



# IMPACT OF LOWER SUKTEL DAM PROJECT: AN ANALYSIS OF MICRO LEVEL IN BOLANGIR DISTRICT, ODISHA

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## ABSTRACT

*A dam is a man-made structure to block or stop the water, the oldest civilizations, like Egypt, Mesopotamia, Harappa, Chinese, Indus etc are Build many dams for the use of domestic water supply and irrigation without any hamper. The dam has several beneficial aspects but could not avoid its negative aspect. The Lower Suktel dam exist in the year 2001 as multipurpose river project, with aim of irrigation, fishing, domestic water supply etc. but it has several negative impact such as ecological disturbance, forest loss, loss of flora & Fauna, population displacement, loss of livelihoods, human harassment etc. the present investigation conduct a micro study on socio-economic based on field survey. Loss of Agricultural land and loss of livelihood is a crucial problem caused by the dam. The data and information, qualitative and quantitative, descriptive statistic used in primary data with SPSS & Eviews software.*

**KEY WORDS:** Lower Suktel dam, displacement, socio-economic, land, Agriculture

## INTRODUCTION

There is nothing new about the dams, for thousands of years people have been building Dams for the use of irrigation and drinking water supply. As the growth of society with population extended, the construction of dams also increases for the multiple uses such as irrigation, drinking water, hydropower, fishing, navigation etc. and dams also establish various types job and benefit to the society. By the end of 1950, dams increases rapidly all over India. At present 5,264 dams are already completed and 437 dams are under construction. As the global level India is the third largest country to made construction of dam after China and America.

Development of infrastructural projects like roads, railways, airports and dams etc. has crucial place in both develop and under develop country. The large projects like dams, play important role for irrigation, flood control, domestic water supply, generate electricity etc. both developing and developed countries. Such types of projects are plays key role of a countries. The dams fulfill water supply of a country, and create a large number of employment opportunities and collect huge amount of revenue in the economy. Dams also generate electricity which is important for our environment and main source of energy. But such type of projects also gives the negative externalities such as socially, economically, and ecologically impacts. These socio-economic impacts have always been very hard on local people affected in the form of landlessness, Homeless, loss of livelihood, loss of economic, social network etc and so on. (Chakravorty, 2016) further, Dams has negative impact of environment. Its include forest, loss of flora and Fauna, land degradation, impact water etc. and also the water pollution increase due to downstream the dam. The irrigation dam is the causes of boost chemical agriculture, salinity, and people are facing directly ecological problems (Dharmadhikary 2001, Williams and Porter, 2006). Study the large number of construction dams change the nature of environment with negative impact of ecosystem, biodiversity, food web, temperature, food production etc. are directly affected and also large number of Birds, Mammals, Fishes, species or aquatic impact of large dams.( McCartney 2009, Bisht 2011, Bottor 2013)

## Review of Literature

The present research work will primarily be based on empirical findings. However, prior to this, a number of scholarly works, both theoretical and empirical have been undertaken on 'development' and 'displacement'. Following are some of the reviews on relevant books, journals and research papers.

Parasuraman(1996) studied the outcomes of displacement on the displaced in upper Krishna irrigation project. In the study, he found that people who were left with some land and invested the compensation money in land purchase, agricultural improvement, and irrigation, were able to recover in their standards of living after displacement. The landless people and the tribal, who owned very little land, suffered more after the displacement. They could not buy land due to a lack of resources and were eventually pushed into the category of migrant laborers and construction workers. As a result of displacement, they trapped under poverty.

Bharali (2005) carried out a study to investigate the impact of Pagladia dam on tribal inhabitants and their livelihood related issues. It is found that the major sources of income of tribal are based on agriculture and common property resources (CPRs). Prior to the displacement, tribal were a protector to the forest and using the forest products sustainably. Moreover, it was found that after the displacement, report of liquor consumption has increased in the locality and as a result of it, domestic violence is escalating. The major factor behind it is frustration due to the loss of the only source of livelihood i.e. forest.

