Policy Planning Committee (PPC) issued (February and October 2007) Administrative and Financial (A&F) sanctions of ₹ 12.45 crore and ₹ 34.99 crore for two RWSSs 'Borabas-Padampura' and 'Nayagaon-Jagpura-Kasar' respectively to provide drinking water to 57 Main Habitations (MHs) and 20 Other Habitations (OHs) of Ladpura Tehsil which were facing scarcity of drinking water during summer period. The source of water for these two projects was Jawahar Sagar Dam, which was falling under the jurisdiction of Chambal Ghariyal Sanctuary. This required permission from Ministry of Environment and Forests (MoEF).

Eventually, both projects were clubbed as 'Borabas-Mandana Water Supply Project'. Three MHs and one OH of Sangod Tehsil were also included under the clubbed project. Revised A&F sanction was given by PPC (September 2011) for ₹ 118.04 crore for the clubbed project. The project was to be executed in two packages[63]. The Finance Committee (FC) approved (September 2012) the lowest rate of M/s GKC Project Ltd. (contractor) for ₹ 90.47 crore subject to the condition that land acquisition and clearance from all the agencies involved should be ensured before taking up the work to avoid any hindrance at the time of execution.

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[61] (i) Chambal Dholpur Bharatpur Project Phase-I Part-I, (ii) Chambal Dholpur Bharatpur Cluster Distribution system Phase-I Part-II, (iii) RWSS Tinwari Mathania Osian Baori Bhopalgarh, (iv) RWSS Borabas Mandana water supply project, (v) FMP Nagaur (JICA) and (vi) Nagaur lift project Phase-I.

[62] 76 Rural Schemes comprised 65 schemes of construction of Reverse Osmosis (RO) plants in Bharatpur district and 11 others RWSSs. All RO schemes were delayed as of May 2017 due to non-availability of land (44), source related problems (14) and electricity/power connection (seven).

[63] **Package-1-costing ₹ 40.68 crore:** Development of infrastructure of the project and coverage of villages (10 MHs and four OHs) of Nayagaon-Jagpura-Kasar scheme.
Package-2-costing ₹ 77.36 crore: Coverage of villages (47 MHs and 16 OHs) of Borabas-Padampura scheme and three MHs and one OHs of Sangod Tehsil.

Audit scrutiny revealed that Additional Chief Engineer (ACE) Kota, despite not having clearance of Forest Department, issued (September 2012) work order[64] to the contractor including 10 years Operation & Maintenance (O&M) on single responsibility turnkey basis with stipulated date of completion of work by December 2014.

During execution of the project, the Forest Department repeatedly informed (July, September and October 2013) PHED to first obtain permission from National Board of Wild Life (NBWL), as the intake pumping station proposed at Akelgarh was within Chambal Ghariyal Sanctuary and the proposed pipelines pass through Mukundara Hill Tiger Reserve. The Forest Department also informed that both these components of the project required separate permission from NBWL and only after getting permission from NBWL, the forest clearance would be considered. Accordingly, PHED applied (June 2013) to NBWL for permissions after nine months of issuing work order. Permission from NBWL for the Mukundara Hill Tiger Reserve was obtained in June 2015 after a delay of more than three years and the permission for the Chambal Ghariyal Sanctuary was still pending (May 2017).

Thus, PHED did not follow the directions of FC to ensure clearance of the site from all the agencies before issuing the work order to the contractor. The work was still incomplete even after lapse of two and half years of stipulated period of completion and payment of ₹ 49.57 crore (December 2016) to the contractor. PHED has granted two time extensions to the contractor (till September 2016) to keep the contract alive. Further, as of May 2017, PHED has neither obtained permission from NBWL for Chambal Ghariyal Sanctuary nor forest clearance for diverting forest land for pipeline work. Thus, the works of Akelgarh Headwork and pipeline falling under the forest areas have not been completed.

GoR stated (September 2017) that the 'in principle' approval for diversion of forest land for laying of pipelines in forest area was received (July 2017) from MoE&F. It also stated that the efforts were being made to complete the work during 2017-18. The reply is not convincing as the final approval for diversion of forest land was still awaited. Besides, PHED had also not obtained permission from NBWL for Chambal Ghariyal Sanctuary.

2.2.12.3 Execution of Nagaur Lift Project

(i) Phase-I

To solve drinking water problems of five towns[65] and 494 villages of Nagaur district, PPC issued (August 2006) A&F sanction of ₹ 761 crore for Phase-I of Nagaur Lift Project and further revised (April 2016) it to ₹ 1,194.03 crore due to delay in awarding the work. The works under Phase-I were divided into seven packages.

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[64] For Rejuvenation work of Intake Pumping Station, Sedimentation Tank, Water Treatment Plant, Clear Water Reservoir and Water Pumping Station, intermediate pumping stations, cluster rising mains, cluster distribution mains, mechanical works, village distribution system, IEC activities etc.

[65] Nagaur, Basni, Kuchera, Mundwa and Merta city.

(a) It was observed that package 1 was completed (January 2012) with a delay of three years and package 2 was completed (June 2016) with a delay of two years after incurring expenditure of ₹ 351.93 crore and ₹ 128 crore respectively. The work order for package-3, amounting to ₹ 324.91 crore was issued (July 2012) to M/s. SPML with stipulated date of completion by July 2015. The work was incomplete as of August 2017 due to slow progress of work by the contractor. The contractor was paid ₹ 236.82 crore.

(b) ***Undue benefit to contractor towards price adjustment:*** Package-4 of phase-I was sanctioned for ₹ 189.48 crore for providing drinking water to 176 villages (Degana block: 54 villages, Merta block: 122 villages) and Merta city of Nagaur district. FC approved (July 2012) the lowest bid of M/s Petron Civil Engineering Pvt. Ltd for ₹ 189.48 crore including O&M for 10 years (cost of execution ₹ 174.20 crore and O&M cost ₹ 15.28 crore). Accordingly, ACE, Ajmer issued (July 2012) the work order with scheduled completion period of 36 months (i.e., by 14 July 2015).

Clause 45 of the contract agreement executed with the contractor provided for price adjustment in the prices of material and wages of labours during the progress of the contract, based on increase or decrease in their standard applicable price indices. Further, entire period of completion of the contract was divided into four time spans and Clause 2 of the agreement provided that the contractor would maintain the prorata progress during each time span. The Department would recover compensation from the contractor for the work not done during the stipulated period.

Clause 45(7) of the contract agreement provided that the price adjustment would be applicable only for the work carried out within the stipulated time. Furthermore, clause 45(10) provided that in case the contractor did not make prorata progress in any time span and covered up the work in subsequent time span, then the price adjustment of the work expected to be done in the previous time span would be notionally given.

Details of span-wise progress of the work and amount of price adjustment paid to contractor are given in **Table 2**.

Table 2

(₹ in crore)

Particulars	**Detail of Span-wise progress**				**Amount of price adjustment paid to the contractor**	**Compensation recovered**	**Up to date payment made to the contractor**
Time Span	**Span-I (25 *per cent*)**	**Span-II (50 *per cent*)**	**Span-III (75 *per cent*)**	**Span-IV (100 *per cent*)**			
Period of Span	**15.07.2012 to 14.04.2013**	**15.04.2013 to 14.01.2014**	**15.01.2014 to 14.10.2014**	**15.10.2014 to 14.07.2015**			
Work to be completed in terms of money	**1/8 of work period**	**3/8 of work period**	**3/4 of work period**	**Full work period**	2.51 (October 2014 to July 2015)	8.86	68.58 (up to 31st running account bill of March 2016)
	21.77	65.32	130.65	174.20			
Work actually completed (*per cent*)	6.67 (30.64)	29.07 (44.50)	53.43 (40.89)	64.68 (37.13)			
Balance incomplete work/ shortfalls (*per cent*)	15.10 (69.36)	36.25 (55.50)	77.22 (59.11)	109.52 (62.87)			

The contractor was paid ₹ 68.58 crore (39.37 *per cent* of the total work) up to 31st running account bill (March 2016) for the work done and ₹ 2.51 crore towards price adjustment up to 3rd running account bill (July 2015). Compensation of ₹ 17.42 crore[66] under clause 2 was also imposed on the contractor for failing to complete the work in each time span, out of which only ₹ 8.86 crore was recovered.

As can be seen from the table above, the contractor did not maintain prorata progress of work during any of the time spans. In spite of regular notices and directions in various meetings, the contractor failed to maintain the prorata progress of work. The matter of slow progress was discussed (May 2016) in FC and it was decided that the contract be rescinded under clause 3 of the agreement (on the risk and cost of the contractor) and the tender be re-invited for execution of remaining work.

However, as the contractor had not maintained the prorata progress during each time span and also failed to cover up the work in subsequent time spans, payment of ₹ 2.51 crore towards price adjustment was not admissible.

GoR stated (September 2017) that the payment on account of price adjustment was made as per clause 45 of contract agreement. The reply is not convincing as clause 45(10) provided that the contractor was eligible for price adjustment for each span to be given notionally only on completing the deficit work of previous spans in subsequent time spans. Hence, the payment of price adjustment was not admissible to the contractor as he did not complete the deficit in any of the spans. Further, out of the compensation of ₹ 17.42 crore imposed on the contractor under clause 2 of the agreement, ₹ 8.56 crore is still not recovered.

(ii) Phase-II

To provide safe drinking water to seven towns and 914 villages of Nagaur district, PPC issued (August 2012) A&F sanction of ₹ 2,938 crore[67] for Phase-II. The Phase-II was divided in 10 packages i.e. packages 1 to 3 for Transmission Mains (TM); packages 4 to 9 for Cluster Distribution System (CDS); and package 10 for fluoride mitigation programme.

Audit scrutiny revealed that the Technical Sanction (TS) for CDS was accorded in July-September 2013 for ₹ 560.62 crore[68] and tenders for CDS were invited on September-October 2013 but the tenders were cancelled (February 2014) by FC as the tender process of TM was not started by that time. Consequently, TS was revised (December 2015 and February 2016) to ₹ 829.20 crore[69], thereby increasing the cost of CDS by ₹ 268.58 crore. The tenders for CDS were invited again in March 2017 which was not finalized up to August 2017. TS of TM was accorded in May and August 2014 i.e. after two years of A&F sanction. The

[66] Span I: ₹ 0.38 crore, Span II: ₹ 1.81 crore, Span III: ₹ 5.79 crore and Span IV: ₹ 10.95 crore, limited to 10 *per cent* (₹ 17.42 crore) of total cost of work (₹ 174.20 crore).

[67] The project was funded by Japanese International Cooperation Agency.

[68] CDS-I: ₹ 113.79 crore; CDS-II: ₹ 131.88 crore; CDS-III: ₹ 156.44 crore; and CDS-IV ₹ 158.51 crore.

[69] CDS-I: ₹ 165.60 crore; CDS-II: ₹ 195.86 crore; CDS-III: ₹ 226.07 crore; and CDS-IV: ₹ 241.67 crore.

tenders for TM were invited in November 2014 and approved in July 2015. The work order was issued in September 2015 with stipulated date of completion of work as March 2018.

Thus, failure of the Department in inviting tenders for transmission lines before taking up distribution network and not finalising the tenders for CDS till date, had deprived the intended benefit of providing safe drinking water to seven towns and 914 villages.

2.2.12.4 Implementation of Chambal Dholpur Bharatpur Project

For providing potable surface water to salinity affected 106 villages of Dholpur district and 945 villages and five towns[70] of Bharatpur district, RWSS Chambal-Dholpur-Bharatpur Project (CDBP) was being implemented in a phased manner (Phase-I and II) since 1999. PPC accorded (July 1999) A&F sanction for ₹ 166.50 crore which was further revised (January 2013) to ₹ 548.68 crore for Part-I of Phase-I. This included the works of TM system from Chambal River to Mallah Head Works, RWSS of 296 villages[71] and Reorganisation of Urban Water Supply Scheme (UWSS) Bharatpur. The balance 755 villages and four urban towns of Bharatpur were to be covered under Part-II of Phase-I, for which PPC accorded (May 2013) A&F sanction for ₹ 720.31 crore. This included the works of RWSS of 246 villages of Kama-Pahadi, RWSS of 283 villages of Deeg-Nagar, RWSS of 226 villages for Bharatpur, Roopwas, and Kumher and balance work of TM from Mallah to Kumher, Deeg, Nagar, Kama and Pahadi.

Under CDBP Part-I and Part-II of Phase-I, the works were awarded in total seven packages during 2007-13. These works were awarded to various contractors with stipulated dates of completion between March 2011 and April 2016.

It was observed that out of seven packages, only one package (TM system from Chambal River to Mallah head works) was completed. As of May 2017, only ₹ 378.44 crore (36 *per cent*) out of ₹ 1,050.83 crore worth of work was executed and only one town (Bharatpur) and 136 villages[72] were benefited. The works of remaining six packages, consisting of six RWSSs were lying incomplete despite lapse of 16 to 93 months from stipulated time of completion for all the packages. Thus, beneficiaries of 915 villages and four towns (Deeg, Kama, Kumher and Nagar) were deprived of desired benefits of the Project even after the lapse of 18 years since the project was initiated.

2.2.12.5 Unfruitful expenditure on Water Supply Project Rishabdeo due to delay in completion

To cater to the water demand of Rishabdeo town and enroute four villages[73], a water supply scheme UWSS Rishabhdeo was sanctioned (July 2003) by PPC for ₹ 4.89 crore. The work of UWSS was awarded (May 2006) to M/s Vishnu Prakash Pungalia for ₹ one crore including O&M for five years. The stipulated date of completion of work was May 2007.

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70 Bharatpur, Deeg, Kama, Kumher and Nagar.
71 Dholpur: 106 villages and Bharatpur: 190 villages.
72 Dholpur: 62 villages, Saipon: 44 villages, Roopwas: 30 villages.
73 Kagdar Bhatia, Kanuwara, Mandwa Phalla and Thana Mafi.

Test check of records of EE, Division-Salumber (Rural) revealed that the contractor executed only work of Ground Level Reservoirs (GLRs) at a cost of ₹ 0.34 crore and did not execute other remaining works[74] as the local residents raised objections regarding the title of land and prevented him from carrying out the work. Notices were issued to the contractor for completion of the work. PHED did not agree with the hindrance indicated by the contractor. Thereafter only in October 2011, ACE Udaipur withdrew the work under clause 3 of agreement at risk and cost of the contractor. The contractor approached (March 2014) the Empowered Standing Committee[75] for settlement of dispute. The committee decided (May 2014) that the contractor deliberately left the work incomplete. At present, the matter was under hearing at District & Session Court, Jaipur.

Thus, it took four years (September 2007 to October 2011) for PHED to withdraw the work from the contractor who had left the work at incomplete stage. Further, only ₹ 0.08 crore towards penalties was recovered from the contractor against the total recoverable amount of ₹ 1.75 crore (clause 2: ₹ 0.07 crore and clause 3: ₹ 1.68 crore) as of November 2016.

To complete the remaining work[76] of ₹ 0.65 crore, tenders were invited in September 2013 and opened in December 2013. In the instant case the tenders were required to be accepted and approved within a period of 70 days as provided in Appendix XI of PWF&ARs. But the decision on tender could not be taken by SE as the rates were higher and the tender was sent to FC. FC asked the Negotiation Committee headed by CE, Udaipur to negotiate and finalize the rates but no meetings of the Negotiation Committee was held. The L-1 contractor M/s Pushkar Lal Dangi was requested to extend the validity of the bid and also give negotiated rate up to July 2014. But the contractor refused to extend the validity and offer negotiated rate. It was decided to re-invite the tender for the work after lapse of eight months (January to August 2014).

The remaining work was awarded (December 2014) to M/s Manoj Bagadi for ₹ 2.34 crore with stipulated date of completion as October 2015. The contractor executed the work of construction of RGF, CWR, Residential Quarters and supply and installation of pump and machinery for ₹ 1.72 crore as of September 2015. Thereafter the work came to a standstill. The contractor could not complete the work of laying and jointing of distribution pipe lines of 100 mm diameter Ductile Iron (DI) pipes, within the stipulated period because PHED did not supply the pipes in time, as it placed the supply order for DI pipes only in October 2016. As of March 2017, the contractor had completed work of ₹ 2.22 crore (95 *per cent*) with remaining work pending because of non-supply of pipes by PHED.

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74 Rapid Gravity Filter, supply and installation of pump and machinery, Residential Quarters and laying and jointing of pipe lines.

75 "Empowered Standing Committee" was constituted under the provision of Clause 23 of the general conditions of the agreement for settlement of disputes and headed by Principal Secretary of the Department.

76 Construction of RGF, CWR, GLRs, supply and installation of pump and machinery, Residential Quarters and lying and jointing of pipe lines.

Thus, PHED took three more years (October 2011 to December 2014) to award the remaining work to M/s Manoj Bagadi. But even after such delay, the work was lying incomplete (as of May 2017) as PHED failed to supply pipes to the contractor till date.

Further, AE Sub Division-Kherwara (February 2008) confirmed that cracks have started to form in the reservoirs due to non-filling of water. During joint physical inspection conducted by audit with the departmental engineers, it was also observed that cracks in the reservoir were formed and repair work was required. Therefore, the expenditure of ₹ 0.34 crore incurred on these reservoirs had proved infructuous.

GoR stated (September 2017) that all efforts for completion of work were made but due to non-existence of rate contract for pipes, the required pipes could not be provided to the contractor by PHED. It was also stated that the pipes have been issued to contractor now and water has been supplied to Rishabdeo town. However, the work of connecting of pipelines with reservoir of enroute villages is still under progress. The reply is not convincing as the delay in completion of work was mainly due to not taking timely action in withdrawing, finalizing of tenders and retendering the work.

Thus, failure of PHED to initiate prompt action in withdrawing, retendering and completing the work and delay in timely supply of DI pipes resulted in the expenditure of ₹ 2.56 crore incurred on UWSS becoming unfruitful and defeated the objective of the scheme to provide drinking water to the habitants for more than ten years.

2.2.12.6 Other cases of delay

It was also observed during test check that seven other water supply schemes involving an expenditure of ₹ 82.24 crore were not completed even after lapse of 28 months to 96 months from the stipulated date of completion of works. The instances of delay in schemes noticed during test check are discussed in ***Appendix 2.8***. The reasons of delay were mainly due to not obtaining necessary clearance from other departments/agencies, land dispute, encroachment, protest by villagers and slow progress by the contractors.

2.2.12.7 Designing of the Project for lesser periods

As per paragraph 2.2.6 of CPHEEO Manual, the water supply projects should be designed to meet the requirements of 30 years period after their completion. The time lag between design and completion of the project should also be taken into account and should not exceed to two to five years. Audit scrutiny revealed the following:

(i) PPC issued (August 2006) A&F sanction for the work of RWSS Manaklav-Dantiwada-Pipar-Bilara (district Jodhpur) for ₹ 308 crore. The scheme was designed in 2008 for projected population of 6.40 lakh as per Census 2001 for design period of 2031. The works under four packages were completed

during March-October 2016 and works of package-IV were completed in February 2017 at a cost of ₹ 318.74 crore. Thus, the project was not designed for 30 years i.e. up to 2038 as required under CPHEEO manual and even the incorrectly designed period (2031) was effectively reduced to only 15 years due to delay in completion of works.

