

Initial Environmental Examination – Main Report

Project No. 41155-013
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NEP: Electricity Transmission Expansion and Supply Improvement Project

Main Report – Chapter 6

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6 IMPACT ASSESSMENT

This chapter assesses the likely adverse impacts during the construction and operation of the Tamakoshi-Kathmandu 400kV TL, which will result in perturbations in the existing baseline conditions. The general discussions are organized in three categories, namely the physical, biological and socio-economic and cultural environment, and divided into construction and operation phases.

6.1 Physical Environment

The main physical impacts on the environment are those associated with land take for stringing of the line, for construction of tower pads and changes in slope stability and drainage patterns. The major impacts anticipated during the construction phase are discussed in the sections below.

6.1.1 Watershed and Drainage Condition

a. Construction Phase

The TL traverses through undulating landscape in the middle hills region of central Nepal. Most of the tower pads are located at the top of subdued hillocks, on the ridges and on flat agricultural land, the interference with drainage patterns due to the construction of the tower pads will be minimal. However, the activities like site clearing, stringing of the line, excavation for foundation, trail construction for material transportation and access road construction may disturb the watershed and increase erosion due to vegetation removal.

Though the area required for tower pad construction may vary depending on gradient, location and weight of towers, approximately 225 m² of land will be disturbed for each tower pad. The earthwork associated with tower construction will be confined to the tower base area with low impact on the adjoining areas. Nevertheless, the cultivated area around the tower pads may be affected due to compaction during the construction and transportation of materials.

Disruption of natural drainage system and soil erosion while stringing the line across the river can be anticipated during the construction phase. However, since the Angle Points are not located near the river or streams except for some like AP-9, AP-11 and AP-12, the probability of the disruption of natural drainage will be insignificant. Since the requirement of land for the construction of tower foundation is limited the impact on drainage and soil erosion is envisaged to be low. Therefore, the impact is expected to be site specific, low in magnitude and for a short duration.

b. Operation Phase

No significant impact on the watershed and natural drainage is expected during the operation and maintenance period.

6.1.2 Topography, Land Use and Land Take

a. Construction Phase

The land interference during construction of the TL is related to the tower foundation, substations and lack of restraint of the RoW. This may result in the change in landscape. No other change in topography is envisaged during this phase. The visualized impact on topographic changes is considered to be low in magnitude, site specific and for long term.

b. Operation Phase

No impact on topography is expected during the operation phase except for the impact on natural scenery. The Impact is high in magnitude, local and for long term.

6.1.3 Land Use and Land Take**a. Construction Phase**

The land use changes involved in the implementation of the project will be basically due to the permanent and temporary land acquisition under the RoW and for the construction of tower pads. The project will require 470.9218ha land for the placement of tower pads (angle and suspension), substations and RoW of the TL and temporary facilities. Out of this, 25.8575 ha land will be permanently acquired and 445.0643 ha will be restricted as RoW. The total number of angle towers will be 129 and the number of suspension tower is estimated as 198. Towers will typically require an area of 15m x 15m which is equal to 0.0225 ha per tower. Altogether 93, 26 and 10 number of APs are located on cultivated land, forest area and others area whereas 142 suspension towers are located in cultivated land followed by 40 towers in forest (Table 6-1). The summary of the land take and land use are given in the Table 6-2.

Table 6-1: Land Use at AP and Suspension Towers

S.No.	Land Use	No. of AP	No. of Suspension Tower	Area (ha)		Total Area (ha)
				AP	Suspension Tower	
1	Cultivation	93	142	2.0925	3.195	5.2875
2	Forest	26	40	0.5850	0.90	1.485
3	Others	10	16	0.2250	0.36	0.585
Total		129	198	2.9025	4.455	7.3575

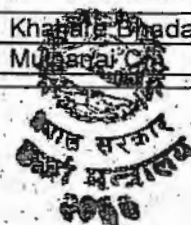
Table 6-2: Land Requirement of Tamakoshi-Kathmandu TL Project

S.No.	Project Component	Land Types (ha)			Total Land Take (ha)		Total (ha)
		Cultivation	Forest	Others	Land Restriction	Permanent	
1	Land to be required under the RoW (excluding tower pads)	284.6592	124.9092	35.4959	445.0643	0.00	445.0643
2	Land to be acquired for the Tower Pad	5.2875	1.485	0.585	0.00	7.3575	7.3575
3	Substation and Camps	18.50	0.00	0.00	0.00	18.50	18.50
Total		308.4467	126.3942	36.0809	445.0643	25.8575	470.9218

The alignment passes through different type of land use and the major forest (community and national) that has been fragmented while passing through has been presented as in the Table 6-3 below.

**Table 6-3: Fragmentation detail of forest due to alignment
Khimti-Barhabise Section**

AP-AP	District	VDC/Municipality	Fragmented Forest
16-17	Dolakha	Pawati-2	Baluwa Bhumethan CF
18-19		Pawati-8	Khatara Bhadaure CF
19-20		Pawati-6	Mubandai CF



20-22		Phasku-1	Charnawoti CF
24-28		Bhimeshwor Mun-6	Sita Kunda CF
30-31		Bhimeshwor Mun-8	Kamalamai CF
49-50		Lakuri-1	Namke Yan mara (Okheti) CF
57-59	Sindhupalchok	Chokati-5,7	Rani Pokhari Mankhola NF
60-62		Karthali-6	Dware khalde CF
Barhabise-Kathmandu Section			
AP-AP	District	VDC/Municipality	Fragmented Forest
13-14	Sindhupalchok	Mankha-1	Salghari pakha CF
		Mankha-2	Phurkhesalla Mahabhir CF
18-20		Mankha-9	Jurethumka CF
21-22		Phulpindada-4,5,6	Chhapbote Binjel CF
		Phulpindada-8	Dharampani CF
22-24		Phulpindada-6,7,9	Phalate Kalika CF
37-38		Bhotsipa-9,7	Tinpakhe Dabi CF
38-39		Bhotsipa-7	Thulitar CF
41-42	Kavre Palanchok	Mahadevsthan-3	Salleni Baguwa Pakha CF
55-56	Kathmandu	Shankharapur Municipality-4	Kushum CF
		Shankharapur Municipality-4	Lambu Dada CF

b. Operation Phase

The impact on the land use changes of the permanent land take for the towers and substations is expected to be high. The land under the RoW will be restricted for the erection of any type of public and private structures except for plantation of dwarf trees species. However, cultivation will be allowed. All temporary land acquired will be converted to its original use or agreed new uses towards the end of the construction period and handed over to their owners. The impact can be classified as high in magnitude, local in terms of extent and of long-term in terms of duration.

