

# Time and Cost Performance Status of Sikta Irrigation Contract

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### ABSTRACT

**Purpose:** *The government of Nepal (GoN) is implementing many small, medium, and large types of Irrigation Projects. Sikta Irrigation Project (SIP) is the National Pride Project implemented by the GoN. The command area of the project has 42766.00 ha and beneficiaries of the project have 46715 households consisting of 449588 population of Banke district. The paper aims to assess the contract performance in terms of the Time and Cost of the Sikta Irrigation Project, Banke, Nepal.*

**Design/Methodology/Approach:** *Using secondary data of contract, content Analysis of Project documents review and Key Informant Interviews were used for assessing the contract performance.*

**Findings/Result:** *Sikta Irrigation Project has a total of 52 contracts out of which consider for study based on documentation, only 18 contracts completed based on schedule time whereas 16 contracts behind schedule. However, 16 contracts are still on going far behind the schedule and one contract terminated. The actual expenditure of the project has 16.26 billion (64.90% of estimated cost) and the allocated budget was 18.26 billion (72.99% of estimated cost) whereas the estimated cost has 25.032 billion. It indicates that the progress of the project was 64.90% and fails to complete the scheduled time 2076/077. The client should prepare the project well before implementation with proper planning, designing, and detailed study from the beginning.*

**Originality/Value:** *It is empirical research to assure the project performance based on lessons from Sikta Irrigation Project.*

**Paper Type:** *Analytical Policy Research*

**Keywords:** Irrigation, contract, expenditure, Contract Duration, Performance

### 1. INTRODUCTION :

Nepal has sufficient water resources. That is why the Government of Nepal has a high priority in the irrigation sector. In Nepal, the National pride projects in the irrigation sector are Sikta Irrigation Project, Babai Irrigation Project, Rani-Jamar-Kularia Irrigation Project, Bheri-Babai Diversion Multipurpose Project, and Sunkoshi Merin Multipurpose Project.

According to Mishra et al, (2021) [1], Sikta Irrigation Project was selected for the study purpose. It is located in the Banke district. The water source for this project is West Rapti River, which originates from the mid-mountains in the Mid-Western Region of the country. There are two system of canal i.e., Eastern canal command area 9000ha and western canal command area 33766 ha. When project have been completed then beneficiary of the project has 46715 household and 449588 population of Banke district. Neediness, lack of education and so forth are seen in Banke locale, where Sikta Irrigation Project is under development. The general objective of the Sikta water system project is to add to the National Development destinations of the Government. The arrangement of water system offices along with the improvement of horticultural, support administrations which would work on the useful limit of ranchers so agrarian creation will be expanded and expectation for everyday comforts of the ranchers

in Banke area will be upgraded. A significant test of the task is the dispersive soil structure in the trench. The disappointment of trench at the hour of trail testing is an illustration of specialized issue. The dispersive soil is seen where the trench and different designs were built. As per the master, cutting of existing soil and filling by sweet soil is essential before the development of the trench and other design according to the necessity of the site state of the task. Huge volume of soil substitution is seen which will diminish the issue. The project performance is measured base on timely completion, within the budget, required quality standards and customers satisfaction (Mishra and Bhandari, 2018) [2]. As a consequence of poor performance, the projects mainly face the problem of time overrun and cost overrun. It is always discussed to complete project on time within budget using Value Management and even crashing could be done if cost allows but in practice time extension is norms not an exception in Nepal [3].

Sikta Irrigation project of command area 42766 ha and beneficiary of the project have 46715 house hold and 449588 population of Banke district [1]. The delay of project might affect agriculture productivity. A country like Nepal where food security and food severance are big issue need to focus on its agricultural development, on agricultural infrastructure. In this circumstance this project itself is unique one to increase the yield of agriculture product in the area to overcome starvation significantly in the respected area that's why the project should have been completed on time with accepted quality within the budget without any safety or ethically issues so the researcher has attempt to conduct the study and contractual performance assessment of Sikta Irrigation Project.

Sikta Irrigation Project was started 2004/2005 (B.S.2061/062) [4] with an objective to complete by 2019/2020 (B.S.2076/077) however the project has not completed yet so its performance needs to be study and issue related performance should be accessed so the researcher as made an attempt to continue to conduct an area.

## 2. OBJECTIVES :

The objective of the study is to assess the status of Contact in terms of time and cost of Sikta Irrigation Project.

## 3. SILENT FEATURE OF SIKTA IRRIGATION PROJECT :

The concept for the SIP was first formulated in prefeasibility studies conducted from 1975 to 1976 and contained in the report on the proposed Western Rapti Multipurpose Development, which comprised the construction of a high dam at Bhalubang in the West Rapti Basin and ad The German company Lahmeyer International GmbH completed a feasibility study for SIP in August 1980 based on a run-of-the-river diversion gravity irrigation scheme. A further study for a run-of-the-river scheme was carried out by the department of Irrigation, Hydrology and Metrology and this was completed in June 1983. In 2004, Feasibility report was assessed.

The study showed that the project is technically, economically and socially viable in the present context as well. Based on the Feasibility Study Report 2004, the Government of Nepal decided to implement the Project in three phases, which are as follows. The total cost of the Project as per the Study is NRS 7.45 billion (revised to NRs 12.80 billion in Fiscal Year 2007/08). Later second revision and add scope of work the approved total financial cost of whole Project was NRS. 25.02 billion in fiscal year 2071/72 B.S. However, the cost of the Project has been increased to NRs 39.98 billion due to rectification of right main canal, some additional command area development and command area protection works, increased cost of Left main canal as per contract agreement, increased cost of Dunduwa irrigation system as per DPR, social cost to address social requirements of project affected area, increased cost of land acquisition, and inflation (SIP Master Plan, 2019) [5].

