1.0 EXECUTIVE SUMMARY

(Pailibo Dialect)

1.1 Project and Public Purpose

Velcan si ango illigne atti go heloke atto gebe power mosu du heloke ai gabe hydroelectric modu, moko dolu he india, Indonesia, heloke Brazil lo. Velcan ge agi be girab ko he Luxemburg heloke administrative heloke financial irab ko he Singapore, Mauritius helok Dubai. Ngunuk ge India Velcan Energy (India) ge irab ko he New Delhi, helok ige ko anga yane Itanagar, Aalo helok Mechukha lo dudu.

Tato-I HE Project si Yarjep (Shi Shito) lo aum gobe iye helok Government of Arunachal Pradesh si ango sum ne Velcan Group hem ne ito lake hela project vide MoAs on 30.06.2007 helok 31st July 2009 alo lo atra tho. Velcan Energy Group he anyi gota shi shito lo ango idn be hegela lata tho helok amin he Pauk HEP helok Heo HEP he. M/s Siyota Hydro Power Private Limited (SHPPL) si Velcan Energy mike lesu, heja sim Special Purpose Vehicle hegela dinchi rube modube hegela Tato-I HEP Build Own Operate Transfer (BOOT) henam ge ikor lok iye.

Tato-I Hydro Electric Project si aum project lok ke kamig yachup nebe idu, sim ne M/s Siyota Hydro Power Private Limited ge amin lo Mechukha helok Tato ara lo moye. Si issi bitne lo ango hem iye ite ko he Yarjap (Shit Shito) Tato la Heyo dolu ge West Siang District Arunachal Pradesh lo (Si Yarjap(Shi Shito) la Siyom shi to ge netche lok adu) . Tato_I HEP Power molen se si 186 MW go helok atoge essu nabe 164 m go. Sim mote ko he Heo Hydroelectric Project ge chokpik jija be idu helok issi bitpok len ne (130.2 cumecs) helok apum bissit-bitmet len ne 2.8 cumecs Yarjap(Shi Shito) gelok Heo Dam helok Power House geni mona ye.

Tato-I HEP si Heo ge netche yachup ne, Heo HEP ge Power House ge isse bitlen ko ja lo dudu-silok ge ajer-ajer be issi bitlen neni Tato-I HEP hem ne mona ye helok ke shito lok ke sin issi hem ne ladlik ye. Issi hem ne 1100 m addo ge Meying dulu ge erik pako duko ge bollen ye koki lok issi he tunnel lo atchi rube buklik moye. Tunnel ge icho be 3.9 km lok ke koki ge terbe. Bitne he atchi rube turbine lo bitlik ye. Hedi nogo ango ite ko he Yarjep(Shi Shito) ge lakche pele lo 3.9 km ge yerso ne tunnel ge duppo Duko ge irap laye la sky singe shaft helok surface power house ge netche yane Heyo dolu terbe iye (Tato ge roda nam dolu). Shi iko si Tato la Aalo ge beda moka lo adu.

Tato-I HE Project ge hai dinchi nam ne abum be Table: ES 1 lo katam du. Abum be rulen –rurab helok kebe ge ango ite ko hem **Figure: ES 1** lo.