6.1.4 Air and Noise Quality

a. Construction Phase

The construction activities consist of site clearance, excavation for the tower, concreting and stringing of the line. These activities will generate dust in the surrounding area. Apart from these activities, movement of transporting vehicles carrying the construction materials along the gravel roads will generate fugitive as well as combustion emissions and will cause temporary impact on air quality.

Since the construction activities are limited to small area, the impact on the ambient air quality will be low in magnitude, site specific in terms of extent and of short duration. The emission of noise and vibrations are inevitable during construction though only insignificant interruption in noise quality has been expected for TL projects. The location of the Angle Points especially in the hilly region are relatively far from the settlements except for angle points which are close to Ghumaune village, Kharidhunga, Sano Palati, Serabesi, Barhabise Bazar, Kuntabesi, Nagarkot Bazar, Changunarayan area etc. will feel the noise disturbances due to vehicular movement and construction activities. Noise pollution will be temporary and will not be different from the prevailing conditions due to low traffic movement along the roadside. The impact is expected to be low in magnitude, site specific and for a short duration.

b. Operation Phase

No major impact on air quality is envisaged during the operation phase. However, a kind of humming sound may be created at the substation area. The transmission overhead lines do

create some noise in certain circumstances; for example during minor surface damage, dirt or change in weather conditions can cause the lines to crackle or hum slightly. This is due to a phenomenon called Corona effect. The effect of corona is conspicuous during rain. However, noise due to the corona effect of the proposed TL with voltage level of 400 kV will not be significant since the alignment does not pass very close to the settlements. The impact is expected to be low in magnitude, long termed and site specific.

6.1.5 Water Quality

a. Construction Phase

During the construction period, water will be used from nearby river and streams. Therefore, there is possibility of water pollution especially in sectors where the line crosses the rivers and streams and where the tower pads are situated close to them. Soil disturbances associated with construction activities of tower pads, the improper disposal of solid wastes and chemicals such as cement slurry, construction materials, and human wastes into the river or streams may deteriorate the river water quality and other existing water bodies around the construction area. This may lead to water borne diseases and other problems especially in the adjacent villages where people use the flow from these streams for household chores. The impact is expected to be moderate in magnitude, site specific and for a short duration.

b. Operation Phase

The operation and maintenance activities of the transmission will not have impact on the water quality in the project impact area.

6.1.6 Waste and Spoil Generation

a. Construction Phase

The improper disposal of solid waste like cement bags, iron bar and other leftover construction materials, kitchen waste and waste generated by the temporary labour camp might cause adverse impact to the environment. The spoil generated due to the excavation of tower pad is also detrimental to land and water quality of the area. Muck volume of 16,550 cubic meter will be generated at substation area. However, more than 90% of the volume of muck will be used for back filling and compaction and remaining 10% of the volume of muck will be deposited near foundation site and river site and also will be used for feeder road gravelling and retaining wall. The magnitude of impact is considered to be low, extent is site specific and duration is short term.

b. Operation Phase

No impact on waste and spoil disposal is expected during the operation phase.

6.1.7 Crossing of Other Utilities and Interferences

Operation phase

The proposed TL alignment crosses roads, rivers, TL of different voltages and structures. Crossings of communication utilities and transmission and distribution lines will result in the interferences to the communication system. Radio interference can disrupt television and AM (amplitude modulated) radio reception close to a line. Interference can sometime be noticed at a distance of 150m away. By contrast, FM (frequency modulated) system is affected very little by interference. Interference varies according to the position of the TL between transmitter and receiver. In some cases, receiving conditions can be improved due to the reflections caused by a TL. Since the TL mostly passes more than 500m distance

from most of the settlement areas the magnitude of the impact is considered to be insignificant. The impact will be low in magnitude, site specific and for short duration.

6.1.8 Storage of Construction Material and Camps

a. Construction Phase

Storage of construction materials will result to the land degradation of the particular area. Likewise, the area designated for the camps will also damage the leased or rented area. Both temporary mobile camps and storage sites are located nearby. The locations for temporary camps and storage sites of construction materials are listed below. The impact will be low in magnitude, site specific and for short duration.

Table 6-4: Location and Area of Storage and Camp sites

District	VDC	Area (ha)
Ramechhap	Phulasi	0.3
Dolakha	Melung	0.5
	Bhimeswor	0.5
Sindhupalchowk	Barhabise	0.5
	Irkhu	0.5
Kavrepalanchowk	Chandeni Mandan	0.3
	Shankharapur	0.4
Bhaktapur	Changunarayan	0.3
Kathmandu	Shankharapur	0.3

b. Operation Phase

No impact is expected during the operation and maintenance period.

6.1.9 Air Traffic

a. Construction Phase

No impact is envisaged on the existing airport at Manthali and Tribhuvan International Airport at Kathmandu as the closest distance from the airport to the proposed line is approximately 11.9 km. and 8 km. south-west respectively.

b. Operation Phase

Since the entry path of the aeroplane towards the runway is in the perpendicular direction of the proposed line, no impact is envisaged on the route of the existing air traffic.

Table 6-5: Physical Environment Impact Assessment Matrix

Table 6-3: Physical Environment Impact Assessment matrix							
S.N	Issues	Impacts	Identification and Evaluation of Impact				
Construction Phase			D	IND	M	E	Du
1	Watershed and Drainage	Angle Points such as AP-9, AP-11 and AP-12 are located near the river or streams, the probability of the disruption of natural drainage will be insignificant.	D		L	SS	ST
2	Topography	Topography of the tower foundation site will be changed due to excavation, fill and cut for leveling the tower pad area leading to the change in landscape.	D		L	SS	LT
3	Land take and Land Use	The project will require 471.7191 ha of land for placement of tower pads, substation and Row of Transmission Line.	D		L	SS	LT
4	Air Quality	Different construction activities and vehicular movements will generate dust/ smoke and affect air quality in the surrounding area	D		L	SS	ST
5	Noise Level	Use of Construction equipment and vehicles will increase noise level.	D		L	SS	ST
6	Water Quality	There is possibility of water pollution especially in sectors where the line crosses the rivers and streams and where the tower pads are situated close to them leading to deterioration of river water quality and other existing water bodies around the construction area.	D		M	SS	ST
7	Waste generation	The improper disposal of solid waste like cement bags, iron bar and other leftover construction materials, kitchen waste and waste generated by the temporary labour camp might cause adverse impact to the environment.	D		L	SS	ST
Operation Phase							
1	Noise Level	A kind of humming sound may be created at the substation area and corona effect might cause	D		L	SS	LT

Note: D: Direct, IND: Indirect

Extent (E)Magnitude (M)Duration (Du)

SS= Site Specific

L= Low

LT= Long Term

L= Local

M= Medium

MT= Medium Term

R= Regional

H= High

ST= Short Term



6.2 Biological Environment

The implementation of the project will affect the existing ecosystems in the project area. The major impacts on the biological environment will be the loss of individual trees and loss of vegetation cover including NTFPs due to site clearance in APs and under RoW of TL. There will be disturbance to the wildlife (mammals, bird and reptiles) because of change of vegetation cover and site disturbances.