Agnihotri (2008) examined the issues pertaining to the lower Suktel irrigation project based on a field

survey. She focused mainly on the legal back up of displaced people after displacement, loss of natural resources and community asset. As a result of the project, a substantial fertile land with huge natural resources will be submerged. It is found that one major source of income in the project area is forest and people are going to lose it as an important source of livelihood if the project will be undertaken. It is found that small irrigation projects are more suitable than the large dam, as it checks the displacement of people, involves low cost with low gestation period as compared to the large multipurpose dam projects.

McCartney (2009) Study the large number of construction dams change the nature of environment with negative impact of ecosystem, biodiversity, food web, temperature, food production etc. are directly affected and also large number of Birds, Mammals, Fishes, species or aquatic impact of large dams. To protect the environment the nation increased environmental awareness to the public.

Maitra (2009) in his paper she The paper discuss the phenomenon of Dam Induced Displacement in Sardar Sarovar Project (Gujrat) highlighted to illustration the policy which is implementation of development projects in India. The Modern India has found itself involved in this fight between the development plans of the State at the macro level and their undesirable consequences for the specific project affected people and issues of compensation and resettlement are found. He argues the there must be legal policy for relief and rehabilitation measures the development projects. The direct affected people through the project provided high compensation, alternative option of livelihood and resettlement in local areas.

Bottero (2013) carried out a study to investigate the impact of large dam community. The hydropower plants impact the livelihoods of local inhabitants due to block the water and its impact to ecosystem or distribution the natural resources. He also found out the displace people loss their occupation, houses, identity, culture and suffering various health problems, and down the livelihood condition. On the other side the project affect the environment and disturbance the fauna specie in the area with landscape. The displace people living reservoir area forcedly. He argues to maintain sustainability to take care environment performance, monitoring programme, proper evaluated and also the provided alternative source of displace people.

Vandana (2012) studied her paper that the gendered analysis of displacement and resettlement of women of the Bhagirathi valley. She has been discussed based on the experiences of women displaced by the Tehri dam construction. Here, the argument presented that the living condition of displaced women, where the critically low level of water supplies, shortage of fuels, and overutilization of arable lands have deprived them of their livelihoods, cultural identity and sense of wellbeing. Resettlement and rehabilitation (R&R) policies exposed the male biases inherent in the insensitivity of the governments towards the needs of women.

Sahoo & Sahu (2013) discuss in his paper various issues and conflicts between affected people and project. People harassed by administration during the collection of their compensation amount in lieu of land. It is also found that affected households are not ensured any livelihood supporting security except the compensation for the loss of their property and land. All sample households oppose this project due to improper valuation of land, house, private orchards, common property resources (CPRs) and payment system adopted by the Government. Moreover, it is found that the proposed submerged area by the government official is not accepted by the people and they have lack of faith in government due to improper pattern of compensation payment.

P.K.Behera (2015) explain how the NALCO impact of the socio-economic condition of local people. According to this study the mining creates Air, water, and sound pollution in the nearer village (ST& SC) and also damage the forest, paddy, crops, land degradation. Health hazards etc. NALCO issued health card only the affected people and permanent employment. The surrounding village affected by skin disease, Astma, water born debases and also crops production decreases. The power of soil fertility became diminishing as a result is very low. The job allocated per family one member and others members depended, the compensation of land was vary which per acre 2000, trees 100 and no compensation for CPR. The women were loss their social status. However for the affected people, the companies provided various facilities like health, education, roads drainage water, infrastructure development. Again he studies in the field of agriculture the crops production decrease due to leakages of caustic soda pipeline which destroy the agricultural land of Goudaguda village and also village population decrease due to the deforestation. At present NALCO not provide any alternative solution of affected people of livelihoods.

### **History of Dam**

A dam is a man-made structure to block or stop the water, the oldest civilizations, like Egypt, Mesopotamia, Harappa, Chinese, Indus etc are Build many dams for the use of domestic water supply and irrigation without any hamper. (Roy, 1989). In the ancient period there are many dams build in all over the world, the fist dam build in history was such as Jawa dam (Jordon) in 3000 B.C, and the two famous dam build in Egypt, like Gravity Dam and Sadda-el-Khapara dam in the period of (2950-2600 BC), in the period of Mesopotamia civilization build the dam as Nimrod Dam (2000 B.C). In 256 B.C china build Dujiangyan dam for control Flood and important sources of irrigation (Roy, 1989).

