# Chapter - II
# Performance Audit

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## Water Resources Department

## 2.1 Implementation of selected Lift Irrigation Schemes

### 2.1.1 Introduction

Lift Irrigation (LI) Schemes are major sources for supply of water for both drinking and irrigation in Andhra Pradesh. They cater mostly to the needs of drought prone areas in uplands where there is no other possible method of providing water supply. As per the data available, there are 17 LI (major and medium) schemes[1], with 25.35 lakh acres of contemplated ayacut, out of which Pattiseema LIS was completed during 2016. Ayacut irrigated under these LI schemes constitute 25 *per cent* of the total irrigated ayacut in the State.

### 2.1.2 Organizational setup

The Water Resources Department (WRD) is responsible for execution and maintenance of the irrigation projects including LI schemes in the State. The Principal Secretary, Water Resources Department at Secretariat level, Engineer-in-Chief (Irrigation) at State level, Chief Engineers, Commissioner of Command Area Development Authority, 50 Superintending Engineers and 266 Executive Engineers are in charge of the administrative, financial, technical aspects and execution of works taken up by Water Resources Department.

### 2.1.3 Scope and Methodology of Audit

A Performance Audit (PA) of implementation of four lift irrigation projects viz. Guru Raghavendra, Pulikanuma, Pattiseema and Pushkara selected through random sampling without replacement basis using Interactive Data Extraction and Analysis (IDEA) software was conducted from March to June 2016. Entry Conference was held on 3 May 2016 in which the objectives, scope and methodology of audit were intimated to the Department.

Scrutiny of records relating to the projects from their inception till March 2016 was done with special focus on last five years, at the Secretariat and Offices of Engineer-in-Chief (Polavaram Irrigation Project), Dowlaiswaram; Chief Engineer cum Superintending Engineer (Pattiseema), Dowlaiswaram; Chief Engineer (Project), Kurnool; Superintending Engineer (Pushkara), Tuni;

[1] Information taken from the Administrative Reports/ official website of Water Resources Department

Superintending Engineer (Irrigation Circle), Kurnool and six Executive Engineers[2]. Audit conclusions were drawn after obtaining information required from the Department through issue of audit enquiries and taking note of views of the Department expressed during the Exit Conference held on 7 December 2016.

## 2.1.4 Audit objectives

Performance Audit of implementation of selected lift irrigation schemes was conducted to assess whether:

(i) Planning for the LI Schemes was comprehensive and the schemes were formulated properly;

(ii) Tendering and contract management, at all stages of the project implementation, had followed the canons of financial propriety and transparency; and

(iii) The LI schemes were executed within the time and cost budgeted and the envisaged target of creation of irrigation potential was achieved.

## 2.1.5 Sources of Audit criteria

Performance Audit findings were benchmarked against the following:

(i) Departmental Codes and Manuals,

(ii) Government Orders and Instructions/Circulars issued by Central/State Governments from time to time,

(iii) Central Water Commission (CWC) Guidelines,

(iv) National Water Policy, and

(v) Guidelines/norms of Ministry of Environment and Forests

## 2.1.6 Acknowledgement

Audit acknowledges the cooperation rendered by the officers and staff of the WRD during the course of the Performance Audit.

## 2.1.7 About the Projects

Out of the four LI schemes covered under the audit, two (Guru Raghavendra and Pulikanuma) were conceived to supplement the existing irrigation project (Tungabhadra) and the remaining projects (Pattiseema and Pushkara) were taken up to derive early benefits from the ongoing Polavaram irrigation project.

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[2] PIP RMC Division, Kovvuru; PIP LMC Division Nos. 1 & 2, Dowlaiswaram; PIP LMC Division No. 3 Jaggampeta; PIP LMC Division No.4, Tuni; and GRP division No. 2, Yemmiganur

Guru Raghavendra Project consisting of 13 Lift Irrigation Schemes and one Minor Irrigation Scheme was taken up for supplementing the Tungabhadra Project Low Level Canal (LLC). Tungabhadra LLC takes off from right flank of Tungabhadra Project in Karnataka. Due to siltation in Tungabhadra dam, about 50,000 acres in the tail ends of distributaries were deprived of irrigation facilities. All the 14 schemes were given administrative approval between 2003 and 2011. The works were entrusted to different agencies under lump sum (LS) or Engineering, Procurement and Construction (EPC) contracts. Out of 14 Schemes, four[3] schemes were executed by Andhra Pradesh State Irrigation Development Corporation (APSIDC) and the remaining 10 were executed through WRD. Out of 14 schemes, 11 were completed/ commissioned between January 2006 and August 2014 and three schemes were under construction. The Pulikanuma LIS, which was administratively sanctioned in January 2008 is also part of Guru Raghavendra Project.

Pattiseema and Pushkara LISs were proposed for deriving early benefits from Polavaram irrigation project (an ongoing project) by lifting water from Godavari river. The water lifted would be routed to the Right Main Canal of the Polavaram Project and Pushkara Main canal, respectively. These schemes were administratively sanctioned by the Government in 2003 (Pushkara) and 2015 (Pattiseema). The work of Pattiseema which was awarded under EPC contract was completed within the prescribed time (March 2016). However, the construction work of Pushkara LIS was in progress till the date of audit. The present status of these projects in financial terms is shown in the table below:

***Table 2.1 – Details of original cost, revised cost and expenditure***

**(₹ in crore)**

| Name of the Project (LIS) | Administrative sanctions (₹ in crore) | Scheduled date of completion of works as per agreements | | Project cost (₹ in crore) | | IP planned (in lakh acres) | IP created/ stabilised (in lakh acres) | Present status of the project | Total expenditure as of May 2016 (₹ in crore) |
|---|---|---|---|---|---|---|---|---|---|
| | | Original | Revised | Original | Revised | | | | |
| Guru Raghavendra LIS (GLIS) and Pulikanuma (14 packages) | 569.77 (2003 to 2011) | January 2005 to March 2015 | January 2006 to March 2017 | 569.77 | 584.97 | 0.86 | 0.18 | Ongoing (11 out of 14 completed) | 359.73 |
| Pattiseema LIS (one package) | 1300 (2015) | March 2016 | March 2016 | 1170.25 | 1667.15 | 4.66* | Not available | Completed | 1232.54 |
| Pushkara LIS (19 packages) | 674.52 (2014) | July 2005 to March 2010 | December 2007 to June 2016 | 297.25 | 674.50 | 1.859 | 1.46 | Ongoing | 652.51 |

* This includes IP contemplated under Polavaram Right Main Canal

***Source:*** Departmental records

[3] Krishnadoddi, Chintamanupalli, Remata and Munagala LI schemes

Audit findings regarding contemplation, execution, completion and maintenance of the selected projects are discussed in the following paragraphs.

**Audit Findings**

## 2.1.8 Deficiencies in Planning

In all the schemes covered under audit, there were failures in planning as discussed below:

### 2.1.8.1 Non-preparation/deficient preparation of Detailed Project Reports

Para 391 of Andhra Pradesh Public Works Department (APPWD) Code prescribes preparation of Detailed Project Report (DPR) before taking up a project. As per directions of the Planning Commission, whenever any project is taken up on interstate river, Preliminary report for clearance of the project is to be sent to CWC for scrutiny following which investment clearance from Planning Commission is to be obtained for inclusion in the State Development Plan. If the proposal is found acceptable, CWC conveys 'in principle' consent to State Government for preparation of DPR. Audit observed the following:

***(i) Guru Raghavendra and Pulikanuma LI schemes:*** The DPR for Guru Raghavendra project (prepared in the year 1998) was originally contemplated for execution of three sub-schemes including Pulikanuma LIS. Subsequently, several changes were made to the project on adhoc basis taking the total number of sub-schemes to 14. However, the Department neither prepared any revised DPR for the entire project taking into account these new sub-schemes nor prepared individual project reports for them. Further, feasibility studies were not conducted for 12[4] of the 13 individual LI schemes. Due to non-preparation of revised DPR, discrepancies/inconsistencies in levels were observed subsequently in some of the sub-schemes under the project, resulting in non-release of water to the intended ayacut, apart from time and cost overrun as discussed in Para 2.1.8.2.