6.2.1 Forest/Vegetation Loss

a. Construction Phase

The total forest area falling under the RoW of TL alignment including area occupied by APs is 126.4 ha. Based on the available detailed survey report of the proposed TL alignment, out of 129 angle points (APs) 26 are located in the forest which will require total 0.585 ha forest area (area occupied by each tower pad = 15 m x 15 m). The TL including AP passes through different community forest, leasehold forest and government forests as given in Table 6-6 and for details refer Appendix D-I.

Since all trees will be removed, it will diminish the crown cover of the forest along the TL corridor. The impact due to the loss of vegetation during project implementation is expected to be moderate in magnitude, local in extent and long termed.

Table 6-6: Total Affected Forest (by Types)

S. No.	Forest Type	District	Forest area (ha) under		No. of AP
			TL RoW including AP	AP	
1	Community Forest (CF)	Kathmandu	5.75	0.0225	1
		Bhaktapur	1.012		1
		Kavre Palanchok	4.9588	0.09	3
		Sindhupalchok	55.7704	0.2925	13
		Dolakha	51.2624	0.18	8
		Sub-total	118.7536	0.585	26
2	Government Forest (GF)	Kathmandu			
		Bhaktapur			
		Kavre Palanchok	2.461		
		Sindhupalchok	2.5576		
		Dolakha			
		Sub-total	5.0186		
3	Leasehold Forest (LHF)	Kathmandu			
		Bhaktapur			
		Kavre Palanchok			
		Sindhupalchok	2.622		
		Dolakha			
		Sub-total	2.622		
	Grand total		126.3942	0.585	26

Source: Field survey, 2015

In addition to 26 APs, an estimated number of 40 suspension towers are to be placed in forest area, though the exact number shall only be finalized in detail survey.

There is no forest area in sub-station. So, there is no forest tree vegetation loss from the area proposed for the sub-station. However, AP and RoW of TL will pass from the different forest areas as given in Table 6-7.

Table 6-7: Component wise Tree loss

SN	Project component	Type of forest	Forest area (ha)	Loss of Vegetation			Crown cover (%)	Timber Volume (cft)	Vegetation type
				Regeneration (seedling & sapling)	(5-11" dbh)	Trees (>11" dbh)			
1	AP and TL RoW	Community Forest	118.7536	63270	15652	6647	40-80	89196	Khote salla, Uttish, Sal
		Government Forest	5.0186	1160	2435	1046	50	13924	Chilaune, Angeri
		Leasehold Forest	2.622	1305	197	84	55	1124	Uttish, Chilaune
		Total	126.3942	65735	18284	7777		104244	

Source: Field survey, 2015

Based on the total enumeration of forest vegetation in AP and under RoW of TL, total of 26,061 (including 18,284 pole size 7,777 tree size) trees and 65,735 regeneration of different species will be removed. Main dominant species are Sal (*Shorea robusta*), Salla (*Pinus roxburghii*), Chilaune (*Schima wallichii*) and Uttis (*Alnus nepalensis*). Other tree species are Kyamuna (*Cleistocalyx operculata*), Bot dhayaro (*Lagerstroemia sp.*) etc. Estimated volume of timber and fuel wood from the removal of forest vegetation will be 104,244 cubic feet (equivalent to 2,953 cubic meter) and 130 chatta respectively during the project construction period as illustrated in Table 6-8. The table shows that very less area of GF and LHF will be affected in comparison to the CFs. Accordingly, there will be very less number of trees will be removed from GF and LGF and that will be from Sindhupalchowk and Kavrepalanchowk districts only.

Since all trees will be removed, it will diminish the crown cover of the forest along the TL corridor. The impact due to the loss of vegetation during project implementation is expected to be moderate in magnitude, local in extent and long termed.

Table 6-8: Total forest vegetation loss according to district and forest types

Table 4-6. Total forest vegetation loss according to district and forest types									
SN	Type of forest	District	Forest area (ha)	Loss of vegetation (no)			Crown cover (%)	Standing vol.	
				Regeneration (seedling & sapling)	Pole (5-11" dbh)	Trees (>11" dbh)		Timber (cft)	Fuel wood (chatta)
1	Community Forest	Bhaktapur	1.012	84	107	45	68	608	0.76
		Kathmandu	5.75	3100	770	330	70	4400	5.5
		Kavrepalanchowk	4.9588	3215	522	223	40-70	2980	3.725
		Sindhupalchowk	55.7704	45933	9484	4019	40-80	54012	67.515
		Dolakha	51.2624	10938	4769	2030	65-80	27196	33.995
		Sub-total	118.7536	63270	15652	6647		89196	111.495
2	Government Forest	Bhaktapur	0.00						
		Kathmandu	0.00						
		Kavrepalanchowk	2.461	974	293	125	50	1672	2.09
		Sindhupalchowk	2.5576	186	2142	921	50	12252	15.315
		Dolakha	0.00						
		Sub-total	5.0186	1160	2435	1046		13924	17.405
3	Leasehold Forest	Bhaktapur	0.00						
		Kathmandu	0.00						
		Kavrepalanchowk	0.00						
		Sindhupalchowk	2.622	1305	197	84	55	1124	1.405
		Dolakha	0.00						
		Sub-total	2.622	1305	197	84		1124	1.405
	Grand total		126.3942	65735	18284	7777		104244	130.305

Source: Field survey, 2015

b. Operation Phase

During operation phase of the project, only trees which grow under the RoW after some years might need to be cleared. Regular trimming of tall trees and allowing growing shrubs and short trees will change the vegetation cover. This impact is low, site specific (local), and long-termed.

In terms of the biological environment, the project area will reap beneficial impacts from the project's forestation program that will be implemented to replenish the loss of forest and vegetation especially in the project affected CFs/LHFs.

6.2.2 Changes of Demand for Fuel Wood and Timber**a. Construction Phase**

There are 1,667 CFs in the five project districts which is found to be large enough to support the demand of forest resources such as firewood and timber to the dependent CFUG households. Therefore, even cutting down a large number of standing trees is of little significance to the livelihood of local people.

Supply of Timber for the Construction of Houses of Earthquake Victims

Almost all the houses along the settlement of proposed project have been destroyed by the recent earthquake of 12 Baisakh 2072 and aftershocks. There is an urgent need of timber for the building of the houses. So, the timber acquired from the cutting of the trees will be used by the local people which will reduce the further pressure on forests.