**Table 1 :** Silent Feature of SIP

1	Name of Project	Sikta Irrigation Project
2	Location	Provenance no- 5, Banke, Nepal
4	Culturable Command Area	33766 Ha. (Western), 9000 Ha. (Eastern)

5	Name of Source River	West Rapti
6	Type of Source	Prennial
7	Catchment Area	5450km <sup>2</sup>
8	Minimum Monthly Flow Rate	12.5 cumecs (80% of Reliable flow)
9	High Flood Design Discharge	8659 Cumecs (100years return period)
10	Diversion Structure	Barrage, 317m (Dam length)
11	Span No and Length	Barrage portion - 13 no@17m span gates
		Under sluice portion - Right Side: 3 no @10m span gates, Left Side: 2no @ 10m span gates
12	Desalting Basin Length	Right Side -640m, Left Side-
13	Western Canal	Total Length: 45.25km, Ideal Length:30km, Branch-7 no
14	Eastern Canal	Total Length: 53km, Ideal Length:1.45km, Branch-2 no
15	Discharge of Canal	Western :50 cumecs, Eastern: 12.50 cumecs
16	Beneficiary Population	449588
17	Beneficiary Household	46715
18	Present Cropping Intensity	168%
19	Future Cropping Intensity	242%
20	Project Start	2061/062
21	Project complete	2076/077 (Based on Revised Master Plan 2014)
22	Total Project Cost	25.02 billion

(Source: SIP Revised Master Plan, 2014) [5].

#### 4. LITERATURE REVIEW :

##### Time and Cost performance of Construction Project

Time overrun is norms not an exception in Nepalese case for construction projects. Time overrun resulted into cost overrun. All the projects under Second Small-Town Water Supply and Sanitation Projects selected for study were time overrun (Mishra et al, 2020) [6]. According to Mishra et.al. [7], the project time and cost of the Public Health Buildings projects in Nepal was highly correlated ( $p = 0.599$ ). An equation,  $\text{Time} = 487.5 \times (C/79.96)^{0.293}$  (time is expressed in day and cost in million NRs.) was developed for the prediction of time and cost components of similar projects. The venture complete time-cost relationship can be dictated by including the immediate expense and circuitous expense esteems together. The ideal undertaking term can be resolved as the task span that outcomes at all venture all out cost. As indicated by Menon et al., [8] appropriate arranging of work, submitted authority and the board, and powerful correspondence framework can be exceptionally useful in further developing time execution. To limit the defers Suwal et al., [9] suggested following that (I) there ought to be arrangements in PPA and PPR to control uncommon low bid by expanding execution security according to level of bid underneath assessed sum, (ii) Appropriate workers for hire ought to be chosen dependent on experience, specialized, monetary limit alongside thought of work close by. The

arrangement of negative stamping according to work close by ought to be done in Public Procurement Act (PPA) and Public Procurement Rules (PPR), with the goal that propensity of possessing works will be diminished, (iii) Pre-execution readiness, (for example, land obtaining, utility migration, EIA and IEE) and arranging of undertaking assignments, asset need and suitable agreement methodology to keep away from low bid ought to be done, (iv) Strict arrangements or limit on project period varieties ought to be done in PPA and PPR, (v) Proper component ought to be developed for steady and fixed residency of Project supervisor in the venture, (vi) Efficient agreement the executives by manager (fast choice and endorsement on schedule).

The project delay is still happening and will continue to happen in the construction for various known and unknown reasons such as unexpected factors, bankruptcy from client, and change in design during the construction, political issue, sudden price fluctuation, with projects manager in result of forcing him/her to leave before completing the assigned job. However, time and cost overrun may not be prevented entering but the evolving new technology like BIM, new methods and past experience could be used to reduce the impact from recognized risk factors, particularly in the undeveloped and developing countries (Yadav and Mishra) [10]. Time Overrun is one of the most significant issues being faced by the construction industry today also.

## **5. RESEARCH METHODOLOGY :**

### **4.1 Selection of Study Area:**

Sikta Irrigation Project is the National Pride Project, it is located at the Banke District. The water source for this project is West Rapti River, which originates from the mid-mountains in the Mid-Western Region of the country. The source of this irrigation system is perennial. There are two system of canal i.e., Eastern canal and Western canal. Eastern canal passes through Rapti Sonari Gaupalika and Narainapur Gaupalika its length 53.50 km and command area 9000 ha. There are 11 no's of secondary canal. Among them Rajkulo contains S1, S2, S3, S4 and Phattepur contains S5, S6, S7, S8, S9, S10, S11. The length of secondary and tertiary canal is 145 km. The discharge of Eastern canal 14 cumec. Western canal passes through Rapti Sonari Gaupalika, Dudwa Gaupalika, Kohalpur Nagarpalika and Baijnath Gaupalika. Its length is 45.25 km with trapezoidal canal section having the tail escape at the end and command area 33766 km. The discharge of western canal 50 cumec. There are 7 no's of secondary canal. S1 (Sidhaniya branch), Dunduwa, S2 (Gohawa), S3 (Akalgherwa), S4 (Persenpur), S5 (Pidari), S6 (GaruwaGaun) are the secondary canal. The length of secondary and tertiary canal 233 km. The ideal length of canal is 30 km. The bed slope of canal is 1/7000. when project have been completed then beneficiary of the project has 46715 house hold and 449588 population of Banke district.

Sikta, which started construction 14 years ago in magh 2063. It was supposed to be built at an average cost of Rs 12 billion. Five years after scheduled time, the project has started partially providing water to the farmers. The estimated cost of the project in the initial year 2061/062 was 12.80 billion. Later second revision and add scope of work the approved total financial cost of whole Project was NRS. 25.02 billion in fiscal year 2071/72. However, the cost of the Project has been increased to NRs 39.98 billion due to rectification of right main canal, some additional command area development and command area protection works, increased cost of Left main canal as per contract agreement, increased cost of Dunduwa irrigation system as per DPR, social cost to address social requirements of project affected area, increased cost of land acquisition, and inflation. (Source: SIP DPR, 2014) [11].

### **4.2 Design and Data Collection:**

The research is ex-post facto research-based field performance as documentary study. The study depends on secondary data of contract documents and project documents. Content Analysis is the main data analysis technique as narrative from Key Informant Interview using snowball technique.

### **4.3 Data Analysis:**

Content Analysis is the methods adopted. The research is a documentation of performance in terms of time and cost using narrative technique from key informant.

### **4.4 Validity and Reliability:**

This is documentation based on authorized project documents after further clarification during KII. Triangulation among respondents and logical comparison of documents verification gives validity of research and comparison with literature provides reliability.