(ii) PPC issued **(**July 2007**)** A&F sanction for ₹ 305.15 crore for the work of RWSS Tinwari-Mathaniya-Osian-Baori-Bhopalgarh (district Jodhpur) and further revised (February 2010) for ₹ 430.06 crore. Out of its total seven packages, first package was completed in 2010, second to fifth packages were completed during 2012-17 and the work of sixth and seventh packages were under progress (August 2017). This RWSS was designed in 2010 based on a projected population of 6.79 lakh for design period of 2031. After completion (five packages) of RWSS in 2016-17 the design period of the project left was only 15 years against the prescribed design period of 30 years.

Implementation of Schemes

There were 54 major drinking water supply projects with a cost of ₹ 25,790.61 crore and 437 rural water supply schemes (as per IMIS Data) costing of ₹ 14,491.40 crore, sanctioned by PHED and were at various stages of completion as of March 2017.

Various deficiencies were observed in the implementation of the schemes/ projects for drinking water supply. 37 out of 54 major drinking water supply projects (with a cost of ₹ 20,695.80 crore) and 119 out of 437 rural schemes (with a cost of ₹ 7,491.58 crore) could not be completed within the stipulated period due to various reasons like delay in taking possession of land, delay in obtaining necessary approvals of authorities, slow progress of contractors, delays by PHED in contracting etc.

The urban water supply projects were not designed to meet the requirements of 30 years period after their completion.

Recommendation:

3. *PHED should evolve a separate system to coordinate and monitor with various external Ministries/Departments/Authorities so that the process of obtaining land clearance/titles and statutory clearances is streamlined and expedited.*

Audit Objective 3: Whether quality of drinking water supply was ensured as per prescribed norms.

2.2.13 Status of water quality in the State

As per data available on IMIS 23,956 villages/habitations (as on 1 April 2014) were classified as 'Quality Affected Habitations', contaminated with various types of chemical contaminants. The details of different contaminants and habitations affected with them are given in **Table 3**.

Table 3

Type of contamination	India		Rajasthan		*Per cent* of habitations of Rajasthan on habitations of country	
	Number of villages/ habitations		Number of villages/ habitations			
	As on 1 April 2014	As on 1 April 2017	As on 1 April 2014	As on 1 April 2017	As on 1 April 2014	As on 1 April 2017
Fluoride	14,132	13,492	7,670	6,695	54.27	49.62
Arsenic	1,991	18,258	0	0	0.00	0.00
Iron	42,093	24,168	10	5	0.02	0.02
Salinity	17,472	14,317	14,722	12,800	84.26	89.40
Nitrate	2,818	1,983	1,554	1,143	55.15	57.64
Heavy Metals	0	2,506	0	0	0.00	0.00
Total	**78,506**	**74,724**	**23,956**	**20,643**	**30.51**	**27.63**

Source: IMIS.

From the above data it is evident that Rajasthan had 30.51 *per cent* of the quality affected habitations of the country as on April 2014. They constituted 19.69 *per cent* of total 1,21,648 habitations in Rajasthan. Out of these 23,956 habitations, 32.02 *per cent* were fluoride affected. It was observed that during 2014-17, the total number of quality affected habitations reduced by only 13.82 *per cent* showing the slow progress in improving the quality of water in the habitations.

In test checked districts, the quality of water has improved except in Bharatpur, Kota and Nagaur where fluoride affected habitations have increased as on date (December 2017). However, the overall Fluoride, salinity and Nitrates contamination continues to be high as compared to the national statistics.

PHED had undertaken various programmes/schemes such as installation of Reverse Osmosis, de-fluoridation plants and *Jalmani* Programme to address the problems of quality of drinking water. The deficiencies in their operations/ implementation are discussed in succeeding paragraphs.

2.2.13.1 Installation of Reverse Osmosis Plants

During 2013-17, total 3,444 Reverse Osmosis (RO) plants[77] were sanctioned in three different phases, out of which only 1,610 RO plants[78] were commissioned by March 2017. The works of installation of 1,421 RO plants were under progress and remaining 413 RO plants were not installed.

It was observed that ACE Jodhpur issued (August 2013) work orders for ₹ 45.19 crore[79] for installation of 240 RO Plants in three circles (Barmer: 160; Jaisalmer: 40 and Jalore: 40) including O&M for seven years. As per the condition of the work order, 65 *per cent* payment was to be made after installation and commissioning of RO plants and remaining 35 *per cent* was to be paid annually for O&M at the rate of 5 *per cent* each year. The stipulated date of

[77] Phase-1: 895, Phase-2: 1,066 and Phase-3: 1,483.
[78] Phase-1: 895, Phase-2: 715.
[79] Barmer: ₹ 30.24 crore, Jaisalmer and Jalore: ₹ 14.95 crore.

completion of work was March 2014. The firm installed 193 plants[80] and was paid an amount ₹ 23.66 crore[81] as of March 2016.

It was observed that after the installation of RO plants, the contractor did not carry out O&M. As a result, 124 RO plants[82] (64 *per cent*) became non-functional. EE, Pokaran also intimated (December 2016) to ACE Jodhpur that most of the RO Plants were not working due to non-deployment of operators by the contractor. Thus, expenditure of ₹ 15.45 crore[83] incurred on installation of these plants proved to be unfruitful.

Joint physical verification of 30 plants (Jaisalmer: 12 plants and Jalore: 18 plants) conducted with the departmental engineers, revealed that except for two RO plants, none of them were in working condition for the period of three to 36 months. Some of them were locked, as no operator was deployed to operate them.

This shows that PHED did not take action against the contractor for not carrying out O&M of these plants. It also deprived the people of those habitations from safe drinking water.

2.2.13.2 Installation of Solar Energy Operated Single Phase Bore Wells with Deflouridation Units

As per guidelines issued (October 2014) by GoI, habitations already covered through major projects or any other surface source based schemes were not entitled for installation of Solar Energy Operated Single Phase Bore Wells (SPBWs). However, habitations having population of 150-250 (census 2011) were entitled for SPBW. Further, SPBWs were to be installed only in bore wells without contamination. However, if water is only fluoride contaminated, bore well should be used in conjunction with Defluoridation Units (DFUs).

GoI conveyed (October 2014) the target for installation of 2,000 SPBWs in the State. Accordingly, PPC sanctioned (December 2014) 345 SPBWs with DFUs[84] in exclusively fluoride affected habitations of nine districts. But only 323 SPBWs with DFUs[85] (September 2017) were installed which were 16.15 *per cent* of the target. In test check district Jaipur, it was observed that:

- SPBWs with DFUs were installed in six habitations covered with surface water from major projects.

- 30 SPBWs with DFUs were installed in the habitations having population of 550 to 2,706 (Census 2011).

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80 Barmer: 113, Jaisalmer: 40 and Jalore: 40.

81 Barmer: ₹ 13.92 crore, Jaisalmer: ₹ 4.86 crore and Jalore: ₹ 4.88 crore.

82 Barmer: 75 Plants, Jaisalmer: 25 Plants and Jalore: 24 Plants.

83 Barmer: ₹ 9.48 crore; Jaisalmer: ₹ 3.04 crore and Jalore: ₹ 2.93 crore.

84 Dungarpur: 101; Jaipur: 79; Jalore: 19; Jhunjhunu: 11; Jodhpur: 17; Pali: 22; Sirohi: 40; Rajsamand: 49 and Udaipur: seven.

85 Dungarpur: 101; Jaipur: 72; Jalore: 19; Jhunjhunu: 11; Jodhpur: 17; Pali: 22; Sirohi: 40; Rajsamand: 39 and Udaipur: two.

- Five SPBWs with DFUs were installed in the bore wells having contaminants other than fluoride.

Thus, PHED did not adhere to the guidelines and installed SPBWs with DFUs at the places where they were not required.

2.2.13.3 Jalmani Programme

GoI introduced *Jalmani* Programme in 2008 for installation of Stand Alone Water Purification Systems (SAWPSs) to provide safe drinking water in rural government schools.

GoI accorded (January 2009) sanction amounting to ₹ 6.88 crore under *Jalmani* for installation of SAWPSs in 3,443 schools. Tenders were invited (January 2012) for the work of supply, installation and commissioning of 3,000 pot filters and 2,000 on line filters, with five year O&M. The work orders were issued (April 2012) by CE (Rural) for an amount of ₹ 6.75 crore and the work was to be completed within six months.

It was observed that during 2010-14, only 2,560 pot filters were installed at an expenditure of ₹ 0.95 crore. All of those installed pot filters became non-functional due to absence of O&M by the firm. No online filter was installed due to non-availability of tap water connection. Thus, the remaining amount of ₹ 5.93 crore was lying unutilized.

A mention was made in paragraph no. 2.3.10 of the C&AG Audit Report (G&SS) for the year ended 31 March 2014 regarding slow progress in implementation of Jalmani programme. Public Accounts Committee[86] (PAC) had sought justification for non-installation of online filters and to appraise it of action taken against the contractor for not carrying out O&M of the pot filters after their installation.

However, PHED did not initiate action against the contractor for non-installation of online filters and not carrying out O&M of pot filters as of July 2017. Further, the unutilised funds were not yet surrendered to GoI, despite the instructions of GoI (February 2016) to do so.

Thus, failure of PHED in implementation of *Jalmani* Programme resulted in non-utilisation of ₹ 5.93 crore for more than three years and wasteful expenditure of ₹ 0.95 crore due to absence of O&M of installed pot filters. Besides, the students of rural schools were also deprived of safe drinking water.

2.2.13.4 Water Quality Monitoring

PHED had established laboratories at State, district and block levels, for monitoring the water quality by conducting regular tests of water sample from different water sources. Testing of sources at grass roots was carried out by field level functionaries like Auxillary Nursing Midwives, ASHA workers[87], teachers, *panchayat* members etc., through Field Test Kits (FTKs). Testing in remote rural

[86] 169 report of 14th Vidhan Sabha.
[87] Accredited Social Health Activists.

areas was also to be conducted by Mobile Laboratories. Audit scrutiny of laboratory infrastructure and the water quality tests conducted during 2014-17, revealed the following:

(i) State Level Laboratory

One State Level Laboratory (SLL) was functional in the State and was accredited by National Accreditation Board for Testing and Calibration Laboratories (NABL) during June 2016.

Uniform Drinking Water Quality Monitoring Protocol (UDWQMP) provided for testing of water on 78 parameters[88].

It was, however, observed that SLL was equipped to examine only 25 parameters against the prescribed 78 parameters. Facilities for testing the presence of heavy metals, pesticides/toxic elements and radioactive elements in drinking water were not available in SLL. Instruments required as per UDWQMP like Atomic Absorption Spectrophotometer, Inductive Coupled Plasma Optical Emission, Millipore Filtration Assembly with a Vacuum Pump, Hydride generators etc., were also not available with SLL.

Thus, SLL was not equipped with all the required equipments and not conducting all test prescribed in UDWQMP.

(ii) District Level Laboratories

District Level Laboratories (DLLs) for water quality testing were established in all the 33 districts of the State and were required to test water quality on 34 different parameters.

It was observed in the test checked DLLs, only three to 15 parameters out of specified 34 parameters were being tested. Further, none of DLLs in the State were accredited by NABL.

(iii) Block Level Laboratories

SLSSC approved (April 2013) establishment of Block Level Laboratories (BLLs) in 233 blocks through private firms for an amount of ₹ 35 crore. The work orders were issued (September 2013 and June 2014) to the firms for setting up of BLLs. Only 165 BLLs[89] were established up to July 2015. PHED was to provide building/room of minimum 300 square feet area with necessary infrastructure viz., power supply, water supply etc., to the firms. Further, each BLL was targeted during the contract period to collect and conduct chemical and bacteriological tests of 3,000 water samples.

Audit scrutiny revealed that:

- PHED did not provide the required space and infrastructure facilities for BLLs in time. This resulted in delays ranging from eight to 18 months in establishment of 165 laboratories and remaining 68 BLLs could not be established.

[88] Requirement as per Annexure IV of UDWQMP.

[89] Ajmer-26; Bharatpur-11; Bikaner-16; Jaipur-48; Jodhpur-22; Kota-14 and Udaipur-28.

- All 165 BLLs became non-functional as on March 2016 due to expiry of contract period. No extension was granted to these BLLs and the process of tendering for reviving the 165 BLLs and establishment of remaining 68 more BLLs was under progress since March 2016.

(iv) Mobile Water Testing Laboratory

Implementation manual of NRDWQM&SP 2004 envisaged establishment of mobile laboratories for facilitating effective water quality surveillance in hilly/far flung areas. Moreover, these laboratories would also be useful for analysis and monitoring of potable water during natural disasters. The status of testing of water sources conducted by mobile laboratory is given in **Table 4.**

Table 4

Year	Tests conducted in urban areas	Tests conducted in rural areas	Total number of tests conducted	*Per cent* of tests conducted in rural areas
2014-15	6,955	1,105	8,060	13.71
2015-16	6,236	1,239	7,475	16.58
2016-17	7,718	1,171	8,889	13.17
Total	**20,909**	**3,515**	**24,424**	**14.39**

Source: Information provided by PHED.

From the table, it can be seen that only 14.39 *per cent* of the total tests were conducted in rural areas during 2014-17. It was also observed that 81 *per cent* to 95 *per cent* of the tests were conducted only in Jaipur district.

Thus, the prime objective of mobile laboratory for serving in hilly/far flung and rural areas was not achieved.

(v) Inadequacy of staff in laboratories

The detail of sanctioned posts and working strength for technical posts in all the laboratories of the State is given in **Table 5.**

Table 5

Posts	Sanctioned posts	Vacancy against sanctioned posts	*Per cent* of vacancy
Junior Chemist	37	19	51.35
Sr. Laboratory Assistant	36	12	33.33
Jr. Laboratory Assistant	56	9	16.07
Laboratory Attendant	70	39	55.71
Sample Taker	03	02	66.66
Total	**202**	**81**	**40.09**

Source: Information provided by PHED.

It is evident from the table that there was a considerable vacancy of 40 *per cent* posts in technical cadre as of 31 March 2017. Further, no posts of microbiologist/bacteriologist were sanctioned by GoR against the proposal for 33 such microbiologists/bacteriologist made by PHED. Furthermore, GoR sanctioned only three posts of sample takers against the requirement of 37 posts.

Thus, vacancies in sanctioned posts and non-sanction of posts of sample taker and microbiologist/bacteriologist affected the water testing performance of the laboratories.

Issues like (i) inadequate infrastructure/manpower in SLL and DLLs, (ii) not establishing required number of BLLs and (iii) Mobile Laboratories not conducting adequate number of tests in rural areas, were also mentioned in paragraphs number 2.3.12.1 to 2.3.12.5 of the C&AG Audit Report (G&SS) for the year ended 31 March 2014. The PAC in its 169th report of 14th Vidhan Sabha, recommended for taking actions to address these issues. Despite this, the position of insufficient infrastructure and manpower continued to persist in the laboratories.

(vi) Inadequacy of testing of water samples

As per UDWQMP, every source was to be tested twice a year for bacteriological parameters and once a year for chemical parameters. Further, there were 1,21,648 habitations and 11,79,083 water sources in Rajasthan during 2016-17. The detail of habitations, sources and test conducted during 2014-17, is given in **Table 6.**

Table 6

Year	No. of Habitations	No. of Sources	Habitations where no source was tested		Habitations where at least one source was tested		Habitations where all sources were tested		Number of habitations found contaminated
			Number	*Per cent*	Number	*Per cent*	Number	*Per cent*	
2014-15	1,21,133	9,59,011	65,220	53.84	55,913	46.16	1,221	1.00	35,251
2015-16	1,21,683	11,03,060	80,464	66.13	41,219	33.87	1,989	1.63	25,699
2016-17	1,21,648	11,79,083	92,351	75.91	29,297	24.08	1,038	0.85	19,786
Total	**3,64,464**		**2,38,035**	**65.31**	**1,26,429**	**34.68**	**4,248**	**1.17**	**80,736**

Source: IMIS

From the above it is evident that during 2014-17, no source was tested in 65.31 *per cent* habitations and number of habitations where all sources were tested was only 1.17 *per cent*.

Thus, testing of water quality of all water sources in habitations was highly inadequate.

Further, it was also observed that PHED procured 5,89,716 FTKs of H_2S vials during 2013 for bacteriological testing. But only 2,56,968 bacteriological tests were conducted during 2013-17. Though remaining 3,32,748 H_2S vials were distributed to laboratory staff, ANM and other grass root workers, no information/records of their utilization was available at SLL/DLLs. Meanwhile, these vials expired in June 2015 but laboratory staff, ANM, and other workers continued to carry out testing with expired FTKs. 31,238 (excluding tests conducted in the month of April and May 2015) tests were carried out through expired FTKs during 2015-17.

Chief Chemist (CC) stated (September 2017) that remaining 3,32,748 H_2S vials were utilized for bacteriological test. The reply was not acceptable as the CC furnished details of issue of H_2S vials to grass root level workers but didn't furnish information about their utilization. In absence of the information the utilization of H_2S vials could not be validated.

Thus, inadequate monitoring over utilization of FTKs by CC rendered the expenditure of ₹ 29.91 lakh[90] on these vials infructuous.

[90] 3,32,748 x ₹8.99 per H_2S vial.

(vii) Testing of sources during Pre-Monsoon and Post-Monsoon period

UDWQMP envisaged that all physical, chemical, and bacteriological parameters of water quality shall be analysed once each during pre-monsoon and post-monsoon season duly registering the GPS co-ordinates and depth of ground water. Status of source testing conducted during pre and post-monsoon period during 2014-17, is given in **Table 7**.

Table 7

Year	Total sources in the beginning of year	Sources tested pre-monsoon period	*Per cent* (Sources tested pre- monsoon period)	Sources tested in post-monsoon period	*Per cent* (sources tested in post-monsoon period)
2014-15	11,67,340	77,649	6.65	51,369	4.40
2015-16	11,67,340	68,834	5.90	44,400	3.80
2016-17	11,67,340	69,275	5.93	18,312	1.57

Source: Indiawater.gov.in

It is evident from the table that during 2014-17, testing of sources in pre-monsoon period was ranging from 5.90 *per cent* to 6.65 *per cent.* Corresponding figures for post-monsoon testing were between 1.57 *per cent* and 4.40 *per cent*. This shows that water sources were not tested by PHED during pre-monsoon and post-monsoon periods as per norms.