It is assumed that most of the labor force will be from local areas. There will be a few people from outside the project area for a short period of time. Due to this, the increase in demand of fuel wood and timber during the construction period is expected to be low in magnitude, site specific and short-termed.

b. Operation Phase

During the operation phase, site-specific and short-term effects such as increase in pressure on forest resources will settle down. Patrolling and maintenance activities along the TL will involve only a few people occasionally. This activity will not have a noticeable adverse impact on the forest and vegetation.

6.2.3 Exploitation of Non-Timber Forest Products (NTFPs)**a. Construction Phase**

Since there will be a small number of work force involved in the project construction, collection and sale of NTFPs by workers will be negligible. CFUGs/LHFGs have imposed strict rules regarding the collection of NTFPs in their community/leasehold forests. However, only few commercially important species like Argeli, Lokta, Nagbeli and Dhasingare are found in some CFs only and will be removed during project construction as given in Table 6-9. Therefore, these impacts are considered as low in magnitude, site-specific and of a short duration.

Table 6-9: Loss of Non-timber Forest Products (NTFPs)

S. No.	Commercially important species	Scientific name	Government forest	Community Forest	Leasehold Forest
1	Argeli	<i>Edgeworthia gardeneri</i>	Rare	Frequent in few CFs	Rare
2	Lokta	<i>Daphne bholua</i>	Rare	Frequent in few CFs	Rare
3	Nagbeli	<i>Lycopodium sp.</i>	Rare	Frequent in few CFs	Rare
4	Chirayito	<i>Swertia Chirayita</i>	Rare	Rare	Rare
5	Dhasingare	<i>Gaultheria fragrantissima</i>	Rare	Frequent in some CFs	Rare
6	Amla	<i>Embllica officinalis</i>	Rare	Rare	Rare

Source: Field survey, 2015

b. Operation Phase

During the operation phase, there will be an occasional intervention of just a few people maintaining the TL. This will have an insignificant effect on the forest itself and the NTFPs along the TL alignment.

6.2.4 Wildlife and Avifauna**a. Construction Phase**

The possible adverse impacts on wildlife and avifauna population during the project construction phase are loss of physical habitat and food habitat, possibility of hunting and poaching by labor force and disturbance in the migratory movement of mammals and birds.

The construction disturbances resulting from digging of foundation, vehicle movement, transportation of materials, and other related activities would interrupt normal movements, feeding and other activities of mammals available in the surrounding areas. The linear clearance of a 46 m wide strip of habitat allows most species to migrate to adjoining areas. However, Construction activities may affect migratory movement of birds resulting in the temporary disturbance to their normal route. The possibilities of hunting and poaching by work force during the construction period will have some adverse impact on local wild fauna. However, such pressure on wildlife will be site specific and will decrease once the work is completed.

Since the project area is not observed to be the ecologically significant, core and undisturbed habitat; the magnitude of impact on wild animals and birds is considered to be low, extent is site specific and duration is of short term.

b. Operation Phase

During operations, there will be some adverse impact on wildlife. Towers might attract population of Primates in the project area as they are climbers and high voltage TL could pose a danger for such animals.

The TL may affect bird mobility to some extent. Inability of birds to notice the wires can cause fatal injuries from collisions. This type of impact is predicted to be high in low visibility conditions such as bad weather and foggy days and during nights. Since the TL route does not pass through any identified bird migration route, this impact is of low magnitude, site specific and will remain for long duration.



6.2.5 Impacts on Rare, Protected, Endangered and Threatened Species

a. Construction Phase

Because of different construction activities and influx of outsiders, pressure on the vegetation and the forest will increase. Physical habitats, feeding habits, reproductive behaviors and movement of wild animals and birds might be disturbed due to construction activities and increased human presence in and around the project area. This might change the existing ecosystem diversity altering natural communities of plants and animals. Ultimately rare, endangered and threatened plant and animal species will be more prone to such adverse impacts. The magnitude of impact is considered to be medium, extent will be site specific and duration will be long-term.

b. Operation Phase

Clearance of trees along the RoW will create open linear stretches in the forest. Likewise, an open stretch in the forest may be barrier for propagation of plants. Thus, bio-diversity of the project area and the status of rare, endangered and threatened plants might be adversely affected. This impact is expected to be low in magnitude, site-specific and for a long duration.

Table 6-10: Physical Environment Impact Assessment Matrix

Table 6-10: Physical Environment Impact Assessment matrix							
S. No.	Issues	Impacts	Identification and Evaluation of Impact				
Construction Phase			D	IND	M	E	Du
1	Vegetation loss	Total 7,777 trees, 18,284 poles and 65,735 regeneration (sapling & seedlings) from 126.4 ha forest will be removed with 102,244 cft timber and 130.3 Chatta (stack) fuel wood.	D		M	L	LT
2	Demand of timber and fuel wood	Demand of fuel wood and timber during construction period is expected less	D		L	SS	ST
3	Exploitation of NTFPs	Collection and sale of NTFPs by workers will be negligible due to less number of workers and strict rules of CFUGs.	D		L	SS	ST
4	Wildlife and avifauna	Possibility of poaching by work force during the construction period and movement of machinery will cause disturbance to wild life and bird.	D		L	SS	ST
5	Protected & threatened species	Protected and threatened plant and animal species may also get disturbed due to construction activities.	D		L	SS	ST
Operation Phase							
1	Trimming of tall trees and growing of shrubs	Change in vegetation cover under the transmission line.	D		L	SS	LT
2	Collision during bird mobility and primates attraction to TL	Possibility of bird injuries from collisions during their mobility. Towers might attract population of primates as they are climbers and high voltage TL could pose a danger for such animals.	D		L	SS	LT

Note: D: Direct, IND: Indirect

Extent (E)

Magnitude (M)

Duration (Du)

SS= Site Specific

L= Low

LT= Long Term

L= Local

M= Medium

MT= Medium Term

R= Regional

H= High

ST= Short Term

6.3 Socio-economic and Cultural Environment

The likely impacts due to project implementation are associated with land take, social and cultural problems, health and sanitation etc. The anticipated impacts regarding the socio-economic and cultural environment of the project area are discussed below:

6.3.1 Acquisition of Land and Structures

a. Construction Phase

i. Households Losing Land

Household survey of 197 HH affected by the project was carried out (Table 6-11). These HHs will be affected due to the location of different project components such as tower pad, structure falls under RoW, access road and substation. Though there are three proposed substations (Chagunarayan Substation, Haledi Substation and Barhabise Substation) to be constructed for 99.36 km long TL, the census household survey of one substation (proposed Barhabise substation) was done. In remaining two substations, representative household survey was carried out.

