Tribal Displacement and Environmental Lose Involved in Balimela Dam Project of Odisha

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Abstract: **When a big dam project comes to an existence in the hilly and tribal areas, by the decision making mechanism, its victims will naturally be a large number of tribals. The great problem while constructing a dam is the submergence caused by the reservoir. Being long neglected, uneducated and poor, they cannot raise their voice against the authorities. Protesting against big dams from different corners has a long history in India and abroad. The present study describes about Balimela Dam Project which has submerged a vast deciduous forest terrains including tribal settlements in the border areas of Odisha and Andhra Pradesh. Environmental-economics relating to of a large dam project is the basic insight of the paper.**

Keywords: World Commission on Dams, Environmental Degradation, Massive Displacement, Decision Making Process, Dam Impoundment Area, Multi Purpose Project, Biodiversity Depletion, Tribal Movements and Unrests, Indigenous and Vulnerable People, Environmental Economics.

1. Introduction

National development strategies are framed and based mostly on the western ideas of modernization. Constructions of Large Dam Projects are thought to be leading to development in a large scale. Now, large dam projects stand as a dogmatic symbol of development. Some selected countries in the world are investing heavily in constructing dams with the main objective of achieving economic development. The top five leading dam building nations today account for nearly 80% of large dams worldwide. Again half of the world's total large dams are found in China and are 23000 in numbers. The other four leading dam building countries include USA with over 6300, India with 4000, Japan and Spain with 1200 and 1000 respectively (Nayak, 2010). As per estimation, a total number of 1700 large dam projects have been under construction, out of them 40% are built in India (World Commission on Dams, 2000). It is stated that, nearly 5000 large dams of the world were built during the period from 1970s to 1975s.

Construction of Large dams is, now-a-days, facing big challenges or protests from various quarters on the plea of environmental degradation and massive displacement. Movements against big dams are growing united with campaigns waged by various environmentalists, Non-Government Organizations (NGOs), movement by affected indigenous people and human right activists. They mostly pressurize the government to withdraw such projects.

Establishment of big dams may be appraised in the context of the broad spectrum of the relevant state policies: i.e., the energy policy, irrigation policy, flood control strategy, forest policy, tribal development policy and so on. Once a project is decided to be established, by the decision making process, all the resultant impacts on account of its implementation need to be identified. The major question which needs to be answered is; "who will be the real gainers and who will be the losers?" Such type of study would like to focus on local employment situation, traffic problem, utilization of local resources, and effects on environment and landscape, and issues relating to displacement, etc.

2. Objectives

The present study is based on the following three important objectives:

- To know the problems observed in large dam reservoir impoundment area including its effect on environment,
- To verify the analytical framework of large dam projects with the movements by tribal communities against major dam projects in India.
- To know the type and nature of loses which are involved in Balimela Dam Project in the remote tribal area of Malkangiri district of Odisha.

Most of the Europian countries, the U.S.A. and Canada had already exploited most of the economical sites for dam construction in their countries. For developing countries, dam projects are often the largest on going public investment project which is considered as a symbol of national development and pride and modern achievement. In these countries it involves un-sustainability in agriculture, forest and other sectors. The insight of the study contains the past experience of a Large Dam Project called Balimela Dam Project in Malkangiri district of Odisha. Most of the consequences of the project are applied. In this context the core of the problem of study hovers around this proposition.

3. Statement of problem observed in large dam reservoir impoundment area

Generally, dam projects have different positive and negative dimensions. The positive effects are related to water supply, generation of hydro- electricity, prevention of flood damage, fishery, navigation and recreation etc. Major Socio economic costs

are displacement, valuable land loss, forest loss, environmental degradation and biodiversity depletion etc. Big dams usually cause big damages in terms of lose of human settlements, resources, forests, wild life and wilderness etc. The most important element of nature is the forest which caters to the basic requirements of fire wood, food, fodder, medicine, wood for building and raw materials etc. Big river valley projects generally have the effects on climate change and an increase in the fragility of natural eco-system, soil erosion, and air and water pollution. Ecological impacts are associated with the river basin development on aquatic life including fish, aquatic plants and organisms that transmit human diseases. Scientific and recreational values of resources may be lost in the process of river basin development (Bhatt 1987). Reservoirs devastate unique natural areas, existing potential parks, wild life reserves and important historical and archaeological sites. It also destroys natural features of free flowing rivers, waterfalls, canyons and rare plant communities permanently. Many reservoirs flooded out numbers of people, their ancestral homes and forced them to resettle in poor and environmentally different sites which have disrupted their social fabrics, (Dasmann et al, 1973).