(viii) Sanitary survey

Implementation manual of NRDQM&SP envisaged conduct of sanitary surveys in and around water sources in the form of onsite inspections and assessment of all conditions and practices in the water supply systems which are prone to develop health hazard. It is not an alternative to water quality analysis but is an important component of such analysis in the overall quality control programme. The detail of sanitary survey conducted during 2014-17 is given in **Table 8**.

Table 8

Year	Schemes/Delivery points and other sources	Total number of sanitary survey done	*Per cent*
2014-15	11,67,340	4,325	0.37
2015-16	11,67,340	4,436	0.38
2016-17	11,67,340	1,462	0.13

Source: India water.gov.in

It is evident from the table that only 0.13 to 0.38 *per cent* sanitary surveys were conducted on schemes/delivery points and other water sources during 2014-17. Further, scrutiny revealed that in 15 districts[91], no sanitary survey was conducted during 2014-17.

The issue of insufficient sanitary survey was also mentioned in paragraph number 2.3.11 of the C&AG Audit Report (G&SS) for the year ended 31 March 2014 and PAC had sought the comments from the Department for this huge deficit in conducting sanitary survey. Despite this, the position of conducting sanitary survey continued to be dismal.

[91] Ajmer, Alwar, Baran, Bhilwara, Churu, Dholpur, Dungarpur, Jaipur, Jaisalmer, Jhunjhunu, Karauli, Nagaur Pratapgarh, Sawaimadhopur and Tonk.

As the biological and chemical contaminants could not be effectively tested and removed, the quality of drinking water could not be ensured. This resulted in exposing the population of the state to serious public health hazards.

Quality of drinking water

Rajasthan has 20,643 quality affected habitations which was 27.63 per cent of all quality affected habitations in the country.

ROs installed at a cost of ₹ 15.45 crore in several quality affected habitations were not functional due to absence of maintenance. Similarly, the Jalmani Programme which aimed to provide quality drinking water to rural schools was unsuccessful resulting in wasteful expenditure of ₹ 0.95 crore besides non-utilisation of ₹ 5.93 crore.

The State and district laboratories were not equipped with all the required capability/equipment/manpower to conduct all the prescribed tests. During 2014-17, in 65.31 per cent habitation no water source was tested. Further, the number of habitations where all sources were tested was only 1.17 per cent. Thus, testing of water quality of all water sources in habitations was highly inadequate. The position of inadequacy in laboratory infrastructure, insufficient testing of water samples and shortfall in conducting sanitary survey for water sources continued despite being pointed out in CAG's Audit Report (G&SS) for the year ended 31 March 2014 and the recommendations of PAC. As the biological and chemical contaminants could not be effectively tested and removed, the quality of drinking water could not be ensured. This resulted in exposing the population of the state to serious public health hazards.

Recommendations:

4. *PHED should take action against the contractors for not carrying out O&M of RO plants and ensure that all RO plants are made functional immediately.*

5. *PHED may enhance the availability of equipment and manpower at the district and State level water testing laboratories so that all prescribed tests for ensuring water quality are conducted.*

Audit Objective 4: Whether coverage and extent of water supply was adequate, reflecting in beneficiary satisfaction and whether efforts were taken to promote beneficiary participation in water management.

2.2.14 Coverage of population with Drinking Water Supply

2.2.14.1 Status of Water Supply in Urban areas

Ministry of Urban Development (MoUD), GoI since 2008, has been prescribing Service Level Benchmarks (SLBs) for monitoring the performance of basic services including water supply. In this regard, MoUD issued handbook for SLB indicators for coverage of water supply connections, quality of water, cost

recovery in water supply, etc., for urban areas. Accordingly, GoR also notified every year the service delivery standards for the basic services for the current year and the achievement of the previous year.

The achievement of SLBs for water supply services for urban areas in test checked districts notified during 2014-17 in the State Gazette is given in **Table 9.**

Table 9

S. No.	Service Indicators	Benchmarks for urban areas as per SLB handbook	SLBs notified by GoR for urban areas during 2014-17	
			Target	Achievement
1	Coverage of water supply connections	100 *per cent*	60 to 85	59.35 to 83
2	Per capita supply of water	135 LPCD	90 to150	90 to 150
3	Extent of metering	100 *per cent*	21 to 80	20.5 to 79
4	Extent of non-revenue water	20 *per cent*	18 to 32	18.9 to 36.5
5	Continuity of water supplied	24 Hours	1 to 4	1 to 4
6	Efficiency in redressal of customer complaints	80 *per cent*	84 to 85	78.5 to 84
7	Quality of water supplied	100 *per cent*	70 to 100	72 to 100
8	Cost recovery	100 *per cent*	9 to 73	9 to 72
9	Efficiency in collection of water charges	90 *per cent*	91 to 91.5	77 to 90.75

Source: Gazette notifications issued by GoR

Audit scrutiny revealed the following:

- ***Coverage of water supply connections*:** As per paragraph 2.1.1 of SLB handbook, the coverage of water supply connection is measured as a percentage of total number of households (HHs) and GoI has fixed benchmark of 100 *per cent* for the service.

It was observed that in test checked cities, the achievement was 59.35 *per cent* (Bharatpur) to 83 *per cent* (Udaipur) during 2014-17. Though the achievement was in line with the reduced targets fixed by GoR, the achievement was far below the benchmarked target of 100 *per cent* fixed by GoI.

- ***Per capita supply of water*:** GoI has fixed benchmark value of 135 LPCD in each urban area for this indicator.

Scrutiny revealed that out of 222 urban areas, the actual level of water supply was 135 LPCD or more in only six urban areas during 2014-17.

It was also observed that in five test checked cities, the targets fixed (Alwar: 110 LPCD, Bharatpur: 90-95 LPCD and Nagaur: 92-105 LPCD) were much below the benchmark of 135 LPCD. Only in Jaipur and Kota the targets fixed (150 LPCD) satisfied the benchmarks.

- ***Extent of metering of water connections*:** As envisaged in the SLB handbook, the quantum of water supplied to the consumers should be measured through water meters. The benchmark value for metering of water connections was fixed by GoI as 100 *per cent*.

It was observed that in test checked cities, the achievement was 20.5 *per cent* (Nagaur) and 79.0 *per cent* (Bikaner) during 2014-17. Though the achievement was in line with the reduced targets fixed by GoR, the achievement was far below the benchmarked target of 100 *per cent* fixed by GoI.

- ***Extent of non-revenue water*:** The indicator expressed the extent of water produced which does not earn any revenue. Benchmark value of this indicator notified by GoI was 20 *per cent*.

It was observed that in test checked cities, the achievement ranged from 18.9 *per cent* (Alwar) to 36.5 *per cent* (Bharatpur) during 2014-17.

- ***Continuity of water supply***: MoUD prescribed SLB of 24 hour water supply in all urban areas. It was, however, observed that PHED had notified reduced benchmark of one to four hours a day supply in urban areas. Further, no town in Rajasthan received 24 hours water supply. Further, the duration of water supply also varied from 20 minutes to over four hours per day. This indicated that the urban population was facing severe water shortages.

It was also observed that in the eight test checked districts, duration of water supply ranged from 15 minutes (Balotra, Makrana and Rajgarh) to four hours (Kota, Ratannagar, Sardarshahar and Tizara). Further, the periodicity of water supply was once in 12 hours in 11 cities, once in 24 hours in 117 cities, once in 48 hours in 64 cities, once in 72 hours in 15 cities and once in four to five days in nine cities.

- ***Quality of water supply*:** Quality of water supply was to be measured with the actual number of water samples taken at both points i.e. at outlet of the treatment plant and at the consumer end and these samples should match the standards specified for potable water. The benchmark value fixed by GoI was 100 *per cent.*

Scrutiny revealed that in test checked cities the achievement ranged from 72 *per cent* (Jaipur) to 100 *per cent* (Alwar) during 2014-17. However, it was noticed that the water samples were taken only at the outlet point of source and not taken at consumer end.

Though PHED achieved the reduced targets for parameters like urban water supply connections, per capita supply, metering and continuity of supply notified by GoR, they failed to achieve the benchmarks set by GoI for supply of water in urban areas.

The targets and achievement for monitoring reduction of non-revenue earning water were not realistic as the system for metering the exact supply at the consumer end was weak. Further, the samples of water for monitoring quality of supply could not be collected at the consumer end.

2.2.14.2 Status of water supply in rural areas

The ultimate goal for 12th Five Year Plan period was to provide rural households with safe Piped Water Supply (PWS) at the rate of 70 LPCD. However, as interim measure, the goal was kept at 55 LPCD considering that 40 LPCD was

the norm for last 40 years and a large population was uncovered with this level. It was targeted that at least 50 *per cent* of rural population in the country would have access to 55 LPCD within household premises or within 100 meter radius from households. Further, at least 50 *per cent* of rural households, was to be provided PWS and at least 35 *per cent* of rural households should have PWS with a household connection, by 2017.

Habitations having average at least 40 LPCD supply of drinking water are called Fully Covered (FC) habitations and habitations having average supply of drinking water below 40 LPCD but more than 10 LPCD, are called Partially Covered (PC) habitations. A Quality Affected (QA) habitation would be 'fully covered' only when safe drinking water is provided to 100 *per cent* population. The details of FC, PC and QA habitations and their coverage during 2014-17 are given in **Table 10.**

Table 10

Year	Number of Habitation				Number of Habitation covered during the period				Number of slipped back habitation/newly emerged habitations	
	FC	PC	QA	Total	FC	PC	QA	Total	Slipped back[92]	Quality affected
2014-15	69,085	28,092	23,956	1,21,133	1,006	876	1,631	3,513	4,277	-71
2015-16	67,315	32,114	22,254	1,21,683	786	912	1,065	2,763	14,725	-273
2016-17	54,567	46,165	20,916	1,21,648	767	1,241	900	2,908	0	0

Source: Information provided by PHED and obtained through IMIS.

From the table, it can be observed that:

- The number of FC habitations decreased from 69,085 to 54,567 and the number of PC habitations increased from 28,092 to 46,165 during 2014-17.

- During 2014-15, while PHED covered 3,513 habitations, 4,277 habitations slipped back from coverage. Similarly, in 2015-16, while PHED covered 2,763 habitations, a staggering number of 14,725 habitations slipped back from coverage.

Further, it was also observed that out of total 54,567 FC habitations (as per 40 LPCD) as on April 2017, only 15,665 habitations (28.70 *per cent*) were provided 55 LPCD drinking water.

The position of Rajasthan vis-a-vis the all India average in various indicators related to coverage is detailed in **Table 11.**

Table 11

(As on 21 August 2017)

S. No	Coverage Indicators	State Average (*per cent*)	All India average (*per cent*)
1	Habitations covered with PWS	34.50	41.82
2	Population covered with PWS	51.60	53.38
3	Household Connections	12.12	16.70
4	Schemes managed by PRIs	6.11	67.77

Source: IMIS

[92] Opening Balance of FC+PC covered during the year+ QA covered during the year-CB of FC.

Thus, the State was lagging behind not only against the goals/targets set under the 12th Five Year Plan but also in comparison with All India averages.

2.2.14.3 Beneficiary survey to ascertain the level of satisfaction

A beneficiary survey was conducted to ascertain the level of public satisfaction on the quantity and quality of service provided by PHED. Accordingly, 810 beneficiaries in 278 habitations of 42 *Gram Panchayats* in eight districts were selected on random sampling basis. A detailed questionnaire was prepared and a survey was conducted by Audit with the officials of PHED during June-August 2017.

The classification of responses indicated that the coverage, quality and quantity of water at the habitation and the household level were inadequate, as detailed below:

(i) At habitation level

- 109 habitations (39.20 *per cent*) were fully covered, 135 (48.56 *per cent*) were partially and 34 (12.23 *per cent*) were quality affected habitations.

- Only 50 habitations (17.98 *per cent*) were covered by Piped Water Supply (PWS) Schemes and the remaining 228 by Hand Pumps/Bore well and Public Stand Post.

- Treated water was supplied only in 42 habitations (15.10 *per cent*), whereas in other 236 habitations (84.89 *per cent*), water was not treated before supply. Further, in all 34 water quality affected habitations, water was supplied without treatment.

- The water supply level was less than 40 LPCD in 93 habitations (33.45 *per cent*), between 40 and 55 LPCD in 113 habitations (40.65 *per cent*) and more than 55 LPCD in 72 habitations (25.90 *per cent*).

- Water supply schemes remained non-operational in 36 habitations (12.94 *per cent*) for one month to four years period due to depletion of ground water, non-availability of electricity, lack of O&M and paucity of funds.

- Five Community Water Purification Plants (CWPPs) were proposed and three were installed[93], out of which one CWPP was not functional.

(ii) At Household level

The sample of 810 Households included 158 General (19.51 *per cent*), 159 SC (19.63 *per cent*), 103 ST (12.72 *per cent*) and 390 (48.14 *per cent*) OBC

[93] CWPP was Functional at Behnera and Ghasola (District-Bharatpur) and non-functional at Berdon ka Bas (District-Jodhpur).

categories. It was observed that:

- Households connection of water supply was provided to only 167 households (20.62 *per cent*) and remaining 643 (79.38 *per cent*) were provided through community connections like HP/tube well and Public Stand Posts (PSPs).

- 119 households (14.69 *per cent*) had to fetch water from a source at the distance of more than 500 meters, 96 (11.85 *per cent*) from source situated between 200–500 meters, 123 (15.19 *per cent*) from source between 100-200 meters, and 472 (58.27 *per cent*) from source situated at less than 100 meters.

- 374 households (46.17 *per cent*) were not satisfied with the quality of water.

- 306 households (37.78 *per cent*) said that water samples were not collected from source/ supply point for testing of quality.

- Information for creating awareness on drinking water was provided to only 24 households (2.96 *per cent*).

- 354 households (43.70 *per cent*) were not supplied with sufficient quantity of water.

- 582 households (71.85 *per cent*) were provided potable water, 186 households (22.96 *per cent*) were provided quality affected water and remaining 42 households (5.19 *per cent*) were provided dirty water.

2.2.14.4 Beneficiary satisfaction in Bisalpur Dudu Water Supply Project

Bisalpur Dudu Water Supply Project was sanctioned (2002) to cover 1,563 villages of three districts[94] through 11 RWSSs apart from seven urban towns. Out of 11 RWSSs, six were completed and five were ongoing as of October 2017. The project envisaged constitution of VWSC in every village for management of drinking water and collection of monthly water charges from the beneficiaries. PHED executed agreements with VWSCs which provided that PHED would disconnect the connection and stop supplying water to village if VWSC failed to deposit water bill charges.

In order to study the functionality of the Public Stand Post (PSP) and whether the users were benefited, a detailed questionnaire was prepared and a joint inspection of 437 PSPs in 29 villages (43,343 beneficiaries) was conducted during November-December 2017 along with the officials of PHED. The results of functionality of PSPs are enumerated in the **Table 12**.

[94] Jaipur, Nagaur and Tonk.

Table 12

RWSS	Number of villages where the scheme was commissioned	Total no of PSPs (No. of villages where joint inspection was conducted)	Disconnected PSPs where water supply was stopped (No. of villages)	No. of working PSPs (No. of villages)	Reasons of non-supply of water
RWSS Mor-Malpura-Pachewar	153	162 (10)	143(9)	19 (1)	Water supply was stopped due to disputes at the PSPs and non-deposition of water charges.
RWSS Dudu	105	70 (11)	70(11)	0	
RWSS Sambhar	50	205 (8)	37 (1)	168 (6)	Out of the eight villages where joint inspection was conducted, in Sinodiya village regular water supply had not started even though declared commissioned. In Dhani Nagan village, no PSP was constructed and instead PHED provided house connections under old scheme. In the remaining six villages, though water supply was currently available, there were disputes at the PSPs.
Total	308	437(29)	250 (21)	187(seven)	

Source: Information provided by PHED and gathered during joint physical inspection.

The joint inspection revealed that out of 437 PSPs, water supply was stopped in 250 PSPs (57.21 *per cent*) for one month to 65 months as water bills were not deposited by beneficiaries.

The beneficiaries of completed schemes (RWSS Mor-Malpura-Pachewar and RWSS Dudu) replied that they were not depositing water charges as there were illegal connections (11 villages) and lack of pressure/uneven distribution (nine villages) of water which caused dispute/conflict among beneficiaries. The beneficiaries of the ongoing scheme (RWSS Sambhar) intimated that they were not depositing water bills due to uneven distribution of water.

2.2.14.5 Decentralization of water supply schemes

As per paragraph 2.1.6 of State Water Policy, water user groups were to be made responsible for community education in water issues, infrastructure operation and maintenance etc. Further, paragraph 2.2.3 envisaged that a rolling program of reform would also be implemented at the small community scale to progressively transfer the management, operation and maintenance of water infrastructure to water user groups. Paragraph 9.2 of NRDWP guidelines also envisaged that the in-village water supply schemes should be planned, implemented and managed by the Panchayat Raj Institutions (PRIs) and local community. Further, additional allocation of 10 *per cent* of NRDWP funds were to be given if the PRIs effectively managed the scheme.

It was observed that only eight out of 222 Urban Water Supply Schemes (UWSS) were transferred to Local bodies/Municipalities/ULBs as of March 2017. In

addition to it, water supply schemes of five other towns, where Rajasthan Urban Infrastructure Development Programme was executing the improvement work, were proposed to be transferred to the respective ULBs.

Further, in rural areas PHED transferred only minor tube well schemes under '*Janta Jal Yojana*' to PRIs and there was no plan/target for progressively transferring of the management of Rural Water Supply Schemes to Village Water and Sanitation Committees (VWSCs).

The details of schemes handed over to PRIs are given in the **Table 13**.

Table 13

Year	Total schemes up to the year (cumulative)	Schemes handed over to PRIs during the year	Schemes handed over to PRIs (cumulative)
2012-13	1,07,838	11,830	11,830
2013-14	1,15,462	5,252	17,082
2014-15	1,19,728	2,015	19,097
2015-16	1,21,394	949	20,046
2016-17	1,23,348	414	20,460

Source: Information provided by PHED.

It is evident from the table that the number of schemes transferred to PRIs was decreasing.

Further, it was observed that the State received less funds than could have been obtained from GoI. The comparative status of entitlement of incentive funds and actual release by GoI is given in **Table 14**.

Table 14

(₹ in crore)

Year	Allocation under NRDWP	10 *per cent* of allocation	Actual release by GoI	Amount which could not be availed
2012-13	1,340.44	134.04	12.10	121.94
2013-14	1,377.98	137.80	10.21	127.59
2014-15	1,340.07	134.01	0	134.01
2015-16	547.17	54.72	10.49	44.23
2016-17	609.59	60.96	5.58	55.38
Total	**5,215.25**	**521.53**	**38.38**	**483.15**

Source: Information provided by PHED.

The table shows that ₹ 521.53 crore could have been availed by the State during 2012-17. But failure in transferring of water supply schemes and O&M funds to PRIs, establishment of District Water and Sanitation Mission, Block Resource Centers &Village Water and Sanitation Committees and in carrying out IEC activities to enable communities to manage water supply schemes, led to deprival of ₹ 483.15 crore, as incentive funds to the State.