**5. RESULTS AND DISCUSSION :**

**5.1 Status of the Contract under the Project:**

The project was started 2063/064 and has a 9-year completion time i.e., 2072/073. The project got affected by several factors resulting in increased time and cost.

**5.2 Fluctuation of cost based on Approved Master plan 2007 and 2014:**

The total cost of the Project as per the study is NRS 7.45 billion (revised to NRs 12.80 billion in Fiscal Years 2007/08). Later second revision and add a scope of work the approved total financial cost of the whole Project was NRs. 25.02 billion in the fiscal year 2071/72. However, the cost of the project has been increased to NRs 39.98 billion due to rectification of the right main canal, some additional command area development and command area protection works, increased cost of Left main canal as per contract agreement, increased cost of Dunduwa irrigation system as per DPR, social cost to address social requirements of project affected area, increased cost of land acquisition, and inflation [5]. The total expenditure at end of F.Y. 2076/077 has Rs16261946890.00.

From Table 2 it is seen that the master plan 2007 total project cost was NRs.12801739074.00. After revised in 2014 the total project cost was increased to NRs 25023180198.00 due to increased scope of work and price escalation. In the 2014 revision of the master plan various scope of work was added such as Eastern Main canal, Eastern branches, detailed breakdown of Right Main branch canals, Command Development works and head work construction. In this comparison, it was seen that in master plan 2007 was not proper detailed planning due to this reason price can be increased and the scope of work was changed.

**Table: 2** Comparison of Approved Master plan 2007 and 2014 [5]

S.N.	Description of Works	Estimated Cost as per Approved Master plan 2007(NRs.)	Updated Cost in NRs. as per Approved Master plan 2014	Analysis
<b>A</b>	<b>Civil Work Cost :</b>			
1	Head work construction	2,591,638,724.00	2,873,398,400.08	cost is increased due to price escalation (10.87%)
2	Main Canal construction (RMC)	4,247,722,000.00	5,679,667,364.34	cost is increased due to price escalation and increased scope of work like length of canal lining, local drainage structures (33.7%)
3	Branch Canals	1,090,664,145.00		Break down under 7 canals
	Sidhaniya B C	-	320,208,997.16	Detailed cost breakdown of branch canals was not included in previously approved Master Plan
	Dunduwa B C		1,529,078,523.66	-
	Other Branch Canal of RMC (5 Nos)	-	1,110,638,419.33	171% increased
5	Left Main Canal	-	1,604,664,821	Scope of work has been changed to included left side command area in 9 VDC's (100%)

6	Branch Canal of LMC	-	39,443,184	Scope of work has been changed to included left side command area in 9 VDC's (100%)
7	CAD Works	-	2,169,289,855	The cost of CAD work was not included in previously approved Master Plan
8	Command Area Protection Works	112,853,251	540,637,390	Cost is increased due to price escalation and increased scope of works
	<b>Sub-total (A)</b>	<b>8,042,878,120</b>	<b>15,867,026,955</b>	(97.28% increased)
<b>B</b>	<b>Program cost :</b>			
9	Consultancy services	207,146,000	271,849,275	cost is increased as scope of work has been changed to include left side command area in 9 VDC and due to price escalation. (31.23%)
10	Agricultural stretching support program	113,910,000	117,525,362	cost is increased as scope of work has been changed to include left side command area in 9 VDC and due to price escalation (10.88%)
11	Institutional Development/ Training	39,000,000	13,043,478	-
12	Environmental impact mitigation	41,000,000	42,301,449	Cost is increased due to price escalation. (3.17%)
	<b>Sub-total(B)</b>	<b>401,056,000</b>	<b>444,719,565</b>	(10.88% increased)
<b>C</b>	<b>Other costs:</b>			
13	Land acquisition	411,800,000	1,601,449,275	cost is increased as scope of work has been changed to include left side command area in 9 VDC and due to price escalation (288.89%)
14	Vehicle and equipment cost	28,200,000	44,147,101	Cost is increased due to price escalation (56.55%)
15	Establishment			
	Furniture	29,000,000	765,942	Cost is decreased by -2.64%
	Machinery goods		5,217,391	Cost is increased due to price escalation (100%)
	Building construction/ maintenance		29,920,290	Cost is increased due to price escalation (100%)
	<b>Sub-total (C)</b>	<b>469,000,000</b>	<b>1,681,500,000</b>	Cost increased by 258.52%
	<b>Total Base Cost</b>	<b>8,912,934,120</b>	<b>17,993,246,521</b>	Cost increased by 101.87%
<b>D</b>	<b>Contingencies &amp; VAT :</b>			
16	D1. Work Charge Staff Cost and Other Minor Expenses	449562406	899,662,326	5% of Base course (100.12% increased)
17	D2. Physical Contingencies	944,081,053	1,799,324,652	10% of Base Course (90.59% increased)

18	D3. Price escalation local cost	1,472,766,442	1,799,324,652	10% of Base course (22.17% increased)
19	VAT	944,081,053	2,339,122,047.69	13% of Base course (147.76% increased)
	sub-total(D)	3,810,490,954	6,837,433,677.86	Cost increased by 79.44%
<b>E</b>	<b>Administrative expenditure</b>	78,314,000	192,500,000.00	Cost increased by 145.80%
<b>Total Project Cost</b>		<b>12,801,739,074</b>	<b>25,023,180,198.54</b>	Cost increased by 95.47%

From table 2 it is seen that comparison of Master plan 2007 and Master plan 2014, civil work cost of project has increased by 97.28%, program cost increased by 10.88%, other cost increase by 258.52 %, contingencies & Vat 79.44% and administrative expenditure increased by 145.80% because of increase in the scope of work in this item and increase in price index. The price index of the Rastriya Bank in 2007 was 74.9 and 2014 was 141.3 i.e., increased by 88.65%. The total cost of the Project has increased by 95.47%. It was clearly saying that due to improper planning of project cause to increase in total Project cost.