Several problems which have come up due to large dam project, can broadly be divided into four categories, i.e. environment and resource problems, social and human problems, production problems and management and administrative problems. The table-1 indicates the problems generally observed in large dam reservoir impoundment areas.

Table 1 : Problems observed in reservoir impoundment areas

Sl. No.	Types of problems	Particulars of Problems
1.	Environmental and resources problems	• Lands available for upland resettlement are less productive than reverie and flood plain area. If soil management is not adequate, decline in fertility and soil erosion may occur. • Resettlement sites, often productive forest lands are converted to less productive agricultural uses. • Resettlement in steep catchments leads to deforestation. • Resettlement areas become a new diseased environment.
2.	Social and human problems	• Resettlement population is in competition with previously established population who are usually shifting agriculturists. • Families extended and broken up cause problems of new land tenure and ownership. • Dietary shift, resulting from consumption of new food crops, cause possible imbalance, leading to malnutrition. • Resettlement demands multiple socio-cultural and economic adjustments. • General disruption of human ecology and man/land relationship.
3.	Production problems	• Settlers unfamiliar with production techniques for new crops in different climatic and social conditions. • In uplands, production technology adopted in flood plain farming is unsuitable.
4.	Management and administrative problems	• Pre settlement surveys are inadequate. • Studies made, but no follow-up action is taken. • Inadequate notification and orientation of affected population. • Inadequate compensation to families evacuated but not resettled.

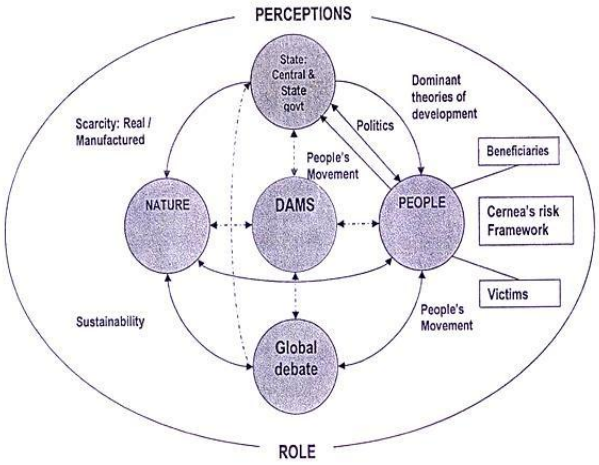
Source: Dasmann, et al, 1973

4. Overview of large dam projects

Most of the European countries, the U.S.A. and Canada had already controlled the activities of dam construction in their countries. The peak period of dam construction stated between 1950 to 1970. There is a slowdown of dam construction from 1980 onwards in the world. For third world countries like India, dam projects are considered as a symbol of national development. The then prime Minister, Jawaharlal Nehuru once said, "Dam projects are the temple of development". The attitude of people has changed with passage of time. Such projects are opposed in many places for one reason or other.

The perception of development is based on the improvement of environment and development of society. Different theoretical propositions help us to know about perceptions which differ and lead to diverse discourses. Various schools have different theories and thoughts which helps us to highlight the issues and challenges about the emerging large dam projects. A schematic presentation of the analytical framework of large dam projects is essential to construct. Singh (2004) has rightly given a systematic framework of large dam project which shows under (fig-1).