Table 6-11: Total Surveyed Households

S.N.	Project Components	Type of losing Structure	Surveyed HHs
Affected Households Due to Project (A)			
1	Substation	Land Only	38
		Land and structure Only	7
2	Angle Point	Land Only	123
3	RoW	Structure Only	10
4	Angle Point and RoW	Land due to AP and Structure due to RoW	4
5	RoW	Fish Pond	1
Sub-Total (A)			183
HHs under RoW but Destroyed by Earthquake (B)			14
Total Surveyed HHs (A+B)			197

Source: Field Survey, 2015

ii. Household Losing Structure

Out of total surveyed HHs, 20 households will lose their structures and nos. of displaced people will be 65. A total of 30 structures (20 houses, 10 cow shed) will be affected due to implementation of the project. The list of the project affected surveyed HHs who lose their structures are given in Appendix E-IV.

There are 17 households whose structures are under RoW of the project but already damaged due to earthquake. The survey of these households has also been conducted. Among these 17 HHs, three HHs' land fall under the tower pad of the project. The list of these households is given in Table below.

Table 6-12: List of Structure under RoW but damaged due to Earthquake

S.N.	District	VDC	Ward	Project Component	Name of Owner
1	Dolakha	Pawati	2	AP15-AP16	Prem BD Bhandari
2	Kavre	Chandeni	8	AP39-AP40	Gokul Parajuli
3	Bhaktapur	Nagarkot	11	AP58- AP 59	Singh Bd Tamang
4	Kathmandu	Sankharapur	7	AP58- AP 59	Krishna Kumari Bhujel
5	Sindhupalchok	Mankha	1	AP12- AP13	Tika Bd Bhandari
6	Sindhupalchok	Thulo Sirubari	5	AP31- AP 32	Indra Bd Shrestha
7	Sindhupalchok	Mankha	6	AP15-AP16	Tika Maya Parajuli*
8	Sindhupalchok	Mankha	6	AP15-AP16	Matrika Parajuli
9	Sindhupalchok	Mankha	6	AP18-AP19	Chitra Khar Parajuli*

S.N	District	VDC	Ward	Project Component	Name of Owner
10	Sindhupalchok	Irkhu	5	AP28-AP29	Hem Narayan shrestha
11	Sindhupalchok	Irkhu	3	AP30-30A	Dil Bahadur Shrestha
12	Sindhupalchok	Thulo Sirubari	6	AP31- AP 32	Horn Nath Chaulagai*
13	Sindhupalchok	Barhabise	6	AP64- AP 65	Sambar Bd Thokar
14	Sindhupalchok	Barhabise	6	AP64- AP 65	Kamala Devi
15	Kavre	Mahadevsthan	4	AP44-AP45	Dek Bahadur BK
16	Dolakha	Pawati	1	AP15-AP16	Dilli Bd Budhathoki
17	Sindhupalchok	Thulo Sirubari	5	AP32-AP33	Tiuri Maya Tamang

Note * HH whose land fall under the tower pad of the project.

iii. Types of Structure

On the basis of structure type (according to the classification made by CBS), of the total 30 structures (20 houses and 10 cowsheds), 3 houses are Pakki, 2 houses are Semi-Pakki and remaining 15 houses are Kachchi type. And all the 10 cowsheds are Kachchi types.

Table 6-13: List of Project Affected Surveyed HHs by Area and Type of Structures

Area	No. of Affected Houses	Affected Area						
		Houses (sq.ft.)				Cowsheds (sq.ft.)		
		Kachchi	Semi Pakki	Pakki	Avg.	No.	Area	Avg.
Single Floor								
<100 Sq.ft.						2	177	88.5
100-150 Sq.ft.						2	255	127.5
150-200 Sq.ft.	1		180		180	1	180	180
> 200 Sq.ft.	4	840	360	600	450	5	1188	237.6
Double Floor	13	7002		3240	787.84			
Three Floor	2	1728			864			
Total:	20	9570	540	3840	697.5	10	1800	180
Other Structure								
Fish Pond	1							

The affected HHs are belonging to different caste and indigenous group. The list of project affected HHs by caste wise with number of structures is given in Appendix E-IV.

• Private/Public Infrastructure

One fish pond owned by Mr. Krishna Prasad Poudyal located under the RoW (between AP45-AP46) is affected by the project.

iv. Households Losing Land

Out of 197 surveyed HHs, 172 households will lose their land. They are likely to be affected due to the location of angle tower and substation on their lands. Out of the total affected households, 72.67% households will lose less than 10% of their land. Similarly, 15.12% of households will lose land in the range of 10% to 25%. Moreover, 5.81% of the households will lose land between 25 to 50% and 6.40% of the households more than 50% of land as well (Table 6-14).

Table 6-14: Affected Household (Surveyed) by Land Loss

% of loss of land	Type	
	HHs	%
< 10	125	72.67
10 - 25	26	15.12
25 - 50	10	5.81
>50	11	6.40
Total	172	100.00

Source: Field Survey, 2015

v. Land Requirement

The project will acquired 308.4467 (65.5%) ha of cultivated land along 99.36 km route. Out of total, 23.7875 ha is permanent land (land required for angle tower, suspension towers and substation area). Out of total towers (angle and suspension towers), 235 towers will be located in cultivated land. Area occupied by these towers is 5.2875 ha. All the three Substations are located in cultivated land. The land under the RoW of TL will be restricted permanently for the construction of houses, cowsheds and plantation of timber size big trees, etc. However, there will be no restriction on agricultural farming after the construction work is over. The detail loss of land of project affected families due to construction of towers and substations is given in Appendix E-IV.

Table 6-15: Cultivated land and other type of private land use by project components

Project components/ facilities	Quantity	Required (ha)	Cultivated (ha)	Percent age (%)	Remarks
Towers	327	7.3575	5.2875	71.87	235 angle towers are in cultivated land
RoW	99.36 km	445.0643	284.6592	63.96	Total cultivated area of RoW (Khimti-Barhabise-Kathmandu)
Substation	3 no.	18.5	18.5	100.00	Chagunarayan S/S.; Lapsiphedhi S/S; Barhabise S/S.
Mobile camp			as required		Mobile camp; store
Total land		470.9218	308.4467	65.50	
Total permanent		25.8575	23.7875	91.99	
Total Cultivated land (RoW)		445.0643	284.6592	63.96	For RoW

Households' survey of land owners related to suspension towers has not been conducted. Similarly, land loss of households regarding Chagunarayan substation, Nanglebhare substation has not been considered for land calculation since detail survey of these households has not conducted yet. In the same way, land loss of HHs of Khimti substation is also not calculated because it is beyond our scope. The magnitude of impact is considered to be moderate, site specific and long termed. The level of impact may vary with the proportion of land acquired.

b. Operation Phase

Land acquisition will not be required during operation and no significant impacts are expected during this phase. Due to safety reason, houses and other permanent structures are not allowed to be constructed within the RoW as per the Electricity Regulation, 2050. The land price under the RoW and in the vicinity of RoW, especially near to the highway and built up areas will be reduced significantly. It is difficult to quantify level of impact on the pricing of the land because there are other factors too that would play the significant role. The land used for camp will be returned to the respective land owners as in the previous condition. Thus; overall magnitude of impact is high, extent is site specific and duration is long term.