The Department, during the exit conference, accepted (December 2016) that individual DPRs for all LI schemes of GRP LI scheme were not prepared but a DPR for the full project had been prepared. The reply was not tenable since the DPR envisaged only three sub schemes but the Department had executed 14 sub schemes. The Department should have prepared fresh DPRs for the new sub schemes.

***(ii) Pushkara LI scheme:*** The feasibility report and DPR for Pushkara LIS were prepared in 2003 for creation of an ayacut of 0.98 lakh acres and the

[4] Feasibility report was prepared for Pulikanuma LI scheme.

works were awarded in 2004. The Department later increased the ayacut to 1.86 lakh acres and prepared a revised DPR in 2006. Even this DPR was found to be deficient and several major and frequent changes were made during execution viz, increase in number of lifts from three to 11 and increase in length of canal from 91.5 km to 97.1 km. Further, though the project was scheduled to be completed by 2006, the Department took nearly five years (2003 to 2008) for finalization of the components of the project resulting in delay in completion. The project was not completed (June 2016) even after lapse of more than 10 years from the scheduled date of completion.

The Department replied that changes had to be made due to undulations in topography observed after survey and investigation. The reply confirms that the DPR was prepared without conducting proper survey and investigation.

### 2.1.8.2 Failure to take into account carrying capacities of distributaries

As the four LI schemes were meant to either supplement the already existing schemes or derive early benefits from other schemes being executed, they should have been planned taking into consideration the geographic locations and carrying capacities of existing distributary systems or those under development.

Audit observed that Department had failed to take into account the carrying capacity/heights of the existing distributary system and to ensure that it would be revamped/constructed in time to utilise the pumping capacity that was available. In all the projects, the ayacut intended was not completely served due to this lacuna on the part of the Department. There were also cases where ayacut was not served due to the height level difference between the water lifted/canal and the distributary system.

***(i) Guru Raghavendra LIS:*** The Guru Raghavendra Project (GRP) works were taken up in 2004/2005, without preparing a comprehensive DPR and without proper investigation regarding compatibility of the existing distributary system of Tungabhadra LLC with the new sub-schemes being taken up. After 11 to 12 years of taking up of the Projects, the Department found (2015) in seven out of nine LI schemes either commissioned or ready for commissioning that the discharge capacities of Tungabhadra LLC distributaries at merging points were less than the discharge capacity of GRP supply channels by 12.83 to 89.04 *per cent* as detailed in ***Appendix-2.1***. Three works were executed under EPC contract system and four were executed under lump sum contracts. Both the EPC agencies and the Department failed to take into account the differences in discharge capacities while designing the schemes. Though the Department had decided (July 2015) to enhance the capacity of canal sections to accommodate full discharge of GRP LI schemes, even estimates had not been prepared/ finalized as of June 2016. Due to non-improvement of canal section, water was not being released into distributaries at the full discharge capacity resulting in deprivation of irrigation facilities to ayacutdars.

The Department accepted (December 2016) that the existing distributaries of Tungabhadra LLC did not have sufficient capacity to take the discharge of GRP supply channels and stated that action would be taken to redesign the canal system.

Further, in Mugaladoddi scheme, which is a part of GRP and was commissioned in 2009, the Department conducted (December 2012) a detailed survey and observed that due to the height difference between the bed levels of Tungabhadra LLC minors and GRP supply channels at the merging points, water was not being supplied to 2600 acres out of the 3793 acres planned. It has not been rectified till date (October 2016).

***(ii) Pattiseema LIS:*** The Pattiseema LIS was intended to derive benefits by utilizing the Right Main Canal (RMC) of Polavaram Irrigation Project. It was to cater to the 1.2 lakh acres of ayacut besides diverting the flood water of Godavari to Krishna river. Thus, completion of Polavaram RMC work simultaneously with the Pattiseema LIS was essential to derive benefits from the LIS. However, though the LI scheme was completed in time (March 2016), Audit observed that as of June 2016, the works of Polavaram RMC were incomplete. Due to lack of canal system of adequate carrying capacity, only 11 of the 24 pumps of Pattiseema LIS were operated during the flood in July - September 2016. Thus, due to improper planning, the targeted objectives could not be achieved despite completion of the LIS.

### 2.1.8.3 Non identification of ayacut/users of the projects

Para 390 of APPWD stipulates that the approximate extent of the ayacut of the project and its general location should be specified while preparing project reports.

Audit observed that neither the ayacut nor the actual users were identified under the schemes though these were meant to supplement either the existing projects or projects under construction.

***(i) Guru Raghavendra Project:*** Basaladoddi LIS was conceived as part of GRP for stabilization of gap ayacut of 6450 acres. However, the details of the area to be covered were not specified. The work was awarded (July 2005) to a contractor under EPC contract for ₹ 59.99 crore and was completed by September 2013. After completion of the lift works, the Department found (August 2015) that against total intended ayacut of 6450 acres, the existing gap ayacut was only 3055 acres. This indicates that the Department had incorrectly estimated the extent of gap ayacut to be supplemented under this scheme. The balance ayacut of 3395 acres had to be newly developed to achieve the targets. The Department had to conclude (March 2016) a supplementary agreement for an amount of ₹1.68 crore with the agency for creation of the same.

Pulachinta LIS (a sub-scheme of GRP) taken up for irrigating gap ayacut of 4400 acres was completed in September 2011. The scheme was taken over by the Department in March 2014 after completion of defect liability period. Pulachinta is a two stage LIS. In the first stage, water is lifted from Tungabhadra River and routed through a gravity canal for a length of 8.525 Km into a reservoir. In second stage, water is lifted from the reservoir and routed through a gravity canal for a length of one Km to Chinnakothiliki distributary for serving the targeted ayacut. The water requirements of the farmers en route were not taken into consideration while planning the scheme. This led to unauthorized drawl of water by the farmers in the villages en route from the gravity canals and reservoir. As a result, the ayacutdars of Chinnakothiliki distributary, for whom the scheme was intended, were not getting the intended supply of water and only 44.32 *per cent* of the planned ayacut was served during the audit period. This could have been avoided had the Department identified the irrigation needs of the farmers en route.

***(ii) Pulikanuma LIS:*** Pulikanuma LIS was taken up for supplementing an ayacut of 26400 acres beyond Km 270.00 of Tungabhadra LLC. The work was awarded (June 2008) to a contractor for ₹263.10 crore for completion in 36 months. It was observed that the details of ayacut to be served (distributary-wise and village-wise) were not mentioned either in the estimate or in the NIT/ agreement and have not been defined even after eight years since commencement.

The Department may therefore identify the beneficiaries of the schemes and details of ayacut to be served for achievement of intended objectives immediately after completion of the Project.

***(iii) Pushkara LIS:*** Audit observed that in Pushkara LIS also several changes were made during execution due to preparation of DPR without proper survey and investigation. The DPR of Pushkara LIS had proposed creation of 1223 acres ayacut in four villages in Kotananduru Mandal. However, during execution, the Department created ayacut in 16 villages in new mandals which were not contemplated in the DPR for creation of ayacut. No steps were taken by the Department to create ayacut in the four villages originally proposed.

***(iv) Pattiseema LIS:*** The Administrative sanction was accorded (January 2015) for the Pattiseema LIS to divert 80 TMC of water from Godavari river for domestic and industrial uses. However, no mention was made about irrigation facilities. The work was awarded at a cost of ₹1427.70 crore in March 2015 and was completed in March 2016. When the details of intended use of water under the scheme were called for by Audit, the Chief Engineer of the project replied (May 2016) that the list of industries had not been prepared and that the villages for domestic supply could not be identified since the distributary system for Polavaram RMC had not been finalized. The reply confirms that the project was taken up without identifying the users.