Fig-1 : Analytical framework of large dam



Source: Singh , 2004

5. Tribal Movements of Large Dam Projects in India

Anti-dam movements have a long history. These have started since long time. Earlier, the campaigns were basically concerned with the protection of river basins, cultivable land, tropical forests and conservation of biodiversity. But recently such campaigns are made against large-scale involuntary displacements. In addition to these, the increasing research outputs through publications against large dams and opposition of activists across the world, enhance and strengthen the movements widely in third world countries like India. Table-2 below gives a list of establishment of major dam projects and associate movements by activists in India.

Table-2 Movements by tribal communities in major Dam projects in India

Sl. No	Name of the project	Name of river	State	Year of commencement	Movements of activists
1	2	3	4	5	6
1	Mulsi Dam	Mulsi	Maharastra (Bombay Presidents)	1927	Malva men, women, children
2	Salient Valley	Narmada	Kerala	1980	IUCN, WWP Local people
3	Bhopalpattnam	Godavari & Indravati	Andhra Pradesh, Maharastra, Madhya Pradesh , Odisha	1982	IUCN, WWP Local people
4	Lechhapalie	Godavari & Indravati	Andhra Pradesh & Maharastra	1983	IUCN, WWP Local people
5	Bodhaghat	Godabari	Madhya Pradesh	1983	IUCN, WWP Local people
6	Mega Soudar Sarovar Project	Narmada	Gujurat	1988	Medha Patkor & Local people
7	Rothaag Chu Project		Sikim	1997	Local People
8	Koelkaro	Koel	Bihar	1998	Local & Other People
9	Hirakud	Maharadi	Odisha	1948	Budhuram dube & supports
10	Polavaram	Godavari	Andra Pradesh	2010	1. Tudumdebba 2. AVSP (CPIM (M)) 3. GVSP 4. CPI
11	Tawa Dam	Narmada	Madhya Pradesh	1988	Aunupam Mishra & Supports Mitti Banchao Andolam

(Source: EPW, 2010 and CSE 1987, IEA 2009)

Large Dams are the structure that regulate, store and divert water from rivers with a height exceeding 15 meters defined by International Commission On Large Dams (ICOLD). The table-3 depicts the displacement of tribal people in comparison to total population in various major dam projects in India.