According to the International commission on large dam (ICOLD) report there are 55,000 of large dams registered in global level. China is the first rank to built Dams, around 51.49 percentage of the country.(Vetrop,1993), the Aswan Low Dam on the Nil River in Aswan, Egypt in 1902. the Hover Dam and Grand Coulee Dam are two largest dam in the USA built in 1931 & 1933, the Guri Dam in Venezuela (1963); Krasnoyarsk dam in Russia (1972), Tucurui dam in Brazil (1984), the Itaipú Dam (1971) between Brazil and Paraguay, and the Three Gorges Dam in China(1994), Longtan Dam in China (2007)

After independence, construction of large dams in progressive manner and important factors of economic activities, the dam providing irrigation, water supply, hydro- electric power, flood control etc. under the 1<sup>st</sup> five year plan the nation mainly priority to irrigation and hydropower. The first Prime Minister of Republic India, late Pt. Jawaharlal Nehru, realizing the nice potential of the major dams in the growth of Indian economy completely referred to as those dams as "Modern temples of India". His vision and long vary coming up with offer nice inspiration and motivation to be then referred to as programe of water river valley project. The first dam i.e. Kallanai Dam (Grand Anicut) built in the river of kaveri, under the period of Chola dynastic. After the five year plan India make more construction of dam. Such as Bhakra Nangal Project (Himachal Pradesh, 1948) on the Sutlej River, Damodar dan on Damodar River (Jharkhand & Westbengal, 1953) Hirakund dam (Odisha) on the Mahanadi river and the Nagarjuna Sagar Dam (Andhra Pradesh, 1955) on the Krishna River, Tehri dam on Bhagirathi river (Uttarakhand, 1978), Sardar Sarovar Dam on Narmada river (Gujarat,1987) etc. the construction of dam still continue. The Maharashtra is top rank to built the dam and follow by Madhya Pradesh

### **Methodology:**

The study is based on an intensive primary survey and interview with 300 households from six villages which are fully submerged (Pardhiapali , Kaindapali, khuntapali) and partially submerged (chudapali, kutensilet and khagsabahal) in lower Suktel irrigation project. Out of 29 displaced villages of the study area, 16 villages are fully displaced and 13 villages are partially displaced. Out of the fully displaced villages the above mentioned three villages were selected randomly. Similarly for the partially displaced sample villages, random sampling was adopted for selecting the above mention villages. the primary data which collected were on displace people their demographic information of the collectors (age, gender, caste, literacy level, land holding, community background).To enrich the present work, The secondary information on lower Suktel project has been collected from different government departments and reports like District statistical Hand Book, NSSO reports, Documents collected from Lower Suktel office, Bolangir , Bureau of Statistics Bhubaneswar, Economic survey of Odisha, Census of India and Satirical Abstract of Odisha etc.

### **Lower suktel dam: An overview**

The Lower suktel dam constructed over the river Suktel was designed to control flood, and to provide irrigation facility of both Bolangir and Sonepur district, however, the construction of the dam which is located near magurbed to 25 km bolangir district. The dam generates displacement of bolangir block. Around 29 villages affect, out of 16 villages fully displaced and 13 are partially displaced both human settlement and agricultural land were submerged under the water reservoir. According to the official record of the resettlement and rehabilitation office, Bolangir, the dam has together caused involuntary displacement of 4160 families; including 1222 families belongs to the schedule tribe.