### 2.1.8.4 Inadequate planning for land

Though land acquisition issues cause delay in implementation of the Projects, these can be mitigated or reduced with proper planning. Audit came across some such issues which could have been avoided if the feasibility study, survey and investigation had been carried out properly.

In Chilakaladona sub-scheme of GRP, a reservoir with full reservoir level (FRL) of +340 M was to be constructed. While identifying the land to be acquired for the project, the Department estimated the submerge area at 307.72 acres. However, the Department conducted (September 2015) joint survey with Revenue Department and observed that the total area submerged was 369.95 acres. This implies that the land identified by the Department in the initial stage was erroneous. Accordingly, it submitted (November 2015) proposals to Revenue Department for acquisition of remaining land. The Department may now have to pay higher amount of compensation at ₹ five lakh to ₹ seven lakh per acre instead of ₹0.65 lakh to ₹0.70 lakh per acre.

While accepting the audit observation, the Department stated (December 2016) that the acquisition of additional land was under process.

It was further observed that the Department had acquired (in 2004) 19.74 acres of land for excavation of a supply channel. Later, the Department found that there was height difference between the supply channel and the distributary and changed the design of supply channel in May 2013. After revising the designs, the 19.74 acres of land acquired at a cost of ₹13.14 lakh was found unnecessary. As of June 2016, this land remains unutilised. This indicates that the supply channel was designed incorrectly.

The Department stated (December 2016) that they were planning to sell the land to the original land owners. However, the Department had not taken any action in the past three years to dispose of the land.

### 2.1.8.5 Benefit-cost ratio

Benefit-cost ratio (BCR) is one of the parameters for deciding whether a project is economically feasible or not. It was observed that BCR was either not calculated or calculated on the basis of incorrect assumptions in the test-checked projects.

***(i) Pattiseema LIS:*** Audit observed that in the case of Pattiseema LIS, the BCR was worked out on the basis of wrong assumptions and without supporting calculations. For example, revenue from industrial water supply was considered as ₹41.51 crore. However, no industrial units have been identified so far. The life of the project was taken as 20 years in DPR and depreciation was allowed accordingly. However, the project is contemplated to run only till the completion of the Polavaram Project which is scheduled for completion in 2019. Thus, the life of Pattiseema LIS would be only three years. Further, while calculating the BCR, the Department considered the irrigation benefits for an ayacut of 1.2 lakh acres under the Polavaram RMC. However, the works relating to distributary network under Polavaram RMC were yet to be taken up and no irrigation benefit has been achieved from this ayacut. If the above factors are considered, the BCR becomes adverse as shown in ***Appendix-2.2***.

***(ii) Pushkara LIS:*** In the case of Pushkara scheme, the Department had revised the BCR of the project from 5.09 (2003) to 2.09 (2006) after increase in project cost and targeted ayacut. The BCR will further reduce as the project cost has increased further from ₹297.25 crore to ₹674.52 crore on account of subsequent changes made in the project components without any increase in the ayacut. Further, since Pushkara LIS is to serve its ayacut only till completion of Polavaram project in 2019, delay in completion of the LIS will reduce its lifespan, thereby further lowering its BCR.

***(iii) Guru Raghavendra and Pulikanuma LIS:*** The Department furnished BCR for only five out of the 13 LI Schemes under Guru Raghavendra and Pulikanuma schemes. Details of calculations or assumptions made were not made available due to which Audit could not verify their correctness.

### 2.1.8.6 Project taken up without obtaining clearances

As per the Guidelines of CWC for Submission, Appraisal and Clearance of Irrigation and Multipurpose Projects, 2010, for any project which is having inter-state ramification, a preliminary report is to be sent to CWC for appraisal. If the project is found feasible, CWC conveys 'in principle' consent for preparation of Detailed Project Report. Further, Section 84 of the Andhra Pradesh State Reorganisation Act (2014) mandated that before taking of any new project on Krishna or Godavari rivers, CWC approval is to be obtained.

CWC approval for Pattiseema DPR was not obtained though it was required not only because Godavari and Krishna rivers that are being linked through the

Project are inter-state rivers, but also mandated under Section 84 of Andhra Pradesh State Reorganisation Act (2014).

Similarly, no Environmental Clearance was taken for the Project though it is required as per the notifications of Ministry of Environment, Forest and Climate Change (MoEF) as it is a major irrigation project.

During the exit conference, the Department stated (December 2016) that there was no necessity to obtain clearances as the same were obtained for Polavaram project.

The contention of the Department was not tenable in view of notifications of the MoEF and AP State Reorganisation Act.

## 2.1.9 Tendering

Many lacunae were observed in tendering process, especially in Pulakurthy LIS (a sub-scheme of GRP) and Pattiseema Project as discussed in the subsequent paragraphs.

### 2.1.9.1 Delay in award of work

Pulakurthy LIS under GRP was administratively sanctioned in August 2011 to irrigate 9830 acres gap ayacut at a cost of ₹113.26 crore. The work was entrusted to a joint venture (JV) of M/s Indian Hume Pipe Co. Ltd. and M/s Megha Engineering & Infrastructures Ltd. for execution in March 2013 under EPC contract and was scheduled for completion by September 2015. The work is still in progress (December 2016).

Audit observed that there were undue delays in award of work. The tender notice was issued in March 2012, after lapse of seven months from the date of administrative sanction (August 2011). Technical and Financial Bids were opened in November 2012 against the scheduled date in April 2012 with a delay of over six months. The work was entrusted to the agency in March 2013 with a further delay of over four months. Thus, the overall time taken for entrustment of work from the date of administrative sanction was 18 months. Delay in entrustment of work coupled with delayed execution of project led to non-accrual of envisaged benefits even after lapse of over five years.

The Department stated (June 2016) that the above delays were due to delay in Technical Sanction and repeated postponement of tender due to non-finalization of technical specifications of pipeline. However, the Department failed to minimize the administrative delays which were avoidable.

### 2.1.9.2 Improper relaxation of tender premium limit

As per Government Orders[5], ceiling of tender premium for all the works should be five *per cent*. Tender beyond the prescribed limit should not be accepted in the first call. Accordingly, a condition to this effect was included in the NIT of Pattiseema Project. However, after issue of tender notice, the Engineer-in-Chief, ISPP Dowlaiswaram requested (7 January 2015) the Government to remove the existing ceiling of tender premium on the ground that the work of diverting water from Godavari to Krishna to fulfill the intended benefits was of urgent nature. Based on the request, ceiling limit of tender premium was relaxed (20 January 2015) by the Government and the NIT condition was amended accordingly before the closing date of the tender.

The estimated cost of Pattiseema LIS put to tender (ECV) was ₹ 1170.25 crore and bid value quoted by the L1 contractor (M/s Megha Engineering & Infrastructures Ltd., Hyderabad) was ₹ 1427.70 crore, which was 21.9991 *per cent* excess over the ECV. The bid was accepted and work was awarded (March 2015) at the quoted rate for completion by March 2016.

However, the Polavaram RMC works including distributary system were not completed even though the Pattiseema LIS completed in March 2016. Audit observed that though the project envisaged lifting of water through 24 pumps, the Department could lift water only through 11 pumps due to non completion of RMC and its distributaries.

Thus, awarding work at higher tender premium without ensuring completion of the Polavaram RMC and its distributary system led to avoidable extra expenditure of ₹ 199 crore, besides non achievement of intended benefit.

During the exit conference, the Department stated (December 2016) that excess tender premium was given as an incentive to complete the work in a record time to achieve efficiency.

However, relaxing the ceiling on tender premium resulted in avoidable additional burden of ₹ 199 crore which was unwarranted as even the intended beneficiaries had not been identified by the Department and the work of distributary system had not been taken up.