Table-3: Displacement of tribal people of major dam projects in India

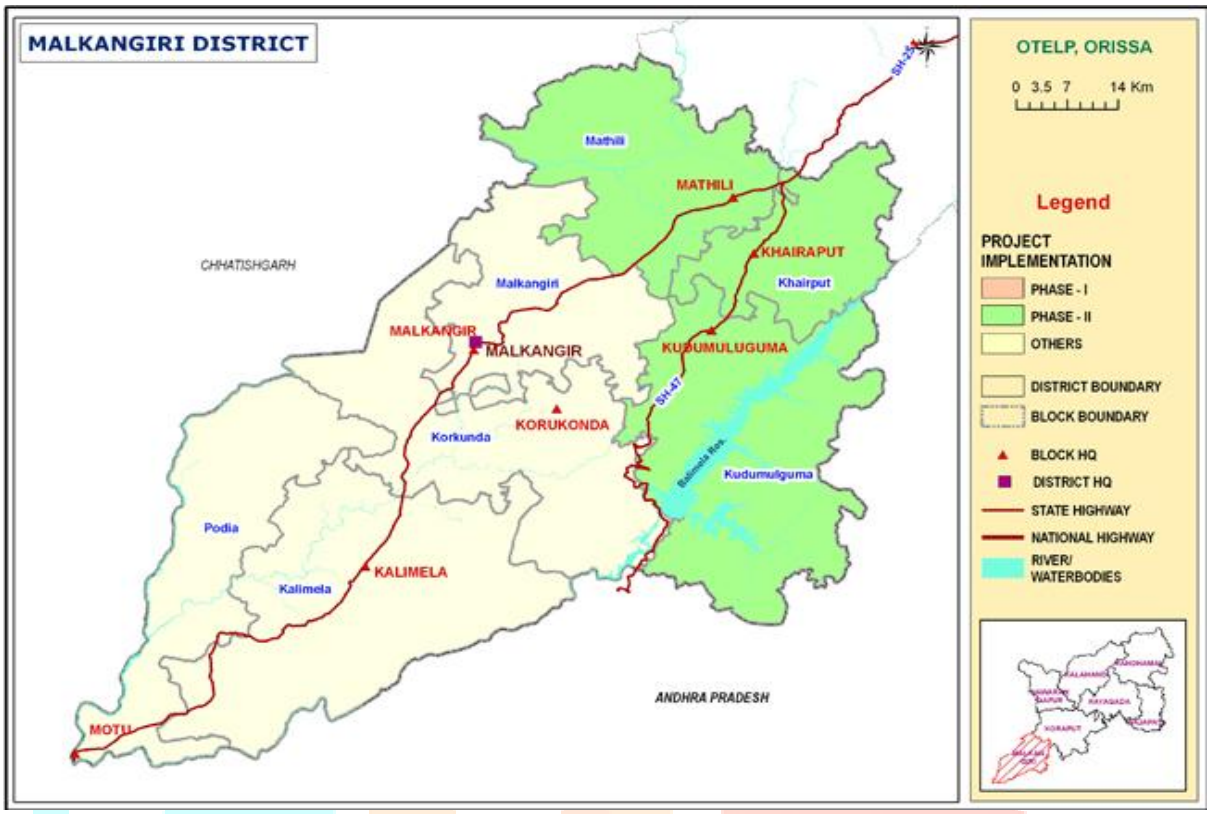
Sl. No	Name of the Project	State	Displaced Population	% of displaced tribal population
1	2	3	4	5
1	Bhakra Nagal	Himachal Pradesh	36000	31.00
2	Bodhghat	Madhya Pradesh	12700	73.91
3	Chandil	Bihar	37600	87.92
4	Daman Ganga	Gujurat	8700	48.70
5	Icha	Bihar	30800	80
6	Inchampalli	Andhra Pradesh & Maharastra	38100	76.28
7	Karjan	Gujurat	11600	100
8	Koel Karo	Bihar	66000	88
9	Mahi Bajaj Sagar	Rajasthan	38400	76.28
10	Maheswar	Madhya Pradesh	20000	57.6
11	Polavaram	Andhra Pradesh	50000	52.90
12	Pong	Himachal Pradesh	80000	56.25
13	Sardar Sorovar	Gujurat	200000	57.6
14	Tulthli	Maharastra	13600	51.61
15	Upper Indravati	Odisha	18500	89.20
16	Hirakund	Odisha	100000 (app)	76.21
17	Balimela Dam Project	Odisha	15800	87.5

(Source: TSJ COATS 2014, EPW 2010)

6. The study of the region

Malkangiri District occurs between 17^0 45' to 18^0 22' North Latitude and 81^o '26' to 82^0 23' East Latitude. It is the Southernmost District of Odisha. The District covers an area of 6190 Sq. Kms. which is 3.92 percent of the State. The District is bounded by Koraput District of Odisha in North, Baster District of Chhatisgarh to West, Khammam and East Godavari District of Andhra Pradesh to South and Vishakhapatam (Map-1). As human settlement, Malkangiri is said to be existing since 25 thousand years ago. The tribal concentration is 57.54 percent in District. The average annual rainfall in the District is 1385mm (ITDA, Malkangiri). The district has a sub-tropical climate with hot and dry summer and pleasant winter. The South-West monsoon is the pleasant source but rainfall is uncertain and erratic. There are 932 villages and 213 MV and MPV hamlets in the District. Since 1961 tom 1991 the sub division (Declared as District on 2^{nd} October 1992) was practiced primitive method of cultivation. Only, 31000 he. of land was cultivated with dry farming and with single crop. The economy of the region was backward and primitive with least development. About 91.8 % of the total population in the district lives in rural areas and 8.2 % of population resides urban centres.

Map-1: Map of Malkangiri district with Balimela dam reservoir



The river Sabari and the River Sileru are joining at the mugi point at Motu in the border area of of Odish, Chhatisgargh and Andhra Pradesh and are considered as two main tributaries and formed as China Godabari. The joining of these two rivers makes a triangle like delta structure at Motu of Odisha.