This indicates that stakeholders and beneficiaries were not involved in planning and management of urban and rural water supply schemes.

2.2.14.6 Support and IEC activities

(i) Preparation and implementation of Support activity plan

As per paragraph 3 of annexure IV of NRDWP guidelines, Water and Sanitation Support Organisation (WSSO) was to undertake preparation of capacity building plan and annual IEC plan for PRI members, VWSC members and staff, and annual IEC plan based on communication strategy.

It was observed that capacity building plan and Annual IEC plan were not prepared. WSSO stated (July 2017) that the plans were included in AAP. The reply was not acceptable as IEC plans were to be prepared for support activities. WSSO should have prepared a comprehensive support activity plan for systematic implementation.

Further, WSSO was to take up training programmes through National, State and District Resource Centers and in-house resource persons. However, WSSO did not take up the training programmes.

(ii) Implementation of Support Activities by WSSO

As per paragraph 5 of Annexure IV of NRDWP guidelines, WSSO was to carry out Information, Education and Communication (IEC) and Human Resource Development (HRD), Water Quality Monitoring & Surveillance (WQM&S), Management Information System (MIS), Monitoring & Evaluation (M&E) and Research & Development (R&D) related activities by utilising the funds under support component of NRDWP. It was observed that the GoI released funds of ₹ 53.19 crore for support activities during 2014-17, of which GoR transferred ₹ 52.46 crore to WSSO. WSSO incurred an expenditure of ₹ 46.54 crore on support activities at State, District, Block and village level.

Scrutiny of support activities undertaken by WSSO during 2014-17 revealed the following:

- No trainings were conducted at the State level, except for two days of training during December 2016 to March 2017 for the departmental engineers, in which 500 newly recruited AEs /JEs participated.

- 78 training programmes were conducted at District, Block and GP level during 2014-15. However, during 2015-17 no training programme was conducted at any level.

- The Department did not evolve any plan for incentivizing ASHA workers to encourage rural households in getting metered connections.

- No R&D activity was carried out during 2014-17.

- IEC activities: NRDWP guidelines envisaged that out of total IEC funds, 10 *per cent*, 20 *per cent*, 10 *per cent* and 60 *per cent* funds were to be utilised at State, District, Block and Village levels respectively.

However, only 22.95 *per cent* was utilised for Village level activities. Further, during 2015-17, no District, Block and Village level IEC activities were taken up.

Coverage, Beneficiary Satisfaction and Participation

PHED could not achieve the Service Level Benchmarks for per capita supply of water, coverage of water supply connections, continuity of water supplied, etc. Further, though it was targeted to provide 55 LPCD drinking water to at least 50 per cent of rural population, PHED covered only 12.88 per cent habitations in the State.

Beneficiary surveys of 810 beneficiaries in 278 habitations indicated that only 17.98 per cent habitations were covered by Piped Water Supply Schemes and only 15.10 per cent with treated water. Water supply level was less than 55 LPCD in 74.10 per cent habitations. Further, in all 34 water quality affected habitations, water was supplied without treatment. In addition, 46.17 per cent people were not satisfied with the quality of water and 37.78 per cent said that water samples were not collected from source/supply point for testing of quality.

Further, beneficiary satisfaction in Bisalpur Dudu Water Supply Project revealed that water supply was stopped in 250 PSPs out of 437 PSPs surveyed (57.21 per cent) as water bills were not deposited by users. This defeated the very purpose of implementation of the scheme to provide potable drinking water to these villages.

State Water Policy envisaged progressive transfer of management of water supply to water user groups and making them responsible for operation and maintenance of water supply schemes. However, PHED transferred only minor rural tube well schemes under 'Janta Jal Yojana' to PRIs and prepared no plan/target for progressive transfer of the management of water supply schemes to the people.

As against 60 per cent, only 22.95 per cent was utilised for Village level IEC activities. Further, during 2015-17, no District, Block and Village level activities were taken up.

Recommendations:

6. *GoR should set targets to achieve the Service Level Benchmarks in line with that of GoI and make efforts to achieve improved service delivery benchmarks.*

7. *PHED should progressively transfer the rural water supply schemes to the local bodies to make them responsible for their operation and involving the people in the management of these schemes.*

8. *As supply of drinking water in villages through PSPs is often mired by conflicts and nonpayment of water charges, PHED should review the modalities of the functioning of these surface water schemes so that the benefits of incurring huge expenditure accrue to the beneficiaries.*

Audit Objective 5: Whether systems for Financial Management, Revenue Collection, Monitoring & Evaluation and Internal Control were effective.

2.2.15 Financial Management

The funds for urban water supply schemes were allotted by GoR under Minimum Needs Programme. Whereas, funds for rural water supply were provided by GoI under National Rural Drinking Water Programme (NRDWP) and GoR in matching share.

As per information provided by PHED, year wise allocation and expenditure in rural and urban water supply schemes during 2014-17 is given in **Table 15**.

Table 15

(₹ in crore)

Year		Allocation		Expenditure		Saving		
		Plan	Non-plan	Plan	Non-plan	Plan	Non-plan	Total
2014-15	Urban	1,175.50	1,139.40	1,015.70	1,090.24	159.80	49.16	208.96
	Rural	3,873.71	1,020.88	3,636.76	1,003.45	236.95	17.43	254.38
2015-16	Urban	892.71	1,286.22	879.20	1,249.40	13.51	36.82	50.33
	Rural	3,631.73	1,183.69	3,511.77	1,176.00	119.96	7.69	127.65
2016-17	Urban	903.10	1,408.14	828.49	1,305.03	74.61	103.11	177.72
	Rural	3,726.03	1,357.62	3,384.09	1,247.45	341.94	110.17	452.11
Total	**Urban**	**2,971.31**	**3,833.76**	**2,723.39**	**3,644.67**	**247.92**	**189.09**	**437.01**
	Rural	**11,231.47**	**3,562.19**	**10,532.62**	**3,426.90**	**698.85**	**135.29**	**834.14**

Source: Information provided by PHED.

It is evident from the table that:

- In both urban and rural water supply schemes, PHED could not utilise the funds of ₹ 1,271.15 crore (urban ₹ 437.01 crore and rural ₹ 834.14 crore) during 2014-17.

- There was saving of ₹ 946.77 crore (74.47 *per cent*) in the State plan out of which 73.81 per *cent* was in rural schemes.

2.2.15.1 Short release of funds under NRDWP

As per paragraph 17 of NRDWP guidelines, GoI every year communicated the allocation of funds for the State according to the criteria fixed for different components of NRDWP and AAP of the State. GoI could also impose cuts in the allocated funds on specified grounds[95].

It was observed that due to non-formulation of proposals to the extent of allocated funds, having opening balance exceeding 10 *per cent*, short utilization

[95] As per Ministry of Finance order (May 2012) carryover of the funds in excess of 10 *per cent* of the previous year released was not allowed and excess opening balance was required to be subsumed in the first instalment. For release of second instalment the State should have made utilisation of 60 *per cent* of the available funds under GoI release and State share. The State was required to submit proposal for release of second instalment by 31 December of the financial year. In case proposal submission is delayed, progressive cuts were prescribed depending on the period of delay in paragraph 17(h) of the guidelines.

of funds released in first installment and not submitting proposals in time for release of second installment, GoI released only ₹ 2,904.31 crore against ₹ 3,055.06 crore allocated for the State. Thus, State was deprived of the GoI grant of ₹ 150.75 crore.

2.2.15.2 Revenue Collection

(i) Revision of Tariff

SWP envisaged that the water rates would progressively be set to move towards recovering full O&M cost of all water supply schemes. Last revision of water tariffs applicable in State, was done in 1998, which only met less than 12 *per cent* of direct O&M cost.

Hence, in compliance of SWP, Thirteenth Finance Commission guidelines and Jawaharlal Nehru National Urban Renewal Mission's (JNNURM) reform agenda, PHED revised (November 2015) water tariffs with a provision of annual increment[96]. These rates were to be reviewed after five years.

The detail of revenue receipts and O&M charges is given in **Table 16**.

Table 16

(₹ in crore)

Year	Revenue Receipts			O&M Charges			Percentage		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
2014-15	188.57	46.75	**235.32**	1,074.80	1,003.45	**2,078.25**	17.54	4.66	**11.32**
2015-16	258.59	59.90	**318.49**	1,244.96	1,176.00	**2,420.96**	20.78	5.09	**13.16**
2016-17	410.23	88.49	**498.72**	1,303.79	1,247.45	**2,551.24**	31.46	7.09	**19.55**

Source: Information supplied by PHED.

From the table, it is evident that till 2015-16, the revenue receipts accounted for only 11.32 to 13.16 *per cent* of total O&M cost of PHED. Further, though the tariffs were revised upwards ranging from 50 *per cent* to 300 *per cent*, the revenue receipts marginally increased to 19.55 *per cent* of total O&M costs during 2016-17.

As water supply assets were increasing over the years, less funds were available for O&M which would lead to decrease in performance of the assets.

(ii) Revenue Collection

The year wise target fixed for revenue collection from urban and rural water supply schemes during 2014-17 and achievement there against, are given in **Table 17**.

Table 17

(₹ in crore)

Year	Urban Water Supply Schemes			Rural Water Supply Schemes		
	Targets (RE)	Achievement	Excess (+)/ shortfall (-)	Targets (RE)	Achievement	Excess (+)/ shortfall(-)
2014-15	212.74	185.49	-27.25	45.77	46.75	0.98
2015-16	260.00	254.68	-5.32	63.00	59.90	-3.10
2016-17	413.70	405.59	-8.11	107.91	88.49	-19.42
Total	**886.44**	**845.76**	**-40.68**	**216.68**	**195.14**	**-21.54**

Source: Information provided by PHED (Progress Report).

[96] Annual increment was to be calculated by multiplying with a factor 1.1 every year with respect to tariff applicable in the preceding year.

The table shows that during 2014-17, there was an overall shortfall in revenue collection of ₹ 62.22 crore (₹ 40.68 crore from urban schemes and ₹ 21.54 crore from rural schemes). Further, as of March 2017 the total accumulated outstanding arrears of water revenue was ₹ 468.47 crore.

Even if all the outstanding arrears were collected during 2016-17 itself, then also the total amount of receipts would be ₹ 967.19 crore (i.e. ₹ 498.72 crore + ₹ 468.47 crore) which would be just 37.91 *per cent* of the total O&M cost during 2016-17.

Thus, the revised tariff and the collection targets set were way off from fulfilling the objective of SWP of recovering full O&M cost.

(iii) Metering of water supply

Scrutiny of information furnished by PHED (August 2017) revealed that there were 37.30 lakh (Urban: 24.97 lakh and Rural: 12.33 lakh) metered connections in the State, of which about 60 *per cent* connections were either non-functional or charged at the flat rate.

CE (Urban) stated (August 2017) that about 40 *per cent* connections were functional and rest were either charged on flat rate or non-functional in urban areas. In rural areas all domestic connections were charged on flat rate.

Proper measurement of water supplied for domestic, commercial and industrial purposes through effective metering was essential to keep a watch on consumption pattern and realization of revenue. Apart from realization of revenues, metering also increases efficiency in use of water, detection of leakage in the system and enable high end consumers to be charged for extra consumption. Thus, PHED should ensure that all the existing water connections are metered.

(iv) Non-Revenue Water

Chapter 15 of CPHEEO Manual and Handbook of Service Level benchmarks in urban areas issued by MoUD, define water produced which does not earn any revenue as Non-Revenue Water (NRW). PHED was to constitute State and Regional level NRW cells to carry out works exclusively related to reduction of NRW.

It was observed that there were no records of NRW at the headquarter level of PHED. Only in November 2016, NRW cell was formed under CE (HQ) which was renamed as CE (Urban & NRW). As a result, PHED was not able to quantify NRW in the State.

2.2.15.3 Monitoring & Evaluation of Water Supply

(i) Water and Energy Audits of water supply schemes

Manual of O&M of Water Supply Systems issued by CPHEEO provided for Water Audit of urban water supply scheme for estimation of losses both physical and non-physical, identification and prioritization areas of immediate attention

for control and effective monitoring of complete systems. Further, Manual of O&M for Rural Water Supply Systems issued by Ministry of Drinking Water and Sanitation (MDWS) also envisaged water audit of the rural water distribution system, water accounting practices, etc.

Similarly, Energy Audit was also required to be conducted by systematic process of accounting and reconciliation between actual energy consumption and calculated energy consumption, taking into account rated efficiency and power losses in all energy utilizing equipment and power transmission system.

Further, GoI issued (February 2012 and 2013) instructions during the meetings held for finalization of AAPs for 2012-14 for taking up Water and Energy Audits of all multi village schemes and large water supply schemes to improve efficiency in water and energy use and to install bulk meters in PWS schemes.

It was, however, observed that PHED neither conducted Water Audits of urban water supply schemes for estimation of losses both physical and non-physical nor the Energy Audits for assessing the actual energy consumption against the calculated energy consumption.

During the meeting held in February 2013 for finalization of AAP 2013-14, PHED reported that Water and Energy Audits were taken up in the urban area and extended it to rural areas, but no records of the audits were provided for validation. Further, no mention was made of the status of Water and Energy Audits in succeeding AAPs. Again in the meeting held in February 2015 to discuss AAP 2015-16, PHED was advised to take up at least, one comprehensive Water and Energy Audit aimed to reduce O&M cost of large water supply schemes of age of more than five years. But the same was not done.

Thus, PHED did not conduct Water and Energy Audits of water supply schemes which were essential for effective monitoring and evaluation of Water Supply schemes.

(ii) Geo-tagging of drinking water sources/assets.

PHED started geo-tagging of assets of all rural and urban supply schemes in 2010-11. The work of baseline survey of all existing assets with geo-tagging, in urban and rural water supply schemes was awarded to M/s Ramky Eviro., Hyderabad (February 2010) and M/s SMEC, Australia (November 2010) respectively. The baseline work in urban areas was completed in May 2013. But, due to inadequate manpower and training to field officers, the web portal prepared by SMEC for urban water supply schemes became non-operational and no data updation was done thereafter. The work of rural water supply schemes remained incomplete and no survey data with geo tagging were available as of August 2017.

Further, in pursuance to MDWS's order (August 2016) which made the geo tagging of assets mandatory, GoR and CE (Rural) again issued directions in November 2016 and December 2016 respectively for finalising the work of geo-tagging of water sources/assets created by PHED and to prepare and maintain database and quality profile of water sources/assets up to 31 March 2017.

However, the work of geo-tagging and database creation was still not operational for rural assets despite the directions by GoR and CE (Rural).

Thus, in spite various efforts by PHED from 2011 onwards, currently only geo-tagging of urban assets upto 2013 was available. Thereafter updation of urban assets has not taken place. Further geo-tagging of rural assets has also not been done so far.

CE (Rural) stated (September 2017) that web application of the geo-tagging had been designed and made available by Department of Information Technology (DoIT) to PHED during August 2017 and the training for data entry was imparted to 50 officers. Hence, the progress of geo-tagging on DoIT website was yet to be achieved.

Financial management and internal controls

During 2014-17 PHED could not utilise the funds of ₹ 1,271.16 crore in both urban and rural water supply schemes. The revenue collection by PHED was abysmally low and only around 20 per cent of its overall O&M cost could be recovered in contravention of the State Water Policy. This was due to the fact that PHED was measuring its water supply from only around 40 per cent of functional meters and it did not have measure of how much water was flowing in rest of the water connections. Further, no assessment was available for the Non-Revenue water supply in the State.

The Department also did not conduct Water and Energy Audits of water supply schemes which were essential for effective monitoring and evaluation of Water Supply schemes.

Recommendations:

9. *PHED must improve monitoring systems to reduce non-revenue earning water by installing meters at the transmission and consumer ends.*

10. *As only around 20 per cent of overall O&M cost of the implemented water supply schemes is being recovered, there is need for PHED to enhance water tariffs realistically and improve its tariff collection efficiency so that all O&M costs are recovered in the near future.*

11. *PHED should immediately conduct water and energy audit to identify and plug leakages so that overall efficiency of the water supply systems is improved.*

2.2.16 Conclusion

Rajasthan is largely dependent on ground water for drinking purpose due to scanty rainfall and limited surface water sources. Depletion of ground water due to excessive use of ground water has caused increase in chemical contamination such as fluoride, nitrate, salinity etc. The State Water Policy, adopted by Government of Rajasthan (GoR) in February 2010, could not get translated into

actionable goals and targets as Public Health Engineering Department (PHED) did not prepare any long term comprehensive/perspective plans.

Annual Action Plans prepared and submitted to GoI continued to be driven from the top in the absence of distinct village and district level water security plans. Further, various institutional mechanisms were either not constituted as per guidelines or not functioning effectively as envisaged.

There were various deficiencies observed in the implementation of the schemes/projects for drinking water supply. 37 out of 54 major drinking water supply projects (with a cost of ₹ 20,695.80 crore) and 119 out of 437 rural schemes (with a cost of ₹ 7,491.58 crore) could not be completed within the stipulated period due to various reasons like delay in taking possession of land, delay in obtaining necessary approvals of authorities, slow progress of contractors, delays by PHED in contracting etc.

Quality of drinking water could not be ensured as per the prescribed norms. During 2014-17, the total number of quality affected habitations reduced by only 13.82 per cent showing the slow progress in improving the quality of water in the habitations. In test checked districts the quality of water has improved except in Bharatpur, Kota and Nagaur where fluoride affected habitations have increased as on date (December 2017).

The State and district laboratories were not equipped with all the required capability/equipment/manpower to conduct all the prescribed tests. During 2014-17, the number of habitations where all sources were tested was only 1.17 per cent.

The PHED was measuring its water supply from only around 40 per cent of functional meters and it did not have measures of how much water was flowing in rest of the water connections resulting in recovering only 20 per cent of its O&M cost.

Urban Development and Housing Department

2.3 Phase-I of Jaipur Metro

Executive summary

Government of Rajasthan (GoR) accorded in principle approval (August 2009) for setting up of Jaipur Metro Project (JMP) to provide Mass Rapid Transit System (MRTS) in the Jaipur city through a metro rail network. Jaipur Metro Rail Corporation Limited (JMRC) was subsequently incorporated on 1 January 2010, as a wholly owned company of GoR, under the Companies Act, 1956. The main objectives of JMRC were planning, designing, developing, constructing, maintaining, operating and financing the MRTS. The JMP was to consist of two corridors namely corridor-I (Durgarpura to Ambabari) having length 17.352 km and corridor-II (Mansarovar to Badi Chaupar) having length 11.566 km.