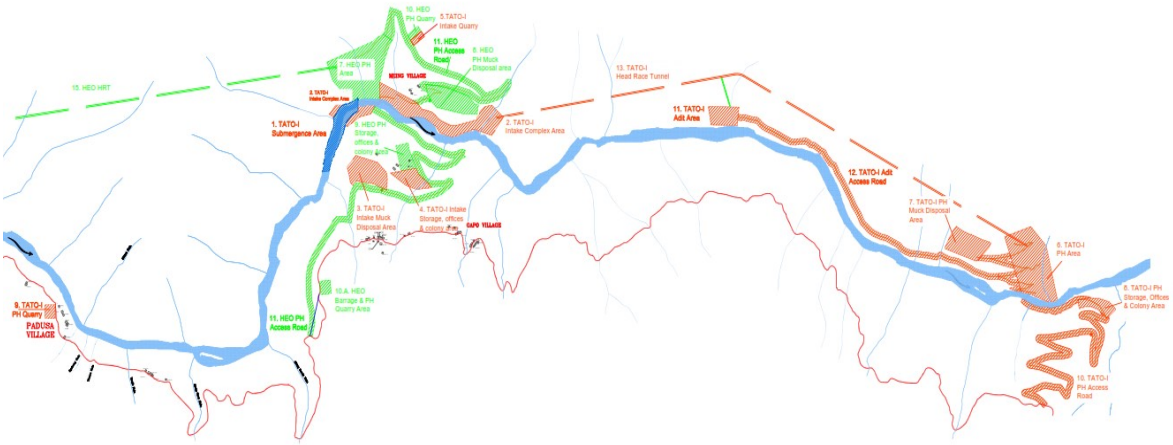

Figure: ES 1 - Tato-I HEP across Yarjep (Shi Shito) river

Table: ES 1- Salient features of Tato-I H.E. Project in West Siang district of Arunachal Pradesh

1.	**LOCATION**	
(i)	State	Arunachal Pradesh
(ii)	District	West Siang
(iii)	Village	Gapo
(iv)	Access Road	Road from Tato to Mechuka
(v)	Geographical Coordinates of Water Intake	
	Longitudes	94°18’43’’E
	Latitudes	28°32’32’’N
(vi)	Geographical Coordinates of Power house	
	Longitudes	94°21’31’’E
	Latitudes	28°31’53’’N
2.	**HYDROLOGY**	
(i)	Catchment area at the water intake (km^2)	1 154
(ii)	River	Yarjep (Shi Shito) River
(iii)	Average Annual Rainfall (mm)	2 621 mm
(iv)	Min-Max temperature (°c)	1°c – 40°c
(v)	Min-Max humidity (%)	39% - 100%
(vi)	PMF (m^3/s)	4100
(vii)	SPF (m^3/s)	3400
3.	**TRENCH WEIR**	
(i)	Type	Raised trench weir
(ii)	Length of Weir	55m
(iii)	Weir Top	1195.50 m and 1197.0 m
(iv)	River Bed Level	1188 m

(v)	Maximum Weir height above riverbed level	7.5 m and 9.0 m
4.	**INTAKE CHANNEL**	
(i)	Length	115 m
(ii)	Width	2.0 m
(iii)	Depth	3.0 m
(iv)	Design discharge	10 m^3/s
5.	**SHINGLE FLUSHING DUCT**	
(i)	Type	Concrete box
(ii)	Size	1.5 m(W) x 1.83 m (H)
(iii)	Length	89 m
6.	**HEAD RACE CHANNEL**	
(i)	Type	Concrete box
(ii)	Shape	Rectangular
(iii)	Length	840 m
(iv)	Width	6.6 m
(v)	Depth	5.0 m to 7.53 m
(vi)	Design discharge (m^3/s)	132.88 m^3/s
(vii)	Invert Level (m) at inlet at Chainage Zero	1180 m
(viii)	Invert Level (m) at the end of ramp just upstream of Inlet of Head Race Tunnel	1174 m
7.	**LATERAL ESCAPE WEIR**	
(i)	Chainage	From 550 m to 634.5 m
(ii)	Crest Length	84.5 m (75 m clear width)
(iii)	Crest Level	EL 1189.30 m
(iv)	Design discharge (m^3/s)	132.88 m^3/s
8.	**INTAKE STRUCTURE AT INLET OF HEAD RACE TUNNEL**	
(i)	Invert Level	EL 1174 m
(ii)	Level of Trash Rack Cleaning Machine operating platform	EL 1193.50 m
(iii)	Size of Trash Rack	4 number each of 3 m width x 19.5 m height
9.	**HEAD RACE TUNNEL**	
(i)	Length	3641 m
(ii)	Shape (Excavated)	Modified inclined legs horse shoe
(iii)	Shape (Finished)	Circular
(iv)	Diameter (m)	6.5 m
(v)	Design discharge (m^3/s)	132.88 m^3/s
10.	**ADIT**	
(i).	Type	D-Shaped
(ii).	Adit-1 to HRT	6.0 m x 6.0 m, Length=199 m
(iii).	Adit-2 to Bottom of Surge Shaft	7.5 m (W) x 8.0 m (H),