6.3.2 Loss of Crops

a. Construction Phase

i. Permanent Loss of Crops

Total annual crop loss of surveyed HHs due to the project implementation is estimated to be 47.52MT (Cereal crops 37.43 MT & Cash crop potato 10.09 MT). Similarly, loss of cereal crops like paddy, wheat and millet are 21.99 MT, 9.54 MT and 5.9 MT respectively. (Table



6-16 shows the details). This implies that the total loss percentage of cereal and cash crops is only 8.23. On the basis of this, total annual crop loss of project affected HHs is 129.74 MT.

Table 6-16: Permanent Loss of Agricultural Production (Due to Land Acquisition)

S.No.	Crop types	Surveyed HHs			Total Project affected HHs
		Actual production area loss (ha)	Production Loss (MT)	Productivity (MT/ha)	Production Loss (MT)
1	Paddy	7.186	21.99	3.06	60.03
2	Wheat	4.969	9.54	1.92	26.05
3	Millet	5.043	5.9	1.17	16.11
4	Potato	1.326	10.09	7.61	27.55
Total			47.52		129.74

Source: Field Survey, 2015

(Note: Actual production area loss seems to be higher than total cultivated land. This is due to multiple cropping pattern in the same land type; and study period is taken for one year not for one season.)

Production loss of crops is calculated only for 8.9 ha of land of the surveyed HHs which will be acquired permanently from project affected families (Appendix E-IV). The actual cultivated land to be acquired permanently by the project is 23.7875 ha. Preferably the construction of TL is to be carried out during lean season so that standing crops will not be damaged due to construction activities. However, it is not completely ignored that construction activities will not take place during the cropping season. Therefore, the adjoining area of RoW may be disturbed due to movement of contractor's machine, labor force and stringing of the line.

ii. Temporary Loss of Crops

Similarly, about 1531.79 MT of crops (paddy 708.80MT, maize 307.531MT, millet 190.19 MT and potato 325.27 MT) will be lost due to the construction of TL. This loss is calculated considering that stringing of the line will be completed in one year and compensation will be paid for one seasonal cropping. The magnitude of this impact is considered to be high, extent is site specific and duration is long termed.

Table 6-17: Annual Loss of Agriculture Production (Temporary Land)

S.No.	Crops Types	Cultivated land	Actual production area loss (ha)	Production Loss (MT)	Productivity (MT/ha)
1	Paddy	284.6592	231.6341	708.80	3.06
2	Maize	284.6592	160.1712	307.53	1.92
3	Millet	284.6592	162.5565	190.19	1.17
4	Potato	284.6592	42.7424	325.27	7.61
Total				1531.79	

Source: Field Survey, 2015

b. Operation Phase

The towers constructed in cultivated area, especially those erected in the middle of land parcels will pose hindrance while tilling agricultural field. The field may be cultivated by using human labor that will increase the cost of agriculture production. The overall magnitude of impact is considered to be low, extent is site specific and duration is long term.

6.3.3 Health, Water Supply and Sanitation

a. Construction Phase

i. Health and Sanitation

The likely influx of construction forces during this phase may add further stress on the local health and sanitation situation. Besides, the increase in the noise level due to vehicular movement in the project area is likely to influence the physical and mental health of the local community. Discharge of wastes of various types including metals, paper, kitchen wastes etc. is potential to degrade the sanitary hygienic conditions particularly around the construction sites and campsites. Considering only 300 numbers of manpower and their short termed mobility at one site the impact is considered to be low, site specific and for short termed.

ii. Drinking Water

Similarly, with the increase in population along with the construction activities, a potential decline of the access to the drinking water and existing sanitation condition will occur in the project area. The overall impact on water supply and sanitary situation will be: shortage of drinking water, increase pressure on the existing water supply system, increase distance to the safe drinking water, increase in disease vectors, and reduced water quality due to increased sanitation problems etc. However, the impact on water supply and sanitation shall be low, short term and site specific.

b. Operation Phase

No impact is anticipated during the operation phase.

6.3.4 Occupational Hazards and Safety

a. Construction Phase

Work related injuries and vehicle accidents are likely impacts expected during the construction of the project. The magnitude of impact is low, the extent is site specific and the duration is short termed.

b. Operation Phase

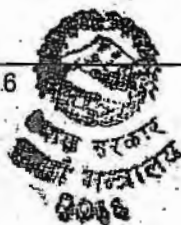
The people residing in the vicinity of the TL will be vulnerable to electrical hazards. Similarly, lack of operation and maintenance skill and unavailability of the essential safety equipment may add further risk with safety regards. The public can be affected principally through their own activities, such as tendency of climbing towers by children; high vehicles attempt to pass beneath the TL; surveyors using metal leveling staffs under the conductors, etc. These risks have low probability of occurrences, but a great significance to individuals involved.

The overall magnitude of impacts is considered to be low, extent is local and duration is long termed. The magnitude of impact is moderate, extent is site specific and duration is long termed.

6.3.5 Impact on House, Settlements and Social Infrastructure

a. Construction Phase

Some tower pads including RoW are proposed to construct close to the house, settlements, social infrastructures and other private properties. The list of such structure/property is presented in Appendix E-IV. The magnitude of impact on above mentioned private and social infrastructures are high, extent is local and duration is long term.



b. Operation Phase

The impact on settlements and community structures remain same in this period also. The magnitude of impact is high, extent is site specific/local and duration is long term.

6.3.6 Impact due to Crossing of Power Cables, Communication Lines, Foot-trails, Roads/ Highways, etc.**a. Operation Phase**

The baseline study shows the proposed TL alignment crosses inter-connected gravel/earthen/trails number of times. The TL also crosses irrigation canals and communication lines. Hence, there will be impact due to crossing over of power cables, communication lines, foot trails and road/highways on local infrastructures and facilities. The impact is expected to be high, regional and long term.

6.3.7 Impact on Communal Resources**a. Construction Phase**

The proposed TL doesn't pass through communal resources like recreational areas and places of public congregation. Hence, there will be no impact on such resources due to construction of TL.

b. Operation Phase

Some settlements, markets, schools, temples and cremation sites are located close to the alignment and substation, thus imposing impact on these structures/places. There will be likely impact on those structures and settlements due to the project implementation. The magnitude of impact is moderate, extent is site specific and duration is long term.

6.3.8 Impact on PAF due to Alteration of Land and Property Values**a. Operation Phase**

The land and property values under the RoW and close proximity to house and settlement will be devalued due to the construction and operation of TL. The nature of impact is expected to be high, local and long term.