As per the 2001 census, Jaipur city with a population of 2.3 million (less than 4 million) was not directly eligible for a metro rail project. GoR also did not prepare a Comprehensive Mobility Plan (CMP)/Alternative Analysis to realistically assess the very need for a metro in Jaipur. Further, instead of preparing CMP, Alternative Analysis and then a Detailed Project Report (DPR), GoR prepared DPR, transportation study as part of DPR and thereafter CMP. This also points to the fact that GoR went ahead with the metro project without considering the mobility alternatives which could have suggested other feasible low cost options to address the problems of congestion of traffic in the city. The more feasible corridor of Durgapura to Ambabari which had higher Peak Hour Peak Direction Trips (PHPDT) and ridership was not selected for implementation.

Due to absence of financial support from GoI for Phase-I of Jaipur Metro Rail Project, GoR had extended a loan of ₹ 265.96 crore to JMRC and liability of JMRC was ₹57.27 crore on account of interest on loan as of March 2017.

The commercial operation of phase-IA of Jaipur Metro was scheduled to commence by 1 July 2013, but it became operational on 3 June 2015 after a delay about two years and phase-IB was scheduled to become operational by 1April 2017,however, the work of civil construction was under progress as of 31 March 2017.

Performance of phase-IA of Jaipur metro was poor as the average ridership during the first 22 months of operation was just 19.17 per cent of projected ridership and ridership has been dropping drastically during the period. JMRC could not achieve projected fare box and non-fare box revenue. They could neither commercially exploit the allotted land parcels nor lease out available area of nine metro stations.

Infrastructure created such as Platform No.2 of Chandpole Station, underground parking beneath the stabling yard, cleaning shed, effluent water treatment plant,

automatic train washing plant could not be fully utilised due to improper planning and defective construction/installation/commissioning.

Important safety equipment like the rail cum road vehicle was not in a position to be utilised for want of mandatory certification thereby compromising the safety of the metro system. The capacity of the power supply system installed by JMRC for phase-I was also much more than the present as well as the projected demand.

Thus, due to defective planning and hasty decision making, a financially unviable metro system was introduced in Jaipur city which has also not eased the difficulties of commuters so far.

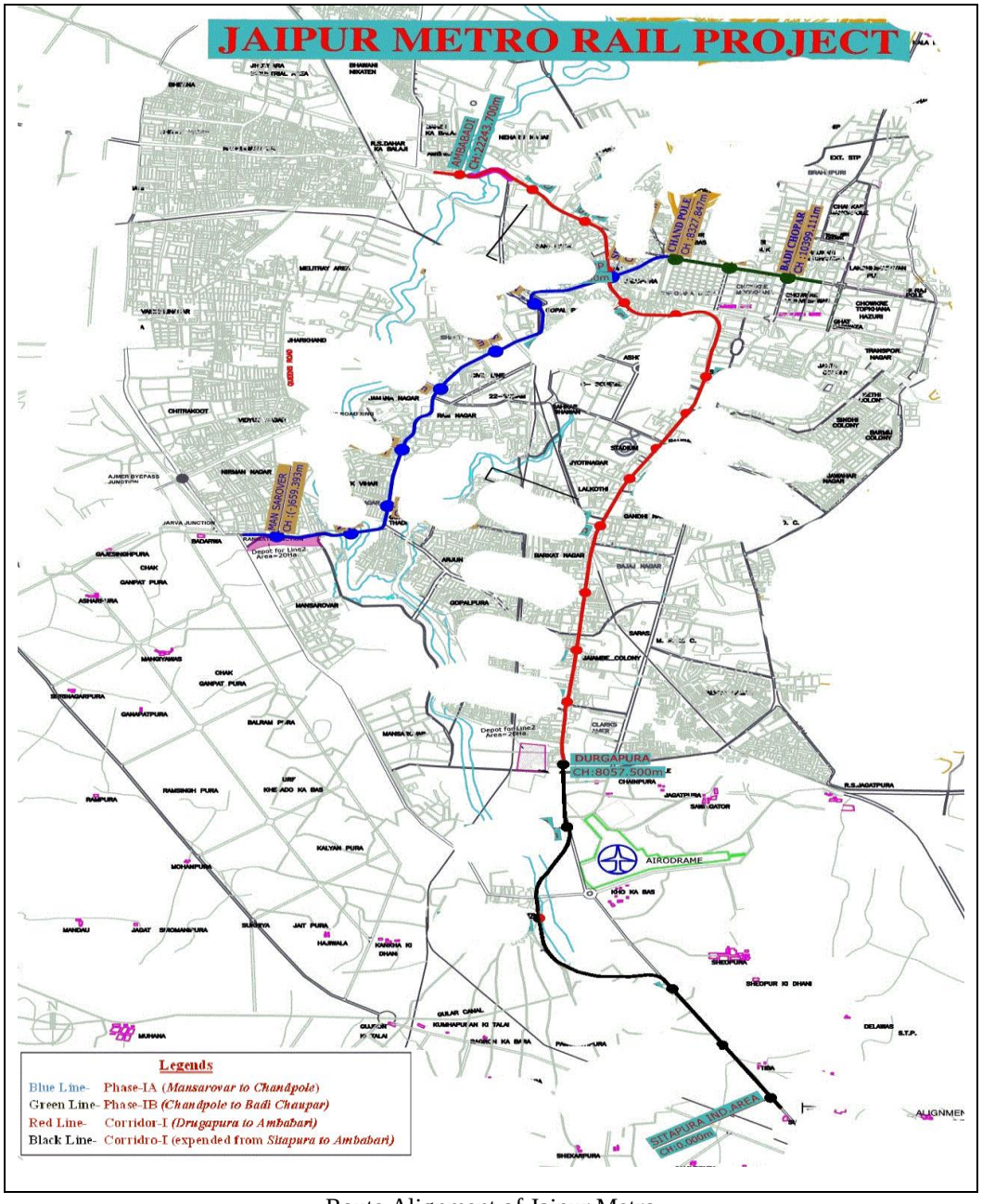
2.3.1 Introduction

Jaipur is the largest city in Rajasthan with highest urban population. The population, as per 2001 census was 2.3 million which was projected to be about 3.6 million in 2011. With the growing population and mega development plans coming up for the city, the demand for public transport was expected to grow steeply. The existing transport system of Jaipur City, which was predominantly road-based, had already come under stress leading to longer travel time, increased air pollution and rise in number of road accidents. To mitigate the growing traffic and transport problems, GoR approached (March 2009) Government of India (GoI) for central assistance for setting up Jaipur Metro Project (JMP). GoI, in turn, advised the GoR to prepare a Comprehensive Mobility Plan (CMP) in order to arrive at the requirement of metro rail or other system. Government of Rajasthan (GoR) accorded in principle approval (August 2009) for setting up of Jaipur Metro Project (JMP) to provide Mass Rapid Transit System (MRTS) in Jaipur City through a metro rail network. GoR also constituted a High Power Committee (HPC) under the Chairmanship of Chief Secretary for execution and effective control of the project. Prior to incorporation of Jaipur Metro Rail Corporation (JMRC), Jaipur Development Authority (JDA) was the nodal agency. Subsequently, JMRC was incorporated on 1 January 2010, as a wholly owned company of GoR, under the Companies Act, 1956. The main objectives of JMRC were planning, designing, developing, constructing, maintaining, operating and financing MRTS.

GoR had earlier engaged (March 2009) Delhi Metro Rail Corporation Limited (DMRC) for preparation of Detailed Project Report (DPR) for Jaipur MRTS Project. As per the DPR (January 2010) prepared by DMRC, JMP was to consist of two corridors namely corridor-I (*Durgarpura to Ambabari)* having length 17.352 km and corridor-II (*Mansarovar to Badi Chaupar)* having length 11.566 km. The DPR was approved by GoR in April 2010.

The DPR was subsequently revised in June 2011 to extend corridor-I from *Ambabari to Sitapura*. DPR was further revised in March 2012 to facilitate a separate DPR for each corridor (i.e. *Ambabari to Sitapura* and *Mansarovar to Badi Chaupar*). The '*Mansarovar to Badi Chaupar'* corridor was further divided in two phases *viz.*, phase-IA (*Mansarovar to Chandpole*) and phase-IB (*Chandpole to Badi Chaupar*) in the revised DPR (March 2012). The length of 11.566 km long corridor of phase-I (corridor-II) from *Mansarovar to Badi*

Chaupar was revised to 12.067 km[97] (March 2012) with a cost of ₹ 3,149 crore. The commercial operation of phase-IA of Jaipur metro was to be started on or before 1 July 2013, but it was opened for public only on 3 June 2015. Phase-IB was scheduled to become operational by 1 April 2017 but only 59.70 *per cent* civil works were completed by March 2017.



Route Alignment of Jaipur Metro

2.3.2 Scope of Audit and Audit Methodology

The Performance Audit covered various activities of implementation and operation of Phase-I of Jaipur Metro for the period from 2010-17. DMRC awarded 57 contracts worth ₹ 1,692.90 crore for phase-IA, out of which 23

[97] 9.278 km elevated and 0.44 km underground for phase-IA (₹ 2,023 crore) and 2.349 km underground for phase-IB (₹ 1,126 crore).

contracts[98] were selected for test check by Audit on random basis. JMRC also awarded civil construction work worth ₹ 507.37 crore for phase-IB which was selected for Audit.

Audit scope and methodology was discussed with Additional Chief Secretary, UDH, who was also holding charge of CMD, JMRC, Functional Directors of JMRC as well as representatives of DMRC and JDA in an entry conference was held on 30 May 2017.

Audit findings and recommendations were also discussed with Additional Chief Secretary in the exit conference held on 8 December 2017.

2.3.3 Audit Objectives

The Performance Audit was carried out to assess whether:

(i) The selection of metro rail as a viable option to decongest traffic was carefully done and routes were selected rationally to ensure economic viability;

(ii) The contract management, including procurement of goods and services and execution of works, was done timely, effectively and economically;

(iii) After commercial operation of phase-IA, whether the planned benefits of the project were achieved; and

(iv) An adequate control mechanism was in existence in JMRC to monitor the projects and to ensure timely completion of works as per specification.

2.3.4 Audit criteria

The sources for audit criteria included:

- Detailed Project Reports and feasibility study/survey for selection of corridors and routes.
- Memorandum and Articles of Association of the Company.
- Delegation of Powers and General Financial & Accounting Rules.
- Provisions stipulated in contracts/ agreements.
- ADB guidelines.
- Decisions of the Cabinet and High Power Committee.
- Agenda papers and Minutes of the meeting of BoDs.
- Guidelines/Urban Transport Policy and instructions issued by the Government of Rajasthan/Government of India from time to time.

[98] 12 contracts worth ₹ 40 crore & above (covering contracts worth ₹ 1,385.73 crore) and 11 contracts (25 *per cent*) below ₹ 40 crore (covering contracts worth ₹ 108.79 crore).

Audit Findings

The audit findings broadly cover issues relating to planning, execution, operation and maintenance of Jaipur Metro and internal control mechanism of JMRC which are discussed in the succeeding paragraphs.

Audit Objective 1: Whether the selection of metro rail as a viable option to decongest traffic was carefully done and routes were selected rationally to ensure economic viability.

2.3.5 Planning for Phase-I

2.3.5.1 Failure to prepare a realistic Comprehensive Mobility Plan/ Alternative Analysis and to assess the need for a metro in Jaipur

In March 2009, GoR engaged DMRC as a consultant for preparation of DPR for Jaipur MRTS Project and simultaneously requested GoI for central assistance for Metro Rail Project.

GoI stated (April 2009) that the choice of technology for MRTS depended on a number of factors such as urban form, trip length, capital cost, operation & maintenance cost, level of demand, projections for future growth, extent of population density, impact on aesthetics of city etc. Further, GoI stated that mega cities with population of 4 million plus (as per 2001 census) might require Metro Rail System on very high demand corridors, on lesser demand corridors other rail/road based MRTS like Light Rail Transit (LRT), Mono Rail, Bus Rapid Transit System might be the required option. Considering the demand, smaller cities with population of 1 to 4 million (based on 2001 census) may also require metro rail projects depending upon other factors. However, such cities would need to justify introduction of metro systems before GoI can accede to their requests for central financial assistance. The choice of technology as well as whether a city requires a Metro Rail Project or not, would depend on the "Comprehensive Mobility Plan" (CMP) of the city concerned duly integrating land use and transport planning, and an "Alternative Analysis" to arrive at the most cost effective solution.

GoI had formulated (August 2008) guidance note and toolkits for preparation of CMP. As per these guidance notes, the proposed projects may not only be technically and economically feasible, but also be packaged in a way that supports a realistic way forward for the city. These issues should be clearly addressed in the CMP. Each high priority project should have a basic document of Project Profile Sheet (PPS) prepared with project outline, project rationale and justification. DPR of the project should be prepared on the basis of PPS.

During scrutiny of records, it was observed that as per 2001 census the population of Jaipur city was 2.3 million, and as the population was less than 4 million, it was not directly eligible for a metro rail project. Hence, as per the GoI guidelines, the metro rail system in the city was to be justified on the basis of the appraisal of CMP and Report on 'Alternative Modes of Transportation' by Ministry of Urban Development (MoUD). Further, GoR also did not have any other system in place for justification and appraisal of metro projects in the State.

Hence, following the steps as indicated in GoI guidelines, was the most logical and prudent option available with GoR for justification and approval of the metro project.

It was observed that GoR did not follow the steps specified in for appraisal of the metro rail system. Instead of preparing CMP, Alternative Analysis and then a DPR, GoR prepared a DPR, a transportation study as part of the DPR and thereafter a CMP.

As JMRC was not incorporated at that time, JDA's agreement (May 2009) for ₹ 3.00 crore with DMRC for preparation of DPR for Jaipur Metro Rail System included payment of 20 *per cent* amount on submission of Traffic and Transportation Report (TTR) consisting of traffic survey data, their analysis and estimation of ridership, including sectional and station loads. DMRC further outsourced (May 2009) the traffic and transportation study to M/s Wilbur Smith Associates. It was observed that no analysis of traffic survey data and estimation of ridership were available. Consequently, DMRC did not furnish traffic survey data and its analysis with the TTR to JDA/JMRC. It was further observed that M/s Mott MacDonald India Pvt. Ltd. (General and Technical consultant) reviewed DPR of Jaipur Metro (*as a component for enabling award of phase-II of Jaipur Metro on PPP basis*) and found that the alignment selection criteria or the study conducted to arrive the selected alignment was not mentioned in the DPR and TTR. It also commented that in absence of the soft copy of traffic model, only output results presented in DPR were examined by 'judgment'. They recommended for further studies, which would provide various Peak Hour Peak Direction Trip (PHPDT) values achieved by different rapid transit systems. Thus, the payment of ₹60 lakh made to DMRC for TTR, without ensuring authenticity of data incorporated in it, was irregular.

From the Review Note of the project (March 2014), we observed that the need for metro in Jaipur was earlier discussed by GoR with the officers of MoUD in June 2006 where Mr. Shridharan, Managing Director, DMRC was also present. In the said meeting it was pointed out that Jaipur does not require a metro till 2025 looking to the ridership projections. However, the State cabinet note for approval of the project submitted in August 2009 stated that Mr. Shridharan found a metro system appropriate for Jaipur and consented for preparation of DPR by DMRC.

GoI subsequently pointed out (April 2010) that cities where metro has been planned had public transport share of 50 to 60 *per cent* of the total city traffic whereas Jaipur had only 19 *per cent* share of public transport. The analysis showed widely varying figures in terms of population forecast and demand on major corridors. Further, the demand on major corridors was grossly overestimated and the ridership figure needed to be firmed up after rechecking the survey results and population forecasts. GoI also directed GoR to submit detailed analysis of alternative transport system. GoR neither submitted the details of alternative transport system nor did they recheck the survey results. GoR justified (April 2010) the need for metro rail and submitted to GoI that the traffic projections prepared by M/s Wilbur Smith and included in the DPR were justified. They stated that metro corridor would provide a pollution free mode of

transport, attract more tourists and lead to increase in economic activities and generation of more employment and revenue for the State Government.

Audit further noticed that the project was started before the *'in-principle'* approval accorded by GoI. The approval for Phase-IA (*Mansarovar-Chandpole*)[99] was given by GoI on 21 January 2011 with the condition to rework the DPR on realistic basis to ensure sustainability of the project. But no such DPR was prepared. The overestimation of the benefits and irrational justification of the metro system in DPR during the planning phase is evident from the fact that only 19.17 *per cent* of the projected ridership (i.e. 1.21 lakh per day of Phase-IA) was achieved during first 22 months of operation (i.e. up to March 2017) **as discussed in paragraph 2.3.7.1.**

Thus, the need for a metro in Jaipur was not assessed properly as GoR neither prepared a realistic CMP and Alternative Analysis as per requirement of GoI nor did they carry out any other feasibility study. This resulted in GoR committing itself to a metro project estimated at ₹ 3,149 crore without realistically assessing the need for and the viability of a metro system in Jaipur.

GoR stated (November 2017) that "CMP was prepared with due process and metro was one of the project proposals given in the form of merely a route proposal, which was actually not detailed out till then. The actual and detailed final report was intended to be prepared after acceptance/approval of MoUD, GoI. Still brief proposals and observations given in CMP were utilised, which needed to be detailed out at the time before the actual implementation of the respective proposals". GoR further stated that CMP was prepared in consultation with all stakeholders.

However, the fact remained that the work for preparation of DPR was awarded as early as in March 2009, while the work for preparation of CMP was awarded only in September 2009. Thus, the sequence of events indicated that CMP was not prepared to assess the feasibility of the project.

Subsequently, in the course of review of the ongoing Metro Rail Project (March 2014), the GoR also raised doubts about the credibility of the consultant M/s Wilbur Smith who had prepared CMP and traffic and transportation study especially in view of certain "glaringly excessive transportation assumed through taxis (which were virtually zero in Jaipur) to be replaced by metro".

2.3.5.2 Failure to select the more feasible corridor and suitable technology

For evaluating a suitable corridor for implementation of a metro project, the 'Guidelines and Toolkits for preparation of CMP-2008' stipulated that metros should be established where the existing average public transport flows on the main corridor was 10,000-15,000 passengers per hour per direction with more than 15 km trip length. Further, metro system should also have the capacity of PHPDT of 40,000-75,000 passengers.

[99] The *in-principal* approval was given only for taking up Stage-I (Phase-IA), being the elevated part of the corridor.

Further, for evaluating the suitable technology needed for providing a metro system in the city, two types of metro rail systems i.e. Light Rail Transit (LRT) and Metro Rail Transit (MRT) were required to be assessed. Thereafter based on PHPDT, daily ridership and distance, an appropriate system and technology was to be adopted which would suit the needs of the city.

The projections given in the revised DPR (March 2012) for both the corridors of Jaipur Metro (*Mansarovar* to *Badi Chaupar* and *Durgapura* to *Ambabari*, extended from *Durgapura* to *Sitapura*) are given in **Table 1**.

