

## ***Impact of Koldam Hydropower Project on Occupational Pattern, Income and Residential Facilities of Project Affected Population***

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*Himachal Pradesh with abundance natural water resources has a vast potential of hydro power generation. The hydro power development is the key engine of economic growth of the state and is significantly contributing in the economy of the state in terms of revenue generation, employment opportunities and enhancing the quality of life. Himachal Pradesh is located in the north of the country and is a mountainous state. The establishment of the Koldam Hydropower project has affected the life of the people whom land has been acquired. In this paper an attempt has been made to study the impact of Koldam Hydropower project on occupational pattern, Income and residential facilities of project affected population.*

[**Keywords :** Hydropower Occupational pattern, Residential facilities, Project affected population]

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## **1. Introduction**

Energy is most required and important determinant for economic and social development of any country. It was predicted by World Energy Forum that coal, fossil and gas reserves will exhaust in near future, because of increase in demand for energy which further leads to exploitation of natural resources have forced planners and policy makers to look for alternate source of energy. It was found that renewable energy provides best alternate. Renewable energy is energy derived from resources that are regenerative and do not repeat over time.

Hydropower is one of the oldest and largest sources of renewable energy, which uses the natural flow of moving water to generate electricity and this hydro power generation is used by more than 60 countries worldwide, meeting half of their electricity demand. This not only provide clean energy source but also provide thousands of job across the globe. Hydro power energy is generated from water sources like rivers, waterfalls and oceans. Water constantly moves through a global cycle and this movement can be harnessed to generate electricity.

Himachal Pradesh is extremely rich in its hydroelectric resources as it is the home of many Himalayan rivers with enough water having huge potential of hydroelectricity. Around 25 percent of national potential is generated within the state. About 27,436 MW of hydroelectric power can be generated in the state by the construction of various hydroelectric projects on the five perennial river basins. Out of total hydroelectric potential of the state, 10,519 MW is harnessed so far and Himachal Pradesh Government has only 7.6 percent of under control rest is harnessed by central government and some public private organizations. (EIA Report 2016). Hydro power generation is the biggest source of revenue to the Himachal Pradesh Government therefore the State Government has given high priority to the development of hydropower projects.

## **2. Review of Literature and Research Gap**

Bhattarai (2015) focused on the impacts of Hydropower projects in Himalayan Region of Sikkim with special reference to the Dzongu region which focus on demographic and social- economic changes. The study analyzed the demographic and economic change of the state since 1971 to 2011. Eleven villages of Dzongu region had been

taken up for the study. The study pointed out positive as well as adverse impacts of the project. Benefits such as employment have accrued to the rural community from these economic development projects.

Chand et al. (2016) analyzed the environment Impact of Kol Dam hydro power project. The study was conducted during 2011 to investigate the impacts on local people and the overall economy due to the construction of Kol dam project. Five affected villages were selected for the study was Kasol, Harnora and Jamthal of district Bilaspur, Ropa and Kyan of Mandi district and there loss of land holding were taken into account. The article attempted to study the environment as well as economic impact of the project. It was found that the submergence of land resulted in the loss of different trees like fodder, timber, fuel, wood and fruit trees. There was substantial decrease in the livestock population, loss of assets, decrease in on farm sector (crops & livestock). But there was an increase in off farm income (jobs and private business). The study concluded that there might be serious impact on local biodiversity as well as on the life study of project affected families.

Reddy (2016) wrote a book on rehabilitation and resettlement of Tehri-Hydro Power project. The book aimed at exploring the socio-economic assessment of the project affected people of Tehri Hydro power project. There were 125 villages and one Tehri town was affected by the construction of the Tehri project. Out of these, 37 villages were fully submerged. The study found out that the education level of affected persons increased after rehabilitation as the resettlement site were situated in urban areas. There were an increase in employment and income level. The project authorities provided one room flat to the economically weaker landless oustees at free of cost in the rehabilitation area. The book also gave some recommendations like training on technology up gradation and modernization should be provided to strengthen the rural artisans.