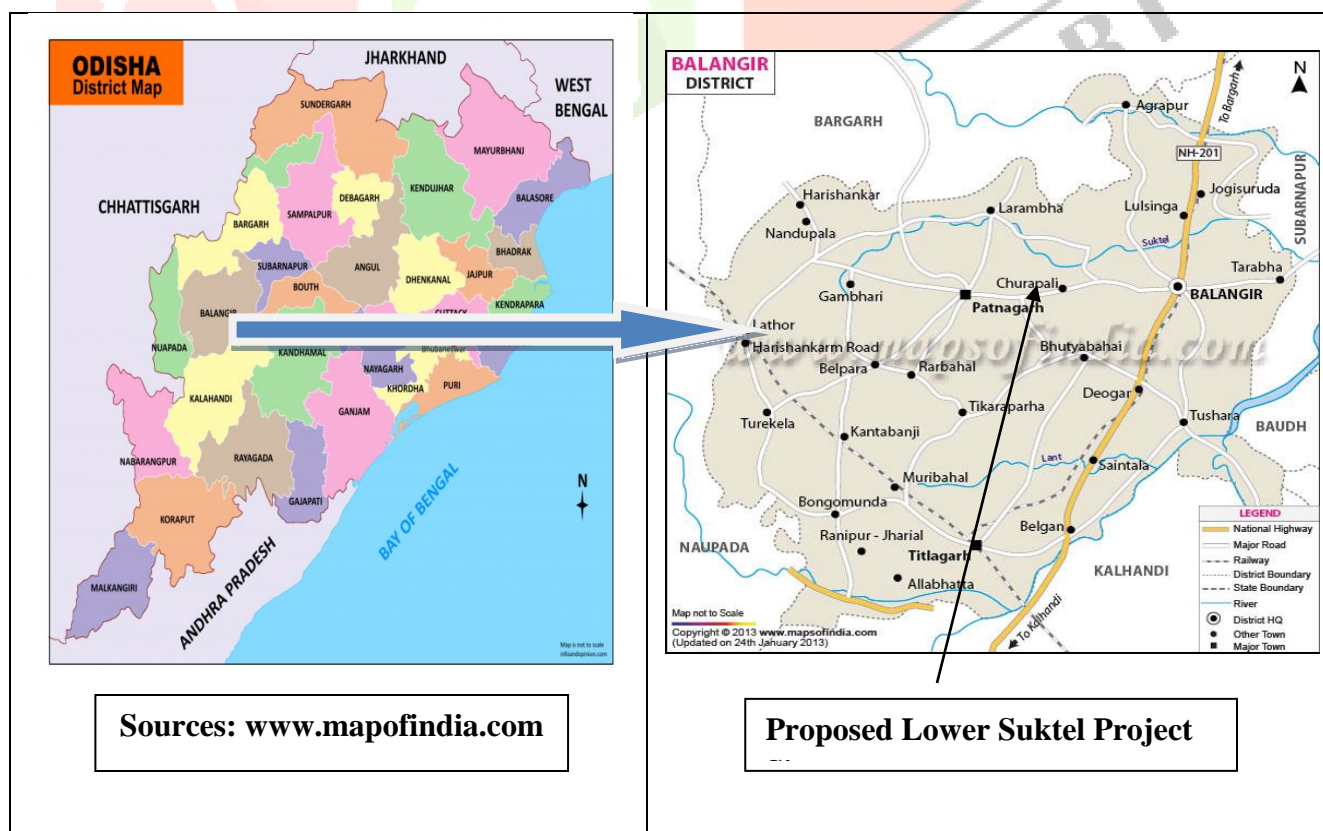
## Lower Suktel dam: It's History

The Lower Suktel dam is built across the river Tel and tributary river Mahanadi, Odisha, about 22 km from Bolangir in the state of odisha in India. The foundation stone of Lower Suktel dam was laid by Sri Naveen Patnaik Chief Minister of Odisha on November 24, 2001. The main purpose of the dam was irrigation and domestic water supply. The Project includes Construction of a 1410 m long and 30m. High stuff Dam with a spillway of 177 m. long to be set centrally across the water course Suktel. There are two main Canals, Right main canal kicking off from right dyke having a length of twenty three.84 km. & the left main canal kicking off from earth dam having a length of ten.76 km as well as the length of 2 of distributaries of regarding thirty five kms. The full command space of the Project is 31830 hector in 189 villages in Bolangir & Sonepur District. On completion, the project can irrigate 29841 hector in Bolangir district spreading over 177 villages of Sonepur district in twelve villages. Further this project can provide twenty Cusecs of drinking water to Bolangir town.

## Location of the project

The proposed irrigation dam will be set up between the Jhareidungri hill and Budalagen hill near the village Magurbeda around 22 km form bolangir town. It has been assessed that 29,146 hectares of land in Bolangir district and 2,684 hectares of land in Subarnapur district can be brought under irrigation through the Lower Suktel irrigation project. The project site can be located from the given map.