## 2.1.10 Execution and Contract Management

Proper contract management leads to timely execution of the Projects and economy in expenditure. Audit observed deficiencies in contract management leading to time and cost overruns as discussed below:

[5] GO Ms. No. 94 of I&CAD (PW-COD) Department dated 01 July 2003 and GO Ms. No. 133 of I&CAD (PW: Reforms) Department dated 22 November 2004

## 2.1.11 Observations relating to Guru Raghavendra Project

### 2.1.11.1 Package-97 of GRP

Package 97 included execution of three LI schemes – Duddi, Basaladoddi and Madhavaram LIS. It was awarded (July 2005) for ₹59.99 crore under an EPC contract for completion in 24 months (i.e. by July 2007). However, land acquisition was completed only in June 2011. The work was in progress as on the date of Audit despite time overrun of over nine years. Audit observed the followings in the package:

***(i) Preparation of inflated estimate by not availing the exemption of Central Excise Duty – ₹2.70 crore:*** As per the notification issued (January 2004) by Government of India (GoI), all items of machinery including ancillary equipment and their components/parts required for setting up of water supply plant for drinking and agricultural purposes are fully exempted from payment of Central Excise Duty (CED).

It was observed that in the estimates prepared (April 2006) for the work, the Department provided for CED at 16 *per cent* for pre stressed concrete (PSC) pipes in the estimates without considering the exemption. This resulted in inflation of the estimate by ₹2.70 crore. Further, the Department also issued CED exemption certificates to facilitate the contractor to avail CED exemption on PSC pipes.

The Department accepted (December 2016) the observation and stated that action was being initiated to recover the same from the agency.

***(ii) Provision of diameter of PSC pipes in the estimates in excess of requirement – Non-accrual of savings of ₹1.11 crore to Government :*** The sanctioned estimate of the work provided for laying of 1100 mm diameter pressure main for a length of 10 Km for Duddi LIS. Agreement entered into with the agency specified the length of pressure main (10 Km) and discharge (1.203 cumecs) without mentioning diameter of pressure main. It was observed that the Department approved the designs of pressure mains for a reduced length of 9.670 Km with 1000 mm diameter and the work was executed accordingly. Due to reduction of diameter of the pipeline by 100 mm and length by 330 meters, there was a saving of ₹1.11 crore[6]. Failure of the Department to ensure the execution of work as per the estimates and absence of appropriate clause in the agreement to take care of variations due to changes in diameter and length of the pipeline led not only to foregoing of

[6] Cost provided in the estimate for 10,000 RMT of 1100mm dia: ₹5.92 crore; cost of work actually executed for 9,670 RMT of 1000mm dia: ₹4.81 crore (worked out as per the rates provided in the same estimate); The difference in cost = ₹1.11 crore

savings of ₹1.11 crore, but also resulted in extension of undue benefit to the contractor.

***(iii) Delay in commissioning due to lack of power supply:*** All the three LI schemes under Package 97 were completed during 2013-15 at a cost of ₹66.18 crore. However, dedicated power supply arrangements had not been made available for any of the three lifts till the date of Audit. Though the Department had paid ₹3.87 crore to Andhra Pradesh Central Power Distribution Company Limited (APCPDCL) towards development charges, security charges etc., in February 2011, dedicated power supply arrangements were yet to be made. Due to lack of power supply, Basaladoddi and Madhavaram LIS, which were to serve a total ayacut of 10,661 acres, have not been commissioned. For Duddi LI scheme, a temporary HT connection was arranged (December 2011) from Satanur sub-station. However, as per the Department records, Satanur sub-station supplies power to Mugaladoddi LI scheme also and would be unable to provide power to both the LI schemes simultaneously. Power supply to Duddi LIS was being made available only when Mugaladoddi LIS was not in operation leading to sub-optimal utilisation of Duddi LIS. Thus, lack of dedicated power supply had adversely affected the Duddi LI scheme.

***(iv) Issue of completion certificate without completion of work:*** Duddi LIS was to lift water from Tungabhadra River during flood days to serve a gap ayacut of 3000 acres. The Department issued completion certificate in September 2013 subject to condition that the agency had to complete the pending items of works and attend to all rectification/defective works within the maintenance period of two years. However, the Department did not include any penal clause to make the agency accountable in case the works were not completed/repairs were not carried out in time.

The Department observed that pump-1 and pump-2 of the scheme required repairs (November 2013 and January 2014). However, the agency completed the repairs only in June 2014 resulting in loss of working season. As a result, against the requirement of 294 Mcft, the water pumped was 66.54 Mcft during 2013-14. In 2014-15, water pumped was only 38.41 Mcft due to breakdown of pumps. Consequently, out of 3000 acres of targeted ayacut, water was supplied to ayacut of only 442 acres to 551 acres during the period 2013-16. The reasons for underperformance of the scheme were repeated breakdown of pumps and failure of the agency to attend to the repair works immediately. In the absence of any punitive clause, the Department also had no means to ensure that the agency attended to the repairs on time.

### 2.1.11.2 Pulakurthy LIS

Pulakurthy LIS is also a scheme under GRP which was administratively sanctioned in August 2011 to irrigate 9830 acres gap ayacut under Tungabhadra LLC at a cost of ₹113.26 crore. The work was awarded to a contractor for execution in March 2013 under EPC contract and was scheduled for completion by September 2015. The work is still in progress (December 2016). The following observations are made on the scheme:

***(i) Non-acquisition of land for execution:*** As per Government Orders[7], administrative approvals for major and medium irrigation projects were to be given in two stages. Stage-I administrative approvals shall include approval of estimates for acquisition of minimum land required. Stage-II administrative approval shall be issued only after lands were acquired for taking up works without interruption for the first two years.

It was observed that one time approval was given for Pulakurthy LIS in August 2011 instead of in two stages. Proposals were sent to Land Acquisition (LA) authorities for acquisition of 121.78 acres of land required for the entire project during June 2013 to November 2014. The land was not acquired till the date of audit. The Special Deputy Collector LA, HNSS, Kurnool (SDC) intimated (October 2015) the Department that Preliminary Notifications were published for acquisition of 88.96 acres and requested the Department to deposit ₹2.67 crore towards cost of land acquisition to take further action. However, the details of funds made available to LA authorities were not on records.

The situation could have been avoided if the Department had followed the two stage process which would have ensured acquisition of minimum land required before awarding of the project.

***(ii) Blocking up of ₹48.55 crore incurred on procurement of supplies:*** Pulakurthy LIS work was scheduled for completion by September 2015. However, only 54.38 *per cent* (i.e. ₹61.59 crore) of financial progress was made till April 2016. Out of this, an expenditure of ₹48.55 crore was incurred between March 2014 to April 2016 towards supply of Pipes and Electro Mechanical (E&M) equipment. The pipes and E&M equipment procured could not be laid and erected due to delay in acquisition of land. The materials supplied are under custody of the Agency. Thus, faulty planning of the Department in timely acquisition of land resulted in blocking up of ₹48.55 crore.

[7] GO Ms.No.94 of I&CAD (PW-COD) Department dated 01 July 2003

### 2.1.11.3 Pulachinta, Soganuru and Chilakaladona LIS

***(i) Omission of electrical works in original agreements:*** The works of three LISs (Pulachinta, Soganuru and Chilakaladona LIS) were entrusted to two agencies under LS contracts in February 2004. However, while preparing the estimates and entrustment of works, the Department omitted some essential electrical items from the scope of work. After a lapse of more than six years from award of the works, the Department prepared estimates with 2009-10 Standard Schedule of Rates (SSR) for the additional work of providing electrical equipment in Pulachinta and Soganuru LIS and concluded (October 2010) supplementary agreements worth ₹80.94 lakh for the same. On completion of works, Pulachinta LIS was commissioned in March 2014 and Soganuru in August 2014.

In case of Chilakaladona, Government instructed (January 2014) the SE to invite bids after preparation of separate estimates. The Department proposed a revised estimate for ₹35.58 lakh. However the Government was yet to accord revised administrative approval for the same. The work was yet to be taken up and the scheme had not been commissioned as of May 2016.