6.1 Geographical Barriers in the region

Malkangiri district has much diversity in the ground of geographical area, people and forest. The district distinct from dense forest terrains, far flung cut-off area of Balimela dam reservoir and the monotony of life. In the up-land and hills, shifting (Podu) cultivation is ongoing and people adopt the practice of mixed cropping. The district is a plateau of 500 feet from Mean Sea Level (MSL). It is a comparatively a flat and plain area but a number of rocky wooded hills and some of them rising to a considerable height which break the monotony of plain.

Table-4: Remote and Challenging Areas in the District

SI. NO.	Name of the Block	Gram Panchayat	Geographical Barrier	Mode of Transportation	Distance from the district headquarters(Kms)
1	2	3	4	5	6
1	Kalimela	Poplur & Kurmanur	Hilltop Habitation	Metal hill slops	55
2.	Kairiput	Andrahal Mudulipada Baddural Mapond	Hilly pocket	Hilltop Bonda Habitat,Metal Road	52
3	Kudumuluguma	Badapada Jodaamba Panasput Papermetla Andrapally	Balimela Reservoir Cut-off Area	Lunch	80

Source : Dandakaranya report, 1998

The District is peculiar for hilltop habitations, hilly populated pockets, reservoir cut-off areas with lunch communication and footways to different part of the Block like Kalimela, Khairiput and Kudumuluguma in the District (Table-4).

The District is bounded by high mountain ranges and hill slopes in all the sides. The catchment area of two major rivers i.e. Sabari and Sileru (Tributary of Godavari). The topography of the District points out that the high land in the district is 69,500 ha. Incorporating of 23100 he. low land (Table-5). The District is occupied a higher percentage of high-up land which is an obstacle of economic growth.

Table-5: Different land topography in the district

SI. NO.	Types of Land	Land (in Hect.)
1	2	3
1	High-up land	69500
2	Medium land	35600
3	Low land	23100
Total		128200

Source: DAO, Malkangiri

6.2 Dandakaranya Project and High Population concentration in the District

When India achieved its liberation from British colonial occupation 'Two Nations Theory' was emerged. The Hindu people residing in the land of East Pakistan (Bngladesh) moved to India as refugees. The refugee People were rehabilitated and resettled in India in three phases. People were settled at West Bengal State and in second phase some of them were sent to take home at Assam and Tripura. In the third phase some of them were decided to send Madhya Pradesh (now in Chhatisgargh) and Odisha. The Dandakaranya Project (DNK) was envisaged on 12th September 1958.The Project was set up after the recommended by a High Power Committee known as AMPO committee with its headquarters located at Koraput of Odisha (hhts//www.revolvy.com). In 1962 the East Bengali People were brought to Malkangiri by the Central Government with the cooperation of State Government in a special rehabilitation and settlement package known as Dandakaranya Project (DNK).

According to 1971 Census, the total population of Malkangiri was 2.69 lakhs where in 1961 the population was 1.42 lakhs. Thus, there was a net increase of 1.27 lakhs population in that decades with a growth rate of 89% after the influx of East Bengal Refugees who settled in this area by Dandakaranya Development Authority. Other reasons of this growth of population are the opening of Governments Developmental Programmes and Policies. The steep fall in the death rate are due to effective control of epidemic like,Malaria, T.B, Cholera, Dysentry, and other similar diseases. There has been a control of malnutrition through different measures by different sectors. The villages settled in the area are called as MV (Malkangiri Village) and MPV (Malkangiri Potteru Village).

6.3 Tribal Concentration

The Adivasis, original inhabitant of the land, were never considered as an integrated part of the mainstream population from the beginning of the Indian planning process. The district covers hilly forest terrains, which is the homeland of ten ethnic tribes namely, Bonda, Koya, Paraja, Dharua or Durua, Matia, Bhumia, Kondha, Gadaba, Kalwa and Didayi. Other three communities like Rana, Mali and Gauda are not scheduled as tribals in the Government records. Some tribal communities living in Malkangiri also occur in other areas of Orissa. However, Bonda, Koya, Halwa, Durua and Didayi are not seen in other district of the state. Among the tribal communities of the district, Bonda and Didayi are two primitive tribes. The state of occurance of the tribals and the main agricultural crops raised by them are given in table-6.