**Figure 1: Map of proposed lower Suktel irrigation project area**



## The Reservoir: Silent feature

<b>HYDROLOGY</b>		
1	Catchment area	1275 sqKm
2	Catchment area intercepted by LSIP	45.0 SqKm
3	Net Catchment area	1230 SqKm
4	Maximum Annual rainfall	1775.21 mm
5	Minimum Annual Rain fall	726.95 mm
6	Mean annual rain fall	1267 mm
7	75% dependable annual rain fall	1094 mm
8	75% dependable annual runoff	21720 mm
<b>PRINCIPAL LEVELS</b>		
1	Top bank Level (T.B.L)	210.00 m
2	Maximum Water Level (M.W.L)	206.00 M
3	Full Reservoir Level (F.R.L)	206.00 m
4	Dead Storage Level (D.S.L)	197.00 m
5	Free Board	4.00 m
6	Deepest Bed Level	179.800 m
<b>RESERVOIR CAPACITY</b>		
1	Gross Storage at FRL	32,028 ham
2	Dead Storage at DSL	5685 ham
3	Live Storage between FRL & DSL	26343 ham
4	Submergence at FRL	197.00 m
5	Forest Land Submerged	4.00 m
6	Deepest Bed Level	179.800 m
<b>FLOOD</b>		
1	Design Flood at Dam site	8540 Cumecs
2	High Flood level	185.28m

Sources: Report on Lower suktel Zonal Office, Bolngir

## People affected by the Dam construction

The main purpose of the Lower Suktel dam was to check drought area. But the construction of dam greatly affected the native of the local people. Nearly 9212 families from 29 villages, as result 4160 families will be displaced including 1222 families belong to schedule tribe (Agnihotri, 2008). Moreover, the villages completely loss their House, land, social network, livelihood, forest etc. Loisinga block of Balangir, with 48% tribal population, which will be affected by the project, is known for its extremely fertile land. The thick forest around the area and through which Suktel river flows is known for rich flora and fauna and is said to be home for wild animals. The fertile land enables people to produce very good quality vegetables such as parwal & brinjal, mahul, mango, jamun, jackfruit etc and crops. People not only in Balangir district but also many other districts in Orissa are benefited by this produce. The area has a massive reserve for Kendu leaf. There will be a loss of at least Rs.10crores due to the felling of trees which will lead to minimal rains ultimately affecting the eco-system of the area. It is not understood how a dam can be built and effectively used for irrigation on a river which is already not heavy flowing and without rain, it will be a dry river.

**Affected Area and Villages:**

The information about reservoir, the project covering an area of 5,216 hectares would submerge 16 villages fully and 13 partially

Sl.No	Village	Area	Sl.No	Village	Area
1	Paradhiapali	279.48	16	Bijapati	272.06
2	Koindapali	496.23	17	Saragadapali	18.12
3	Khuntapali	938.38	18	Kumiapali	600.95
4	Kokhal	254.42	19	Tusurabahal	128.28
5	Kutensilet	143.09	20	Tabalbanji	15.17
6	Chudapali	525.47	21	Kapilbahal	539.39
7	Barapita	140.74	22	Uchhalbahal	146.22
8	Kankara	410.25	23	Bundimuhan	329.58
9	Dhulusar	392.3	24	Banchhorpali	646.07
10	Brapudugia	269.36	25	Budabahal	113.49
11	Santelenpali	247.16	26	Dunguripali	722.99
12	Pudhmund	197.86	27	Bhatapali	92.81
13	Garjan	331.00	28	Dumerpita	110.07
14	Badtelenpali	421.	29	Antapali	503.67
15	Khagasabahal	438		Total	9723.95