Thus, non-inclusion of electrical equipment in the original estimates/ agreements and further delay in taking up these works resulted in delay in completion of the Schemes. Further, there was increase in cost as supplementary agreements had to be entered into on the basis of SSR of 2009-10 and 2014-15. Audit could not calculate the increase in cost due to non availability of required information with the Department.

***(ii) Excess deposit of ₹69 lakh with APSPDCL[8]:*** In Chilakaladona LIS, the Department applied (December 2004) for two HT service connections for Stage-I and Stage-II lifts. According to the demand notice issued (January 2006) by APSPDCL, the Department paid (February/March 2006) ₹1.16 crore against the demand of ₹1.41 crore. However, the power supply was not provided as the contractor failed to complete the work of laying HT lines. When the Department requested (August 2008) the APSPDCL authorities for according necessary approval of service line, APSPDCL raised (May 2015) a reduced demand for ₹47 lakh without taking into account the already deposited amount of ₹1.16 crore. The Department intimated (June 2015) APSPDCL authorities that they had already paid ₹1.16 crore. After adjusting for the fresh demand of ₹47 lakh, there was an excess payment of ₹69 lakh. The service line has still not been provided (May 2016).

Audit observed that due to delay in execution of Chilakaladona LIS works and non-completion of electrical works even after a lapse of 12 years after

[8] Southern Power Distribution Company of Andhra Pradesh Ltd. (formerly APCPDCL)

concluding agreement by the agency, an amount of ₹69 lakh was blocked for 10 years (March 2006 to March 2016). There was no evidence to show that the Department made any efforts for refund/adjustment of the excess amount paid to APSPDCL.

#### 2.1.11.4 Observations relating to Pulikanuma LIS

Government accorded (January 2008) administrative sanction for Pulikanuma LIS to irrigate 26400 acres at a cost of ₹261.19 crore. The work was technically sanctioned in April 2008. The work was awarded to a contractor in June 2008 for an agreement value of ₹263.10 crore under EPC contract to be completed by June 2011.

***(i) Incorrect provision of ₹one crore for railway bridge in the estimate:*** As per agreement conditions, a railway bridge was to be executed by the Railway authorities as a deposit work for the Department and the role of the EPC agency was only to prepare the proposals. The Department would process the proposals with Railway authorities for execution.

The IBM estimate of the Pulikanuma LIS included provision of ₹one crore for construction of Railway bridge and tender was invited based on this estimate. However, it was stated in the NIT that the cost of bridge was not included in the bid. The work was subsequently awarded to an EPC agency including the provision of ₹one crore. However, the Department subsequently paid ₹5.14 crore to the Railways for construction of the bridge. Despite this, the Department had not taken any action to recover ₹one crore from the agency.

The Department stated (December 2016) that efforts were being made to recover the amount from the agency.

***(ii) Non-accrual of savings due to non-inclusion of cost variation clause for pressure main component:*** It was observed from the sanctioned estimate that the length of Pressure Main was to be 28000 RMT and was to cost ₹60.20 crore. However, the Department neither specified the length of pressure mains nor included a suitable variation clause in the agreement for adjustment of cost of pressure main according to the actual length executed.

It was observed that the total length of pressure mains approved (July 2009) by the Department and executed by the agency was only 26600 RMT, which was 1400 RMT less than the quantity provided in the sanctioned estimate. In the absence of a suitable variation clause, the cost savings of ₹3.01 crore[9] on account of reduction in work has not accrued to Government.

[9] Quantity as per estimate: 28000 RMT; Quantity actually executed : 26600 RMT; Reduction in length of pressure mains: 1400 RMT; Rate per RMT as per estimate: ₹21500; Total savings: 1400 RMT X ₹21500 = ₹3.01 crore

The Department replied (December 2016) that the basic parameters for pumping stations, as per Government memo (May 2008), would be the locations of starting and ending of pressure mains only and accordingly length was not mentioned. It was also stated that any increase or decrease in the cost of execution of on any component due to implementation of approved design was to accrue to the contractor under EPC system unless there was a change in basic parameters.

The reply was not acceptable as the Department had failed to assess the actual requirement while preparing the estimate. Thus, preparation of estimates without assessing actual requirement and absence of suitable clause in the agreement led to non-accrual of savings of ₹3.01 crore to Government but also resulted in undue benefit to the contractor.

***(iii) Delay in commissioning due to delay in approaching Railways for approval:*** As per the agreement conditions, the EPC agency was to provide 33 KV HT lines from APSPDCL sub-stations to pump house locations, which were to cross the Chennai – Mumbai railway line. Further, as per the agreement conditions, the Department was to take up the issue with Railways and the EPC agency was to follow up on the progress.

Though the work was awarded in June 2008, the Department had not approached the Railways for approval to construct Railway line crossings till the date of audit. Proposals were however sent to APSPDCL for vetting and forwarding to the Railway authorities. The APSPDCL forwarded (April 2016) the line diagram to SC Railway authorities for information rather than approval. The Department has thus not pursued the laying of 33 KV HT line with the Railways for more than eight years and this may delay the completion of the project.

The Department replied (December 2016) that the proposal submitted by the agency was under scrutiny by the Railway authorities.

***(iv) Delay in applying for HT power connection:*** It was observed that after completion of more than six years from the date of agreement, the Department applied (November 2014) for HT power supply for a Contracted Maximum Demand (CMD) of 7540 KVA (at Sathanur Sub-station) and 10106 KVA (at Deverabetta Sub-station) for Pulikanuma LIS Stage-I and II pump houses. The SE, Operation, APSPDCL, Kurnool issued (July 2015) demand notice for ₹2.31 crore and ₹1.77 crore (total ₹4.08 crore) towards development charges, supervision charges and security deposit charges for Pulikanuma Stage-I and II, respectively. The amount was paid in March 2016.

It was observed from the correspondence of the SE, Operation, APSPDCL (January 2016) to the SE, O&M Circle, AP Transco that new HT services to

Pulikanuma LIS were not possible from the 132/33 KV EHT Sub-station (under construction) at Madhavaram as the power was proposed to be utilized for other purposes. Pulikanuma LIS had not received HT connection till the date of Audit.

Thus, the delay of more than six years on part of the Department in applying for sanction of HT power supply coupled with lack of continued pursuance contributed to delay in commissioning of Pulikanuma LIS.

## 2.1.12 Observations relating to Pattiseema LIS

The contract for Pattiseema LIS was awarded in March 2015 and the work was completed within the target date of March 2016.

As per clause 39.3 of the General Conditions of Contract of the agreement, the cost on any component due to any implementation of approved design should always be on the contractor's account within the cost of the total contracted amount under EPC until and unless such designs effectively change any of the basic parameters as defined. In such a situation, where there is any revision in design due to changes in the basic parameters, then the modalities for effecting such a change shall be decided with the prior approval of the employer.

However, the contract included terms which turned out to be unduly beneficial to the contractor as there was an increase in cost of the items covered under the cost variation clause though there was no change in basic parameters and there was decrease in cost of items not covered under the clause though basic parameters had changed. Audit observed the following:

***(i) Adoption of alternative technology instead of conventional technology resulted in additional cost:*** As per the IBM estimate, pump house was to be constructed at a cost of ₹147 crore through conventional technology. During execution, the contractor requested the Department to allow it to use RCC Diaphragm Wall technology. The same was approved by the Department. As per the cost estimate furnished by the contractor for construction of pump house by diaphragm wall method, the cost was shown as ₹234.60 crore (excluding tender premium), which was ₹87.60 crore in excess of cost of pump house estimated in IBM. Considering the tender premium of 21.9991 *per cent*, the additional cost works out to ₹106.17 crore.

This resulted in increase in the cost of construction even though there was no change in the basic parameters of the pump house. Further, there was no time savings since the work was completed in 12 months as stipulated in the agreement. The Department also stated that it was possible to complete the work within the stipulated time i.e., 12 months by adopting the conventional method which could have been completed with lesser cost.