**5.3 Assessment of Schedule Contract:**

Out of a total of 52 contracts, only 18 contracts were completed based on schedule time whereas 16 contracts behind the schedule. However, 16 contracts are still on going far behind the schedule. The status of timely completed 18 contract's which estimated cost, agreement amount and expenditure are shown in table 3.0

**Table 3:** Contracts completed based on Schedule

S. N.	Stretch of Canal	Contract No	Name of the contractor	Estima ted Amou nt	Agree ment Amoun t	Total Expen diture	Date of signing of contra ct	Sched ule Date of compl etion	Comp leted date
1	1400m length Desilting Basin, 317m Weir cum Bridge, Flushing Channel & Protection work	SIP/HW/IC B-01	SINOHYDRO Corporation Chania and Lumbini Builders JV.	233649 9000	185505 1000	185420 0000	2006- 06-05	2010- 05-11	2010- 05-10
2	ch 15+km to ch 16+000 km	SIP/MC/N CB/04	P.S/Golden/Bha irav Construction (p) Ltd.	109856 000	891252 60.21	890000 00	2011- 11-06	2013- 11-05	2013- 11-05
3	Ch.16+00 km to ch 17+000 km	SIP/MC/N CB/05	Siddhi sai Prakash (p) Ltd., Mahalaxmi construction (p) Ltd. & Mahadev Khimti Nirman Sewa (P)Ltd.	119894 000	969014 49.8	960000 00	2011- 11-06	2013- 11-05	2013- 11-05

4	Ch.17+00 0 km to ch 17+700 km	SIP/MC/N CB/06	Hirachan construction (p) Ltd. & Mahadev khimti Nirman Sewa (p) Ltd. & anjan Nirman Sewa (p)Ltd.	861937 50.8	861937 50.81	860000 00	2011- 11-06	2013- 11-05	2013- 11-05
5	Constructi on of Canal Lining, Drain & Protection Work	SIP/MC/N CB-07	Kalika Construction P Ltd	390106 81.9	354321 48.69	319572 44	2015- 03-15	2017- 02-11	2017- 02-11
6	Aagiya Camp compound wall and main canal lining works	SIP/MC/H W/NCB-01	Swachchhanda, Gongabu, Kathmandu	124265 42.6	124265 42.62	121926 30.00	2016- 03-06	2018- 03-14	2018- 03-14
7	Mul badh tahta bajapur command area protection works	SIP/CAP/N CB-01	Swachchhanda/ Gajurmukhi JV, Gongabu, Kathmandu		610469 21.21	599437 06.00	2015- 02-16	2016- 07-13	2016- 07-13
8	Jhijra Command area protection works	SIP/CAP/N CB-04	DEV & SAYAR MALLA JV	287360 43.3	249089 41.43	193464 35.00	2017- 06-17	2018- 03-12	2018- 03-17
9	Paruwa Command area protection works	SIP/CAP/N CB-05	AMAR CONST. PVT LTD	287312 64.5	281341 75.00	266793 32.00	2017- 06-17	2018- 03-18	2018- 03-18
10	Constructi on of Revetmen t and Spur at Muguwa Khola in Hariharpu r	SIP/CAP/N CB-09(Re)	M/S AMAR / MAJDOOR JV	214430 69	164320 19.75	150571 37.00	2018- 07-06	2019- 07-05	2019- 07-05
11	River Training Works at Harkundi Khola at Chainage 8+400 of Western Main Canal	SIP/CAP/N CB-10(Re)	M/S ROYAL BUILDERS PVT. LTD.	282271 87	240097 62.17	243466 52.00	2018- 07-05	2019- 07-05	2019- 07-05

12	Constructi on of Embankm ent & Protection works at Jharna khola in Tikulipur	SIP/CAP/N CB-11	M/S KHADKA NIRMAN SEWA	154460 00	101450 00.00		8,378,0 63.00	11- Jan-18	2018- 01-11
13	Command area protection work at Paruwa khola	SIP/CAP/N CB-14	M/S P.S. NIRMAN SEWA	118200 00	818100 0.00	7,437,1 15.00	2018- 07-04	2019- 07-05	2019- 03-27
14	Immediat e maintenanc e of WMC by filling RBM in void/sink hole	SIP/SQ/01/ 075-76	Prased construction	197844 8.57	194793 2.19	1,945,0 98.00	2019- 06-11	2019- 06-15	2019- 06-13
15	Immediat e maintenanc e of WMC by filling RBM in void/sink hole	SIP/SQ/02/ 075-76	Sabik construction pvt, Ltd.	196370 2.83	194740 9.17	1,912,3 43.00	2019- 06-11	2019- 06-15	2019- 06-13
16	Immediat e maintenanc e of WMC by filling RBM in void/sink hole	SIP/SQ/03/ 075-76	M/s. S.S. Construction	198283 9.47	198283 9.47		2019- 06-11	2019- 06-15	2019- 06-13
17	Immediat e maintenanc e of WMC by filling RBM in void/sink hole	SIP/SQ/04/ 075-76	Bhawani Nirman sewa	192258 8.55	190634 6.49	1,901,5 54.00	2019- 06-11	2019- 06-15	2019- 06-13
18	Consultin g service for Detail Measur ement and Quality Assessme nt WMC 17+700 to 34+700		M/s Innovative support Hube Pvt. Ltd	169500 0.00	169500 0.00	169500 0.00	2019- 04-07	2019- 07-09	2019- 07-09