		Length=135 m and 6.0 m (W) x 6.0 m (H), Length=88 m
(iv).	Adit Top of surge shaft	6.0 m x 6.0 m, Length=72 m
(v).	Connecting Adilt tovalve house Bottom	48.0 m
(vi).	Connecting Adilt tovalve house Top	147.0 m
(vii).	Connecting Adilt to Bottom of Pressure shaft	7.5 m (W) x 8.0 m (H), Length=170 m
11.	**SURGE SHAFT**	
(i)	Type	Restricted Orifice
(ii)	Diameter (m)	15.5
(iii)	Orifice Diameter (m)	4.0
(iv)	Vertical height (m)	73
12.	**VALVE HOUSE**	
(i)	Type	Underground
(ii)	Length	20.25 m
(iii)	Width	11.0 m
(iv)	Height	17.0 m up to top of Crown
(v)	Number of Valves	1
(vi)	Diameter	5.75 m
13.	**PRESSURE SHAFT**	
(i)	Number	1
(ii)	Type	Underground Steel lined
(iii)	Internal Diameter	5.75 m
(iv)	Length	495 m
(v)	Thickness (mm)	Varies from 16 mm to 40 mm
(vi)	Grade of Steel	ASTM 537 Class-II
14.	**UNIT PENSTOCK**	
(i)	Number	3
(ii)	Diameter (m)	2.4
(iii)	Length (ml	Average 20 m each
(iv)	Thickness (mm)	20 mm
(v)	Grade of Steel	ASTM 537 Class-II
15.	**POWER HOUSE**	
(i)	Type	Surface
(ii)	Head (m)	
	a. Gross Head (m)	164 m
	b. Net Head (m)	153.3 m
(iii)	**Size of power house:**	
	a. Length (m)	80 m
	b. Width (m)	19.6 m
	c. Height (m)	33.38 m
(iv)	Installed capacity (MW)	186 (3 x 62 MW)

(v)	Turbine (s):	
	a. Type	Francis vertical
	b. Number	3
	c. Turbine C/L Elevation	El 1018.22 m
	d. Min Tail Water Level	El 1023.22 m
	e. Normal Tail Water Level	El 1025 m
16.	**GENERATOR STEP-UP TRANSFORMERS**	
(i)	Number	10 (including one spare)
(ii)	Type	Single Phase
(iii)	Capacity/Rating	25.5 MVA
(iv)	Voltage	11 kV/ 220/√3 kV
(v)	Location (Elevation)	EL 1034 m
17.	**POTHEAD YARD**	
(i)	Outgoing Lines	220Kv Double circuit Line
(ii)	Size	80 m x15 m (Approx)
(iii)	No. of Bays	4 (including space for two future Bays)
18.	**GIS HALL**	
(i)	Bus Arrangement	Double bus with bus coupler
(ii)	Size	45 m x15 m (Approx)
(iii)	Voltage	220 kV
(iv)	Type	GIS
(v)	No. of 220 kV bays	8 (3 Generating bays, 2 outgoings bays, 1, bus coupler bay, 1 Bus Reactor Bay, 1 Station Transformer Bay)
(vi)	Space for spare bays	2 nos. in GIS area
19.	**TAILRACE**	
(i)	Type and Shape	Open Rectangular Channel
(ii)	Length from center line of units (m)	34.0 m
(iii)	Number of draft-tube gates	3
(iv)	Size of draft Tube gates	6.4m (W) x 3.5 m (H)
(v)	Sill Level of Draft Tube Gates	EL 1013.00 m
20.	**CONSTRUCTION PERIOD**	
(i)	Total construction period	50 months
(ii)	Commissioning of units	48 months
	Unit-1	49 months
	Unit-2	50 months
	Unit-3	
21.	**POWER &ENERGY BENEFITS**	
(i)	Installed capacity (MW)	186 MW
(ii)	Annual energy (M U)	822.08

(iii)	Design energy (M U)	802.59
(iv)	Load factor (%)	50.45 %
22.	**COST (as per TEC)**	
(i)	Hard Cost (Sept 2014 P.L) (Rs. Crores)	982.56
(ii)	Hard Cost per MW (Rs. Crores)	5.28
(iii)	Completed Cost including Escalation, IDC, Financial Charges (Rs Crores)	1493.55
(iv)	Completed Cost per MW (Rs Crores)	8.03
(v)	Levelized Tariff at completion cost (Rs/kWh)	4.40

Tato-I Hydro Electric Project ge mocham hem ne ***Section 2(I)(b)(i)*** alko loke iye si abum be icham ya nagi hem ne Government of India ga Department of Economic Affairs (Infrastructure Section) number 13/6/2009-INF dated 7th October, 2013 he naggi-naggi hem ne atlen jiye, sum ne Annexure 1 "Updated Harmonized Master List of Infrastructure Sub-Sectors" RTFCTLARR ACT 2013 lo mendu anga-atte holoke duku ge anga ne dolu ami hem nesin da Electricity jiye.

