WHITE PAPER ON IRRIGATION

1.Introduction:

Irrigation is the sector which touches rural livelihood in terms of increased output of agricultural production to irrigation. All across India, it is those areas which have assured irrigation which have prospered in terms of agriculture and the dry lands and the dry areas are generally the less endowed and poorer regions of the country. Expansion of irrigation and providing water is one way of ensuring economic agricultural prosperity in the dry regime. It was the construction of Krishna Barrage and Godavari Barrage, which has transformed agricultural scenario in the Central Coastal Districts of Andhra Pradesh leading to agricultural prosperity and generating surplus wealth which got invested in the manufacturing and tertiary sector. Keeping in view of the importance of irrigation for transformation of the rural economy, successive Governments have focused on expanding irrigation facilities in the State. A programme which was going on in a smooth manner giving benefits in terms of highest value for money by having a cascading effect on wealth generation, unfortunately took a different turn in the last one decade. Though, huge amounts of money have been spent, corresponding irrigation facilities have not been created. Canals were dug without Head works being built resulting in infructuous expenditure. The alacrity with which projects were grounded was missing in the interest shown in getting clearances, solving bottlenecks in order to complete the already grounded projects. It is this very nature of imbalance in prioritizing and taking up of projects with huge expenditure without making commensurate efforts in helping in realization of immediate additional irrigable area has attracted CAG criticism. This White Paper analyses the problems involved, the correctness of priorities adopted and the reasons for the failure in achieving the targeted benefits.

The budget on irrigation used to be of the order of **Rs. 2,178 crores in 2003-04.** Suddenly the Budget has increased to **Rs. 4,245 crores in the year 2004-2005 and rose to Rs.17811 crores in 2009-10.** The total number of projects sanctioned has been 86 with an outlay of **Rs. 1,90,598 crores** in the undivided A.P. in the last one decade. This number of projects with this much of an outlay with this type of expenditure can only be completed in a period not less than 10 years, that too if the Plan Budget for irrigation is 20% to 30% of the State Budget and the outlay remains not less than 15000 Cr per annum while agreements were done with 4 (Four) years completion period. This itself shows that the projects were taken up even without giving any proper thought on the likely period of completion and the constraints we have in meeting such huge outlay.

The Indira Sagar Polavaram Project which is of great importance to the State in terms of providing Irrigation facilities, Drinking and Industrial water , power generation could not be completed as per schedule due to various hindrances. The important projects like Vamshadhara Stage-I&II, Thotapally Reservoir Project, Pulichintala Reservoir Project, Veligonda Teluguganga etc., are to be completed timely with meticulous planning for the realization of intended benefits.

A huge number of Lift Irrigation Projects was taken up in the undivided State of Andhra Pradesh without even considering what are going to be its operational costs.

Hence, without a proper analysis of all the issues involved, these projects have been taken up on a large scale leaving large number of incomplete projects without realization of contemplated or commensurate benefits.

2. *Challenges faced by the Irrigation sector:*

Instead of prioritizing the projects over a medium to a long term time frame concentrating on few projects at a time, large number of projects with huge outlay were taken up simultaneously creating financial burden on the State exchequer for a long time to come.

- **Investment & Returns in Irrigation sector – comparison:**

Description	During Period 1994-2004	During Period 2004-2014
Andhra Pradesh (Combined)		
1. Expenditure incurred	**Rs. 10,394 Cr**	**Rs. 95,539 Cr**
2. Irrigation Potential(I.P) created in Lakh acres	**10.60**	**23.49**
3. Cost of investment per acre of I.P Created	**Rs. 98,057**	**Rs. 4,06,722**

During period from 1994 to 2004, an investment of Rs 10,394 Crores was made in the combined State of Andhra Pradesh and **an I.P. of 10.60 Lakh acres** was created. **The cost of investment on the projects per acre of I.P created works out Rs 98,057/-. But during the period for 2004 -2014, a huge investment of Rs 95,539 Crores** has been incurred and the I.P. created has been **23.49 Lakh acres** only. **The cost of investment on the projects during 2004-2014 per acre of I.P created works out to Rs 4,06,772/-, which is four times higher than the corresponding cost during 1994-2004.**

- **Sustainability of Lift Irrigation Schemes:**

- A large number of LI Schemes were taken up especially in Telangana Region without studying properly the operation and maintenance cost involved in running these projects. Certain major LI.Schemes in the earstwhile A.P. are listed below as examples:

- **Handri-Niva Sujala Sravanthi:**

  The operational cost (electrical charges) of this scheme would be of the order of Rs 16,750 per acre. It requires 653 MW of power for supplying water for 120 days for I.D. crops of 6.0 Lakh acres.