Table 4: Delay Completed Contract detail

S. N.	Stretch of Canal	Contract No	Name of the contractor	Estimated Amount	Agreement Amount	Total Expenditure	Date of signing of contract	Schedule Date of completion	Completed date	Delay
1	Main dam steel gate fitting and Hydromechanical works	SIP/HW/ICB-02	OM Metals Infra Strs Pvt Ltd, New Delhi, India	2003711000	1109277301.4	1106640640	2013-03-19	2016-10-30	2017-09-30	11 month (25.58%)
2	Ch 0+614 km to ch 12+037 km	SIP/MC/ICB/01	CTCE-KALIKA JV, International Contractor	2117723000	1670497255	1936027123	2009-01-12	2012-01-11	2013-09-13	8 month 2 days (22.22%)
3	Ch 12+037 km ch 13+000	SIP/MC/NCB/01	Tamang-Rasuwa JV, National contractor	101128000	65001165.15	56303543.33	2008-06-18	2010-06-17	2011-06-26	12 month 9 days (50%)
4	Ch 13+000 km to ch 14+000 km	SIP/MC/NCB/02	Waiba-Bhairab-Himdung & Thokar JV, National Contractor	85180000	52078866.25	42748244.63	2008-06-18	2010-06-17	2011-06-26	12 month 9 days (50%)
5	ch 14+000 km to ch 15+000 km	SIP/MC/NCB/03	Waiba-Bhairab-Himdung & Thokar JV, National Contractor.	84726000	56407097.55	46807824.66	2008-06-18	2010-06-17	2011-06-26	12 month 9 days (50%)
6	Construction of Main Canal Ch. 17+700 to 35+000 km	SIP/MC/ICB-02	CTCE and Kalika Construction P.Ltd. JV	3330525000	2117566386	3024804000	2011-12-16	2015-02-01	2015-04-15	3 month (7.89%) but not final
7	Construction of Main Canal Ch. 35+000 to 45+250 km	SIP/MC/ICB-03	Kalika/CTCE	2032010000	1635826332.18	1646852000	2015-06-15	2017-12-01	2017-11-30	Construction completes but not final
8	Main canal Protection works	SIP/FDR/NCB-01	Kalika Construction P Ltd	128284000	85184791.23	89630000	2015-03-01	2015-07-10	2016-04-07	9 month (225%)
9	Main canal maintenance work	SIP/MC-RP/NCB-01	Apex Construction Co.Pvt.Ltd.	29984000	17806162.58	16745538	2016-06-20	2018-05-13	2018-10-16	4month 3 days (16.66%)

	ch 0+000 to ch 25+000									
10	Main canala gate fitting works	SIP/MC/Gate/NCB-01	OM Metals Infra Strs Pvt Ltd	23304780.7	23304780.67	22127984	2016-07-12	2018-03-31	2018-07-31	4 month (20%)
11	Sighiniya branch ch 0+000 to ch 6+000	SIP/SBC/NCB-01	Tamang/Pacific JV, Kathmandu	196162385	93204858.08	90223585	2014-06-19	2016-06-07	2019-02-06	24month h (100%)
12	Sighiniya sub branch, field canal	SIP/SBC/NCB-03	Kankai/Thodung/Mahalaxmi JV Ktm	178290703	124232872.77	121365061	2014-06-17	2016-06-12	2019-07-16	36 month 4 days (150%)
13	Jagaiya command area protection works	SIP/CAP/NCB-06	M.S.-Oli JV	28726500	19770902.62		2017-07-16	2018-03-30	2018-07-09	3 month 9 days (37.5%)
14	sighniyag hat command area protection works	SIP/CAP/NCB-07	Amar-Malla JV	114972936	105988803.6	102388541.8	2017-06-28	2018-05-25	2020-04-07	22 month 12 days (200%)
15	Binonam a command Area protection works	SIP/CAP/NCB-08	Mahadev Khimti- Oli JV	63259711	47256989.85	46884523.75	2017-07-17	2018-04-04	2020-01-10	21 month 6 days (233%)
16	Construct ion & Protectio n work at Boksini khola near Sikta Barrage Sukhar khola	SIP/CAP/NCB-13	M/S RAJ BUILDERS PVT. LTD.	14941000	8991508.00	8,116,244	2018-06-13	2018-04-19	2020-04-12	23 month 23 days (120%)

From table 3 it can be seen that 18 contracts were completed based on schedule because of well-planned and the performance of the contractor are good. However, the variation of cost out of 17 only 1 contract i.e., contract SIP/CAP/NCB-10(Re) has estimated cost NRs 28227187.00, agreement amount NRs 24009762.70, and expenditure NRs 24346652.00. The variation percentage of this contract has 1.4%.

#### 5.4 Completed Contract with Delay:

The status of delay completed 16 contract's which are shown in table 4 it clearly says the estimated cost, contract agreement amount, expenditure, agreement date, completed date, and delay percentage. From table 5 it can be seen that 16 contracts were completed based on behind the schedule because of delay due to unavailability of material, premonsoon, band, hadtal and hence performance of contractor became slow. The maximum time delay contracts are SIP/CAP/NCB-03 has 233%, SIP/FDR/NCB-01 has 225%, SIP/CAP/NCB-07 has 200%, SIP/SBC/NCB-03 has 150% and so on. The average percentage of delay of the project has 82.50%. The contract SIP/MC/ICB-03 has completed the construction work and final bill forwarded by the contractor but not final yet and extended the DLP

period. The contract SIP/MC/ICB-02 has completed the construction work and final bill forwarded by contractor but not final yet and anti-graft body (CIAA) on 7th December 2018 lodged a corruption case against a contractor and 28 officials at Special Court citing misappropriation of funds and quality of construction works in Sikta Irrigation Project. Out of 16 contracts, only 4 contracts have variation. The variations of contracts are SIP/MC/ICB-01 has 15.89%, SIP/MC/ICB-02 has 42.84%, SIP/MC/ICB-03 has 0.67% and SIP/FRD/NCB-01 has 5.22%.

### 5.5 Ongoing Contracts Status:

Out of a total of 52 contracts, only 18 contracts were completed based on schedule time whereas 16 contracts behind the schedule. However, 16 contracts are still ongoing far behind the schedule. The status of ongoing far behind schedule 16 contract's which estimated cost, agreement amount, expenditure, date of signing of contract, scheduled date, and performance of work progress. Which are shown in table 5.

**Table 5: Ongoing contract detail**

S. N.	Stretch of Canal	Contract No	Name of the contractor	Estimated Amount	Agreement Amount	Total Expenditure	Date of signing of contract	Schedule Date of completion	Completed date	Performance
1	Purbi Mul nahar sakha, upsakha atha Sanrachna Nirman karya.	SIP/EMC/ICB-01	Kalika & Kumar JV	3857770000	3069859259	1658229197	2017-07-24	2019-11-11	ONGOING	30%
2	Sighiniya branch 6+000 to ch 19+000	SIP/SBC/NCB-02	Raman/K S JV, Dhangadhi, Kailali	171205647.9	105469170.32	70166502.13	2014-06-12	2016-06-04	ONGOING	65%
3	Chater tatha sighiniya command area p.works	SIP/CAP/NCB-02	Pappu Constructions, Tinkune, Kathmandu	94596000	76377166.52	39368649	2015-03-01	2017-06-29	ONGOING	52%
4	Chater tatha sighiniya command area p. works	SIP/CAP/NCB-04	Dev and Sayar-Malla JV, Narayan, Dailekh	52500000	41658412.94	40192159	2017-06-21	2018-07-18	ONGOING	96%
5	Construction of Protection work at Dunduwa Khola in Sidhaniya	SIP/CAP/NCB-12	M/S NISHAN BUILDERS PVT. LTD.	18609000	13072000.00	5,739,092	2018-06-04	2019-04-10	ONGOING	44%
6	Command Area Protection	SIP/CAP/NCB-15(Re)	M/S AMAR /	23694890	18934258.70	7,746,272	2018-07-06	5-Jul-19	ONGOING	50%