Audit observed that the Government had cleared all the hurdles for execution by completing the land acquisition within the agreement period and a special mechanism was created to approve the designs on fast track basis. Hence, it was possible to execute the work within the stipulated period by adopting the conventional method as contemplated at the time of calling of tender. There was no need to adopt alternative technology and bear the additional cost.

The Department accepted (December 2016) the fact and stated that overall additional burden was only about ₹100 crore. The reply of the Department was not tenable as additional charge on the exchequer was without any additional benefit /change in basic project parameters.

***(ii) Lacunae in framing contract terms resulted in non-accrual of savings to the Government:*** As per the basic parameters mentioned in the agreement, 30 Pumps and motors were to be erected with a discharge capacity of eight cumecs each to lift 240 cumecs of water. The cost of pumps and motors and other Electro Mechanical equipment and Hydro Mechanical equipment were adopted from the estimates of Chintalpudi LIS (2008) by the Department to arrive at the estimates by considering ₹2.062 crore per Megawatt as unit rate.

During execution, basic parameters like the head from which water was to be lifted, the number of pumps and the height to which water was to be lifted were changed. However, these items were not included under the cost variation clause. The impact on cost due to these changes could not be calculated as the relevant details were not furnished to Audit. However, it was observed that the power requirement of the pumps was reduced from 123 MW to 113 MW due to these changes. Considering this reduction, there was a saving of ₹20.62 crore worked out by Audit (10 MW X ₹2.062 crore) on the basis of Department's estimate of ₹2.062 crore per MW. However, the savings did not accrue to Government due to non-inclusion of this component under cost variation clause.

***(iii) Payment of Central Excise Duty on exempted items:*** Government of India in January 2004, issued a notification fully exempting all items of machinery, equipment, pipes, etc., required for setting up water supply schemes intended for agricultural or industrial use, from payment of Central Excise Duty (CED). CED was neither a part of IBM nor any provision was made in the estimate in this regard. An amount of ₹32.01 crore was paid to the contractor towards reimbursement of CED on pressure mains executed in the work. Despite availability of CED exemption, the Department included a clause in the agreement that the CED would be reimbursed to the contractor as per actuals paid.

During the exit conference, the Department stated (December 2016) that CED was reimbursed based on the agreement conditions and only on production of invoices by the contractor.

Thus, inclusion of agreement clause for reimbursement of CED despite availability of exemption led to avoidable extra expenditure of ₹32.01 crore.

***(iv) Incorrect reimbursement of Labour Welfare Cess - ₹14.22 crore:*** As per NIT, the contractor was required to quote his bid considering all taxes, duties, etc. except Central Excise Duty and VAT. The agreement conditions also stipulated that Labour Welfare Cess at the rate of one *per cent* would be recovered from the gross value of each bill. Thus, the price quoted by the contractor was deemed to be inclusive of Labour Welfare Cess. It was however observed that the Department reimbursed (December 2016) the Labour Welfare Cess of ₹14.22 crore to the contractor which was irregular.

Department stated (December 2016) that Labour Welfare Cess was reimbursed as per the agreement conditions. The reply was not tenable as the quoted price was inclusive of all taxes and duties including Labour Cess and there was no condition in the agreement for its reimbursement. This resulted in undue benefit of ₹14.22 crore to the contractor.

### 2.1.13 Observations relating to Pushkara Project

Pushkara LIS was taken up (2003) as there was delay in completion of Polavaram project. The cost of the project originally estimated at ₹297.25 crore in 2003. However, during execution, due to several changes in the project and delay in execution of the project, the cost of the project increased (September 2014) to ₹674.52 crore. Observations relating to execution and contract management in this project are given below:

***(i) Lack of planning in obtaining clearances for crossings on National Highways, Oil/Gas pipelines and Railway crossings:*** The Department had contemplated to complete the main canal and distributaries by September 2006. The canal system under the project had several crossings on National and State Highways, railway lines, oil/gas pipelines and water pipelines. Execution of work at these crossings required clearances from the concerned authorities. The Department had to make necessary arrangements to ensure that permissions were obtained within the targeted period i.e., September, 2006. It was observed that there were eight NH crossings in the main canal and five crossings on distributary network. There were also Gas Authority of India Limited (GAIL) oil/gas pipeline crossings at two locations on the main canal and 14 locations on distributary network. Similarly, there were Hindustan Petroleum Corporation Limited (HPCL) pipeline crossings at two locations on main canal and 13 locations on distributaries. The distributaries were also to cross Railway lines at 10 places.

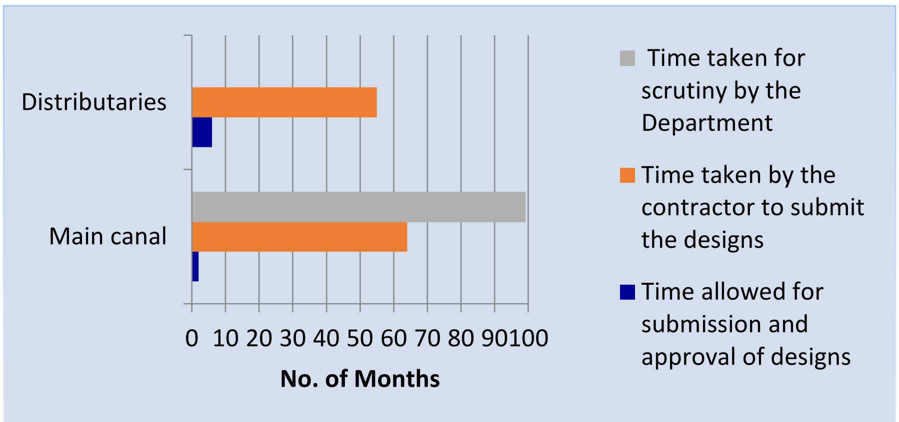
Audit observed that though the Department was required to issue letters to the concerned agencies immediately after awarding the work (i.e, October 2004), it addressed letters to GAIL, HPCL, NH and Railways only during 2006-2009. The Department did not pursue the matter with any of the agencies despite being aware of the deadlines for completion of the work.

The lack of pursuance by the Department added to the delay in completion of the work. As of September 2016, execution of distributaries at seven crossings of gas/oil pipelines was yet to be taken up due to non-obtaining of clearances. The Department accepted that there was delay in obtaining clearances.

***(ii) Submission and approval of designs:*** The work of canal excavation was awarded in October 2004 to a contractor for ₹ 197.82 crore under EPC contract for completion by September 2006. As per clause 10.2 of additional special conditions of the agreement, the contractor was to submit all designs and layout within the time period as stipulated in the construction programme.

As observed from the construction programme, the drawings and designs of main canal were to be completed by November 2004 and the drawings and designs of the distributaries by March 2005. The designs submitted by the contractor were to be processed at four levels i.e., the EE, SE, CE of the project and the CE, Central Designs Organization (CDO). It was observed that there was delay in submission of designs in respect of 175 structures of main canal and 34 structures of distributaries. There was delay of three to 64 months (from December 2004) in submission of designs of main canal and six to 54 months (from April 2005) in submission of designs of distributaries as shown below:

***Chart 1: Time allowed for submission and scrutiny of designs and the actual time taken***




***Source:*** *As per the information obtained from the Department*

There is no specific timeline at CE/CDO level to approve the designs. It took nine to 98 months in submission of 96 designs to the CE/CDO. There was delay ranging from one to 25 months in approval of the designs of 28 structures of main canal. The details of time taken by the Department for scrutiny in respect of distributary system were not furnished to Audit.

Thus, absence of fixed timelines at CE/CDO level for approval of designs led to abnormal delays in approval and consequent delay in project execution. Though the work was stipulated for completion by September 2006, the same is still in progress (June 2016) with a time overrun of more than nine years.