Sources: Lower Suktel Office, Bolangir, 2017

**Table 2.** Household's Characteristics in the Sample Villages

Variable	Frequency	Percentage
Distribution of sample households by cast category		
Schedule Group	151	50.3
Non-Schedule group	149	49.7
Total	300	100
Distribution by gender group (for total person)		
Male	728	51.63
Female	682	48.36
total	1410	100
Distribution of sample age group (for total person)		
0-15	97	6.87
16-35	351	24.89
36-60	782	55.46
above 60	180	12.76
Total	1410	100
Family size of the households		
1-3	50	16.7
4-5	163	54.3
7-9	87	29
Total	300	100
Distribution of sample by level of education		
illiterate	138	9.78



Infant	80	5.81
primary	668	47.37
high school	390	27.65
graduation and above	94	6.66
Others	40	2.83
Total	1410	100
Occupation of the respondents		
Agriculture & Farm Labour	249	83.7
services, Business and non farm	51	16.3
Total	300	100
Landholding		
Noland	110	36.7
0-2 acr	113	37.7
2-5 acr	33	11.4
above 5 acr	44	14.7
Total	300	100
Distribution of sample households by range of annual income		
Up to 50000	196	65.3
50000-100000	73	24.3
100000-150000	22	7.3
150000 & above	9	3
Total	300	100

(Source: Author Calculation)

Socio-economic and demographic characteristics of the sample households are presented in Table 2. It is found that a majority of the sample households are from schedule group (50.7 per cent) followed by the Non- scheduled castes (49.3 per cent). On the basis of genders male were 51.63 per cent and female were 48.36 per cent of the total population of respondents which is 1410. While a significant proportion of the respondents are in the age-group of 36–60 (55.46 per cent) which is large section of the population, and which is followed by the age group 16-35 (24.89 per cent), infant age by 0-15 (6.87 per cent) and 12.76 per cent are comes under old age. While about 9.78 percent of people were illiterate, around 47.37 per cent of them have education up to primary, 27.65 per cent, high school and only 6.6 per cent were graduation and above and only 2.83 per cent have technical education. In case of family size, 16.7 per cent are small family, 54.3 per cent are having medium sized family and 29.0 per cent are of larger size family.

It is also found that more than 83 per cent of population directly or indirectly depends on agriculture and that is their main occupation, and only 16 per cent people are engaged in other activities. (Service, business and non-farming). More than 65 per cent of the sample households have their income below 50,000 per annum.

## Impact of displacement

- **Impact on land:** Lower suktel dam occupies 13097.78 acr of land area (29 villages), forest land 1440acr and govt. land 3359.63 acr land, out of this land, the 2 mouzas of Bolangir Block and loisinga block. 16 villages have been submerged totally under water and 13 villages are partially submerged. Most of the people of that mouzas who lost the major share of the fertile agricultural land for construction of the reservoir, were the tribal under the category of Scheduled Tribe and people under the category Scheduled Caste, The landless person who is completely dependent upon the production from land became migrant laboures (Cernea, 1997. Mohanty, 2011 )
- **Impact on economy;** The area under study has experienced a number of economic losses due to the construction of the Dam, some of these economic losses are direct and some are indirect. Direct economic losses are much related with the construction period of the dam, such as acquisition of land, forests, ponds, household etc. which they had to handover to the dam building authority. Indirect losses are mainly the economic losses due to the scarcity of water, clearance of forest, reclamation of land and a long term effect on the economy related to crop production. The economic loses thus may be explained with the consideration of loss of land, loss of forest,
- **Impact of Common property Resources (CPRs):** CPRs (forested lands, pastures, water bodies, Grazing land, burial grounds, quarries, etc.) play an important role in the poor people and fulfill their livelihoods.(Cernea 2000) However CPRs are affected by displacement people, which are not compensated by the government. Most of the family does not have land or any property but they were highly depending on CPR to sustain their life. However after displacement it is very difficult to maintain their life especially women condition became painful and making food, folder, shelter and caring their children. (Koenig,2000. Dharmadhikary2001, Fernandes 2009)
- **Impact of ecology:** Large number of construction dams changes the nature of with negative impact of ecosystem, biodiversity, food web, temperature, food production etc. (McCartney 2009) are directly affected and also large number of Birds, Mammals, Fishes, species or aquatic impact of large dams, and also impact of forest, loss of flora and Fauna, land degradation, impact water etc (Bisht.2011). The irrigation dam is the causes of boost chemical agriculture, salinity, and people are facing directly ecological problems. The impact of environment should adopt the strategy ‘reconstructive adaptive’ for better condition of the project ( Bottero 2013).
- **Impact of social infrastructure:** land used for infrastructure development project and force displacement tears apart the social fabric of the oustrees, social system break down (Cernea, 2000. Mohanty,2011) the impact of social network associated with large dams with school, college, hospital, post office, police station, community center, public place, religious place, drainage system, street light, roads were directly affected to the people at large.