	n Works at Jhijhari Khola		MAJDOOR JV							
7	Command Area Protection Work at Rapti River 2700m Downstream from Sidhaniya Ghat Bridge	SIP/CAP/NCB-16	M/S DEV & SAYAR / MALLA JV	94803382	84561437.45	24,753,045	2018-07-05	2019-07-05	ONGOING	29%
8	Drainage Development work at Pidari Nala	SIP//DR/NCB-01	M/S AMAR CONSTRUCTION	84231000	71173000.00	53,007,569	2018-07-02	2019-07-03	ONGOING	74%
9	Drainage Development work at Kiran Nala & Junction	SIP//DR/NCB-02	M/S BAJRGURU CONSTRUCTION	94914000	77096000.00	34,083,896	2018-07-02	2019-07-03	ONGOING	44%
10	Construction of Canal and Structures of Akalgharwa Secondary Canal (Ch. 0+000 to 4+600)	SIP/RMC/AKL/NCB-01	M/S BHAIRAB CONSTRUCTION	87551851	76726356.33	31849362.08	2018-07-03	2020-07-05	ONGOING	42%
11	Construction of Canal and Structures of Gohawa Sub-Secondary Canal (Ch. 0+000 to 2+050)	SIP/RMC/GHW/NCB-01	M/S BHAIRAB CONSTRUCTION	78628461	68999804.34	34083896.17	2018-07-03	2020-07-05	ONGOING	49%

12	Construction of Canal and Structures of Persenipur Secondary Canal (Ch. 0+000 to 4+750)	SIP/RMC /PRS/NCB-01	M/S AMAR CONSTRUCTION	86616082	73584804.59	21139028.28	2018-07-03	2020-07-05	ON GOING	29%
13	Construction of Canal and Structures of Pidari Secondary Canal (Ch. 0+000 to 4+100)	SIP/RMC /PDR/NCB-01	M/S MAHAD EV KHIMTI / OLI JV	74448200	76058340.15	10250903.67	2018-07-03	2020-07-05	ON GOING	13%
14	Construction of Canal and Structures of Sidhaniya Secondary Canal (Ch. 5+200 to 6+000)	SIP/SBC/NCB-04	Amar-Majdoor J/V	55488000	32,254,078	5862773.02	2019-05-19	2020-05-18	ON GOING	18%
15	Maintenance & Protection work of Headworks of Dunduwa Irrigation System	SIP/DIS/NCB-01/076-077	M/s Dynamic - Narayana JV	57981000	54,128,000	14619000	2020-02-16	2021-02-22	ON GOING	27%
16	Review of Design, Construction Supervision & Contract management of East Main Canal of Sikta Irrigation Project.	SIP/EMC /Consultancy-01	M/s CMS Engineering Consultancy-full Bright consultancy Pvt Ltd. and Expert professionals Pvt. Ltd	2400000	2,366,800	1597200	2018-05-17	2020-12-20	ON GOING	67%

The status of 16 running contract detail as shown in this table 4.

**Terminated Contracts:**

The termination contact of Dunduwa Sinchai Parnali contract no SIP/DIS/MC/ICB-01 detail shown in table 6.

**Table 6:** Contract Status of Terminated of Contract

S.N.	Stretch of Canal	Contract No	Estimated Amount	Name of the contractor	Agreement Amount	Total Expenditure	Date of signing of contract	Schedule Date of completion
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1	Dunduwa sinchai Pranali	SIP/DIS/ MC/ICB -01	1550667301	Coastal/Pappu JV	988118268. 2	14903570	2016-06- 20	2018-10-08
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The status of termination of contract SIP/DIS/MC/ICB-01, Contractor Name Coastal Pappu JV has agreement amount NRs 988118268.21, agreement date 20th July 2016 and schedule date of completion 10th October 2018. But total expenditure NRs 14903570.00, i.e., till schedule dated of completion. So, the contractor fails to complete the construction works within schedule date. Then the employer i.e., SIP has terminated the contract.

**Status in terms of Budget Expenditure Based on Master plan (2007):**

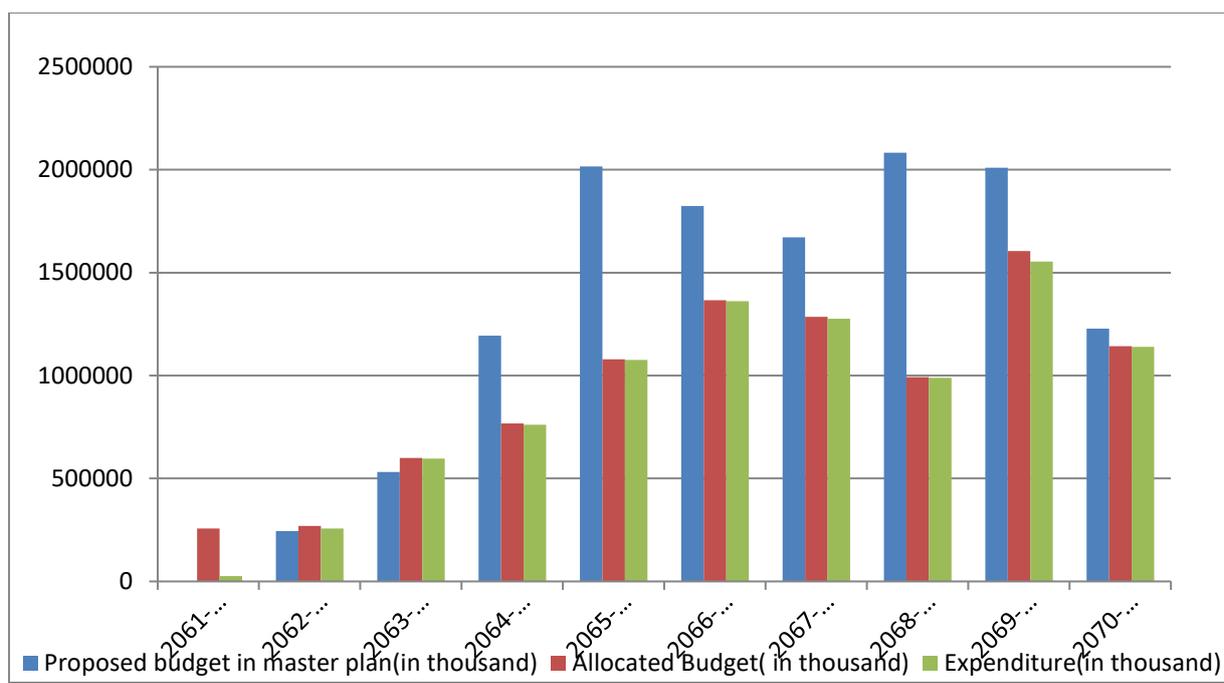
**Table 7:** Detail of Propose budget, allocated budget and expenditure of Master Plan 2007

