

Chapter 13

Estimates

13.1 General

The estimates for the project are prepared based on the Working Group Report "Guidelines for preparation of detailed project reports of irrigation and multipurpose projects" of Govt. of India, Ministry of Irrigation (now Ministry of Water Resources), 1980.

The cost of the Godavari (Inchampalli) - Krishna (Nagarjunasagar) link canal project is estimated under four units. The cost of 'Head Works' is given in Unit-I. The cost of 'Conveyance System' is given under Unit-II. The cost of 'Power Component' is given under Unit-III. The cost of 'pump houses' is given under Unit-IV. The total cost of the link project is estimated to be Rs. 26289 crores at 2003 - 04 price level.

13.1.1 Classification of Minor Heads/Sub-heads

The estimated cost of the works under Inchampalli-Nagarjunasagar link project has been divided into the following minor heads classified as direct and indirect charges.

Sl.No	Items	Rs. in Lakh
A	Direct charges	
I	Works	2407649
II	Establishment	193688
III	Tools and plants (Ordinary)	15875
IV	Suspense	Nil
V	Receipts & Recoveries	(-) 7850
	Sub-Total	2609362
B	Indirect charges	
I	Capitalised value of abatement of land revenue	639
II	Audit and Account Charges	18876
	Sub-Total	19515
	Total Cost of the Project	2628877

13.2 Unit I – Head Works

Total cost of head works is estimated to be Rs. 1120 crore.

13.2.1 Classification of Minor Heads/Sub-heads

The estimated cost of **Unit-I** has been divided into the following minor heads classified as direct and indirect charges.

Sl.No	Items	Rs. in Lakh
A	Direct charges	
I	Works	106191
II	Establishment	6012
III	Tools and plants (Ordinary)	601
IV	Suspense	Nil
V	Receipts & Recoveries	(-) 592
	Sub-Total	111212
B	Indirect charges	
I	Capitalised value of abatement of land revenue	213
II	Audit and Account Charges	601
	Sub-Total	814
	Total Cost of the head works	112026

13.2.2 Direct Charges

I – Works

'A' Preliminaries: An amount of Rs. 1950 lakh is provided under this sub head. This is worked out based on the apportioned cost 'A'-Preliminaries of Inchampalli joint project report escalated to the present level. This sub-head covers the expenditure on investigations to be conducted during execution, surveys, design studies, field tests etc.

'B' Land: An amount of Rs. 36042 lakh is provided under this sub-head under **Unit-I** based on the apportioned cost of 'B'- Land provided in the Inchampalli joint project report after escalating to 2003-04 price level.

'C' Works: Total cost of the 'C'- Works of the **Unit- I** (Head Works) of Inchampalli project as given in the Inchampalli joint project report, prepared by the Irrigation Department, Government of Andhra Pradesh is Rs. 12862.99 lakhs. The additional cost in the right flank regulator on

account of increased discharge to be passed through it for the Inchampalli-Pulichintala link canal has been estimated on proportionate basis and added to arrive at the new cost of Rs.12983.43 lakhs for the 'C'- Works of **Unit I** (Head Works). The cost of 'C'- Works chargeable to Inchampalli-Nagarjunasagar link project is arrived at by apportioning the total cost of 'C' - Works in the ratio of diversion (16426 Mm³) through the Inchampalli-Nagarjunasagar link canal to the total utilization of waters (21287 Mm³) from Inchampalli reservoir. The total utilization includes a quantity of 4371 Mm³ proposed to be diverted through Inchampalli-Pulichintala link canal. The apportioned cost of the 'C'- Works chargeable to Inchampalli-Nagarjunasagar link project works out to Rs. 10018.69 lakhs. With 10% rate of escalation, the cost of 'C'- Works at 2003-04 price level was arrived at Rs.46036.00 lakhs.

'K' Buildings: An amount of Rs. 8633 lakh is provided under this sub-head under **Unit-I** based on the apportioned cost of 'K'- Buildings provided in the Inchampalli joint project report and projecting to 2003-04 price level by considering the percentage of escalation as 10%.

'M' Plantation: An amount of Rs. 213 lakh is provided under this sub-head under **Unit-I** based on the apportioned cost of 'M'- Plantation provided in the Inchampalli joint project report and projecting to 2003-04 price level.

'O' Miscellaneous: An amount of Rs. 6301 lakh is provided under this sub-head under **Unit-I** based on the escalated apportioned cost of 'O'- Miscellaneous provided in the Inchampalli joint project report.