6.3.9 Impact due to Restriction of Future Landuse Development near to settlement**a. Operation Phase**

The proposed TL mostly passes through rural and semi urban sections. However, the TL passes through some sections like, Ittakhel of Shankharapur Municipality, Kunta bazaar of Kavre Mahadevsthan VDC which belongs to growing up market setting. This creates the land devaluation.

Due to implementation of TL, land near by settlement and road will be affected mostly. It restricts the multipurpose land use potentiality of the area. Plan and programs proposed by concern VDCs/Municipalities and DDCs will be affected. Hence, impact is expected on future land use development. The nature of impact is high, local and long term.

6.3.10 Disturbances to Radio, Television and Mobile/ cell phone Reception**a. Operation Phase**

There will be likely impact on radio, television, telephone, and mobile/cell-phone due to creation of electromagnetic field interference in the conductor of 400kV TL. The frequency of electrical gadgets will be disturbed. However, there are no proven findings of impact due

to high voltage TL. Hence, the nature of impact is expected to be high, local and long termed.

6.3.11 Electric and Magnetic Field Effect

a. Construction Phase

No significant impacts are expected during this phase.

b. Operation Phase

Electric power TL create electric and magnetic field together known as electromagnetic field or EMF. Electric field is created by the presence of voltage and is expressed in volt per meter (V/m). Magnetic field is produced by the presence of current in the line and is expressed in terms of ampere per meter (A/m). Power lines EMFs are strongest beneath the lines and diminish rapidly with distance. Numerous researches have been done abroad to investigate the effect of EMF associated with TL but none has proved and quantify about the health risks. Scientific research on the effects of EMFs on public health has not demonstrated clearly the existence of a significant risk, nor has it proven the complete absence of risk.

Electric field of high voltage line gives rise to corona effect causing ionization leading to the generation of ozone and oxides of nitrogen, possible radio and television interference and audible noise at high levels. Such noise will increase under rain and smog conditions. Similarly, there will be impact on pacemaker users. The magnitude of overall impact is considered to be low, extent is local and duration is long termed.

6.3.12 Gender and Vulnerable Group

a. Construction Phase

During the project construction people will be employed on daily wages for excavation, transportation of construction materials and other construction related works. The contractor, especially the sub-contractors, may discriminate the women and vulnerable group while hiring the worker. Despite, the Government of Nepal ban on child labor, it remains a potential temptation in an economically poor region such as the proposed project area for children to be exploited to pursue menial jobs. It is assumed that most of the labor force required for the construction of the TL will be farmers and landless people from the vicinity of the actual work place moving around the alignment as the construction proceeds.

Considering the nature of construction work and manpower employed the magnitude of impact is considered to be low, the extent is local and the duration is short termed.

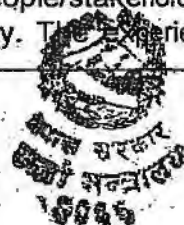
b. Operation Phase

After the completion of the project most of the male population involved directly or indirectly in the project will be left without job, which will compel the female population to look for alternative source of income. This may add extra burden to their normal daily activities. This impact is expected to be medium in magnitude, local in extent and long termed in duration.

6.3.13 Economic Activities

a. Construction Phase

Some sections of the TL passes very near to market area like Charikot, Khadichaur, Barhabise, Kuntabazaar, Irkhu bazaar and Nagarkot where economic activities are high. Similarly, most of the section of the TL passes close to the rural roads which are considered as the semi-urban area. The interaction among different people/stakeholders and ethnic group may attract rural people towards more advance society. The experience with other



project has revealed that sudden cash flow may cause unproductive spending earned by the workers. The availability of cash may divert some workers towards gambling and other awful habits like alcohol consumption. The magnitude of impact is low, extent is local and duration is short term.

b. Operation Phase

Local people will benefit from the project induced economic opportunities. After the project completion, these opportunities will be closed and the workers will lose their job. Demand for local agricultural production, community and local commodity transactions will be reduced. The withdrawal or decrease in economic activity during operation phase may affect the life of the local people after the habitual of spending more during construction phase. They will face difficulty in managing the lifestyle once the economic activities will be reduced and earning will drastically decline. However, due to the linear nature of the project, the local labors will be hired at the different locations only for the short duration of time. Thus, the magnitude of the impact is considered to be low because the economic activities are limited and are spread throughout the settlements of the alignment. The extent is local and duration is of long term.

6.3.14 Religious, Historical and Archeological Site

a. Construction Phase

Though there are numbers of temples, religions and cultural sites in the project area, none of them are located under the Row. Therefore, none of such structures need to be relocated due to the proposed pylon and TL construction. However, many temples, cremation area are found within the distance of 100-300m from the TL. List of the temples that are found within the area of 300m from the TL are given below.

Table 6-18: Name of the temples within the area of 300m from TL

TL Section (AP to AP)	VDC/ Municipality*	Infrastructures	Distance from the Conductor (m)
AP1-AP2	Melung	Sitali Devi Mandir	50
		Cremation center	75
AP3-AP4	Melung	Radhakrishna Mandir	50
AP5-AP6	Melung	Pashupati Mandir	70
AP8-AP9	Bhedapu	Cremation center	60
AP30A-AP32	Irkhu	Mahadevsthan Mandir	300
AP34-AP35	Bhimeshwar	Mahankal Mandir	50
AP36-AP37	Thulo sirubari	Devasthan Mandir; Kumeshwor Mahadev	300
AP58-AP59	Chokati	Nandala devi; Seti devi; Phabara kharedevi	300
AP61-AP62	Shankharapur	Ganesh Mandir	300
AP64-65	Barhabise	Chhema devi Mandir; Barhabise Mandir	200

b. Operation Phase

No impact is expected during the operation phase.

6.3.15 Infrastructure and Service Facility

a. Construction Phase

i. Infrastructure

Charikot, Dolakha; Khadichaur, Barhabise and Irkhu bazaar of Sindhupalchok; Kuntabazaar, Kavrepalanchok, Nagarkot Bhaktapur and Sankhu bazaar of Kathmandu are the main markets/trade centers of the project area. The average distance of these market centers from the proposed TL is ranged from 500m to 2000m. The implementation of project will

likely to affect these market centers. The magnitude of the impact is moderate, extent is local and duration is long termed.

ii. Service Facility

The construction work and related influx of population in the project area will make the existing institutions regarding health, water supply, telecommunication, electricity, etc. unable to deliver the required service. Besides, existing market and hotels will come under pressure. However, privately operated service is expected to cope-up with this situation considering the nature of job and limited workers staying with their families in the project area. The impact is expected to be low in magnitude, local in extent and short duration.

b. Operation Phase

No impact is anticipated during the operation phase.