1.2 Location

Si project sim ne mote ko he Tato helok ke Mechukha West Siang District Arunachal Pradesh lo, sim ne hai rube Figure ES 2 lo katam du. Tato he lapa yachup ne dolu be idu, 132 km go Aalo ge addo du, District ango iko ge. Chokpik ge dolu he Meying dolu he (Gapo dolu ge roda he) si 28^0 32' 32''N latitude helok $94^0$18'43''E longitude lo dudu. Silok ke power era he Heyo dolu ge ageh lo dudu helok 28^0 31'53''N latitude helok $94^0$21' 31''E longitude lo dudu. Tato-I hydroelectric project si Aalo ge Gapo terbe beda he hai du, helok addo he 148 km go. Project iko terbe NH-52 he isshit du Aalo ge state beda (Tato-Aalo) helok 298 Km go Akajan, Assam ge 252 Km go Pasighat he dudu (Akajan ge Pasighat NH-52 addo 103 km). Tato-I project ge netche yachup ne rail beda he silapathar (Approx. 296 km) helok Pasighat terbe moye. Project moke ge lage la, netche yachup ne airport ango ite ko he 441 km go addo du he Likhabali, North Lakhimpur District Assam lo dudu helok netche yachap ne international airport he Guwahati 830 Km go addo du, si capital Assam ge.