'P' Maintenance: An amount of Rs. 177 lakh is provided under this sub-head under **Unit-I** based on the escalated apportioned cost of 'P'- Maintenance provided in the Inchampalli joint project report.

'Q' Special Tools and Plants: An amount of Rs. 1074 lakh is provided under this sub-head under **Unit-I** based on the escalated apportioned cost of 'Q'- Special Tools & Plants provided in the Inchampalli joint project report.

'R' Communications: An amount of Rs. 5453 lakh is provided under this sub-head under **Unit-I** based on the escalated apportioned cost of 'R'- Communications provided in the Inchampalli joint project report.

'X' Environment and ecology: An amount of Rs. 177 lakh is provided under this sub-head under **Unit-I** based on the apportioned cost of 'X'-

Environment and ecology provided in the Inchampalli joint project report and projecting to 2003-04 price level by taking percentage of escalation as 10%.

'Y' Losses on stock and unforeseen: An amount of Rs. 135 lakh is provided under this sub-head under **Unit-I** based on the apportioned cost of 'Y'- Losses on stock and unforeseen provided in the Inchampalli joint project report and projecting to 2003-04 price level by taking percentage of escalation as 10%.

II- Establishment

An amount of Rs. 6012 lakh is provided under this sub-head for establishment including leave and pensionery charges at 10% on I-Works (on C-Works, K-Buildings & R-Communications).

III- Tools and Plants (Ordinary)

A sum of Rs. 601 lakh at 1% of the cost of I-Works (on C-Works, K-Buildings & R-Communications) is provided under this sub-head to cover the cost of survey instruments, camp equipment, office furniture and equipment and other small tools.

IV – Suspense: No provision is kept under this sub-head.

V - Receipts and Recoveries

An amount of Rs. 1592 lakh is provided under this sub-head under **Unit-I** based on the escalated apportioned cost of V-Receipts & Recoveries on capital amount provided in the Inchampalli joint project report.

13.2.3 B. Indirect Charges

I) Audit and Account Charges

A provision of Rs. 601 lakh is made under this head at about 1% of the cost of I - Works (on C-Works, K-Buildings & R-Communications) to cover the audit and account charges.

II) Abatement of Land Revenue

An amount of Rs. 213 lakh is provided under this sub-head under Unit-I as 5% on apportioned cost of land provided in the Inchampalli joint project report after escalating to 2003-04 price level.

Unit II - Conveyance System

Total cost of conveyance system consisting of main canal, lead canal, including various CD / CM works along these canals works out to Rs. 14636 crore. Cost under various sub-heads is worked out as follows.

13.3.1 Classification of Minor Heads/Sub-heads

Unit-II has been divided into the following minor heads classified as direct and indirect charges.

Sl.No	Items	Rs. in Lakh
A	Direct charges	
I	Works	1289421
II	Establishment	153171
III	Tools and plants (Ordinary)	12894
IV	Suspense	Nil
V	Receipts & Recoveries	(-) 5242
	Sub-Total	1450244
B	Indirect charges	
I	Capitalised value of abatement of land revenue	426
II	Audit and Account Charges	12894
	Sub-Total	13320
	Total Cost of conveyance system	1463564

13.3.2 A. Direct Charges I – Works

'A' Preliminaries: The provision made under this sub-head is Rs.25788 lakh. At 2% on cost of I-Works (i.e Rs.1289421 lakh). This sub-head covers the expenditure on investigations to be conducted during execution, surveys, design studies and field tests etc.

'B' Land: Provision made under this sub-head covers the cost of land acquisition for main canal, lead canal, link canal power house, pump houses, rehabilitation colonies and camp colonies. The cost of land acquisition and related items works out to Rs. 12998 lakh.

'D' Regulators: A provision of Rs. 5800 lakh has been made for construction of cross regulators.

'F' Cross Drainage Works: The cross drainage works are (1) aqueducts/ syphon aqueducts, (2) super passages and (3) under tunnels. Cost of these structures across the main canal is deduced from the cost curves prepared by making use of the abstract estimates of the existing structures on NSRBC considering the 1998-99 cost level (as given in FR of Krishna (Nagarjunasagar) – Pennar (Somasila) link canal). Cost of structures thus arrived has been updated to 2003-04 price level taking percentage of escalation as 10%. The cost of structures on lead canal is arrived by making use of the cost curves given in Handri – Niva canal project report prepared by Irrigation & C.A.D Department, Government of Andhra Pradesh and considering percentage of escalation as 10%. Total cost of cross drainage works is estimated to be Rs. 70400 lakh.