Slariya (2020) Chamera series of Projects (Chamera-I, II, III) are the major projects. These hydropower projects displaced thousands of people and many are still struggling for their identity even after 36 years. Through this paper Slariya being an independent researcher attempted to understand more than three decades journey of NHPC in Ravi basin and the changes brought because of the power projects installed by NHPC, changes in socio-

economic conditions of displaced people of Chamera-I was the main focus of this paper. The paper was based on master level research conducted by the researcher by using exploratory research conducted by the researcher by using exploratory research design and responses had been recorded by using interview schedule and observation methods. This research confirmed that Chamera project has changed the standard of the people to a greater extent in many aspects of their life. This hydropower project positively contributed in the socio-economic development of the respondents. The project also adversely affects the lives of people of the area as many people's committed suicide by jumping into the dam over small family issues in a fit of anger. The study suggested proper fencing/boundary around the project dam area.

Srinivasan and Nathalapati (2020) in their research paper tried to examine the household and other factors that make displaced households vulnerable to different types of risks and help them in confronting these risks successfully. Their study harnessed a large primary data set from 1,070 affected households in four irrigation projects along the Godavari River basin in Andhra Pradesh. The findings showed the loss of land, casualization of labour and loss of livestock assets in the resettlement process. Econometric analysis was also done which suggested that a sense of satisfaction with housing and the time taken for resettlement has a positive effect on household's ability to confront displacement risks, whereas episodes of illness have a negative influence. In their study they also discuss about R&R programme which tailored to include vocational training, assistance for self-employment, strengthening of SHGs and other community-based organizations. In order to overcome displacement risks study suggested for providing full compensation, investment on post-settlement welfare and benefit sharing measures.

### **3. Objectives of the Study**

On the basis of research gap in the study area the specific objectives of this paper are as under :

1. To study the impact of Koldam Hydropower project on occupational pattern of project affected population.
2. To examine the Impact of Koldam hydropower project on income of project affected population.

3. To evaluate the impact of Koldam hydropower project on residential facilities of project affected population.

#### **4. Methodology**

The present study is based on the data collected through primary survey using multistage random sampling. The land acquired for Koldam Hydropower project is spread over in four districts i.e. Bilaspur, Mandi, Shimla and Solan which covered 41 villages, out of which 36 villages have been submerged, project activities are almost completed and five residential colonies for NTPC Ltd. have been constructed in three districts. Among these 41 villages, directly affected by project activities, 1125 families have been directly affected. Out of these families, 482 were displaced from their ancestor villages and resettled at five residential colonies. Three of these colonies at Jamthal, Chamyon and Kasol are in district Bilaspur where as district Shimla and Mandi have one colony each located at Sunni and Kangoo respectively. It is evident that the Most of Project Affected Family (PAF) who have lost their houses, residential and commercial land are now residing in these five Resettlement Colonies and hence data collection have been done in these colonies. These five residential colonies form the primary sampling unit for the study. From these colonies a sample of 125 households is selected keeping in view the size of their earlier farm land holding so that farmers of different size classes are represented in the sample. The data collected has been properly organized and tabulated for interpretation and analysis.

#### **5. Results and Discussion**

##### **5.1 Impact on Occupation Pattern**

Impact of rehabilitation and resettlement action plan of the NTPC Koldam Project authorities on occupational pattern of sampled respondents' families has been analyzed and results are presented in Table-1 on next page. The data regarding occupational pattern in this table reveal that about 31.2 percent households were engaged in employment/service sector before the acquisition of land, a slight increase of 5.1 percent change was calculated in after situation. As the agricultural land of PAFs was acquired for the project, lots of households lost their primary occupation source therefore the no. of households decreased from 72.8 percent to 58.4 percent a negative

change of 19.8 percent. In earlier situation a few households were engaged in business sector but at present the percentage is double of the earlier situation 13.6 percent to 27.2 percent a hundred percent change. A few households were engaged in other works like daily wage labour, carpenter, painter or artisan. The percentage of these households increased from 10.4 to 28.8 percent, a percentage increase of 176.9 percent. Overall it may be concluded that due to the project there has been a shift from agriculture to non-agricultural activities. With loss of traditional source of livelihood, an opportunity like jobs in construction work and need of labour work force a new source of income in the project area leads to a diversification in the occupational pattern is found in after situation.