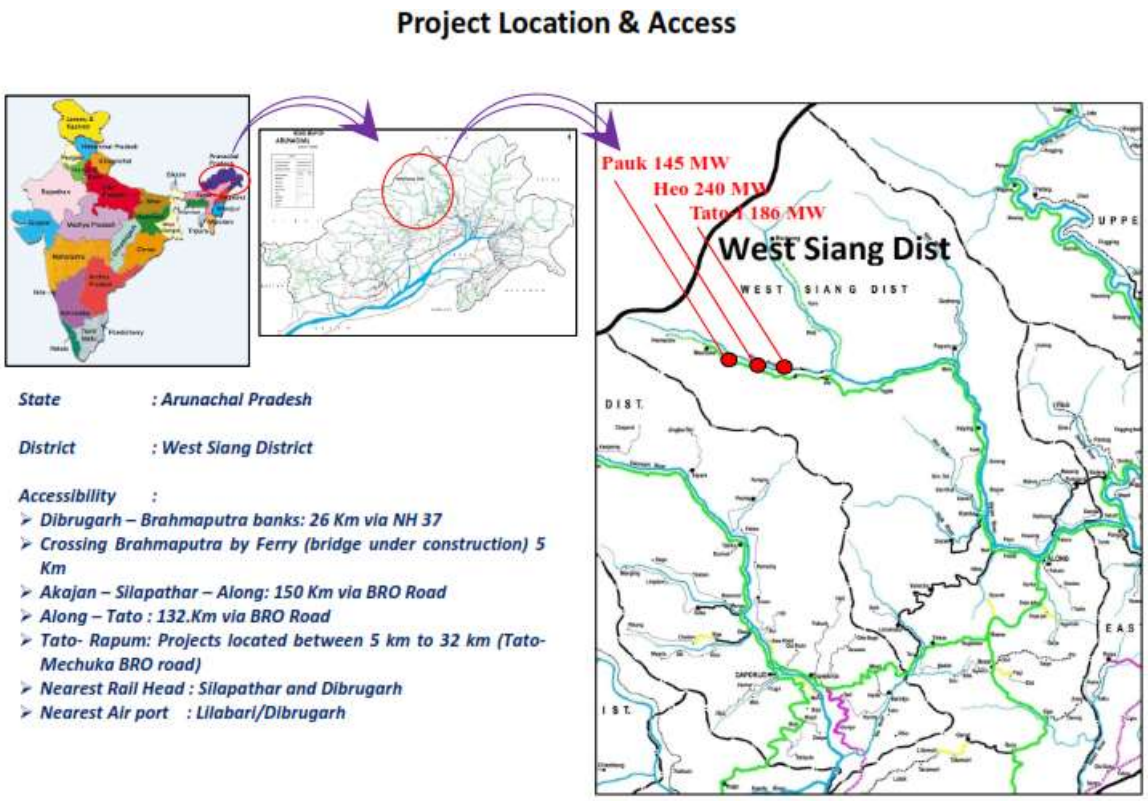

Figure : ES 2–Location Map & Access to Tato-I HEP

1.3 Size and Attributes of Land Acquisition

Abum be kede dincham si Tato-I H.E. Project gebe silo 52.8 ha, ga 47.7 ha surface kode, 2.3 ha riverbed holoka 2.8 ha robu loko bo. Manyi ga kede hem me per pen rato unclassified State Forest/Community Forest land hegelo, sim me Table: ES 2 la katam du. Abum be submergence iko he 3.0 ha apom lo 1.8 ha go riverbed holoka 1.2 ha go surface kede go. Siloke ikur-ijur ga 50.00 ha go apum la riverbed hesinda.

Table : ES 2- Project component wise break up of land in Tato-I H.E. Project

S.No	Project Component	Surface Area (Ha)		Underground Area (Ha)	Total Area (Ha)
		Surface Land	River Bed		
1	Submergence area	1.2	1.8		**3.0**
A	**Surface Structures**				
2	Intake complex area	8.2	0.5		**8.7**
3	Intake Muck Disposal area and construction	3.2			**3.2**

S.No	Project Component	Surface Area (Ha)		Underground Area (Ha)	Total Area (Ha)
		Surface Land	River Bed		
	platform				
4	Intake Storage and Colony area	1.7			**1.7**
5	Intake Quarry site	0.3			**0.3**
6	Power House Area (including penstocks and Tail Race)	8.8			**8.8**
7	PH Construction Platform and Muck Disposal	3.2			**3.2**
8	PH Storage Area, Office and Colony	1.4			**1.4**
9	PH Quarry Site	0.5			**0.5**
10	PH Access Road	10.7			**10.7**
11	Adit Area	1.9			**1.9**
12	Adit Access Road	6.6			**6.6**
	Total of surface area	47.7	2.3		**50.0**
B	**Under Ground Structures**				
13	Head Race Tunnel (including Adit tunnels)			2.8	**2.8**
	Total	**50.0**		**2.8**	**52.8**

Si project si Tato holoka Mechukha administrative circles lo adu, West Siang apom la abum be Surface kede dinchi runam he 50.0 ha go apum la riverbed hesinda. Si kede la se si dolu hem me aji nago hai mobo iye, si kede sim lacham hem ne LA R&R Act 2013 ga atkor loka laya , lacham he:

Table : ES 3- Affected Village wise Land Requirement

S.No	Name of Village	Surface Land (Ha)	River Bed (Ha)	Total (Ha)
1	Tato HQ (W)	10.30	0.0	10.30
2	Heyo	22.30	0.0	22.30
3	Gapo	6.30	1.15	7.45
4	Meying	8.30	1.15	9.45
5	Padusa	0.50	0.0	0.50
	Total	**47.70**	**2.30**	**50.00**

1.4 Alternatives Considered

Kebi yo ichom duma electricity hem ne si kede solo ima lo, si kede si hydro power monam gabe nagi he dume du. 186 MW power go monam gebe si kede ngunu kalen toba hebe ija kabo mote na kumda project ga michom eichom hem kotom dube hela.

1.4.1 Intake

Lalik cham ge lega lo, mote ne he barik du addek-addek ne betam lok ke bolen ye hegem ne preliminary stage lo ilen tho. Hegem anyi gobe kalen ge la leto. Kacham yachup name he upstream hem. Si kalik cham ne geological and economical gelok kage la. Ako tha kaki name 500 m downstream lo dudu, bolen teko hem ne kanam he sibuk –rache cheken du hegem ikam-irak dube iye helok kede hem achum gobe lachum dube iye. Upstream hem kaki name, geological helok geotechnical lo kerlik teko hem ne katam ye, he shito ge lakbik helok lakche pele shito lo dudu. Hebe ija, a technical helok economical nesin nai nego ige ye, icham he herya ne upstream hem kacham du. Silok ke submergence he achop nago be iye, helok si abum be shito ge riverbed lo iye. Silok ke upstream lo heja be poma ne local activities helok environment losinda ama ye.