***(iii) Undue benefit to the contractor in violation of agreement terms:*** In the canal package of Pushkara LIS, the NIT/agreement conditions (clause 42.4) stipulated that no price adjustment would be paid for any variation in prices and wages. The work of execution of the canal and its distributaries/field channels was scheduled for completion in September 2006. However, extension of time was allowed on various occasions up to June 2016 on the grounds of delay in handing over of site, objections from farmers due to non-payment of compensation and non-finalisation of design and drawings. Audit observed that on the request of the contractor, the Department made extra payment of ₹21.81 crore (between July 2008 and July 2015) towards price escalation on steel and other materials though it was contrary to the contract conditions.

As per agreement conditions, for all the crossings of canal system at National/State Highways and R&B roads, suitable bridges were to be provided as per the standards and permission of the respective Departments. The cost of these bridges was deemed to have been included in the contract price quoted.

However, Department deleted construction of nine bridges from the scope of work and recovered the allocated amount of ₹6.17 crore. The Department subsequently deposited ₹33.26 crore with NHAI/R&B Department for which Government accorded sanction[10]. Thus, deletion of the bridges from the scope of original contract and executing them as deposit works through NHAI/R&B led to avoidable additional expenditure of ₹27.09 crore.

The Department stated (December 2016) that due to legal issues in execution, the Government deleted the works from the scope of the contract and entrusted them to NHAI/R&B Department. However, against the agreement conditions, the cost of the structures was borne by the Department instead of by the contractor.

Thus, Department made an additional expenditure of ₹48.90 crore (₹21.81 crore + ₹27.09 crore) on payment of price escalation and additional cost on construction of bridges against the conditions of the contract.

[10] G.O.Ms.No.50 Irrigation & CAD (Proj.I) Department, dated 22 September 2014

***(iv) Payment of price escalation even after defect liability period:*** The work of second pump house at Purushothapatnam under Pushkara LIS, was awarded (July 2004) to a contractor under EPC contract for ₹50.26 crore for completion by January 2006. In this EPC contract, the amount agreed to for the work was to be the final amount and there was no provision for price adjustment in the agreement.

The work was completed and completion certificate was issued (September 2009). After five years of completion, based on the representation of the contractor, the Department paid (October 2014) ₹1.57 crore towards price escalation for the work though it was completed five years ago. This was irregular and led to extension of undue financial benefit to the contractor.

Department replied (December 2016) that the Government took a decision to apply the price escalation clause on all ongoing works and since the Pushkara LIS was an ongoing project, price escalation was allowed. However, price escalation was not admissible as per the terms and conditions of the EPC contract. Further, completion certificate for the work was issued in September 2009 and it was not ongoing at the time of payment.

## 2.1.14 Operation and Maintenance

### 2.1.14.1 Observations relating to Guru Raghavendra Project

GRP works were taken up for serving an ayacut of 85,790 acres[11]. The ayacut served during 2011-16 ranged from 7,092 acres (i.e. 8.27 *per cent*) in 2011-12 to 23,490 acres (27.38 *per cent*) in 2014-15. Observations relating to operation and maintenance of some of the sub-schemes are given below:

***(i) Suguru MI Scheme – Not providing irrigation facilities due to non-taking up of repairs to supply channel:*** Suguru MI Scheme was initially administratively sanctioned (October 2003) for ₹6.49 crore. The Government accorded (November 2005) revised administrative sanction for ₹8.72 crore. Suguru MI tank was completed (January 2006) to serve 2,925 acres. Out of the total targeted ayacut of 2,925 acres, 800 acres was proposed as new ayacut. However, no evidence was available on record to show that distributary network for this new ayacut was created. The EE, TBPLLC Division, Adoni could not furnish this information, though specifically sought for by Audit.

It was further observed that though the project was to supplement 2,125 acres of already existing ayacut, water was not being supplied to the ayacut from 2009-10 due to damages to the supply channel in the floods that occurred in 2008. The Department had prepared (May 2008) an estimate for ₹1.07 crore for restoration of supply channel. Thereafter, multiple estimates were prepared

[11] stabilization of 81,662 acres and new ayacut of 4,128 acres

but the same were not approved (May 2016) for the reasons not on record. As per the last estimate prepared (January 2014), the cost of restoration of supply channel was ₹2.13 crore.

Due to non-restoration of supply channel, no irrigation benefits were derived since 2008 from the project constructed at a cost of ₹8.72 crore. Besides, the cost of restoration work increased from ₹1.07 crore (May 2008) to ₹2.13 crore (January 2014) and would increase further with the current SSR.

***(ii) Munagala LIS – Not providing water to 1,149 acres in Parla village:*** The works of Munagala LIS was awarded to a contractor in March 2006 for ₹12.30 crore. The scheme, which was intended to serve an ayacut of 4,365 acres in six villages during Khariff, was completed in July 2012 at a cost of ₹11.88 crore. The work was executed by APSIDC. It took six years to complete the project against the original completion period of 16 months.

Out of the total ayacut of 4,365 acres proposed under the project, distributary system covering 1,149 acres was proposed in Parla Village, Kallur Mandal of Kurnool district. After trial run of the scheme in November 2011, APSIDC requested the Department to restore the distributary system in Parla village for this ayacut. However, the Department had not initiated any action in this regard till the date of audit in spite of issue of reminder (December 2014) by APSIDC. Due to this, ayacut in Parla village remained unserved. Thus, inaction of the Department in taking up restoration work on distributary system in Parla village resulted in sub-optimal utilization of the LI Scheme.

***(iii) Absence of Manpower for Operation and Maintenance (O&M):*** As per terms and conditions of the agreements of irrigation projects, the contractor has to maintain the project/work for a period of two years, after which the Department takes over the project/work.

The Department had taken over Mugaladoddi LIS in February 2013 and Pulachinta LIS in March 2014. Since the Department had taken over the LI Schemes, for operation of pumps and motors for supply of water to ayacut, engaging qualified operational crew was essential. The EE requested (April 2015) the SE for recruitment of 25 qualified O&M crew for maintenance of LI Schemes. However, Audit observed that only 25 unskilled lascars were deployed (August 2015) on outsourcing basis for O&M operations.

Department accepted (December 2016) that required number of qualified staff were not available for carrying out O&M operations of completed LI Schemes and stated that proposals for sanction of permanent staff had been sent to the Government for sanction.

### 2.1.14.2 Observations relating to Pushkara LI scheme

The Pushkara LIS was administratively sanctioned[12] for ₹297.25 crore. The scheme is broadly categorized into three components viz., (i) Head works and lifts, (ii) excavation of main canal (97 Km), distributaries and field channels including necessary CM&CD works and (iii) construction of 11 sub-lifts on main canal.

***(i) Non-creation/utilisation of ayacut due to non-completion of works:*** As per the agreement conditions of canal package, the agency was to create an ayacut of 1.86 lakh acres by 2006. As of June 2016, the headworks/lifts and main canal were completed and the work of distributary network was in progress. The Department stated that total ayacut of 1.45 lakh acres had been created as of June 2016. However, Audit observed the following:

- **Non-completion of field channels:** As per the agreement for the canal, the scope of work included construction of distributary system with micro irrigation network (field channels) so as to irrigate contemplated ayacut of 1.86 lakh acres. Though the Department stated that total ayacut of 1.45 lakh acres had been created, Audit observed that out of 1312.95 Km of field channels required to serve the targeted ayacut, field channels for only 645.73 Km (i.e. 49 *per cent*) were created as of June 2016, even after 12 years of the commencement of the project.

  The Department accepted (December 2016) the fact and stated that action was being taken to create distributary system in a phased manner.

- **Non-completion of structures:** As per the status reports (May 2016) submitted by the Divisions, 44 structures out of 228 were still incomplete. Non-completion of structures could be one of the reasons for short-creation of ayacut. For example, an ayacut of 446 acres could not be created due to non-completion of a culvert at a road crossing on a distributary (on the main canal at Km 59.363) under Peddanapalli lift. However, completion certificate was issued to the agency in July 2009 with a condition to complete the pending works in the maintenance period of two years. Even after lapse of more than seven years from the issue of completion certificate, neither the agency resumed the work nor did the Department make any alternative arrangement to complete the pending work through other agencies. The Department stated (December 2016) that action was being taken to complete the work.