Aqueducts: The total cost of aqueducts/syphon aqueducts comes to Rs. 47534 lakh.

Under tunnels: The total cost of under tunnels works out to Rs. 13054 lakh.

Super passages: The total cost of super passages comes to Rs. 9812 lakh.

'G' Bridges: The total cost of bridges works out to Rs. 15270 lakh.

Single lane bridges: The cost under this sub-head works out to Rs.11488 lakh.

Double lane bridges: The cost of double lane bridges works out to Rs.2609 lakh.

Railway bridges: The cost of railway bridges works out to Rs.1173 lakh.

'H' Escapes: The total cost of escapes comes to Rs. 954 lakh .

'K' Buildings: The buildings are classified broadly as permanent and temporary buildings. These are further classified as residential and non-residential buildings. A sum of Rs. 8491 lakh is provided for buildings.

'L' Earthwork and Lining: Total cost of earthwork and lining for the main canal and lead canal is estimated to be Rs. 1123868 lakh.

'M' Plantation: The plantations required under Unit-II and under link canal powerhouse at Musi have been considered under this sub-head. The cost of plantation works out to Rs 388 lakhs.

'N' Tanks and reservoirs: A sum of Rs. 5240 lakh is provided for formation of intermediate reservoirs and improvement of bunds of the existing Musi reservoir.

'O' Miscellaneous: The total provision made under this sub-head is Rs. 1802 lakh.

'P' Maintenance: A provision of Rs. 8451 lakh is made under this sub-head for the maintenance of all the works during construction period.

'Q' Special Tools and Plants: A provision of Rs. 2837 lakh is made under this sub-head. The net amount charged to special tools and plants is computed after deducting hire charges at 75% on the capital cost of machinery.

'R' Communications: A lump sum provision of Rs. 1068 lakh is made under this sub-head for connecting important work spots with existing roads, roads to quarries, temporary diversion etc.

'X' Environment and ecology: A provision of Rs. 2947 lakh is made towards afforestation, restoration of land in construction areas by filling, grading etc. to prevent further erosion and for protective measures as may be necessary.

'Y' Losses on stock and unforeseen: A provision of Rs. 3119 lakh at 0.25% of I-works less 'A' Preliminaries, 'B' Land and 'Q' Special T & P is made under this sub-head in the estimate.

II- Establishment

An amount of Rs. 153171 lakh is made under this sub-head for establishment including leave and pensionery charges at 12% on I-works less B-Land.

III- Tools and Plants (Ordinary)

A sum of Rs.12894 lakh is made under this sub-head to cover the cost of survey instruments, camp equipment, office furniture and equipment and other small tools which works out to about 1% of the cost of I-Works.

IV- Suspense: No provision is kept under this sub-head.

V - Receipts and Recoveries

An estimated deduction by way of resale or transfer of temporary buildings and sale of special T & P and miscellaneous receipts from rent charges of buildings is provided as Rs. 5242 lakh.

13.3.3 B. Indirect Charges

a) Audit and Account Charges

A provision of Rs. 12894 lakh is made under this head at about 1% of the cost of I-Works to cover the establishment charges of the Accounts staff.

b) Abatement of Land Revenue

A provision of Rs.426 lakh at 5% of the land cost is provided towards abatement of land revenue due to land acquisition for canals and camps.

13.4 Unit III – Power Component

Power component of Inchampalli-Nagarjunasagar link project consists of dam toe powerhouse at Inchampalli and link canal powerhouse at Musi.

Additional cost on account of reversible turbines and creation of pondage on downstream of dam has been added to the classified abstract of power scheme of Inchampalli project. The same has been escalated to the 2003-04 price level. The total cost of powerhouse at Inchampalli works out to Rs. 241250 lakh.

The cost of link canal power house has been worked out based on the estimate for the construction of the power house of Polavaram project on pro-rata, considering the installed capacities and adopting escalation of 10% annually to bring the cost to 2003-04 price level. Total cost of the link canal power house at Musi works out to Rs. 42900 lakh.

The total cost of the powerhouses at Inchampalli and canal power house is works out to Rs. 2841 crore and is considered under **Unit - III**.

13.4.1 Classification of minor heads/sub-heads

Unit-III has been divided into the following minor heads classified as direct and indirect charges.

