

CHAPTER - IX

COST ESTIMATES

9.1 General

The Burhi Gandak-Noon-Baya-Ganga link canal project envisages construction of a barrage across river Burhi Gandak near Muriaro village in Samastipur district, a 28.95 km long link canal and 26 cross drainage/masonry structures on canal.

This chapter has been prepared as per the “Guidelines for Preparation of Detailed Project Report of Irrigation and Multipurpose Projects-2010” issued by MoWR Govt. of India. The cost estimate for the project has been prepared based on the quantities worked out from the field surveys and designs of the various structures. The rates have been taken from CSR, 2012 of Govt. of Bihar. Wherever necessary, the rates have been escalated @8% per annum to arrive at the cost for the year 2012-13.

9.2 Classification of units

The cost of the project has been worked out under following units:

1. Unit - I: Head works – Burhi Gandak barrage
2. Unit -II: Canal and canalization – Main canal, branch canal and distribution system.
3. Unit - VI: Command area development

The cost estimate of the link project works out to Rs. 421374.92 lakh.

The unitwise cost of the project is given in **Table 9.1**

Table 9.1

Cost estimate of the link project

Unit: Rs. in lakh

Unit-I(Headworks)	Unit-II(Canal and canalisation)	Unit-VI(Command area development)	Total
97054.72	302541.53	21778.68	421374.92

The unitwise estimation of cost of the project is described in following paragraphs.

9.2.1 Unit-I Headworks

Unit-I consists of cost of headworks viz. Burhi Gandak barrage including head regulator. The total cost of Unit-I Headworks works out to Rs 97054.72 lakh which includes direct and indirect charges. The abstract of the cost of Unit-I Headworks is given in **Annexure-9.1**.

9.2.1.1 Direct charges

The water is diverted through link canal to river Baya/Ganga for reducing the flood damages in the lower reaches of Burhi Gandak basin. Further, the link canal will also provide enroute irrigation during kharif season.

I-Works

‘A’ Preliminary

A lumpsum Provision of 2% of I-Work has been kept under this sub-head and works out to Rs. 1775.75. It covers the actual expenditure incurred on detailed survey & investigation works viz. topographical surveys & investigations, hydrological & meteorological surveys, geological & geotechnical surveys, construction material survey, seismic studies carried out construction of access roads to facilitate site investigations, charges for consultancy works for various studies, for preparation of detailed project report and the probable expenditures for establishing the final locations of different project components at preconstruction stage.

‘B’ Land

A provision of Rs. 3907.52 lakh has been made under this sub-head. Under this sub-head, compensation for land acquired for approach road, afflux bund, borrow areas & quarries and for colony areas have been made. Land rates obtained from Govt of Bihar have been enhanced 4 times for granting compensation to the project affected person as per R&R policy of Govt. of India. Provision for compensation of standing crops has also been made. The details are shown in **Annexure - 9.1.1**.

‘C’ works

The estimated cost under this sub-head has been assessed to Rs. 71088.97 lakh. This covers the cost of construction of Burhi Gandak barrage.

Provisions have also been made for the cleaning of the construction site, drilling work etc. The details of the 'C'-works are given in **Annexure-9.1.2.**

'K' Buildings

A provision of Rs. 3977.58 lakh has been made under this sub-head. Provision of building for office and residential accommodation for the staff of Chief Engineer, Superintending Engineer, Executive Engineer and Assistant Engineer offices of the project site have been made. The details are shown in **Annexure - 9.1.3.**

'M' Plantation

A provision of Rs. 99.29 lakh has been kept under this sub head. This includes plantation of trees in colonies, downstream of earthen portion and along the approach road to the project site etc. Details of plantation for barrage and bunds are shown in **Annexure - 9.1.4**

'O' Miscellaneous

A lumpsum provision of 2% of I-works has been made in this sub-head which works out to be Rs. 1775.75 lakh. It includes provision for external and internal electrification of the colonies, water supply and sewage disposal, recreation facilities, medical and security arrangement, fire fighting equipment, telephone facilities, visits of VIPs for inauguration ceremony etc.

'P' Maintenance

A lumpsum provision of 1% of I-works excluding "A" Preliminary, "B"-Land and "Q"- special T&P for barrage has been made in this sub-head and works out to Rs. 805.58 lakh.

'Q' Special T & P

Under this sub head, provision has been made at 25% of capital cost of major construction equipment and other equipment. Cost of inspection/transport has been added to above cost to arrive the total chargeable cost under this sub-head. A provision of Rs. 2546.02 lakh has been kept under this sub-head. The recoveries on resale value of Q-special T&P is considered as 75% of chargeable capital cost of major construction equipment & general purpose equipments and 20% cost of inspection/transport equipment which works out to Rs. 1800.98 lakh. Details are furnished in **Annexure 9.1.5.**

‘R’ Communication

A lumpsum provision of 2% of I-works has been kept under this sub-head and works out to be Rs. 1775.75 lakh. This includes construction of approach roads upto the barrage site, approach to colony and quarries etc.