Apam lo, silok ke upstream hem lalik teko he valley ge sibu hem ne aigo bitpik ye si downstream hem herya ya be. Sim topography helok geological lo hai ube kanam he upstream hem kalik yadu. Upstream he hai yadu geological socio-environmental issues hem kanam he. Aige topography helok geology hem ne hai rube monam gebe bolik teko ge isse hem bitpak lendu be modu be iye. Ango irab yem ne cost of diversion hem ne achop yabe monam gebe sinda ngunu ango hem ito. Helok , ango idi hem ne lean season lo, ango ite ko hem ne kikhi rube illi kede hem ne bitlen kobe modu be iye. Hebe ib bolo tunnel hem boar bapma ye.

1.4.2 Power House

Power era mocham ge, mote ne barik du si aken na icham golo surface power era hem topographical reason lok modu be iye. Power era si lakche pale ge shito lo dudu, si Heyo dolu ge neche lo dudu, Silo era helok ami he dula maye. Head Race Tunnel hem kalen tho hege lakche pale lo silok ge motum shito ge lepa lo, si Meying helok Heyo dolu ge lepa lo dudu Head Race Tunnel si naggi-naggi ne illi hem ne lenpet ye , harya be gneisses henam illi he.

1.5 Social Impacts

(186 MW) Tato-I Hydro Electric Project hem ne monam gebe kede hem laye holok ga dolu ga hai panam gebe:

- ✓ Impact during Pre- construction stage.
- ✓ Impact during Construction Stage.
- ✓ Impact during Operation stage

Social Impact Assessment ga ichom si project ga pone hem lalen dube holoka aji gona hem me lalen paku. Tato-I EIA report la, holoka sum me social impact management plan la atlig jiye holoka panam hem ne darlen ye holok hai nam me dumo ye. Social Impact Assessment hem illig ye project ga bettom lo, construction stage holoka operational stage lo, sim ne chennam gebe, ngunu Table: ES 4 hem kadu be iye.

Table :ES 4- Identification of Social Impacts at different stages

Pre-construction	Construction	Operation
Kede hem me laye Sine gidi hem sinda laye Hai be inko, duko ango ite ko helok nashu, derne mome bolo hillu/pimir hesinda len ye Kede hem me kaken rube moyi-moma ye. Ango itene ami hesinda ango iko be aye. Issi helok kede ,illi eshi hem nesinda ena ye Atten-aye rete ko gebe sinda moye ango eyem me atte-aye lako be Dolu mi hem me ango inam sinda paye.	Kede ge hillu he adek yeku Ango irap yem ne ami he 1160 go itcho be iye Derne, machinery helok ke DG set hem sinda aigo lalik ye. Pimir helok duke hesinda len ye. Issi hemsin hai be moye Issi hem ne herya be ina ye helok kede, illi. Eshi hem sinda. Ami ge ahi helok anyi ge hai mane hem sinda kaji ye (Fuel) Issi juk na ne Dolu ge hai mane helok ani be achi len ne hem sinda idar ye. Hai ne ango ipa ye helok atto ge atte-aye hem sinda puk la ye. Sinyo-silo ge hai ne technical monam gidi hemsinda nonum ijiye. Hai rube ngumuk ge koyum-kolo gem sinda iji ye.	Ango idu lo addek ne dolu loke achop be aye Era achop ne monam hem toyak yeku Nami gidi ge hai pona besin barik raye Project ete ko hem sinda kaken be moye. Dube teke helok ango ite ko helok nashu hem sind moten momo tene dinye. Keba ge ango iye Panam –Pinam besind hai ye. Duko-Dakko gebe sinda hai be moji ye. Ami ge sicham-gicham hesinda hai yaye Hai rube sinam helok atto he ango issu nam sinda paye LADF hem sinda jibe ye Power hem ne jiye, doku-dakko helok nagi-nagi hemnesinda dolu la paya.

Abum bo kede atto he holoka project la era pamma be isse he 105 era go. Dolu ge ami dune he community Forest Land lo atto ge donam hem ne ladu holoka motum lok lage la dodu. Harya ne RFCTLARR Act 2013 ga Rehabilitation la idar yeku holoka Environment Act hem ne ayu be project matena iji ye hella mento. Holoka Social Impacts lo dolu ge ami hem ne, chen mo dube holoka demographic profile lo benpa ye heto.