**Table-1 : Impact on Occupation Pattern of Households**

Occupation	No. of Respondents		Percentage Change
	Before	After	
Employment/service	39 (31.2)	41 (32.8)	5.1
Agriculture	91 (72.8)	73 (58.4)	-19.8
Business	17 (13.6)	34 (27.2)	100
Others	13 (10.4)	36 (28.8)	176.9

**Note :** The figures in parentheses represent percentage.

**Source :** Computed from field survey.

## 5.2 Impact on Income of Households

Impacts of NTPC Kol dam Project on Income & Employment of different categories of households surveyed are shown in Table-2 on next page. Comparison of before and after situations reveal that the average annual income has increased from ₹3,20,155 to ₹5,97,193 with a 86.5 percent change. The share of Service sector in the household's income has increased with average annual income of ₹ 1,82,738 as compared to the before situation i.e. ₹1,08,976 around 0.68 percent change. The share of agriculture in the households has declined at negative change of 29.9 percent from average annual income of ₹75,286 to after situation ₹ 52,733 because of the reduction in the size of their land holdings after acquisition of their agricultural land. In case of those households who started doing their own business or carrying their old business or who were allotted alternative plots for shop, average annual income before the execution of project was

₹1,20,286 which has increased to ₹ 2,86,857 there is 138.5 percent change after the construction of project in that area.

**Table-2 : Impact on Income level of Households**

Income	Average Annual Income (₹)		Percentage Change
	Before	After	
Employment/service	1,08,976	182738	67.6
Agriculture	75286	52733	-29.9
Business	120286	286857	138.5
Others	15607	74865	379.7
Total	320155	597193	86.5

**Note :** The figures in parentheses represent percentage.

**Source :** Computed from field survey.

### 5-3 Impact on Residential Facilities of Households

The present study focused on the houseless PAPs, who are allotted plots in Residential Colonies constructed by project authorities. The plots allotted to houseless families by NTPC authorities in Resettlement colonies were of small size 50×40 Sq. Ft. as compared to the houses acquired by NTPC for the construction of project. House details of households surveyed shows a change in residential facilities of PAFs which is shown in the following table :

**Table-3 : Impact on Residential Facilities of Households**

Category		No. of Respondents		Percentage Change
		Before	After	
Type of Houses	Kachha	77 (61.6)	0	-100.0
	Pucca	22 (17.6)	125(100.0)	468.2
	Semi	26 (20.8)	0	-100.0
Others	Kitchen	123 (98.4)	125 (100.0)	1.6
	Separate Toilet	109 (87.2)	125 (100)	14.7
	Separate AS	120 (96.0)	90 (72.0)	-25.0

**Note :** The figures in parentheses represent percentage.

**Source :** Computed from field survey.

The findings of analysis show that before the acquisition of land 77 surveyed households were living in Kuchha type of houses

and 26 households were living in semi type of house and at present all 125 households are living in Pucca houses. After acquisition of land for the construction of Kol dam and compensation provided to the households, most of the houseless households are now living better life in respect of residential facilities compared to their previous situation before the execution of land by project authorities. Before the acquisition of houses/ land most of the PAFs were living in Kucca or Semi Pucca houses without essential amenities like separate Kitchen 98.4 percent, separate toilets 87.2 percent and separate animal shed 96 percent. Although the size of house per Sq. Ft. decreased after the acquisition of their houses yet most of the families are living in permanent pucca houses with facilities like separate kitchen 100 percent, separate toilets 100 percent. The plots allotted to houseless families by NTPC authorities in Resettlement colonies were small of 50×40 Sq. Ft. as compared to the houses acquired by NTPC and because of the small size households couldn't keep animals along with them or either keep less number of animals. Therefore no. of separate animal shed decreased after the land acquisition by the project with a negative change of 25 percent and those 72 percent households who are still keeping animals are either living in houses constructed on purchase land or constructing housing on remaining land.

## **6. Conclusion and Suggestions**

The socio-economic impact assessment study reveals that there have been positive impacts on income and employment pattern of project affected families. A slight shift in income and employment away from agriculture to non- farm activities has occurred in PAA. The findings of analysis show that after acquisition of land for the construction of Koldam and compensation provided to the households, most of the houseless households are now living better life in respect of residential facilities compared to their previous situation before the execution of land by project authorities. The occupation pattern of project affected population has changed, income has increased as well as residential facilities increased after the establishment of the Koldam project. It was observed during field visit that project affected population has other societal challenge which need attention of policy makers.



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