Sl.No	Items	Rs. in Lakh
A	Direct charges	
I	Works	268494
II	Establishment	12307
III	Tools and plants (Ordinary)	1381
IV	Suspense	Nil
V	Receipts & Recoveries	(-) 641
	Sub-Total	281541
B	Indirect charges	
I	Capitalised value of abatement of land revenue	Nil
II	Audit and Account Charges	2609
	Sub-Total	2609
Total Cost of Power component		284150

13.4.2 A. Direct Charges

I - Works

'A' Preliminaries: Provision made under this sub-head is Rs. 1488 lakh, consisting of Rs. 689 lakh for the dam toe-powerhouse and Rs. 799 lakh for the link canal powerhouse. This sub-head covers the expenditure on investigations to be carried out during execution, surveys, design studies, field tests etc.

'B' Land : Provision made under this sub-head covers the cost of land acquisition for power houses. The cost of land acquisition and related items of link canal powerhouse has been included under **Unit – II**. The cost of land acquisition and related items of dam toe powerhouse works out to Rs. 23 lakh.

'J' Power plant civil works: Cost of civil works for the power plant works out to Rs. 65453 lakh. The break-up is Rs. 55290 lakh and

Rs.10163 lakh respectively for dam toe powerhouse and link canal powerhouse.

'K' Buildings : Provision made under this sub-head covers the cost of buildings for power houses. The cost of buildings of link canal powerhouse has been included under **Unit – II**. The cost of buildings of dam toe powerhouse works out to Rs. 300 lakh.

'M' Plantation : Provision made under this sub-head covers the cost of plantation for power houses. The cost of plantation of link canal powerhouse has been included under **Unit – II**. The cost of plantaion of dam toe power house works out to Rs. 23 lakh.

'O' Miscellaneous : Total provision made under this sub-head is Rs.1683 lakh. The break-up is Rs. 1378 lakh for dam toe powerhouse and Rs.305 lakh for link canal powerhouse.

'P' Maintenance: A provision of Rs.1841 lakh is made under this sub-head for the maintenance of all works during construction period. The break-up is Rs. 1708 lakh and Rs.133 lakh respectively for dam toe powerhouse and link canal powerhouse.

'Q' Special Tools and Plants: A provision of Rs. 308 lakh is made under this sub-head. The break-up is Rs.295 lakh and Rs.13 lakh respectively for dam toe powerhouse and link canal powerhouse.

'R' Communications : A provision of Rs.186 lakh is made under this sub-head.The break-up is Rs.161 lakh and Rs.25 lakh respectively for dam toe power house and link canal power house.

'S' Power Plant Electrical Works : The cost of power plant electrical works is estimated to be Rs. 196664 lakh. The break-up is Rs. 168227 lakh and Rs.28437 lakh respectively for dam toe powerhouse and link canal power house.

'Y' Losses on Stock and Unforeseen: A provision of Rs. 525 lakh is made under this sub-head in the estimate. The break-up is Rs. 427 lakh and Rs.98 lakh respectively for dam toe powerhouse and link canal powerhouse.

II Establishment

An amount of Rs. 12307 lakh is provided under this sub-head. An amount of Rs. 10026 lakh is provided for dam toe powerhouse. An amount of Rs.2281 lakh is provided for the link canal power house by considering 10 % of the cost of the civil works and 4 % of the electrical works .

III- Tools and Plants (Ordinary)

A sum of Rs. 1381 lakh is provided under this sub-head to cover the cost of survey instruments, camp equipment, office furniture and equipment and other small tools. An amount of Rs. 1125 lakh is provided for dam toe powerhouse. An amount of Rs.256 lakh is provided for the link canal powerhouse which works out to about 1% of the cost of civil works and 0.5% of the cost of electrical works under I-works. .

IV- Suspense: No provision is kept under this sub-head.

V - Receipts and Recoveries

An estimated deduction by way of sale of special T & P is provided as Rs. 641 lakh. An amount of Rs. 631 lakh is provided for dam toe powerhouse. An amount of Rs.10 lakh is provided for the link canal powerhouse considering 75% recovery of the provision under Q-Special Tools and Plants.

13.4.3 B. Indirect Charges Audit and Account Charges

A provision of Rs.2609 lakh is made under this sub-head. An amount of Rs. 2209 lakh is provided for dam toe powerhouse. An amount of Rs.400 lakh is provided for the link canal powerhouse at 1% of the cost of I-Works to cover the establishment charges of the Accounts staff.

13.5 Unit IV – Pump house

The total lift involve is 107.20 m. For lifting water it is proposed to install vertical turbine pumps of suitable capacity with one standby unit in each pump house. The pumping arrangement includes suitable lengths of suction and delivery mains and pumping main of minimum length.