S.N.	F.Y.	Proposed budget in master plan (in thousands)	Allocated Budget (in thousands)	Expenditure (in thousands)	Percentage of Expenditure (%)
1	2061-062		257547	26540	10.30
2	2062-063	245000	269450	257564	95.59
3	2063-064	532000	600524	596509	99.33
4	2064-065	1193500	767350	760950	99.17
5	2065-066	2016500	1078987	1075844	99.71
6	2066-067	1823000	1366295	1361619	99.66
7	2067-068	1671000	1284706	1276289	99.34
8	2068-069	2083000	992308	989492	99.72
9	2069-070	2009800	1605518	1552974	96.73
10	2070-071	1228000	1142069	1138957	99.73
	<b>Total</b>	<b>12801800</b>	<b>9364754</b>	<b>9036738</b>	<b>96.50</b>

(Source: SIP audit Report, 2018) [12]

The project was started 2063/064 and have a 9 year for complication time i.e, 2072/073. Total project cost has total project cost was NRs12801739074.00 but not complete in timely. According to Master Plan 2007 the proposed budget has NRs 12801800000 but allocated only budget NRs 9364754000 i.e., 73.15 % and expenditure NRs 9036738000. i.e., 96.50%. up to f.y. 2072/073.

From the figure 1 clearly shows that facial year 2061-062 to f.y.2063-064 of the allocated budget more than the approved proposed budget in master plan. The expenditure is 1st year 10.20%, 2nd yr 95.59% and 3rd year 99.33%. After that F.Y. 2064-065 to F.Y. 2070-071 allocated budget less than the proposed budget in master plan and expenditure more than 99%. So, it shows that the project was delay due to financial shortage.



**Fig. 1 :** Bar chart for detail of propose budget, allocated budget and expenditure of Master Plan 2007

**Status in Terms of Budget Expenditure Based on Revised Master Plan 2014 :**

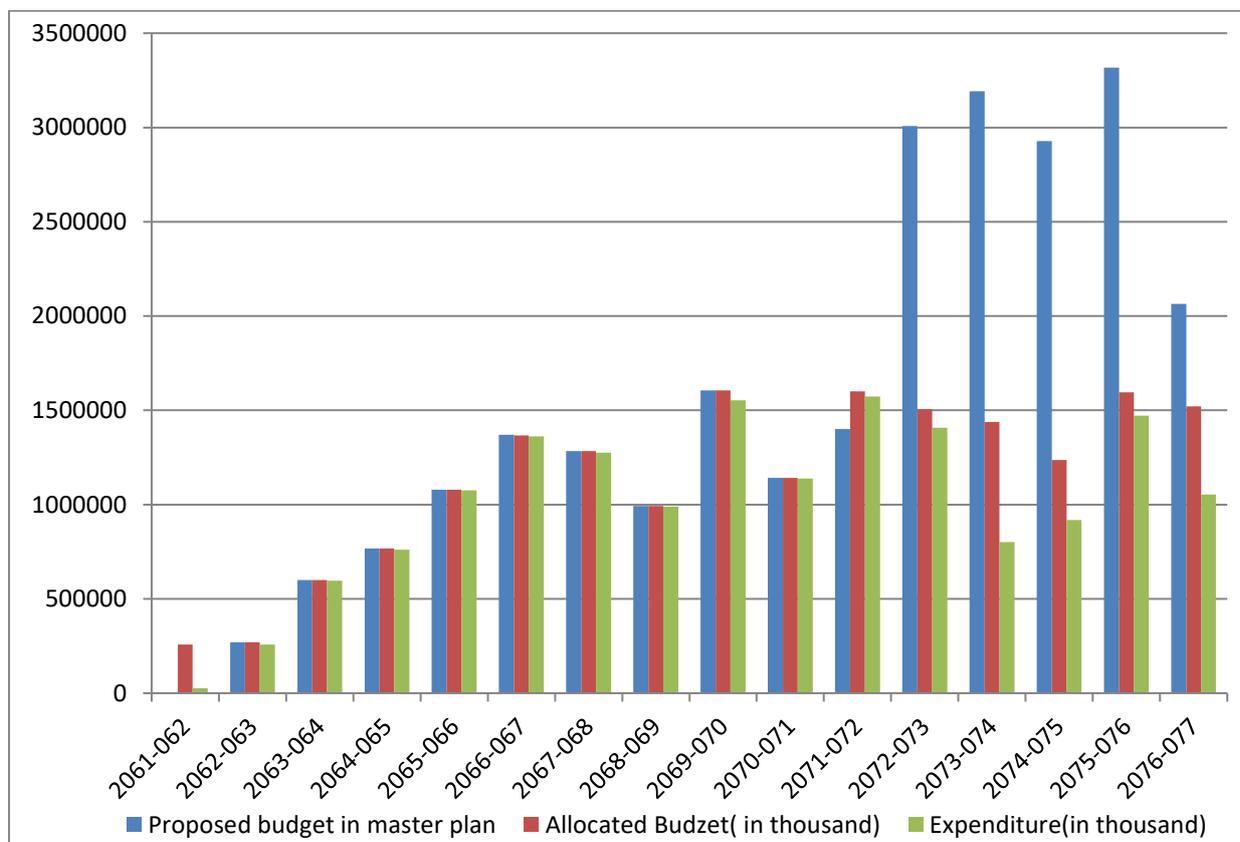
**Table 8:** Detail of Propose budget, allocated budget and expenditure of Master Plan 2007