- **Non-localisation of ayacut:** Once the field channels are constructed and ayacut is created, the ayacut is to be localized in coordination with the

[12] Vide G.O. Ms. No. 126 of I&CAD Department dt. 27.8.2003 (for ₹144.25 crore) and G.O. Ms. No. 167 of I&CAD Department dt. 31.10.2003 (for ₹153 crore)

Revenue Department. Further, the AP Farmers' Management of Irrigation Systems (APFMIS) Act, 1997 provides for encouraging participation of farmers in management of irrigation system by forming Water Users Associations (WUAs).

Audit observed that the project started functioning from 2006 and completion certificates for the portions of canals completed were issued by 2011-12. Though 1.45 lakh acres of ayacut was stated to be created, the ayacut created had not been localised and WUAs had not been formed so far due to non-completion of the project in its entirety. Further, though the EPC agreement conditions stipulated that the EPC agency had to prepare and submit ayacut registers (which specify the details of lands being covered under the ayacut) to the Department, the Department had not obtained the same from the contractor till the date of Audit.

- **Short lifting of irrigation water:** The Pushkara LIS was designed to lift 11.5 TMC of water per year. It was observed that though the lifts were commissioned in September 2009, the total quantum of water actually lifted ranged from 13 to 54 *per cent* of the total capacity during 2011-16, even though 78 *per cent* of total targeted ayacut was stated to be created.

While the targeted ayacut of 1.86 lakh acres has not been created fully due to non-completion of distributary system, even the 1.45 lakh acres of ayacut stated to be created had not been authenticated through localisation process.

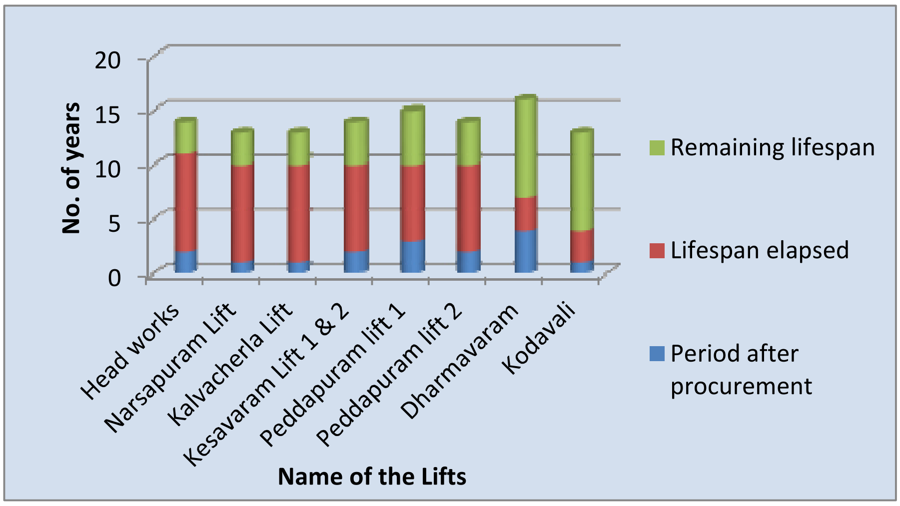
***(ii) Drinking Water facilities:*** As per the DPR of the Pushkara LIS, the project also contemplates providing drinking water facilities to a population of 5.23 lakh in 143 villages en route. The Basic Project Parameters in the canal agreement (October 2004) also stipulated providing drinking water to villages en route. However, details of facilities to be provided were not discussed anywhere in the contract. Audit observed that though the main canal had been developed, no drinking water facilities had been extended to the villages as of June 2016.

The Department stated (June 2016) that there were no specific points allocated for tapping of drinking water and since it was an open channel, people were using water as per their requirement. During exit conference (December 2016), it was replied that Department provided only the source and it was the responsibility of Rural Water Supply (RWS) Department to utilize the source.

However, it was observed that there was no correspondence between the RWS Department which is responsible for providing drinking water in the villages and the Water Resources Department to identify the specific tapping points or storage facilities for supplying drinking water. Further, the project had contemplated providing drinking water to the villages and not untreated water.

**(iii) Maintenance of Project system:** In the DPR, the life span of the pumping system including motors (Hydro and Electro mechanical equipment) was taken as 12 years. The equipment was procured between September 2005 and September 2009. As per the Agreement conditions, the project should have been completed in two years. However, Audit observed that the project had not been completed and Extension of Time (EOT) was given for completion of the project up to 2016. Meanwhile, the life of the Electro Mechanical & Hydro Mechanical equipment is about to expire as shown in chart below:

***Chart 2: Remaining life span of the Lifts***




***Source:** As per the information obtained from the Department*

On analysis of the dates of procurement, erection and operation of pumps and motors of the pumping system in nine lifts/sub-lifts (out of 13), for which the date of procurement was made available, Audit observed the following:

- Though the pumping equipment of head works of the scheme were procured during 2005 and 2006, all were erected and testing was done with a delay of five to 15 months.
- The life span of Lift-I at Purushothapatnam would expire by January 2019. The depreciated value remaining as of January 2016 was only 25 *per cent*.
- In seven out of the nine lifts/sub-lifts, the gap between procurement of motors/pumps and erection and testing ranged from six to 39 months. However, in respect of Peddapuram and Dharmavaram LIS, the gaps were 20 and 39 months, respectively. While calculating BC ratio of the project, the annual interest on capital was estimated to be 10 *per cent*. Interest calculated at 10 *per cent* on the capital cost of these lifts during the idle period worked out to ₹ 1.24 crore.

Thus, non-completion of the works on time led to non-utilisation of the equipment procured in all these cases.

#### 2.1.14.3 Monitoring of the schemes

National Water Policy 2002 stipulates close monitoring and supervision of projects so that works are executed in time and with economy. There should also be a system to monitor and evaluate the performance and socio-economic impact of the project/ scheme which is essential to judge their success or failure.

Audit scrutiny revealed that no evaluation was conducted to assess the performance of any of the schemes. Economical viability and efficiency of the LISs were not assessed by the Department. Such studies by a third party would facilitate corrective actions on lapses observed and improve the functioning of the projects.

### 2.1.15 Conclusion

*Lift Irrigation Schemes are major sources for supply of water for irrigation, domestic and industrial uses and cater to the needs of drought prone areas. Guru Raghavendra and Pulikanuma schemes were proposed for stabilization of ayacut of Tungabhadra Project and Pattiseema and Pushkara LIS were proposed to derive early benefits due to delay in execution of Polavaram Project. Audit observed that the projects were commenced either without DPRs or with deficient DPRs. The components of the Projects were not synchronised in many cases leading to delay in deriving the benefits. For example, in Pattiseema project distributary systems were not ready while the pumps were commissioned. There was also lack of coordination among various agencies and Departments involved in the execution of the Projects. There were also cases of abnormal delay in approval of designs. As a result none of the selected LIS could achieve the targeted objectives. Audit also noticed deficient contract management leading to excess payments, avoidable additional expenditure, etc. Monitoring on implementation of the projects at various levels was deficient in Guru Raghavendra and Pushkara projects.*

### 2.1.16 Recommendations

***Audit recommends that:***

- ***DPRs may be prepared with proper survey and investigation to avoid deviations.***
- ***The various components of the projects may be synchronized to ensure utilization of infrastructure after its creation.***

- ***The Department may ensure execution of works in accordance with the estimates prepared and include suitable clauses in the agreement to protect its interest in case of major changes in design leading to cost variations.***
- ***Timelines may be fixed for approval of designs.***
- ***Coordination with NHAI, Power Distribution Companies, Railways and other agencies may be ensured to allow for timely completion of projects.***