The cost of these pump houses has been assessed based on the estimate for construction of the pump house of Alimineti Madhava Reddy Project on prorata, considering the installed capacities and adopting escalation of 10% annually to bring the cost to 2003-04 price level.

Total cost of the pump houses is assessed as Rs.10255 crore. The above figures are derived based on the estimate for 308 crores (2001-02 price level) for construction of the pump house of Alimineti Madhava Reddy Project. But the project was executed by A.P. GENCO within 269 crores with a saving of 12.7%. This project involved 3.3 km approach channel, 1.4 km tunnel, long delivery lines and deep setting of machines, whereas, in the present case these components neither exists nor of such magnitudes and as such a total reduction of 25% is considered to the above figures. Therefore, the total cost under **Unit – IV** is taken as Rs. 7691 crore.

13.5.1 Classification of Minor Heads/Sub-heads

Unit-IV has been divided into the following minor heads classified as direct and indirect charges.

Sl.No	Items	Rs. in Lakh
A	Direct charges	
I	Works	991391
II	Establishment	29597
III	Tools and plants (Ordinary)	1332
IV	Suspense	Nil
V	Receipts & Recoveries	(-) 500
	Sub-Total	1021820
B	Indirect charges	
I	Capitalised value of abatement of land revenue	Nil
II	Audit and Account Charges	3696
	Sub-Total	3696
	Total Cost of the Project	1025516

13.5.2 A. Direct Charges

I – Works

'A' Preliminaries : Provision made under this sub-head is Rs. 666 lakh. This sub-head covers the expenditure on investigations to be carried out during execution, surveys, design studies, field tests etc.

'B' Land : Requirement of land for the pump houses is included under **Unit - II**. As such no provision is kept under this sub-head in **Unit- IV**.

'J' Pump houses civil works : Cost of civil works for the pump houses works out to Rs. 369266 lakh.

'K' Buildings (Non-residential Buildings Including Erection Hostel): Total provision made under this sub-head is Rs.3328 lakh based on the estimate for the construction of the pump house of Alimineti Madhava Reddy project duly considering the escalation to bring the cost to the 2003-04 level.

'M' Plantation : An amount of Rs. 333 lakh is provided under this sub-head. This is based on the estimate for the construction of the pump house of Alimineti Madhava Reddy project duly considering the escalation to bring the cost to the 2003-04 level.

'O' Miscellaneous : A sum of Rs. 6658 lakh is provided under this sub-head based on the estimate of Alimineti Madhava Reddy project duly considering the escalation to bring the cost to the 2003-04 level.

'P' Maintenance : A provision of Rs. 3696 lakh is made under this sub-head for the maintenance of all works during construction period based on the estimate of Alimineti Madhava Reddy project duly considering the escalation.

'Q' Special Tools and Plants : An amount of Rs. 1999 lakh is made under this sub-head based on the estimate for the construction of the pumphouse of Alimineti Madhava Reddy project duly considering the escalation.

'R' Communications : A sum of Rs. 666 lakh is made under this sub-head which is estimated based on the estimate for the construction of the pump house of Alimineti Madhava Reddy project duly considering the escalation.

'S' Pump house electrical & mechanical works and Transmission scheme : The cost of pump house electrical & mechanical works and Transmission scheme works is estimated to be Rs. 603415 lakh.

'Y' Losses on stock and unforeseen : A provision of Rs.1364 lakh is made under this sub-head which is estimated with reference to the

estimate for the construction of the pump house of Alimineti Madhava Reddy project duly considering the escalation.

II- Establishment

An amount of Rs. 29597 lakh is provided under this sub-head which is estimated with reference to the estimate for the construction of the pump house of Alimineti Madhava Reddy project duly considering the escalation.

III-Tools and Plants (Ordinary)

A sum of Rs.1332 lakh is provided under this sub-head to cover the cost of survey instruments, camp equipment, office furniture and equipment and other small tools which is estimated with reference to the estimate for the construction of the pump house of Alimineti Madhava Reddy project duly considering the escalation.

IV- Suspense: No provision is kept under this sub-head.

V - Receipts and Recoveries

An estimated deduction by way of sale of special T & P is provided as Rs. 500 lakh under this sub-head which is estimated with reference to the estimate for the construction of the pump house of Alimineti Madhava Reddy project duly considering the escalation.

13.5.3 B. Indirect Charges Audit and Account Charges

A provision of Rs. 3696 lakh is made under this sub-head to cover the establishment charges of the Accounts staff which is estimated with reference to the estimate for the construction of the pump house of Alimineti Madhava Reddy project duly considering the escalation.