- **Mahatma Gandhi Kalwakurthy L.I.Scheme:**

  This project requires 450 MW of power for providing irrigation to 3.4 Lakh acres of I.D.crop for 120 days. **The operational cost (electrical charges) would be of the order of Rs 20,469 per acre.**

- **Dr.Ambedkar Pranahitha-Chevella L.I.Scheme:**

This project requires 3466 MW of power for providing irrigation facility to **16.4 Lakh acres** for I.D.crops by pumping water for 90 days. The operational cost (electrical charges) of this project would be of the order of **Rs 24,514 per acre.**

The operation cost of several LI Schemes taken up is high and there is need to optimize the output by adopting best water management practices and suitable commercial crops duly minimizing the input costs.

- **Sustainability of existing projects:**

In most of the existing projects like Sri Ram Sagar Project(SRSP) , Nagarjuna Sagar Project(NSP) , the total irrigation potential created could not be utilized due to deferred maintenance or inadequate O&M measures taken up. The lack of effective participation of water users and poor irrigation and water management practices also resulted in increase in gap ayacut in the commands of existing projects.

Even though schemes like A.P. Economic Restructuring Project (APERP) with financial assistance from World Bank were taken up to improve the existing canal distributory network and drainage facilities under existing projects, the expected results could not be achieved because of non involvement of WUAs and general neglect of O&M practices in a rush to ground new projects.

- The irrigation sector in Andhra Pradesh is faced with following critical challenges also:-

✓ First, competition among different water using sectors (irrigation, urban/rural domestic water supplies, industry, Power generation etc.) and even within the same sector among various water users (for example, in irrigation sector among the head, middle and tail reaches of farmers) is increasing, giving rise to disputes and conflicts.

✓ Second, the poor quality of irrigation service delivery is undermining the performance of irrigated agriculture.

✓ Third, out-dated irrigation/water management practices/instruments and low use of modern technologies are resulting in poor irrigation/water service deliveries and low productivity of water as well as irrigated agriculture.

✓ Fourth, technical and managerial capacity in irrigation/water sector institutions in the state have not kept pace with time, resulting in uncoordinated and fragmented multi-sectoral planning and management of the state's water resources.

3. *Factors influencing the performance of Irrigation sector:*

The Government of Andhra Pradesh (GoAP) carried out a review on the performance of the irrigation/water sector in 1996-97. Based on the review, GoAP recognized that the performance of the sector, particularly the quality of irrigation service delivery and coverage of planned area under irrigation were poor. Three main factors were found to be responsible:

- Failure to meet the full annual operations & maintenance (O&M) costs, resulting in deterioration of irrigation systems due to deferred maintenance;
- Lack of effective and meaningful participation of water users in irrigation system/service management;
- Poor irrigation/water management practices.

4. *Government Actions*:

To address the irrigation sector issues and challenges, the Government of AP initiated some important sector reforms in 1997.

- Enacted AP Farmers Management of Irrigation System (APFMIS) Act in 1997, through which the concept of Farmers Organizations has been created to promote more efficient, equitable and sustainable irrigation service delivery through effective and meaningful involvement of WUOs and formed 10292 WUAs, under all the Major, Medium, Minor Irrigation schemes.

- Government adopted Participatory Irrigation Management (PIM) in 1997 by involving WUAs for water regulation and to find a lasting answer to systemic deficiencies like undependable water flows, indiscriminate water use by head reach users depriving the same to the tail end users, inequitable distribution and resulting conflicts. According to a study conducted by A C Nielsen ORG MARG Pvt., Ltd., on 214 projects in 2005, the performance of WUAs was positive, as many irrigation systems have realized increased revenue, an increase in irrigated area and enhanced involvement of farmers in the irrigation water management. After 2005, the performance of WUAs was deteriorating in terms of achievement and participation in irrigation management. Elections to WUAs were not conducted for last 4 years.

- Water Charges Review Committee was constituted in December, 1997, charged with the responsibility of annual review and recommendations on water revenues and O&M expenditures to the GOAP.

5. ***Investment & Returns in irrigation sector:***

Projects taken up between 2004 and 2014 in Erstwhile Andhra Pradesh:

- Projects taken up and cost (Major-44, Medium-30,Flood banks,modernisations-8) : 86 Nos. – Cost: Rs. 1,33,730.20 Cr.

- Revised cost : Rs. 1,90,598 Cr.