S.N.	F.Y.	Proposed budget in master plan	Allocated Budget (in thousands)	Expenditure (in thousands)	Percentage of Expenditure (%)
1	2061-062		257547	26540	10.30
2	2062-063	269450	269450	257564	95.59
3	2063-064	600500	600524	596509	99.33
4	2064-065	767400	767350	760950	99.17
5	2065-066	1078987	1078987	1075844	99.71
6	2066-067	1371289	1366295	1361619	99.66
7	2067-068	1284704	1284706	1276289	99.34
8	2068-069	992308	992308	989492	99.72
9	2069-070	1605518	1605518	1552974	96.73
10	2070-071	1142069	1142069	1138957	99.73
11	2071-072	1400632	1600632	1572785	98.26
12	2072-073	3007510	1506400	1407850	93.46
13	2073-074	3192793	1438764	800895	55.67
14	2074-075	2928883	1237159	918264	74.22
15	2075-076	3316645	1596000	1472300	92.25
16	2076-077	2064492	1521663	1053115	69.21
	<b>Total</b>	<b>25023180</b>	<b>18265372</b>	<b>16261946.89</b>	89.03

(Source: SIP audit Report, 2018) [12]

In the revised master plan total cost of the project has Rs 25023180198.54 and the project was completed in F.Y.2076-077 but not complete till now. In Annex (table 8) it shows that the proposed

budget of the approved master plan and allocated budget of this project duration has not been equal it means the allocated budget of Rs 18265372000 is less than the proposed budget of Rs 25023180000. The expenditure at end of 2076-077 has Rs 16261946890.00 and the average expenditure of the allocated budget has 89.03%.



**Fig. 2:** Bar chart shows detail of budget allocation and expenditure (SIP, 2020)

In the above Bar chart Fig.2, it was clearly seen that in comparison of the proposed budget, the allocated budget in duration F.Y.2072/073, F.Y.2073/074, F.Y.2074/075, F.Y. 2074/075, F.Y.2075/076, F.Y.2076/077 was 0.5%, 0.45%, 0.4%, 0.48%, and 0.73% respectively. This indicates a very less allocated budget in this period.

In comparison of the allocated budget, the expenditure in duration F.Y. 2061-062, F.Y. 2062-063 to F.Y. 2072-073, F.Y.2073-074, F.Y.2074-075, F.Y.2075-076, and F.Y. 2076-077 was 10.30%, more than 90%, 55.66%, 74.22%, 92.25% and 69.21% The project starting period 2061-062 only the expenditure 10.30%. F.Y.2073-074, F.Y.2074-075 shows that expenditure very less. In this duration quick change in the project director affects the project progress. Financially the 64.90 % of the work was completed.

**Status in terms of Land Acquisition:**

The Sikta Irrigation Project was Land Acquisition and compensation for the land up to F.Y.2076/077 has a total 871901 sqm and total no of plot acquisition has 1723.

**Table 9:** Land Acquisition up to 2076/077

S.N.	Main Canal, Branch and Sub-Branch Canal	No of plot Acquisition	Acquisition of Land Area (Sqm)
1	Western Canal	174	92809
2	Shighniya Secondary Canal	649	224793
3	Shamsergang	5	4507

4	Nepalganj office	16	23230
5	Chatar		14392
6	Dudwa Secondary Canal	286	108597
7	Eastern Main Canal	5	4597
8	Akalgharuwa secondary Canal	214	104030
9	Gohawa Secondary Canal	65	44401
10	Persenipur Secondary Canal	153	107031
11	Pidari Secondary Canal	146	78082
12	Aagaiya Area	10	65432
	<b>Total</b>	<b>1723</b>	<b>871901</b>

Status in terms of Discharge of Canal

The Western canal running in different dated flows of maximum discharge which are given below.

**Table 10:** Maximum discharge of Western Canal of SIP

S. N	Design Discharge (m <sup>3</sup> /s)	Measured Max. Discharge (m <sup>3</sup> /s)	Date	Remarks
1	50	15.0	June, 2016	Fails (Break) Canal during Trial Testing
2	50	5.85	June, 2018	Canal running
3	50	13.40	July, 2018	Second time canal fails( Break)
4	50	1.46	Jan., 2019	Canal running
5	50	1.46	May, 2020	Canal running
6	50	4.14	June, 2020	Canal running
7	50	4.14	July, 2020	Canal running
8	50	2.67	Aug. , 2020	Canal running

(Source: SIP Barrage control Room Record, 2020)

From table 10 it is seen that design discharge of western canal 50.00 cumecs and measured maximum discharge 15 cumecs of 27th June 2016 of canal failure at the time of trial testing is an example of a technical problem. Canal fails at Changai Nala during the Second time 20th July 2018 measured discharge 13.4 cumecs. It clearly says that the canal has not to test full design discharge. The anti-graft body (CIAA) on 7th December 2018 lodged a corruption case against the Contractor and 28 officials at Special Court citing misappropriation of funds in Sikta Irrigation Project.

## 6. CONCLUSION :

Sikta Irrigation Project has a total of 52 contracts out of which consider for study based on documentation, only 18 contracts were completed based on schedule time whereas 16 contracts behind the schedule. However, 16 contracts are still ongoing far behind the schedule and one contract terminated. According to the master plan of 2007, the total estimated cost of the project was NRs 12.80 billion and project completion date 2014/015 (B.S.2071/072), i.e., 9 years. During this period total allocated budget was 9.36 billion out of which expenditure was 9.03 billion. After that, the scope of work was added and revised the master plan with a total estimated project cost of 25.02 billion (2014) with the extension of time till 2019/020 (B.S.2076/77). As of the date 2019/020 (2076/077), only an 18.26 billion (72.99%) budget was found to be allocated with an expenditure of 16.26 billion. It indicates the progress of the project was 64.90 % and fails to complete the project in scheduled time 2019/020 (B.S.2076/077).

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