Table-6 : Different Tribes in Malkangiri

Sl. No.	Name of the tribe	Areas of occurrence within the district	Areas of occurrence outside the district in Orissa	Main agricultural crop raised by the tribe
1	2	3	4	5
1.	Bonda	Khairput	--	Maize, suara, paddy
2.	Koya	Kalimela, Malkagiri, Podia, Korkunda	--	Maize, Ragi, Paddy
3.	Bhumiya	Mathili & Kudumulugumma	Koraput, Phulbani, Ganjam, Sundargarh	Paddy,maze,Ragi
4.	Paraja	Kudumulugumma, Korkunda	Kalahandi, Koraput, Sundargada, Dehenkanal, Puri, Cuttack, Phulbani	Paddy, wheat, Maize, Groundnut, etc.
5.	Kondha	Kudumulgumma, Korkunda	Koraput, Phulbani	Paddy,Ragi, Maize, Kendu
6.	Gadaba	Kudumulguma	Koraput, Kalahandi, Sundargarh, Ganjam, Baudh	Paddy, Ragi, Suan
7.	Matia	Kudumuluguma, Khairput	Dhenkanal, Balangiri, Kalahandi	Maize, Suan, Tobacco, Vegetable

Source : Malkangiri Itihas (Sahu 1998)

7. Nature and extent of lose due to Balimela dam project

The Balimela Multipurpose Dam Project is a joint venture of the Government of Odisha and Government of Andhra Pradesh with the inter-state agreement signed by both the Government on dated 04.09.1962. The location of the dam is in a latitude of 18-9'N and a longitude of 82-7'E. The dam is surrounded by high hill with dense forest terrain. The main feature of the project was construction of an earth dam, three dykes and spillway with ten numbers of gates across the Machkund river in Malkangiri district of Odisha.

7.1 Type and Nature

The Balimela Dam is an earth dam of 1821m length. The maximum height of the dam fom its deepest foundation is 70m, but the maximum height of dam is 68.58m. The total length of dam and dykes are 4442.24m.

Table-7 shows that the reservoir of Balimela Dam submerged 17496 Ha or 43233 acre of land in Odisha and 648 Ha or 1601 acre of land in Andhra Pradesh. Nearly 2000 families were affected by the dam. Out of 80 affected villages of Odisha, 58 villages were affected partly or completely and another 22 villages were facilitated some communication.

Table -7: Area Submerged due to Balimela Dam Project

Sl. No	State	Land lost in Acres	No. of Villages affected	% to total
1	**2**	**3**	**4**	**5**
1	Orissa	43233	80	96.42
2	Andhra Pradesh	1601	11	3.58
	Total	**44834**	**91**	**100**

(Source:Mishra,2002,p.87.)

The total land lost due to Balimela Dam Reservoir is 42438 acre out of which 29,988 acre of land belongs to the Government and 12450 acres of land is private land.

Table -8 shows the types of government land lost due to the submergence under the Balimela Dam Project.It shows that the area of forest lost is 10,432 acre, which is the highest land lost among other categories of government land.

Table-8: Government land lost due to the project

1	2	3	4
1	Forest Blocks	10,432	34.79
2	Village Forest	10,151	33.85
3	Nala, Jholla	2359	7.87
4	Stoney Ground	135	0.45
5	River	2536	8.46
6	Hills	3788	12.63
7	Village Road	159	0.53
8	Village Sides	40	0.13
9	Fallow Land	297	0.99
10	Burial Ground	89	0.30
	Total	**29986**	**100**

(Source : Mishra,2002,p.87)

Table-9 represents the type of private land lost due to the submergence of Balimela Dam Reservoir. The loss is shown only to Odisha State. The total private land lost due to the submergence is 12452 acre. The paddy land, lost by the submergence is 750 acre, where homestead and temple land lost is 30 acre. It is seen that the land lost due to the submergence come down in summer season.