	No.	IP contemplated
Projects started (excluding Uttarandhra Sujala Sravanthi not started)	: 85 Nos.	New ayacut - 97.069 lakh acres Stabilisation - 23.535 lakh acres

	No.	IP created
Projects Completed	: 16 Nos.	New ayacut - 2.33 lakh acres Stabilisation - 1.89 lakh acres
Projects with partial irrigation created	: 25 Nos.	New ayacut - 17.20 lakh acres Stabilisation - 2.07 lakh acres

Major and Medium Irrigation in Residuary Andhra Pradesh:

	Cost	IP contemplated
▪ Administrative cost of 54 Projects. (Major-26, Medium-18,Flood banks-4, modernisations- 6)	: Rs. 80,559.98 Cr.	52.05 lakh acres
▪ Projects Completed	: 13 Nos.	
▪ Projects where water released for part ayacut but not completed	: 14 Nos.	
▪ Expenditure incurred on 27 projects (13 completed + 14 ongoing projects giving partial Irrigation)	: Rs.19,460 Cr.	
▪ Ongoing Projects	: 40 Nos. (including partially completed 14 projects)	

	Expenditure	IP Created
▪ Expenditure incurred and IP created during 1994-2004	: Rs.6,087 Cr. -	5.37 lakh acres
▪ Expenditure incurred and IP created during 2004 – 2014	: Rs.41,434 Cr. –	11.747 lakh acres
▪ Amount required for completing ongoing Projects (excluding Polavaram and Uttarandhra Sujala Sravanthi)	: **Rs.17,368.00 Cr.**	

6. ***Key issues of investment in Irrigation:*** (Source CAG Report 2012)

Simultaneous grounding of large number of projects, poor and inadequate planning, hindrance in execution of projects due to delay in acquisition of land and obtaining clearances (like investment clearance from planning Commission, forest clearance, environmental clearance, in principle clearance from CWC), marred the programme of completion of projects. Government should have concentrated its attention on few projects at a time, ensuring that adequate resources are allotted and land acquired for timely completion to get desired benefits from the investment.

Projects were taken up without detailed Project Report and without even feasibility studies and resulted in poor AIBP funding of the projects. This inadequate planning is the main reason for time and cost overrun in these projects which resulted in heavy financial burden on the state budget. As most of the projects were included in Prime Ministers Relief Package where obtaining all clearances was a prerequisite to avail Central funding, grounding of projects without Technical Advisory Committee (TAC) clearances added heavy burden on the State

resources due to failure in leveraging financial assistance from Government of India. As major chunk of the Plan Budget was earmarked for Irrigation sector, non realization of Irrigation potential turned these projects into liabilities than assets thus affecting the growth of all sectors of economy in the state.

Contracts for works relating to projects under jalayagnam were awarded on turnkey basis through Engineering, Procurement and Construction (EPC) method. Under EPC method contractor will quote a fixed lump sum price for conducting detailed survey and investigation, designing the project and execution of works. The EPC model in the State was not exactly FIDIC model. For the purpose of cost estimation, the Department prepared internal bench mark (IBM) estimate to compare with the price bids of contractors. Standard guidelines were not issued by the Government for preparing the estimate with regard to EPC contracts and the method of estimation continued as per old system. This gave scope for unsubstantiated estimates on account of unverified quantities, higher costs etc. This had a cost implication since these estimates were used to benchmark the price bids for award of contracts even though the ceiling of contract was fixed at 5%.

Project duration specified by Government was not realistic, since it could not obtain requisite clearances, acquire necessary land and complete the rehabilitation and resettlement activities within the agreement period. All these have had a cascading effect on the time and cost budgeted for execution of the projects.

An amount of Rs.4805.61 crores paid as mobilisation advances to the contractors out of which an amount of Rs 3062.55 crores recovered so far and the rest of Rs. 1743.07 crores could not be recovered due to poor progress of works, thus substantial Government principle amount with huge interest was blocked with the contractors.

- ***Insufficient power for Lift Irrigation Schemes:***

The 31 lift projects involving an estimated cost of Rs.1,21,860 crore were taken up which require 8,746 MW power which works out nearly 54.43 per cent of the total installed capacity of the erstwhile State and around 30.39 per cent of total consumption of the erstwhile state. At the same time no efforts were made by the Government for last 10 years to increase the power generation, to meet the additional demand for lift irrigation projects. In this scenario the sustainability of many lift irrigation projects is becoming doubtful on account of availability of power. Considering the crippling power shortage in the state, the state will be forced to purchase power at very high rates, for providing the required power to operate the lifts and release of water for irrigation to the farmers under the lift irrigation schemes would be a huge challenge for the State Government.

- ***Failure to address the vide gap available between IPC & IPU in the existing projects:***

There is about 10.50 lakh acres gap in the existing irrigation projects between Irrigation potential created and irrigation potential utilised, hence the modernisation of the existing irrigation projects should have completed on priority basis to reap quick benefits from less investment. To avoid deterioration of existing irrigation systems and to reduce gap, Government should have made full allocation of annual operations & maintenance (O&M) costs.

- ***Benefits under Jalayagnam not commensurating with the huge expenditure:***

The expenditure incurred so far on Jalayagnam was Rs.79,357.45 Cr and new irrigation potential created was only 19.53 lakh acres, this shows that the irrigation benefit under Jalayagnam was not commensurate with the huge expenditure incurred.