Social Impacts ga minki nam he, PAF hem ne duteh ko hem ne ruji ya hedu. Ango ite ko tolo ka kar yelo, dam lo holoka miki name affected ami hem tau kipok tho. Dolu ge mitigation measures lok ke menter he:

- LARR Act, 2013 ga atkor lo kede ige hem ne aber jidu be.
- Kede atto hem ne naukri jidu be ango iko lo sim ne GoAP holoka mote ne atra tho.

1.6 Mitigation Measures

Si miki nam holoka abum be kanam he kede ga areh hem ne RTFCTLARR,2013 ga atkor lo adu, si dolu hem ne hai rubo menra to.
Kede areh ga apam lo, dune-dakna agom gosin affected ami gebe dudu holoka areh apam lo Diversion of Unclassified State Forest (USF) si adu ngunu ga Govt. of Arunachal Pradesh Rehabilitation & Resettlement Policy, 2008 lo.

Table : ES 5- Analysis of the Various Possible Social Impacts

S.No	Type of Impact	Status	Mitigation Measures
1	Duma te kede	Ah,kede hem ne duku maye helok eda era na ye	Kede ge areh hem ne RFCTLARR Act, 2013 loke jiye helok 2015 atkor lo
2	Hai rube siye helok paye	Si eda-era ye heja ge sina nebe kede late ko lok motum ajer lok ke.	Areh hem jiru ye hebe ija R&R hem RFCTLARR lok helok 2015 ge atkor lok
3	Kapa dube inne pako.	Kede ge hillu he adek yeku. Kede hem kaken rube moye. Duke helok pamir ge hai mane sind lenya. Issi he sinda kane yeku. Issi heloka kede, illi eshi hem nesinda ena ye. Ango itene ami hesinda ango iko be aye. Eshi alla lako losinda lapa reku maye.	Menjub renam agam sim Tato EMP lo jilik tho.

4	Aige dinchi nam atte-aye.	Dolu ge era affected nam ge kede hem lama ja sine gidi hem hai be simo mabe ija kebe hegem sinda dinchi nam atte-aye be kiye.	Project affected helok netche ge dolu lok aige dinchi nam atte-aye he atte ya be kola du ango idu lo helok moten-momo rab yem.
5	Public Services and Utilities (Dolu gebe helok ena)	Dolu silo hogo sin pama ye mima beka silo nonum ne duko-dakko paye helok. Sinyi silo ge hai nem me heryo be lalik jiye nonu gebe.	Hai rube inko hem ne BRO helok ngunuk rabu ge inko nesinda ngunu hai be moye.
6	Health (Aih)	Ango irab yem me dolu ge kede atto gidi gebe aih atchi moma dube sinda kaji ye	Si agam sum me public health management chapter ge Tato-I EMP lo menra-mira ye.

1.7 Assessment of Social Cost and Benefits

Hebe ija kebe hedi gobe areh hem jiye hegem ne menpo ma kede hem ne lacham he addek addek be laye. Hebe ija kebe ngunu R&R lo runam ge poma nam achop nago idhar kidu be iye. Hebe ija, si project silo ka dolu hem aigo hai na paye. Manno ga hai na project silo ke pasa he:

Silo ke areh hem ne hai nam holoka poma nam kage la iye. Si ga Tato-I HEP Mechukha sub-division ,West Siang District Arunachal Pradesh gameh. Areh hem neku ge RFCTLARR Act & Rules atkor kede hem project mona bo, LADP hem sinda Hydro Policy ge atcham lo jiye holoka GoAP RR Policy ge atko lokke affected ami hem ne hai na paye.

Haina holoka poma nam minam project hi rube atge la Table No. ES 6 lo katam dune.

Table: ES 6- Comparative Analysis of Positive and Negative Impacts

S.No	Positive Impact	Negative Impact	Remarks
1	Enhanced payment towards land acquisition	Loss of Community Forest land	After careful examination of various parameters of cost and benefit of positive and negative impacts, it is found that the project would come as a net benefit the locals community to a large extent
2	Social Development		
3	Infrastructure Development		
4	Economic Development		
5	Improvement of quality of life		
6	Employment generation		

Si project dolu ge ami hem duko-dakko yecham yeme holoka singcham-singme losinda nonum kagur ye.