Table 1

Particulars		***Sitapura* to *Ambabari* corridor**	***Mansarovar* to *Badi Chaupar* corridor**
Length (in kms.)		23.099	12.067
No. of Stations		20	11
Daily Ridership	**2014**	3.22 lakh	2.10 lakh
	2021	4.86 lakh	2.93 lakh
	2031	6.77 lakh	4.22 lakh
PHPDT	**(in 2014)**	more than10,000 in 10 Sections (highest 12,901)	more than 10,000 in two Sections (highest 11,264)
		more than 8,000 and below 10,000 in three Sections	more than 8,000 but below 10,000 in four Sections
		less than 8,000 in six Section	less than 8,000 in four Sections
	(in 2021)	more than 10,000 in 15 Sections (highest 18,683)	more than 10,000 in seven Section (highest 16,376)
		more than 8,000 and below 10000 in one Section	more than 8,000 and below 10,000 in one Section
		less than 8,000 in three Section	less than 8,000 in two Sections
	(in 2031)	more than10,000 in 16 Sections (highest 22,428)	more than 10,000 in 10 Sections (highest 27,750)
		less than 8,000 in three Sections	-
Average Lead[100]		8 km	5 km

Source: Revised DPR (March 2012) of Jaipur Metro.

The table depicted that the projections for daily ridership and PHPDT in 2014 and 2021 of *Sitapura to Ambabari* corridor were more than the corresponding projections for *Mansraovar to Badi Chaupar* corridor. However, GoR first undertook *Mansarovar to Badi Chaupar* corridor for Jaipur metro. No justification was found on record for choosing the *Mansarovar to Badi Chaupar* corridor as phase-I which had lower PHPDT, lower ridership and lower average lead compared to the *Sitapura to Ambabari* corridor, as per the projection.

It was also observed that JDA awarded (September 2009) contract for the work of preparation of CMP for Jaipur city to M/s Wilbur Smith Associates and paid ₹ 21 lakh. The firm submitted (January 2010) CMP, which proposed to develop multi modal corridors[101] for Jaipur city with an aim of reaching 50 *per cent* public transport goal in three phases of 2010-16, 2016-21 and 2021-31. CMP suggested two alignments of metro for Jaipur (*Mansarovar to Badi Chaupar* and *Durgapura to Ambabari*) in first phase of 2010-16. The CMP stated *'the GoR intended to implement the first section of metro from Mansarovar*

[100] The average distance travelled by each passenger.

[101] Which included significantly augmenting buses (as a first step), adding metro corridors, monorails/Light Rail Transit and Bus Rapid Transit corridors.

to Chandpole by 2013 and the remaining sections thereafter'. No other justification was on record. M/s Mott MacDonald India Pvt. Ltd. also reported (May 2011) that the DPR, TTR and CMP did not mention the alignment selection criteria or the study conducted to arrive at the selected alignment.

Project Profile Sheet (PPS) attached with CMP prepared by M/s Wilbur Smith suggested a comparison of different types of transit systems for study area. The PPS also recommended that the final alignment and technology of the corridors would be determined after a Techno Economic Feasibility Study considering performing capacity, geometric constraints, capital and operating costs, alternative analysis etc. This was not adhered to.

GoR stated (November 2017) that the Railway projects are analyzed on *'per km basis'* and on that basis, decision to go in for corridor-II (*Mansarovar to Badi Chaupar)* was a prudent and cost effective decision.

The reply is not convincing as the project documents including the revised DPR have only considered PHPDT as a criteria for selection. Further, *'per km basis'* analysis was never carried out or suggested at any stage while selecting the routes. Thus, the comparison of the more viable corridor should have been done on the basis of PHPDT projections rather than *'per km basis'.*

Scrutiny further revealed that planning for selection of feasible technology for Jaipur Metro did not consider other options like LRT.

Institute of Urban Transport (IUT) found (2013) that LRT had ability to go round sharp road bends which reduces the need to acquire roadside property and the project cost. Thus, LRT was cheaper to build and operate in comparison with metro rail as use of low axle load of 11 tonnes compared to 17 tonnes would save operating cost.

However, there was no analysis available on record as to whether LRT was considered as an alternative option before finalizing option of MRT. As discussed in **paragraph 2.3.5.1,** PPS and report on all modes of transportation were not prepared. Further, LRT with elevated/at-grade corridor in place of metro could have considerably reduced the capital cost of construction of metro from *Mansarovar to Chandpole* considering the per km cost estimated in CMP.

GoR stated (November 2017) that PHPDT on the corridor-II (*Mansarovar to Badi Chaupar)* in the year 2031 and 2041 have been projected as 27,750 and 29,169 respectively, whereas LRT was good enough only to serve the PHPDT of 25,000. As per the study conducted (2013) by IUT on Modern Trams (LRT), the capital cost per km for Metro Rail (elevated) was ₹ 182.05 crore while for LRT (elevated) was ₹ 159.25 crore. The difference of the cost of construction between MRT and LRT is around 15 *per cent* while the passenger carrying capacity of LRT is almost half of that of metro.

The reply may be viewed in the light of difference in capital cost between LRT and MRT which works out to ₹ 276.93 crore[102] (considering 15 *per cent* saving) and the audit findings discussed above.

[102] 15 *per cent* of the capital cost equals ₹ 1,846.23 crore= ₹ 276.93 crore.

2.3.5.3 Project Funding

The sources of funding the project cost of ₹ 3,149 crore were equity/debt from GoR of ₹ 1,860 crore (59.07 *per cent*), equity/debt/grant from Rajasthan Industrial Development and Investment Corporation Limited/Rajasthan Housing Board/Jaipur Development Authority (JDA) of ₹ 320 crore (10.16 *per cent*) and loan from Asian Development Bank (ADB) of ₹ 969 crore (30.77 *per cent*).

However, National Urban Transport Policy (NUTP) 2006 provided that the Central Government would encourage high capacity public transport systems being set up through the mechanism of Special Purpose Vehicles (SPV) and would offer financial support either in the form of equity or one time Viability Gap Financing (VGF), subject to a ceiling of 20 *per cent* of the capital cost of the project. Accordingly, the DPR (January 2010) provided the funding pattern under SPV model as well as under BOT/PPP model and recommended that the Jaipur Metro Rail Project should be implemented and operated under a SPV owned by GoI and GoR.

Accordingly, GoR actively pursued with GoI since August 2010 for sanctioning the grant as equity assistance up to 20 *per cent* of the total cost of work for phase-I and to consider VGF for phase-II of Jaipur Metro. GoI approved (November 2013) phase-I of Jaipur Metro Rail Project, covering a length of 12.067 km at the cost of ₹ 3,149 crore. GoI agreed to form a JV with GoR (50:50) as a SPV, as was done in the case of Delhi Metro, Bangalore Metro, Chennai Metro and Kochi Metro. GoI proposed to contribute equity of ₹ 472.50 crore (15 *per cent* of the project cost) and subordinate debt of ₹ 157.50 crore (five *per cent* of the project cost). GoI and GoR would nominate five Directors each to the Board of Directors with the Secretary, MoUD, GoI as ex-officio Chairman and GoI would also appoint fulltime Managing Director nominee by GoR.

GoR did not agree to the financial and institutional arrangements proposed by GoI and is still requesting (July 2017) for 20 *per cent* of the project cost as a grant to JMRC towards viability gap as was being given to private companies.

As GoR has gone ahead with Phase-I of JMP without financial support from GoI, they had to extend a loan of ₹ 265.96 crore to JMRC in lieu of GoI share of equity and subordinate debts of ₹ 630 crore. The interest liability of JMRC on this account is ₹ 57.27 crore (March 2017).

GoR stated (November 2017) that it is still expecting a grant of ₹ 630 crore from GoI.

2.3.5.4 Non-constitution of Directorate of Urban Land Transport/Unified Metropolitan Transport Authority

GoI promulgated NUTP 2006 for development of safe, convenient and efficient transportation system across all urban areas. On the lines of NUTP and following the recommendations of National Working Group on Urban Transport for 11th Plan, GoR was to constitute Directorate of Urban Land Transport (DULT)/ Unified Metropolitan Transport Authority (UMTA) to assess (i) periodic travel

demand, (ii) level of public transport required in different corridors and the type of transport systems required, (iii) new investments needed for the creation of infrastructure, (iv) procurement of public transport service from private operators, (v) policy guidelines for development of total network in urban areas/new layouts and (vi) designing and developing integrated policies and plans for city level transportation. The formation of DULT/UMTA before initiating the project in 2009, would have been useful in appropriate decision making.

Considering the fact that the current ridership and PHPDT of phase-IA operations is very low, GoR should consider formation of DULT/UMTA which would be a specialist directorate and could aid in effective design and development of integrated policies and plans for city level transportation in the future.

It was further observed that only in January 2016, a sub-group on urban affairs of Chief Minister's advisory council suggested for institutional set up for urban transport in Rajasthan on the lines of DULT of Karnataka. However, even as of September 2017, GoR had not constituted a DULT in the State.

GoR stated (November 2017) that UMTA was to be constituted as per the guidelines of NUTP 2006 but the detailed framework/guidelines were not available. Now GoI in 2016 has circulated draft model guidelines to all the states and action is being expedited at the level of Government.

Planning for selection of metro rail at Jaipur

As per the 2001 census, Jaipur city with a population of 2.3 million (less than 4 million) was not directly eligible for a metro rail project. GoR also did not prepare a Comprehensive Mobility Plan/Alternative Analysis to realistically assess the very need for a metro in Jaipur. Further, instead of preparing CMP, Alternative Analysis and then a DPR, GoR prepared DPR, transportation study as part of DPR and thereafter CMP. This also points to the fact that GoR did not adequately assess the need for a metro in Jaipur. The more feasible corridor which had higher PHPDT and ridership was not selected for implementation. Further, the lower cost technology of LRT was also not considered.

Due to absence of financial support from GoI for Phase-I of Jaipur Metro Rail Project GoR had to extend a loan of ₹ 265.96 crore to JMRC. The interest liability of JMRC on this account was ₹ 57.27 crore as of March 2017.

Recommendations:

1. *Keeping in view the low ridership achieved so far in phase-IA of the metro, GoR may consider all alternative technologies like LRT for Phase-II of Jaipur metro so that the costs would be reduced and the project would be viable for PPP engagement.*

2. *GoR should constitute a DULT/UMTA for proper planning and effective implementation and operation of mass rapid transit systems in Rajasthan and in particular Jaipur metro in the future.*

Audit Objective 2: Whether the contract management, including procurement of goods and services and execution of works, was done timely, effectively and economically.

2.3.6 Execution of Phase-I of Jaipur Metro

The civil, track and electrification works of phase-IA was awarded (August 2010) to DMRC on 'deposit work' basis. The DMRC awarded 57 packages to different contractors for phase-IA of Jaipur Metro Rail Project. The work of construction of tunnel and stations in phase-IB was awarded (September 2013) to M/s Continental Engineering Corporation, Taiwan (CEC) at a cost of ₹ 507.37 crore. CEC was to complete the work within three years from 15 October 2013.

The commercial operation of phase-IA of Jaipur metro was to be started on or before 1 July 2013, but it was opened for public carriage of passengers only on 3 June 2015 after delay of around two years and incurring cost of ₹ 1,846.23 crore.

Phase-IB was scheduled to become operational by 1 April 2017. However, CEC completed only 59.70 *per cent* works as of March 2017 and payment of ₹ 302.92 crore was made to CEC.

The audit findings in respect of the execution of phase-I of Jaipur Metro are discussed in the following paragraphs.

2.3.6.1 Irregular deferment of recovery of Mobilisation Advance in Phase-IB

Clause 14.2 of General Conditions of Contract provided for payment of mobilization advance to the contractor at the rate of 10 *per cent* of the contract value in two equal installments. The first installment was payable within 21 days of receipt of bank guarantee and the second installment after submission of proof of utilization of the first installment. Further, the advance was recoverable in 12 equal installments after 12 months from the date of commencement of the work.

It was observed that first installment of mobilization advance ₹ 25.27 crore was released to CEC in December 2013 and second installment of ₹ 25.23 crore in July 2014. Since the stipulated date of commencement of work was 15 October 2013, the recovery of first installment was due from October 2014. Meanwhile, in September 2014, CEC requested the Engineer (DMRC) for deferment of recovery of mobilization advance till it achieve 15 *per cent* financial milestone. The Engineer recommended (December 2014) for deferment of the recovery of mobilization advance till achieving key date-7 of *'starting initial drive for shield TBM-2'* or 13 *per cent* of the financial milestone.

CMD, JMRC accepted (January 2015) the request of CEC and deferred recovery of mobilization advance till March 2015 considering that certain interim bills of CEC were pending beyond prescribed period of payment of 56 days and CEC had agreed not to insist for payment of interest on delayed payment of interim bills. CEC subsequently communicated (February 2015) that as discussed and mutually agreed, no interest charges would be levied by JMRC on the deferred period for recovery of mobilization advance.

It was, however, noticed from the records made available that no interim bill of CEC was pending for payment beyond the prescribed period. Moreover, bills which were submitted by CEC were paid within 56 days as discussed in **paragraph 2.3.6.2**. GoR stated (November 2017) that the contractor was in financial crisis due to slow progress of work and accordingly it was decided to defer the recovery of advance. GoR further stated that the request to defer the recovery of advance was genuine and in the larger interest of project to push up the momentum of work.

The Central Vigilance Commission (CVC) guidelines (April 2007) stipulate that recovery of mobilization advance should be time based and not linked to the progress of the work. The reply is, therefore, not convincing as mobilisation advance was deferred on invalid grounds and against the provisions of the contract as well as the CVC guidelines.

Thus, due to deferred recovery of mobilization advance JMRC extended undue benefit of ₹ 2.03 crore[103] to the contractor on account of the interest on advance from October 2014 to March 2015.

2.3.6.2 Loss of interest on early payment of bills

As per clause 14.7 of the General Condition of Contract *'the employer (JMRC) shall pay to the contractor the amount certified in each Interim Payment Certificate (IPC) within 56 days after the Engineer (DMRC) receives the Statement and supporting documents'*. Further, as per clause 14.8, if the contractor does not receive payment within 56 days of raising the bill, the contractor shall be entitled to receive financing charges compounded monthly on the amount unpaid during the period of delay.

In the pre-bid meeting, the bidders requested to reduce the period of intermediate payments to 30 days but this was not agreed to by JMRC. Minutes of pre-bid meeting also formed the part of the agreement.

Detailed scrutiny of the payments made to CEC revealed that the amounts certified in 19 out of total 35 IPCs valuing ₹ 177.40 crore (63.80 *per cent* of the total value of payments under this contract) were paid to the CEC within a period of 30 days though the period up to 56 days was available for making the payment.

GoR accepted (November 2017) that in the pre bid meeting the proposal of the bidders was not agreed to, however, smooth and regular flow of funds was the essence of the project and it facilitated the contractor to execute the work to the desired progress.

By not availing of the benefit under the contract JMRC had to forgo interest earning of at least ₹ 96.46 lakh[104] calculated at the minimum rates of interest of 5.25 *per cent* received during that period.

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[103] Calculated at simple interest of 8.05*per cent* (the lowest rate of interest, JMRC was getting on Fixed deposits with Banks) for six months from October 2014 to March 2015 (₹ 50.5 crore x 8.05 *per cent* x 6/12).

[104] Bills paid within 30 days of receiving IPC considered.

2.3.6.3 Advance procurement of rolling stock

As per revised DPR (June 2011/March 2012), eight train sets of four cars each (32 cars) and two train sets of four cars each (eight cars) were required for Phase-IA (*Mansarovar to Chandpole*) and Phase-IB (*Chandpole to Badi Chaupar*) respectively.

GoR decided (November 2011) to make the modification in Request for Proposal (RFP) to be floated for phase-II (including phase-IB) on PPP basis considering identical rolling stock, signaling & telecom and automatic fare collection for *Chandpole* to *Badi Chaupar* corridor. GoR subsequently decided (November 2012) to execute phase-1B on 'Engineering Procurement and Construction' (EPC) mode with DMRC as General Consultant. Accordingly, the civil work of phase-IB was awarded (September 2013) to CEC. However, DMRC had already issued (November 2011) work order to BEML for manufacturing, supply, testing and commissioning of 10 train sets of four cars each (40 cars). Later, Board of Directors (March 2012) also approved the proposal for the procurement of total 40 cars. BEML supplied 40 cars during May 2013 to June 2014 at a cost of ₹ 361.46 crore. The above fact indicates that DMRC had placed the supply order to BEML even before GoR decided to execute the Phase-IB of Jaipur Metro on EPC basis.

It was observed that the commercial operation of Phase-IA commenced from 3 June 2015 and only 59.70 *per cent* of civil work of Phase-IB was completed by CEC as of March 2017. JMRC revised the date of completion of civil works of Phase-IB tentatively to August 2018. Thus, Phase-IB would be operational only after August 2018 and two train sets procured for Phase-IB would not be operational for almost four years from their procurement (June 2014).

This was also objected to later by GoR (April 2014) as the advance procurement did not appear to be justifiable. An enquiry (May 2014) was ordered into the advance procurement of rolling stock. The details of enquiry conducted, if any, was not made available to audit.

JMRC stated (December 2017) that procurement of two train sets was done in advance to avoid extra financial burden due to very high cost at a later date and various approvals required at later stages.

The reply is not acceptable as the imprudent procurement of rolling stock in advance for Phase-IB resulted not only in blocking of funds of ₹ 72.30 crore[105] but also reduction in useful life by at least four years, which would cost JMRC ₹ 9.64 crore[106] considering the life of 30 years of the rolling stock.

2.3.6.4 Avoidable payment to Indian Railways

As per provision of section 18 (a) and section 19(2) of the Metro Railways (Construction of Works) Act, 1978, the metro railway administration should take necessary precaution for causing least damage during construction of metro

[105] Cost of one train (₹ 361.46 crore/10 trains) = ₹ 36.15 crore and cost of two train (₹ 36.15*2)= ₹ 72.30 crore.

[106] ₹ 72.30/30 years* four years= ₹ 9.64 crore.

railway and cost for the actual damage to the structures/properties including railways was payable.

Further, the Railway Board also prescribed (September 2009) recovery of the cost of land at commercial rate, intended to be used for commercial development and not for exclusive use of bonafide passengers.

It was observed that metro railway track for phase-IA crossed over 890 square meters (sqm) land of Ganapati Nagar residential colony of North Western Railway (NWR). JMRC paid ₹ 6.38 crore[107] as crossing charges at the commercial rate of ₹ 71,645 per sqm. However, the land was to be used for bonafide passengers and crossing charges should have been paid at the residential rates of ₹ 19,464 per sqm. This resulted in excess payment of ₹ 4.65 crore to NWR.

GoR stated (November 2017) that the area for metro crossing at Ganapati Nagar was not proposed exclusively for use of bonafide metro passengers. Hence, commercial rates were applied.