- **Impact of health:** Development of large water bodies result in the spread of water bodies' diseases like malaria, typhoid fever, diarrhea, polio, skin diseases. (Joshi,1982 Guha 2006 **Lerer and Scudder 1999**). Water bore diseases (Diarrheal, Cholera, typhoid, dysentery and serious illness) and vector born diseases (malaria, Dengue fever, west Nile virus, Lyme diseases etc.) etc. large dam also impact of animal health, pollution and vector-borne diseases to agriculture. Most of the household living nearby to reservoir sites and access to river water or muddy water and poor status etc. in the reservoir site increase the sexually transmitted disease and HIV. However health condition of displace people too problematic. To improve the health status of affected people there should be increase the household treatment. Improve infrastructure, and also provided rehabilitation and resettlement ( Lerer & Scudder 1999)
- **Impact of Harassment:** When a development projects start or during the construction period of developmental projects whether it is successfully settle for the several year. Harassment is a common phenomenon, such problems blended with developmental projects. Administrative harassment regarding compensation payment is very common in the project area. People reported they are harassed from the time of survey of asset to compensation payment. As a result people became stress and strain in both mind and body to great extent (Sahoo & Sahu 2013, Ghosh, et.al.2018).

### Conclusion and policy Implication

The primary objective of the Dam was irrigation and Domestic water supply. But the benefit does not receive the sacrifice person who loses their land, home, livelihoods etc. Land is one of the limited resources and it needs for the best possible use. The construction of an irrigation dam project requires huge amount of land for setting up the project. the owner of the land only getting compensation which is very low. There are various problems facing to the affected person, among the different problems, valuation of asset is unaccepted by the affected families and there is a need for revaluation of assets at the present price. Besides this, the cost of loosing ancestral land cannot be compensated through monetary compensation. The only solution for this problem is land for land compensation programme. Moreover, through the establishment of irrigation project; the livelihood sources of established people will be affected. In such a point, it is necessary to find an alternative livelihood programmes to solve the problem. One of the possible ways to solve such a problem is to replacing large irrigation dam project with check dams, which will check the huge loss of land resource as well as sustain the ecology.

Rehabilitation and resettlement by the government should be made after providing necessary facilities such as livelihood options, education, health and sanitation in the resettlement area. It is not only end with providing basic facilities rather the most important task is to giving them full phased ample opportunities to reconstruct their livelihood source through various employment and self employment training programme. Since they are staying in the present place with a certain standard of living, necessary step should be

undertaken by government so that at least they stay at the same level or improve after displacement. Though it may not be possible to provide all affected families with job benefits in the ongoing project, necessary steps should be taken to provide employment opportunities to the displaced families or local people participation under any of the government programmes needed.

### Policy suggestion

- .To improves food security and livelihoods status among the affected peoples.
- Government and non-governmental organizations should convince the IDP households to move to the nearby safer places and should work to provide basic amenities such as schools, hospitals, communication, and safe drinking water.
- Government and other agencies should work on IDP households, as possible disastrous impacts of floods and other natural calamities and make them aware of resilient mechanisms of thwarting food insecurity.
- To identified the displace people and proper resettlement as soon as possible.
- To provide basic facilities to affected people.
- Proper medical facilities and sanitation.
- The displaced and affected person has right treated with dignity.
- All affected and displace person have right to treated without any discrimination on the basic of rescue, relief and rehabilitation.
- All displace persons, in particular displaced children, have right to education.
- All displace persons have right to adequate standard of living without discrimination
- Here should be a mechanism to ensure equitable sharing of project benefits with the displace people.
- To special treatment for children, women, elder and disable person
- All affected person have right to information about their missing relatives, friends etc.

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