- ***Neglecting Water Conservation Methods:***

The areas like minor irrigation, water conservation measures, rain water harvesting for ground water recharge, conjunctive use of surface and ground water, sprinkler and drip irrigation was totally neglected which resulted in reduction of area under irrigation.

7. *Land acquisition for Projects:*

The total land acquisition required for the projects taken up after 2004-05 in the residuary Andhra Pradesh was 5.82 lakh acres out of which land requisitioned for acquiring is 5.06 lakh and so far acquired is 4.66 lakh acres and balance to be acquired is 1.16 lakh acres.

8. *Resettlement and Rehabilitation:*

The Resettlement and rehabilitation is the major issue that contribute to the progress of execution of projects. About 594 (411 fully, 183 partially)villages are affected under the projects and new R&R centres to be established are 480.The land required for 215 R&R centres has been acquired. Total housing units constructed so far for BPL families are 22,133 as against the contemplated units of 42,782.

LARR Act 2013 has come into force with effect from 01.01.2014. For implementation of the Act, rules are not framed. Draft rules for carrying out the provisions of the LARR Act are pending approval by the Government.

9 . *State Bifurcation Impact on Irrigation Sector:*

- The management and operation of projects of Krishna and Godavari basins serving both in Andhra Pradesh and Telangana will be under the control of River management boards constituted under the provisions of Andhra Pradesh Reorganisation Act, 2014 (6 of 2014). Water being a state subject has been taken over by the Government of India making it difficult for resolution of issues related to release of waters, responsibility of O & M etc.
- The regulation from Srisailam and Nagarjuna Sagar reservoirs will become an Inter-State issue and there will be multiple complexities in routing of flood waters through Srisailam, Nagarjunasagar and Prakasam barrage and the planning of available water in the two reservoirs.The integrated operation of Srisailam and Nagarjunasagar in lean years will certainly become extremely difficult to regulate and manage with the available quantum of water.
- The tenure of the Krishna Water Dispute Tribunal is extended to make project wise specific allocation, if such allocation have not been made by the Tribunal constituted under Inter-State River Water Disputes Act, 1956; and also to determine an operational protocol for project-wise release in the event of deficit flows.

10. *Way Forward:*

- Cost will not be a constraint for completing all incomplete projects. This Government is committed to give highest priority to the farmers and meet their needs.
- Projects to be executed with a medium to long term gestation concentrating on completion in a fixed time frame.
- The operation cost of several LI Schemes is so high that there will be power related negative impact due to these projects if simultaneous efforts are not made towards enhancement of power production and efficient water and power use through modern water management practices.
- Mission mode approach will be adopted to implement Micro irrigation, Recycling of water including conjunctive use of ground water, Benchmarking of water and crop usage for maximum benefits with a minimal usage of water by linking all Lift irrigation schemes with Micro irrigation, and popularizing of ID crops, horticulture and floriculture and other low water consuming commercial crops through a multi departmental approach.
- Minimizing power and maintenance charges along with other input costs.
- In existing projects, the total IP created to be utilized by undertaking immediate O & M measures.
- The lack of effective participation of water users and poor irrigation and water management practices also resulted in increase in gap ayacut in the commands of existing projects.
- **By adopting the best practices for cost effective water management and water conservation, the approach of the Government will be to make the entire State, Drought Proof**.
- The main objective of Irrigation Department will be to manage the available water resources efficiently for their optimum utilization among various stakeholders.
- Indira Sagar Polavaram Project which is very important for the overall development of the State will be completed well within the schedule.
- Water conservation methods will be taken up in a systematic manner with mission mode to conserve water in each water shed.
- Micro Irrigation methods will be taken up under all LI Schemes.
- All important projects will be completed in phased and timely manner.
- Objective of Irrigation Projects is to provide Irrigation and thereby increasing the production with better water use efficiency and adopting other modern methods.
- Better Irrigation-Agriculture co-ordination to achieve higher productivity by utilizing less quantum of water.
- Empowering of APWRRC regulatory and strengthening of Water Use Organisations (WUOs) to improve Irrigation service standards.
- Improving water use efficiency is very crucial in the present water availability scenario. Water balance mechanism is required by way of recycling of irrigation return flows.
- Practicing modern water management will be done by using instruments like space applications and satellite imagery, water audit, bench marking, asset management etc.,
- Integrating Minor Irrigation with water conservation will be promoted to maximize the water utilisation and agriculture production.

11. *Conclusion:*

This white paper provides information about issues and challenges faced by irrigation sector and Government actions to overcome the shortcomings in Andhra Pradesh. The white paper also provides progress in execution of irrigation projects and irrigation potential created along with constraints for delayed completion of works. This paper outlined the actions to be taken by Government of Andhra Pradesh for sustainable irrigation service delivery and increase in farmer's income.