The reply is not convincing as Ganapati Nagar is a residential colony, where the metro viaduct was crossing over by constructing the piers. Hence, there was no scope for commercial use and the crossing charges should have been paid at residential rates.

GoR further stated (December 2017) that NWR has been requested to re-examine and revise the crossing charges.

2.3.6.5 Infructuous expenditure on engaging consultants and non-refund of the IIPDF contribution/grant

(i) DMRC opined (July 2009) that Public Private Partnerships (PPP)-Built Operate and Transfer (BOT) model was not globally successful as it involved huge capital cost and fares had to be kept low as a matter of public policy. If metro projects are to be made viable by granting VGF up to 50 to 55 *per cent*, then the Government, instead of following the PPP-BOT route, should follow the Government funding route i.e. by forming Special Purpose Vehicle (SPV) between GoI and GoR to undertake the project. It was also recommended in DPR (January 2010) that the Jaipur Metro Project should be implemented and operated under SPV owned by GoI and GoR.

In spite of this, JMRC engaged three consultants in October 2010 for General and Technical, Financial and Legal matters for selection of concessionaire on PPP basis. However, the selection of concessionaire could not materialize due to defective process[108] of selection, which resulted in infructuous expenditure of ₹ 2.40 crore for payment to three consultants[109].

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[107] 890 sqm x ₹ 71,645 per sqm (commercial rate) = ₹ 6.38 crore.

[108] Such as (i) belated floating of RFQ for selection of concessionaire with due date 31 May 2011 without approval of GoI and (ii) floating of RFQ with original scope of work in flouting of the Cabinet decision (July 2010) that if PPP partner does not selected before June 2011 then signaling and rolling stock work of phase-IA would also be undertaken through DMRC on deposit work basis.

[109] General and Technical Consultant: ₹ 1.57 crore; Financial Consultant: ₹ 43.13 lakh and Legal Consultant: ₹ 40.18 lakh.

GoR stated (November 2017) that it was decided in the cabinet meeting (21 July 2010) to seek private participation of 60 *per cent* of the total project cost. Further, to assess the ground realities on the interest of private partners in the phase-II and the percentage of participation, it was decided by GoR to invite Request for Qualification (RFQ) for PPP and accordingly the consultants were hired to provide consultancy for documents preparation and for the selection of PPP partner.

The reply needs to be viewed in the light of the fact that as per the DPR (2010), the contribution of GoI and GoR was projected as 93 *per cent* and only 7 *per cent* was to be invested by the PPP/BOT partner. As for just 7 *per cent* participation it was not appropriate to consider the PPP/BOT model, the expenditure on hiring of consultants was not required and was therefore infructuous.

(ii) The payment for consultancy services was to be made on actual number of man hours of the financial/legal expert deployed by the consultant for each deliverable[110] subject to a maximum number of hours per deliverable. Further, if the financial consultancy was terminated prior to its completion, payment for 60 *per cent* of the man hours, actually deployed by the consultant on the incomplete deliverables were to be made.

It was observed that in contravention of these provisions, full payment of ₹ 43.13 lakh was made in the case of financial consultancy (with contract value of ₹ 43.13 lakh) and ₹ 40.18 lakh in case of legal consultancy (in excess of contract value of ₹ 34.80 lakh) inspite of only a part of the work (i.e. completing of work up to RFQ stage and not up to selection of PPP concessionaires) being completed.

In absence of man hours deployed by the consultants for each deliverable, the exact amount of additional payment could not be calculated. However, the fact remained that the excess amount paid was required to be calculated by JMRC and recovered from the consultants.

GoR stated (November 2017) that the time extension and additional 25 *per cent* man-hour of financial and legal consultants were approved by JMRC due to the peculiar nature of the project.

The fact remained that additional payment was released to both consultants in contravention of the terms and conditions of the agreement as no documents[111] other than RFQ was finalised and submitted.

(iii) GoI approved (January 2011) grant of 75 *per cent* of the cost to be incurred for engaging consultants to JMRC under Institution for India Infrastructure Project Development Fund (IIPDF). The grant was to be refunded in case JMRC does not conclude the bidding process of selection of PPP concessionaire.

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[110] Financial: Revenue model, appraisal report and advisory services on financial matters and Legal: Draft concession agreement, vetting of manual and bidding documents, advisory services and obtaining regulatory approvals.

[111] Documents such as Revenue Model, Appraisal Report and Draft Concession Agreement.

It was observed that as JMRC did not complete the process of selection of PPP concessionaire, the grant of ₹ 1.65 crore received under IIPDF was refundable to GoI. However, JMRC did not refund the grant to GoI.

JMRC stated (August 2017) that the grant would be refunded after the decision to take up phase-II of Jaipur Metro on 'other than PPP mode'. GoR stated (November 2017) that the expenditure incurred on services of Legal, Financial and Technical consultants was not wasteful. It will expedite the search to find suitable partner in the light of proposed review of DPR. The reply was not convincing as the decision to award phase-II of Jaipur Metro has not been finalised and the grant should have been refunded to GoI as it was not utilised for the purpose intended, so far.

2.3.6.6 Non-completion of work within the stipulated time

It was observed that 21 out of 23 test checked packages were completed with delay ranging between 307 to 1,322 days (average 641 days). Further, only in two packages (C4 and C5), delays were attributed to the contractor and Liquidated Damage of ₹ 1.18 crore was levied but not recovered as of March 2017. In the remaining 19 packages, delays were attributed to 'delay' on part of DMRC.

DMRC stated (July 2017) that extension of time for hindrances were reviewed on the basis of documents available on record and various correspondences pertaining to the contract.

GoR stated (November 2017) that in view of audit observation, DMRC may consider adopting the practice of maintaining the hindrance register in future cases.

The reply is not acceptable as DMRC did not have a system of recording hindrances that occurred during execution of work, Audit could not verify the genuineness of reasons claimed for delay.

2.3.6.7 Non-recovery of costs for modification works from CEC

CEC intimated (January 2015) that 30 meter additional space was required inside the tunnel of phase-IA, to achieve optimum time cycle for mucking/segment feeding activity. This required modification in signalling, Overhead Equipment (OHE) termination and shifting of friction buffer. JMRC undertook modification in rigid OHE structure at an expenditure of ₹ 33.30 lakh, which was chargeable to the civil work of phase-IB and recoverable from CEC.

Though JMRC accepted (August 2017) the observation, the amount is yet to be recovered from CEC.

GoR stated (November 2017) that JMRC has requested DMRC to recover the total amount of ₹33.30 lakh from the contractor.

Execution of Phase-I of Jaipur Metro

The commercial operation of phase-IA of Jaipur metro was started only on 3 June 2015 after delay of around two years and incurring cost of ₹ 1,846.23 crore. The work of construction of tunnel and stations for phase-IB was awarded at a cost of ₹ 507.37 crore and was to be completed by 15 October 2016. However, as of March 2017, only 59.70 per cent of the work was completed.

Test check of 24 contracts (out of 58) awarded for phase-IA and IB revealed a case of deferred recovery of mobilization advance leading to undue benefit of ₹ 2.03 crore to the contractor. Further, JMRC made early payment to the contractors and this resulted in loss of interest of ₹ 96.46 lakh. There were cases of avoidable payment to Indian Railways of ₹ 4.65 crore in violation of provisions of Metro Railway Construction Act 1978. Other contract management issues like non-recovery of charges for modification works, irregular deferment of recovery of mobilization advance etc. were also noticed.

Recommendations:

3. *Keeping in view financial prudence, JMRC should avail the full benefits of the available invested funds so that JMRC could minimise its operational losses by maximising interest income on investments.*

4. *As a record of hindrances encountered during contract execution is an important document for deciding time extensions and attributability for delays in contracts, JMRC must insist upon maintenance of the hindrance register in all contracts entered into with executing agencies.*

Audit Objective 3: After commercial operation of phase-IA, whether the planned benefits of the project were being achieved.

2.3.7 Operation of phase- IA of Jaipur Metro

The commercial operation of phase-IA of Jaipur metro from *Mansarovar to Chandpole* was opened for public carriage of passengers on 3 June 2015 after a delay of around two years. The revenue from operations for the first twenty two months was ₹ 18.87 crore against the corresponding operating cost of ₹ 85.56 crore (excluding depreciation and finance charges). Thus, JMRC is currently unable to meet even its operating expenses for running the Jaipur metro.

The performance of phase-IA of Jaipur metro has been assessed with respect to the projected PHPDT, ridership and expected revenues and observations in this regard are discussed below.

2.3.7.1 Poor operational performance of phase-IA

The average projected ridership of phase-I was 2.1 lakh passengers per day which included 1.21 lakh passengers per day for phase-IA and 0.89 lakh passengers per day for phase-IB.

For phase-IA, besides an expected ridership of 1.21 lakh passengers per day during first two years of operations, fare box earning of ₹ 164 crore was also envisaged in the revised DPR of March 2012.

Details of projected daily average ridership *viz-a-viz* actual for phase-IA of Jaipur Metro are given in **Table 2.**

Table 2

Month	Monthly ridership	Projected ridership per day	Average ridership achieved per day	Percentage of ridership achieved
June 2015	14,43,456	1,21,000	51,552	42.60
July 2015	9,95,326	1,21,000	32,107	26.53
August 2015	9,05,868	1,21,000	29,222	24.15
September 2015	7,86,428	1,21,000	26,214	21.66
October 2015	7,56,253	1,21,000	24,395	20.16
November 2015	7,16,928	1,21,000	23,898	19.75
December 2015	6,81,223	1,21,000	21,975	18.16
January 2016	7,03,312	1,21,000	22,687	18.75
February 2016	6,28,545	1,21,000	21,674	17.91
March 2016	6,28,551	1,21,000	20,276	16.76
April 2016	6,11,677	1,21,000	20,389	16.85
May 2016	6,74,382	1,21,000	21,754	17.98
June 2016	6,47,858	1,21,000	21,595	17.85
July 2016	6,59,458	1,21,000	21,273	17.58
August 2016	6,40,734	1,21,000	20,669	17.08
September 2016	6,01,310	1,21,000	20,044	16.57
October 2016	6,00,793	1,21,000	19,380	16.02
November 2016	5,66,655	1,21,000	18,889	15.61
December 2016	6,01,102	1,21,000	19,390	16.03
January 2017	5,82,296	1,21,000	18,784	15.52
February 2017	5,06,287	1,21,000	18,082	14.94
March 2017	5,30,319	1,21,000	17,107	14.14
Average ridership		**1,21,000**	**23,191**	**19.17**[112]

Source: Revised DPR (March 2012) and information provided by Jaipur Metro.

From the table above, it can be observed that after operationalisation of phase-IA, the actual average ridership from June 2015 to March 2017was only 19.17 *per cent* of the projected ridership. In the first month of operation, the ridership was 42.60 *per cent* (51,552 passengers) which steadily dropped to 14.14 *per cent* (17,107 passengers) in March 2017**.**

During the period from June 2015 to March 2017, JMRC could earn fare box revenue of only ₹ 16.19 crore (9.87 *per cent*) against the projected revenue of ₹ 164 crore.

It was also observed that Principal Secretary, UDH, GoR had expressed apprehension (March 2014) that phase-IA was completely unviable, as the ridership projection was impractical because even if total numbers of commuters by way of public as well as private transport was added, it would be difficult to get a figure of more than 25,000 to 30,000 commuters per day as against a projected ridership of 1,21,000 commuters per day.

Thus, after the commercial operation of phase-IA from June 2015 to March 2017, the planned revenue from the project could not be achieved.

[112] Arrived at by dividing average ridership per day for 22 months by projected daily ridership [(23,191/1,21,000) x 100].

GoR stated (November 2017) that the revised approved DPR projected ridership during 2014 as 3.22 lakh for the corridor-I and 2.10 lakh in corridor-II when both the corridors were in place. A fare box revenue of ₹ 164 crore was envisaged during first two years of operation again when both the corridors were in operation. Therefore ridership of 19.17 *per cent* and fare box earning of 9.87 *per cent* worked out by Audit are based on assumptions and not realistic.

The reply is incorrect as DPR of June 2011 and DPR of March 2012 projected the fare box revenue of ₹ 164 crore during first two years of operation with projected ridership of 1.21 lakh per day for phase-IA (*Mansarovar* to *Chandpole*). When phase-IB was to be operational along with phase-IA in April 2017, the fare box revenue and ridership in 2017-18 were projected to be ₹ 167 crore (in one year) and 2.10 lakh per day respectively. This fact had earlier also been admitted (June 2017) by DMRC and endorsed by JMRC.

2.3.7.2 Earning of non-fare box revenue

As per DPR (March 2012) the total non-fare box revenue was projected as ₹ 16.40 crore (10 *per cent* of fare box revenue of ₹ 164 crore) during first two years of the commercial operation of phase-IA. It was observed that revenue earnings from property development were very low and JMRC could earn only ₹ 2.68 crore non-fare box revenue (16.34 *per cent* of projected revenue) during 2015-17. This resulted in shortfall against the projected earnings for ₹ 13.72 crore during that period.

As per the directions issued by MoUD, the non-fare box revenue should be 40 to 50 *per cent* of the fare box revenue. It was observed that Bangalore Metro was able to achieve such non-fare box revenue collection. GoR stated (November 2017) that various actions are in pipeline to further enhance the non-fare box revenue from all possible sources and significant increase is expected in current and next financial year surpassing the estimates 40-50 *per cent*.

Shortcomings noticed in earning of non-fare box revenue are discussed below:

(i) Non-utilisation of land parcels for property development

In terms of MoUD directions issued in March 2009, as metro systems are highly capital intensive projects, the only way they can remain financially healthy without government subsidies, is by increasing their non-operational revenues from advertisement, retailing, real estate (at metro stations and outside) and parking lot revenues.

Revised DPR (March 2012) of phase-I of Jaipur Metro envisaged real estate development at the estimated cost of ₹ 850 crore which would generate rental revenue from 2016-17 with annual increase of five *per cent* thereafter. Further, GoR handed over eight land parcels of total area of 3.01 lakh sqm to JMRC for property development during November 2010 to June 2011.

In this regard, it was observed that the BoD resolved (March 2012) to hire the service of property development consultant for development of land parcels handed over by GoR. Accordingly, JMRC awarded the work of 'assessment of

market potential of land parcels' to Mott MacDonald (General and Technical Consultant) in March 2012. The consultant submitted their report in June 2012 and recommended that the land parcels could be developed for various commercial activities. However, JMRC took no action on the recommendations of the consultant as of August 2017.

JMRC stated (July 2017) that property development work was deferred as the works related to operationalisation of phase-IA of Jaipur metro were taken up on priority. GoR stated (November 2017) that as per initial DPR, Jaipur Metro Rail Project (phase-II) was proposed to be developed through PPP Model. As a part of package there was a proposal to offer the assets of completed phase-I to phase-II concessionaire. Accordingly, PPP model was being explored by the Project Directorate of JMRC by discussing with probable agencies.

However, the fact remained that earning of non-fare box revenue to the extent of 40 to 50 *per cent* was a necessity as per MoUD directions and failure to do so would affect the financial survival of the metro system.

(ii) Infructuous expenditure on construction of underground parking

During execution of work of construction of Depot cum Workshop at *Mansarovar,* it was noticed by DMRC that provision for sufficient underground parking below the Stabling Yard could facilitate real estate development.

As per the DPR there was no provision for construction of underground double floor parking in the basement of the Stabling Yard at *Mansarovar* Depot. However, a proposal for construction of a two level basement parking for approximately 4,000 vehicles was approved by JMRC in March 2012 at an additional cost of ₹ 60 crore with a projection of non-fare box earning of ₹ 133.30 crore from the property development.

Accordingly, DMRC constructed (October 2014) two level basement parking beneath the Stabling Yard at cost of ₹ 22.54 crore with a view to facilitate real estate development by constructing mall/business hotel/commercial tower above the Stabling Yard.

Underground double storied basement parking beneath the Stabling Yard

In this regard, it was observed that JMRC could not finalise any of options for property development even after the lapse of almost three years. This has resulted in the entire expenditure of ₹ 22.54 crore on construction of underground parking remaining infructuous.

JMRC stated (August 2017) that the case has been initiated to engage a consultant for property development. GoR stated (November 2017) that parking is a long term investment which will add value to the future earnings of JMRC from property development.

However, the fact remained that the underground parking built at a cost of ₹ 22.54 crore was lying idle since June 2015 and JMRC could not utilise the property for commercial development to earn non-fare box revenue.

(iii) Non-utilisation of space in the metro stations

Retail space of 8,318.52 sqm (excluding space for mobile towers on roofs) was available in nine metro stations of phase-IA for leasing out to the entrepreneurs interested in establishing kiosks for various services like food courts and ATMs. Accordingly, JMRC prepared Expression of Interest (EoI) during August 2013 and RFP during September 2013, but did not finalise and publish them in the media to obtain responses of interested parties.

It was further observed that since operationalisation of phase-IA, JMRC has received revenue of only ₹ 2.63 crore by leasing out only 157.51 sqm area (1.89 *per cent* of available area) for ATMs at the metro stations.

GoR stated (November 2017) that plan of utilisation of spaces on metro stations was being discussed at various levels in JMRC. Final plan for leasing out of spaces was presented before Chief Minister on 14 August 2017. Now the estimates have been approved at competent level and RFP for different packages of retail area were being processed.

The fact remained that JMRC failed to utilize 98.11 *per cent* of the available space within the metro stations and lost an opportunity to increase its non-fare box revenue in the last more than two years.

2.3.7.3 Non-utilisation of Platform No.2 of Chandpole Metro Station

Two platforms were constructed at *Chandpole* underground metro station at the cost of ₹ 111.50 crore. Both the platforms were designed to accommodate metro trains of six coaches each. Commissioner of Railway Safety (CRS) inspected (April 2015) the station and noted that platform No.2 was not suitable for receipt and despatch of trains, as it could not accommodate a train of even four coaches due to various technical reasons. JMRC was using only Platform No.1 at *Chandpole* underground metro station for reception and despatch of the trains and platform No.2 was closed.

***Chandpole* Platform No. 2**

JMRC stated (August 2017) that it would obtain Railway Board's condonation before six coach trains are put into service. The reply was not acceptable, as the asset created for the specific purpose could not be put to use due to faulty design. Further, GoR stated (November 2017) that suitable modification of signalling system to accommodate four coaches has been completed. The application for sanction of CRS to permit reception and dispatch of four coach train on platform No.2 is under preparation and submission. After getting CRS sanction the platform No.2 will be utilized as per operational requirement.

Thus, due to faulty design of platform No.2, it could not be used and JMRC has to incur extra expenditure (which has not yet been assessed) to make it useful in future.

2.3.7.4 Non-utilisation of assets created for specific purposes

(i) Non-utilisation of Interior Cleaning Shed

DMRC constructed one Interior Cleaning Shed for washing of train rakes and cleaning of interior walls, floors, window glasses etc., of metro trains.