Table -9 Private land lost due to submergence of Balimela Dam Project

Sl. No	Type of Land Lost	Land Lost (In acres)	% from total
1	**2**	**3**	**4**
1	Paddy Land	750	6.02
2	Home stead and temple	30	0.25
3	Dry Land	9670	77.66
4	Other Land	2002	16.07
		12452	**100**

(Source: Mishra,2002,p.87)

8. **Potential of Hydro-Electric Power Projects**

The water of Machhakund,Duduma and Gurupriya have been harnessed for hydro-electric generation in Balimela reservoir. The river of Machhankund and Sileru harnessed for power generations in its path for many years. The proposed Polavaram Dam Project will be the highest hydro power generating station in the Godavari catchment area which depend on the water contribution of Machhakund,Sabari and Sileru rivers A list of Channels of Hydroelectric power Stations of Machhakund-Sileru Catchment area has indicated (Table-10).

Table-10: List of Hydropower projects in Machhakund-Sileru basin

SI. No.	Name of The Project	State	Power generation (in MW)
1	2	3	4
1	Upper Indravati	Odisha	600
2	Machhakund	AP	360
3	Balimela	Odisha	360
4	Upper Seleru	AP	240
5	Lower Seleru	AP	540
6	Upper kolab	Odisha	240
7	Pench		160
8	Ghat Ghar pumped Storage		250
9	Polavaram (under construction)	AP	960

Source: httas//Wikipedia.org

9. Conclusion

Environmental-Economics is the relationship between environment and economic system. Dam projects have different positive and negative dimensions. The positive effects are related to water supply, generation of hydro- electricity, prevention of flood damage, fishery, navigation and recreation etc. Major Socio economic costs are displacement, valuable land loss, forest loss, environmental degradation and biodiversity depletion etc. Big dams usually cause big damages in terms of loss of human settlements, resources, forests, wild life and wilderness area etc. The most important element of nature is the forest which caters the need on the basic of fire wood, food, fodder, medicine, wood for building and raw materials etc. Big river valley projects generally have the effects on climate change and an increase in the fragility of natural eco-system, soil erosion, and air and water pollution. Ecological impacts are associated with the river basin development on aquatic life including fish, aquatic plants and organisms that transmit human diseases. Scientific and recreational values of resources may be lost in the process of river basin development (Bhatt 1987). Reservoirs devastate unique natural areas, existing potential parks, wild life reserves and important historical and archaeological sites. It also destroys natural features of free flowing rivers, waterfalls, canyons and rare plant communities permanently. Investment in mega projects environmental protection is normally less prominent (Dasgupta and Pearce, 1972. Little and Mirrules, 1974). The valuations of environment costs are untouched.

According to the estimate 15% or more then tribal population have been displaced or affected by development projects. The uprooting of the tribal people from their homes and habitat for building dam has been one of the shocking scandals of post-independence India. Providing monetary compensation has not been much use. It was not adequate. The tribal people who have given lump sum amounts of money could not use it properly. They were nothing in a short period of time. The rehabilitation projects were flawed as the tribal people put in area which had no similarity with the habitat they were used to. They were even given to rocky or barren land. Displacement has meant that the evacuated tribal people are driven to take up back breaking jobs in the unorganized sector.

In the decision making, when a project come to an existence an big assurance will be committed by the Public authority not towards its minimization displacement but also to provide adequate rehabilitation scheme at its initial plan formulation stage. After evacuation of the project affected people in the site, experience shows that there will be a long gap between the words and the work. The Hirakud dam commenced on 1964 (Nayak-2010) will be completely failed not only its development policy but also rehabilitation policy. People till today are not received any compensation towards displacement. In case of Balimela dam Project, commenced in 1961, survey conducted in the cut-off area proved that people still today have not received compensation and rehabilitation rather they lived in far from the human civilization with facing great difficulties by losing their ancestral homes. The past experience shows that the actual gap between works and words are prevailing in all the multipurpose dam projects. It ignores the cultural, social, economic and religious life of the tribal people.

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