6.3.16 Social and Cultural Practices

a. Construction Phase

During the project construction, the influence of the outside workforce on the local way of life and traditional cultural practice may result into cultural erosion, undesired social practices, disputes, conflicts and possible dilution of social bonds among the local people. However, the social and cultural life style of the local people will hardly be affected by the influx of workers due to nature of project. This is because of the linear type of the affected project area, low number of the construction workers from outside and their fast mobility. These impacts are expected to low in magnitude, local and short termed in duration.

b. Operation Phase

After completion of the construction work, the impact on culture by the construction work force will subside and will slowly return to its normal social condition.

6.3.17 Law and Order

a. Construction Phase

During the construction of the TL labor from different places with different religion and faiths will be employed by the contractor and there will be possibilities of conflict of interest thus affecting the law and order situation. The past experience reveals that local people have misunderstanding with the employer's and contractor's staff. Since the project is of linear type and the number of local labor for construction activities will be less the likely impact on law and order situation due to project is expected to be low in magnitude, local and short termed.

b. Operation Phase

No significant impacts are expected during this phase.

6.3.18 Impacts of Aesthetics

a. Construction Phase

No significant impacts are expected during this phase.

b. Operation Phase

Impacts to visual resources are examined in terms of changes between the existing landscape character and proposed actions, sensitivity of viewing points available to the general public, their viewing distances and visibility of proposed changes. Some section of the TL passes nearby market centers and settlements 80m. The existence of tower and TL

will likely to create aesthetic impact on natural and manmade resources by hindering the mountain. Hence, the magnitude of impact on aesthetic will be moderate, local and long termed in nature.

6.4 Beneficial Impacts

6.4.1 Local Employment

a. Construction Phase

One of the major beneficial impacts of the project during the construction phase is the creation of employment opportunity. Such employment opportunities to some extent may check out migration of the project area and promote in-migration. In this regard, the employment opportunities contribute to poverty alleviation to some extent. The availability of reliable power in the Central Development Region will assist in establishing new industries which will generate employment for the local people. The magnitude of impact is considered to be moderate, extent is local and duration is short termed.

6.4.2 Local Economy

The employment opportunity, income from shops, house rental, increase demand for fresh vegetables, fruits, meat and rental/lease of land etc. are the areas of income during construction period.

Furthermore, local contractor and local people will also be engaged for some construction work, which is considered as beneficial impacts for the local economy. As a result of increased trade and business, significant amount of cash will be introduced into local economy. This short term economic boom will contribute to the development of local economy. The increase in business will enhance the economic status of local people. The magnitude of impact is considered to be moderate, extent is local and duration is medium term.

The people of project area will have opportunity to sell their products to the construction workforce and project farmers in terms of cash economy. With the start of proposed project construction, visible and significant impact will be realized in the local economy of the area as whole and economic activities of the urban/semi urban centers like Khimti bazaar, Irkhu bazaar, Khadichaur, Barhabise, Kunta bazaar, Nagarkot and Sankhu bazaar.

6.4.3 National/ Regional Economy

The proposed project will evacuate the energy from Khimti and Tamakoshi River and other projects to be developed in Central Development Region of Nepal. The reliability in power distribution will enhance the production of the industries and boost the economic activity in the central Nepal.

6.4.4 Living Standard

Beneficial impacts of the development project are development of urban and semi urban area with better facilities and amenities, which avail short term economic benefits to the local community. Given the opportunity of job (300 locals) in the project, the unemployed people of the area and households depend upon labor will benefit immensely. Their purchasing power is expected to improve the living standard during the construction phase. People thriving in subsistent agriculture will have cash flow, then exposed to the direct cash earning economic activities will certainly lead to positive changes in the existing social relationships and socio-economic value.

Table 6-19: Socioeconomic and Cultural Environment Impact Assessment Matrix

Table 6-15: Socioeconomic and Cultural Environment Impact Assessment Matrix									
S. No.	Issues		Impacts		Identification and Evaluation of Impacts				
Construction Phase					D	IND	M	E	Du
1.	Acquisition of Land and Structure		The project will require 308.4467 ha cultivated land out of which 23.7875 ha private cultivated land is acquired permanently. Total 30 structures (20 houses, 10 cowsheds) will be affected.		D		M	SS	LT
2.	Loss of Crops		Loss of 129.74 MT food crops from permanent land acquisition.		D		L	SS	LT
3.	Health, Water Supply and sanitation		Likely impact on workers' health due to poor sanitary situation in labor camps		D		L	SS	ST
4.	Occupational Hazards and safety		Likely increase in construction related accidents.		D		L	SS	ST
5.	Impact on House, Settlements and Social Infrastructure		Likely impacts on house, settlements and social infrastructures.		D		H	L	LT
6.	Gender and Vulnerable group		Likely discrimination while hiring workers, compensation or other project related benefits.			IND	L	L	ST
7.	Economic Activities		Likely increase in economic activities as well as unproductive spending.		D		L	L	ST
8.	Religious, Historical and Archeological Site		No need to relocate any such sites, however, many temples, cremation area are found within the distance of 100-300m from TL.		IN		L	L	LT
9.	Infrastructure and Service Facility		Likely impact on infrastructures and service facilities.				M	L	LT
10.	Law and Order		Likely increase in pressure to maintain the law and order			IND	L	SS	ST
Operation Phase									
1.	Acquisition of Land & Structures		No significant impacts are expected on Land acquisition and houses and other structures are not allowed to be constructed within RoW.				H	SS	LT
2.	Loss of Crops		Placement of tower at center of field pose difficulty for the cultivation which further increase production cost		D		L	SS	LT
3.	Occupational health and safety		Likely increase risks with safety regards.		D		M	SS	LT
4.	Impacts due to Crossing of Power Cables, Communication Lines, Foot trails, Roads/Highways etc.		The project will cross highways 9 times, feeder roads 112 times, 2 canals, Jure Landslide, 11kV; 33kV; 220kV TL in many times.				H	R	LT
5.	Impact on PAF due to Alteration of Land and Property Values		Land and Property values under RoW will be devalued.		D		H	L	LT



6.	Impact due to Restriction of Future Land use Development near to settlement.	Restriction on the multipurpose land use potentiality for the growing up market area.	IN		H	L	LT
7.	Economic Activities	Withdrawal of economic activities. Negative impacts on locals.	D		L	L	LT
8.	Electric and magnetic field	Electromagnetic impact due to long term exposure		IND	L	SS	LT

Note: D: Direct, IND: Indirect

Extent (E)

SS= Site Specific

L= Local

R= Regional

Magnitude (M)

L= Low

M= Medium

H= High

Duration (Du)

LT= Long Term

MT= Medium Term

ST= Short Term