Shed for cleaning of train rakes

It was observed that JMRC never used the shed for cleaning train rakes since operationalisation of phase-IA. JMRC stated (July 2017) that the shed could not be utilised as basic facilities like water pipe line and its outlets and ladders were not provided. JMRC had not even raised this issue with Director (Works) of DMRC in a meeting held to discuss issues of left over work of Phase-IA on 25 October 2016.

GoR accepted (November 2017) the observation and stated that pending petty works likewise pipeline and its outlet, ladders etc., had been planned to be executed by JMRC against the saving in the project cost.

(ii) Non-utilisation of Effluent Water Treatment Plant

DMRC constructed Effluent Water Treatment (EWT) Plant at a cost of ₹ 60 lakh for treatment of wastewater before its discharge at *Mansarovar* Depot.

It was observed that EWT Plant was never used since operationalisation of phase-IA.JMRC stated (July 2017) that pipe connection to outlet of the Plant to dispose/utilise the treated water is pending with DMRC leading to non utilisation of the Plant.

Thus, the asset created for environmental safeguard with expenditure of ₹ 60 lakh, was lying idle. Further, JMRC had not even raised this issue with Director (Works) of DMRC in a meeting held to discuss issues of left over work of phase- IA on 25 October 2016.

GoR accepted (November 2017) the observation and stated that pending petty works like pipe connections to outlet have been planned to be executed by JMRC against the saving in the project cost.

(iii) Non-operation of Rail cum Road Vehicle

DMRC supplied (June 2014) Rail cum Road Vehicle (RRV) to carry re-railing and rescue equipment at a cost of ₹ 33.48 lakh. RRV is capable of running on road as well as on track in emergency situations. As per the contract, DMRC was responsible to obtain the mandatory safety certificate from Commissioner Railway Safety and provisional speed certificate from Research Designs and Standards Organisation (RDSO).

It was observed that despite regular pursuation DMRC did not obtain the certificates and RRV was lying in the workshop since June 2014.

Thus, in absence of mandatory safety certificates, RRV would not be in a position to be utilised in a situation of emergency and the safety of the commuters was at stake.

Rail cum Road Vehicle

GoR accepted (November 2017) the observation and stated that DMRC has been asked to withhold pending payment of ₹ 3.35 lakh to the contractor till the operation of vehicle is sanctioned by the Central Government on mainline metro track.

(iv) Non-commissioning and under performance of Automatic Train Wash Plant

Clause 5.2 of the agreement executed by DMRC for supply of fully Automatic Train Washing (ATW) Plant at a cost of ₹ 3 crore, provided that after continuous working for two months without any break or 100 number of train washes (whichever was later), the ATW would be treated as commissioned.

It was observed that DMRC supplied ATW in October 2013, but since installation, the problem of automatic shutdown of the Plant in auto mode has occurred repeatedly mainly due to software and other problems. The Plant had worked in auto mode for only 352 days out of 588 days since its installation and washing of the trains was being managed by operating it in manual mode.

Thus, ATW Plant could not be commissioned even after lapse of two years as it was underperforming.

GoR accepted (November 2017) the observation and stated that till the satisfactory compliances for working of the plant as per contract, DMRC has been asked to withhold pending payment of ₹ 37.48 lakh and 10 *per cent* performance guarantee.

2.3.7.5 Non-functioning of Rain Water Harvesting Pits

The work of construction of 255 Rain Water Harvesting (RWH) pits was included in the main works of construction of viaducts. JMRC intimated (August 2017) that only 29 RWHs were constructed by DMRC and they too were not constructed according to the approved drawing and design. Further, RWHs were not functioning since operationalisation of phase-IA. Although JMRC regularly requested DMRC for rectification of RWHs, no action has been taken by DMRC.

Non-functional Rain Water Harvesting pits

GoR accepted (November 2017) the observation and stated that JDA/JMRC will undertake the remaining work.

2.3.7.6 Management of power systems

(i) Avoidable extra expenditure on power supply system

As per guidelines issued (May 2010) on 'Power Supply Installations in Electrical Traction' by the Institution of Railway Electrical Engineers, Indian Railways was to employ Traction Sub-Station (TSS) to supply power for electric traction at distance of 35 to 50 km. To ensure continuity of supply under all conditions, high voltage feed to the TSS was to be invariably arranged from two sources of power or by a double transmission line. Accordingly, Indian Railways follows the process of installing two transformers at each TSS including one standby transformer. Thus for 35 to 50 km distance, there was need to install one TSS and two transformers (including one standby transformer).

It was, however, observed that in contravention of these guidelines, DMRC for phase-I (12.07 km length), installed two TSSs with four transformers each (including two standby transformers each)[113] at *Mansarovar* and Sindhi Camp at an expenditure of ₹ 65.54 crore. This resulted in the capacity of transformers installed being double the required power supply for operation of 12.07 km long corridor.

It was also observed that Chennai Metro (21.96 km length for second corridor)[114] and Hyderabad Metro (29 km length for first corridor)[115] had one TSS each for covering longer distances than the phase-I of Jaipur Metro.

JMRC stated (August 2017) that the power supply system of Indian Railways and Metro Rail System cannot be compared on techno-economic consideration. The reply was not acceptable as the electricity supply system installed by JMRC is much more than the present and projected demand as well as the design adopted in other metros.

[113] Capacity of 103.2 Mega-Volt Ampere (MVA) for traction and auxiliary load (with equal standby facility).

[114] Capacity of 31.8 MVA for traction and auxiliary load (with equal standby facility).

[115] Capacity of 37 MVA for traction and auxiliary load (with equal standby facility).

GoR stated (November 2017) that as per DPR, the peak hours demand projections for traction and auxiliary load requirement was 23.6 MVA (2031) for Phase-I (A & B). GoR further stated that the approved DPR (of June 2011) has provision of two TSSs. Accordingly, two (one as standby) 21.6 MVA single phase transformers for feeding traction load and two (one as standby) 30 MVA three phase transformers for feeding all auxiliary loads had been provided each at *Mansarovar* and Sindhi Camp TSSs.

The reply of GoR clearly indicates that 103.2 MVA[116] capacity transformers were installed at two TSSs/locations (with equal standby capacity) to cater to load of 23.6 MVA up to 2031, which was a gross overestimation. Moreover, presently both the TSSs are connected with load of 6 MVA for operation and maintenance of only 9.63 km corridor (*Mansarovar* to *Chandpole*).

GoR further stated (December 2017) that the extra capacity of power supply system would be technically and efficiently utilized for Phase-II.

Thus, DMRC incurred an avoidable extra expenditure of ₹ 32.77 crore (half the capital cost of ₹ 65.54 crore) on installation of excess power supply system.

(ii) Excess payment of electric plant charges

Clause 4(5) of Terms and Conditions for Supply of Electricity (TCSE)-2004 of Jaipur Vidyut Vitran Nigam Limited (JVVNL) provided that only 15 *per cent* of expenses on transmission line and electric plant were payable as supervision charges when the electric line and plant are installed by the consumer itself.

It was observed that JMRC deposited (February 2013) ₹ 2.11 crore to JVVNL for 132KV electrical connection of 10 MVA each at *Mansarovar* and Sindhi Camp to feed TSSs, which included ₹ 50 lakh[117] as electric plant charges. Since the work of electric line and plant was carried out by DMRC, therefore only 15 *per cent* supervision charges were payable to JVVNL. Thus, JMRC irregularly paid ₹ 50 lakh to JVVNL for electric plant.

GoR stated (November 2017) that as per clause 2 of Part-II of TCSE of JVVNL, ₹ 250 per KVA of connected demand was applicable towards plant charges plus 15 *per cent* supervision charges on the cost incurred by the applicant on electric line & plant for the HT supply connection.

The reply is not acceptable since as per the above clause 4(5) of TCSE, if the applicant provides electric line and plant, only 15 *per cent* of such expenses had to be deposited as supervision charges with the application.

GoR further stated (December 2017) that JVVNL has been requested to refund the electric plant charges.

[116] 21.6 x 2 + 30 x 2 = 103.2

[117] ₹ 250 per KVA x 20,000 KVA.

2.3.7.7 Wasteful expenditure on idle staff

Phase-IA of Jaipur Metro was scheduled to be operationalised from June 2013. Accordingly, JMRC appointed 389 technical and non-technical employees during January 2013 to April 2013. They were given in-house and on-the-job (practical) training in DMRC up to September 2013.

It was observed that as Phase-IA of Jaipur Metro was operationalised after a delay of two years, the services of the trained staff could not be utilised from October 2013 to May 2015 and the 383 trained staff remained idle.

Thus, failure of JMRC in synchronising recruitment of staff with the operationalisation of phase-IA resulted in wasteful payment of ₹ 11.05 crore to the staff.

GoR stated (December 2017) that recruitment and joining of staff would be staggered as per requirement in Phase-II.

2.3.7.8 Non-creation of Dedicated Metro Fund

GoR decided (July 2010) to provide financial support to Jaipur Metro Rail Project by creating a Dedicated Metro Fund (DMF) under the UDH Department to be managed by JMRC. The objective of DMF was to (i) fund the viability gap, expansion of the project and debt servicing; (ii) meet the capital expenditure on new/ongoing project and ancillary activities of the project; and (iii) fund the operational loss of JMRC.

DMF was to be funded from (i) revenue from sale of land and commercial development/leases/transfer etc., of the land allotted to JMRC, (ii) transfer of revenue by JDA on account of premium floor area ratio, (iii) revenue and entry tax to be levied on light/medium and heavy transport vehicles and (iv) revenue from grant/contribution/subsidy or any other sources as may be approved by GoR.

It was noticed that GoR formed (July 2010) a Fund Management Committee headed by Principal Secretary, UDH Department to operate, manage and approve the funding to JMRC from DMF. However, even after a lapse of seven years, the proposal for creation of DMF was not finalised by Finance Department. The operational losses of JMRC were being met from the Rajasthan Transport Infrastructure Development Fund.

GoR stated (November 2017) that the proposal for creation of DMF has been approved by incorporating some modifications/changes and issuance of formal orders, is under process.

2.3.7.9 Avoidable expenditure on hiring of office premises

JMRC hired 725.22 sqm space (since September 2010) from Rajasthan State Mines & Minerals Limited (RSMM) and 1,082.13 sqm (since June 2013) from Rajasthan Small Industries Corporation Limited (RSIC), on rent/lease basis for housing its offices.

JMRC constructed a new administrative building of 15,460 sqm area at *Mansarovar* depot and accordingly in May 2015, JMRC vacated around 250 sqm space of RSMM and shifted all Departments of Operation and Systems (O&S) into the new building at *Mansarovar*.

It was observed that inspite of availability of 15,210 sqm in the new building at *Mansarovar*, JMRC did not vacate the entire space rented from RSMM. This resulted in expenditure of ₹ 1.36 crore (RSMM: ₹ 27.94 lakh and RSIC: ₹ 107.89 lakh) on hiring of premises of RSMM and RSIC, during June 2015 to March 2017 which was avoidable.

GoR stated (November 2017) that the administrative building at *Mansarovar* depot was constructed only for management of Operation & System manpower and Assets of JMRC. The reply is not convincing as sufficient additional space was available in its own premises to accommodate all remaining offices of JMRC.

Operation of Phase-I of Jaipur metro

Performance of phase-IA of Jaipur metro was poor as the average ridership during the first 22 months of operation was just 19.17 per cent. Further the ridership has been dropping drastically from 42.60 per cent since its operationalisation to 14.14 per cent as of March 2017. With an operating revenue of ₹18.87 crore, JMRC is currently unable to meet even its operating expenses of ₹85.56 crore for running the Jaipur metro.

JMRC could earn only 16.34 per cent revenue of projected non-fare box revenue, during 2015-17 as they could neither commercially exploit the allotted land parcels of 3.01 lakh sqm nor lease out 98 per cent area of 8,318.52 sqm available in nine metro stations.

Infrastructure created such as Platform No.2 of Chandpole Station, underground parking beneath the stabling yard, cleaning shed, effluent water treatment plant, automatic train washing plant could not be fully utilised due to improper planning and defective construction/installation/ commissioning.

Important safety equipment like the rail cum road vehicle was not utilised for want of mandatory certification thereby compromising the safety of the metro system. The capacity of the power supply system installed by JMRC for phase-I was also much more than the present as well as the projected demand.

JMRC also continued to house its offices in hired buildings inspite of availability of space in own building.

Recommendations:

5. *In view of the low ridership and high operating cost, JMRC should evaluate the reasons for the low utilisation of the metro system by conducting a detailed survey amongst both current users and potential users and take up initiatives to increase the ridership.*

6. *As earning of non-fare box revenue to the extent of 40 to 50 per cent was a necessity for financial survival of the metro system, JMRC should strive to increase its non-fare box revenue by commercially exploiting its available land parcels and spaces at metro stations.*

7. *Considering the huge operating losses, JMRC should immediately shift all its offices into its own administrative building at Mansarovar and save hiring expense of ₹ 6.80 lakhs per month.*

Audit Objective 4: Whether an adequate control mechanism was in existence in JMRC to monitor the projects and ensure timely completion of works as per specification.

2.3.8 Internal Control in JMRC

Effective corporate governance is essential for a company to meet its strategic goals. A corporate governance structure combines controls, policies and guidelines that drive the organization toward its objectives while also satisfying stakeholders' needs. JMRC's control mechanisms are discussed in succeeding paragraphs:

2.3.8.1 Non-adherence of contractual obligation by DMRC

As per clause 25 K of the agreement, DMRC was required to submit the funds requirement on quarterly basis along with the details of expenditure incurred in the form of statement of account supported by the full details and bills, required by JMRC for audit purposes.

It was, however, observed that DMRC did not submit details of expenditure in the form of statement of account with supporting documents. The issue of non-submission of documents to support the expenditure is also being pointed out by statutory auditors in their annual audit reports since 2010-11, but JMRC did not obtain details of expenditure and the supported documents from DMRC to facilitate the audit process.

GoR stated (November 2017) that JMRC had decided that the quarterly progress report should not include any bills for expenditure as the project was being executed on deposit work basis by DMRC which is a government body fully accountable to audit.

The reply is not acceptable as JMRC should have ensured accuracy and genuineness of project expenditure.

2.3.8.2 Non-adhering to the provisions of the Companies Act 2013 and rules made there under

Section 149 of the Companies Act, 2013 stipulated for appointment of at least two independent directors in JMRC. Further, Section 177 provided for constitution of an Audit Committee with minimum three directors (independent directors in majority).

It was observed that GoR belatedly appointed (February 2017) one independent director[118] on the Board and the appointment of another independent director was not decided as of September 2017.

However, as only one independent director was appointed, the compliance of the Companies Act, 2013 (i.e. assess the quality, quantity and timeliness of flow of information between the company management and the Board that was necessary for the Board to effectively and reasonably perform their duties) could not be adhered to. Further, GoR did not follow the provisions of Companies Act for appointment of two independent directors and appropriate constitution of Audit Committee for JMRC.

GoR stated (November 2017) that appointment of another independent director is under process.

2.3.8.3 Non-adherence to the provisions of the Contract Labour Act

The Contract Labour Act, 1970 provided for mandatory registration of employer and placement agency/contractor, employing more than 50 workmen.

It was observed that during the period from December 2013 to March 2017, JMRC employed more than 50 personnel of various categories on monthly basis through placement agency/contractor and paid them ₹ 4.86 crore. However, neither JMRC was registered under the Contract Labour Act, nor it ensured registration of the placement agency/contractor for monitoring the compliance of statutory provisions by the Department concerned.

GoR stated (November 2017) that presently (August/September 2017), JMRC and Placement Agency have been registered and proper monitoring is being done. The fact remained that the disbursement of wages to employed personnel through placement agency could not be monitored during December 2013 to August 2017.

2.3.8.4 Internal Audit

Internal audit is concerned with evaluating and improving the effectiveness of risk management, control and governance processes in an organisation. Internal auditors work with management to systematically review systems and operations. Audits can also identify areas where efficiency can be improved and innovations made.

It was observed that JMRC did not have a dedicated Internal Audit Wing and during 2011-17, internal audit was entrusted to external firms of Chartered Accountants. The scope of Internal Audit was mainly restricted to audit of vouchers to ensure that the expenditure was incurred in accordance with schedule of powers. The reports did not state whether right processes were in place in JMRC and it could not identify areas where efficiency could be improved.

Thus, there was a need to improve the internal audit control systems in JMRC.

[118] Collector of Jaipur District.

GoR stated (November 2017) that the internal auditor has not only done the audit of vouchers but also tax matters and revenue system. Internal auditor submits its report on a progressive basis. Any unattended observation/paragraphs raised by internal auditor which required compliance is included in next quarterly report.

The reply is not convincing in view of fact that the compliance of observations were not found recorded and approved by the competent authority. Moreover, GoR did not offer any comments on the other issues highlighted in the paragraph.

Control Mechanism in JMRC

GoR did not follow the provisions of the Companies Act as only one independent director was appointed resulting in the compliance to provisions of the Companies Act 2013 being compromised. JMRC did not adhere to the provisions of the Contract Labour Act. JMRC also lacked a dedicated internal audit department and there was a need to improve the internal audit control systems.

Recommendation:

8. In view of the high operating costs and poor financial performance JMRC should immediately create an Internal Audit Department so that necessary corrective action is taken on the recommendations of Audit.

2.3.9 Conclusion

Jaipur city with a population of 2.3 million was not directly eligible for a metro rail project. Instead of preparing Comprehensive Mobility Plan (CMP), Alternative Analysis and then a Detailed Project Report (DPR), GoR prepared a DPR, a transportation study as part of DPR and thereafter a CMP. The more feasible corridor of Durgapura to Ambabari which had higher projected ridership and Peak Hour Peak Direction Trips (PHPDT) was not selected. Instead Mansarovar to Badi Chaupar corridor which had lower PHPDT, lower ridership and lower average lead compared to the Sitapura to Ambabari corridor was executed first.

Further, the lower cost technology of LRT was not explored. The Procurement of rolling stock in advance for Phase-IB resulted not only in blocking of funds of ₹ 72.30 crore but also reduction in useful life by almost four years.

Performance of phase-IA of Jaipur metro was poor as the average ridership during the first 22 months of operation was just 19.17 per cent. Further, the ridership had been dropping drastically. With an operating revenue of ₹ 18.87 crore, JMRC is currently unable to meet its operating expenses of ₹ 85.56 crore for first 22 months.

During 2015-17, JMRC could earn only 16.34 per cent revenue of projected non-fare box revenue. They could neither commercially exploit the allotted land parcels nor lease out available area of nine metro stations.

Important safely equipment like rail cum road vehicle was not utilized for want of mandatory certification thereby compromising the safety of the metro system. The capacity of the power supply system installed by JMRC for phase-I was also much more than the present as well as the projected demand.

Thus, due to defective planning and hasty decision making, a financially unviable metro system was introduced in Jaipur city.