‘X’ Environment and ecology

A provision of 1% of I-works has been made in this sub-head and works out to be Rs. 887.88 lakh. This includes soil conservation measures, compensatory afforestation, preventive measures of forest fires, restoration of land and public health measures etc.

‘Z’ Losses on stock and unforeseen

A provision of Rs. 201.40 lakh has been made @ 0.25% of cost of I-works less cost of A-Preliminary, B land and Q special T & P, towards losses on stock of material due to natural causes.

II-Establishment

A provision of Rs. 8493.40 lakh has been made under this sub-head @ 10% of I-Works excluding ‘B’ land.

III-Ordinary T & P

A provision of Rs. 887.88 lakh has been kept under this sub-head @1% of I-works.

IV-Receipts and recoveries

A provision of Rs. 2160.65 lakh has been kept for receipts and recoveries.

9.2.1.2 Indirect charges

A total of Rs. 992.06 lakh has been kept for this sub head. An amount of Rs. 888.41 lakh has been provided @ 1% of I-Works as audit and accounts charges and an amount of Rs. 103.65 lakh @ 5% of cost of B-land (culturable) for land revenue also provided.

The total estimated cost under Unit-I “Headworks” has been worked out as Rs. 97054.72 lakh. General abstract of cost of Unit-I Works is given in **Table-9.2** and estimated cost of Unit-I is given in **Annexure - 9.1**

Table – 9.2**Unit-I :Head works” – general abstract of cost**

Sl. No	Item(s)	Amount Rs. in lakh
	Direct charges	
I	Works	
	‘A’ Preliminary	1775.75
	‘B’ Land	3907.52
	‘C’ Works	71088.97
	‘K’ Buildings	3977.58
	‘M’ Plantation	99.29
	‘O’ Miscellaneous	1775.75
	‘P’ Maintenance	805.58
	‘Q’ Special T&P	2546.02
	‘R’ Communications	1775.75
	‘X’ Environment and ecology	887.88
	‘Z’ Loss on stock and unforeseen item	201.40
	Total of I-works	88841.49
II	Establishment	8493.40
III	Ordinary tools and plants	888.41
IV	Deduct receipt and recoveries	(-)2160.65
	Total direct charges	96062.66
V	Indirect charges	992.06
	Grand total	97054.72

9.2.2 Unit: II Canal and canalization

This consists of the main link canal with the provision for lining of the canal system consisting of branch canals, distributaries, minors and water courses in the enroute command. The estimated cost is Rs. 302541.53 lakh. The abstract of cost is given at **Annexure - 9.2.**

9.2.2.1 Direct charges

‘A’ Preliminary

This sub head covers the expenditure on investigations already done and yet to be carried out such as soil surveys, investigation of foundation, preliminary soil tests etc. and establishing of laboratories etc. A lumpsum amount of Rs. 5603 lakh @ 2% on cost of I-works has been provided under this sub-head.

‘B’ Land

Acquisition of private land for the main and branch canal as well as for residential and non residential buildings have to be made under this head. Solatium charges for compulsory acquisition, legal charges, diversion of communication system etc. have also been provided. Provision of Rs. 132017.65 lakh have been kept under this sub-head. Details are furnished in **Annexure-9.2.1.**

‘D’ Regulators

Under this sub-head the estimate for cross regulators/ head regulators at branch canals, terminal point of link canal etc. are made separately. Provision under this sub-head is Rs. 6207.61 lakh. The details are furnished in **Annexure-9.2.2.**

‘F’ Cross drainage works

Cost of C.D. works like syphons, aqueducts, hume pipe culverts etc. have been worked out and the cost of individual works have been derived. Total provision in this sub-head is Rs. 36523.63 lakh. Details are furnished in **Annexure - 9.2.3.**

‘G’ Bridges

Provision for 14 number of road bridges on the main canal only have been kept in this estimate on the basis of the cost estimate derived after necessary escalation in price level. An amount of Rs. 24653.03 lakh has been estimated under this sub head. Details are shown in **Annexure-9.2.4.**

‘H’ Escapes

One canal escape has been provided at RD 7.35 km along the main canal and the estimate of the same has been derived. Cost under this sub-head is 1534.27 lakh. The details are shown in **Annexure-9.2.5.**

‘K’ Buildings

The cost under this sub-head amounting to Rs. 11155.23 lakh has been arrived on the basis of rate of plinth area derived from the model estimates of each type of buildings. The details are shown in **Annexure-9.2.6.**

‘L’ Earth work

A major share of the total estimated cost has been made under this sub-head. Bush clearance, cutting of trees including its uprooting, stripping of the seat of embankment, excavation in clay & sandy soil etc. compaction of earth by sheep foot roller, construction of dowlah, transportation charges for earth, for lining, tamping in canal bed and side slopes etc. Total cost has been worked out as Rs. 34711.13 lakh. The details are shown in **Annexure-9.2.7.**

‘M’ Plantation

Under this sub-head a provision of Rs. 86.51 lakh for plantation in the colonies and different offices alongwith the plantation of trees on the embankment of the canal on both sides have been made. The cost includes the price of the saplings and protective measures also. The details are shown in **Annexure-9.2.8.**

‘O’ Miscellaneous

Under this sub-head a provision for external electrification of the colonies, water supply and special lighting arrangements for construction works have been included. A lumpsum provision of 2% of I-Works i.e. Rs. 5603.00 lakh is made under this sub-head.

‘P’ Maintenance

A provision for maintenance of water supply and sewerage of colonies telephones, security arrangements, school buses and inspection vehicles are kept under this sub-head. Maintenance cost is taken lumpsum as 1% of I-works Less ‘A’ Preliminary, ‘B’ land and ‘Q’ Special Tools and plants. Provision under this sub-head has been made to the tune of Rs. 1419 lakh.

‘Q’ Special T&P

Under this sub head a provision has been made at 25% of capital cost of major construction equipment and other equipment. Full cost of inspection/transport has been added to above cost to arrive the total chargeable cost under this sub-head. A provision of Rs. 658.74 lakh has been kept under this sub-head. The recoveries on resale value of Q-special T&P is considered as 75% of chargeable capital cost of major construction equipment & other equipments and 20% cost of inspection/transport equipment which works out to Rs. 466.02 lakh. Details are furnished in **Annexure 9.2.9**.

‘R’ Communication

Cost of construction of quarry roads, temporary roads in the work area are provided under this sub-head of the estimate. The amount under this sub-head is 58.60 lakh. The details are furnished in **Annexure-9.2.10**.

‘U’ Distributaries and minors

A provision of Rs 6873.06 lakh has made under this sub-head. The cost has been worked out on the basis of rate per ha of culturable command area.

‘V’ Water courses

Under this sub-head a provision of Rs. 9885.49 lakh is made in the estimate. The cost has been assessed on the basis of rates per ha of CCA.

‘W’ Drainage

For this purpose, a provision is made under the sub-head X-environment and ecology.

‘X’ Environment and ecology

A provision of 1% of I-Works has been made in this sub-head including drainages and works out to Rs. 2801.00 lakh. This includes soil conservation measures, restoration of land and public health measures etc.

‘Y’ Losses on stock and unforeseen

A provision of 25% of the cost of I-Works less ‘A’ Preliminary ‘B’ Land and ‘Q’ Special T&P has been made as losses on stock under this sub-head. The amount arrived at this sub-head is Rs. 355 lakh.

II-Establishment

A lump sum provision of 10% of I-Works less B-land i.e. Rs. 14812.83 lakh is made under this sub-head.

III-Ordinary tools and plants

A lump sum provision @ 1% of the I-Works i.e. Rs. 2801.46 lakh has been kept for this in the estimate.

IV-Receipts and recoveries

Provision of Rs. 752.30 lakh for receipts and recoveries on the special tools and plants and temporary buildings have been kept.

9.2.2.2 Indirect charges

(i) Audit and account charges

A total provision of Rs. 2801.46 lakh @ 1% cost of the I-Works has been kept for the audit and accounts charges.

(ii) Abatement of land revenue

A total provision @ 5% cost of B-land (culturable area) amounting to Rs.2732.13 lakh for abatement of land revenue have been made under this sub-head.

The total estimated cost under Unit-II ‘Canals and canalisation’ have been worked out to be Rs. 302541.53 lakh. General abstract of cost of Unit II is given in **Table – 9.3** and estimated cost of canal and canalization Units-II is given **Annexure-9.2**.

Table – 9.3**Unit – II Canal and canalization – General abstract of cost**

Sl.No.	Item(s)	Amount Rs. in lakh
	Direct charge	
I.	Works	
	‘A’ – Preliminary	5603.00
	‘B’ – Land	132017.65
	‘D’ – Regulator	6207.61
	‘F’ – Cross Drainage Works	36523.63
	‘G’ – Bridges	24653.03
	‘H’ – Escape	1534.27
	‘K’ – Buildings	11155.23
	‘L’ – Earthwork including canal lining	34711.13
	‘M’ – Plantation	86.51
	‘O’ – Miscellaneous	5603.00
	‘P’ – Maintenance	1419.00
	‘Q’ – Special T & P	658.74
	‘R’ – Communications	58.60
	‘U’ – Distributaries, minors & sub-minors	6873.06
	‘V’ – Water courses	9885.49
	‘W,X’ – Environment and ecology including drainage (1% of I-work)	2801.00
	‘Y’ – Losses on stock & unforeseen item	355.00
	Total I – Work	280145.95
II.	Establishment	14812.83
III.	Ordinary Tools & Plants	2801.46
IV.	Deduct receipt & recoveries	-752.30
	Total direct charges	297007.94
V.	Indirect charges	5533.59
	Grand total	302541.53

9.2.3 Unit VI : Command area development

The total culturable command area covered under the project is 126034 ha. A provision has been made at the rate of Rs. 17280/- per ha for the entire CCA amounting to Rs. 21778.68 lakh.

9.4 Total cost of the project

The total estimated cost of Burhi Gandak-Noon-Baya-Ganga link project works out to Rs. 421374.92 lakh at the price level of the year 2012-13 including the cost of Unit-I Headworks ,cost of Unit-II Canal & canalization and Unit-VI Command area development.