

HYDRO-ELECTRIC POWER GENERATION: AT WHAT COST- A SOCIO- PSYCHOLOGICAL ASSESSMENT OF DEPRIVATIONS IN RAVI BASIN IN HIMACHAL HIMALAYAS

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Abstract

The affected people of power project have received a considerable amount of trauma after the installation. The impact on the local people can be divided in two broad categories; firstly, people who have got displaced and got compensation as well as jobs in executing agencies. The second category is of those who have not affected as per the revenue/policy document, but in real sense, they are the people who are facing all ill-effects of such developmental projects and paying the cost and they will have to pay till their last breath.

The present paper is based on primary study conducted in Ravi basin on one of the hydroelectric power projects of National Hydroelectric Power Corporation Ltd (NHPC) named Chamera-I. To measure the trauma five-point based standardized tool i.e. very weak, weak, moderate, strong and very strong has been used in semi-structured interview scheduled. The interview schedule has been administered on 300 respondents chosen by using probability sampling. Both categories of respondents i.e. displaced and native have been included in the study sample. The responses received from respondents have been documented by applying suitable statistical tools and finally inferences have been drawn. The paper concludes that respondents living on both sides of reservoir are facing trauma for many reasons which need urgent attention of the Govt. as well as of executing agency.

Keywords: Development, Hydro-electric Power Project, Psychological Trauma, Displacement



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Introduction

Since the inception of human civilization man has been involved in make his life more and more comfortable and in this process, he aims to achieve rapid economic growth which further planned and implemented number of developmental projects at state as well as at national level. These projects include construction of mega irrigation dam, power project, industries, mining operation etc. undoubtedly, these projects have provided irrigation to thirsty lands which further resulted into “green revolution”, energy for growing economies which is corner stone of any developing economy. But such developmental projects had not only brought prosperity but also deprivations and displaced millions of people and impact the

environment at large scale. As per available data in different publications Govt. as well as independent confirmed that more than 75 percent displaced people because of such projects have not rehabilitated and their income and livelihood has not restored to earlier conditions so far (Fernades; 1991). The available data suggested that more than 20 millions people have been displaced because of mining operations, parks and wildlife, industries, dams (major contributor of displacement).

Initially development was aimed to fulfil basic needs to the optimum level, but it's meaning has undergone change over the period of time. Development which is a value-laden concept and aims to bring *desired change* is not new to human society, it's concern has been there since time memorial. After world-war-II, with the emergence of new nations it was required to tackle the prevailing poverty and problem of unemployment. During that period leadership of third world countries has realized that irrespective of satisfactory economic growth, *trickle down* effects failed to incorporate other aspects of development particularly the human dimension (SL Sharma, 1986).

After the independence, planned development was started in form of five-year plans and new factories, mega dams, mining etc. and were called as *temples of modern India* by the political leadership of that time (Kaviraj, 1996). Gradually with the coming up of these projects, they start becoming *temples of doom* and responsible to uproot people in the name of development. These projects become responsible for change in land-use pattern, water, forest, natural resources and deprived off the people living in the catchment and affected very badly those who are living in the vicinity of these developmental mills (Goyal; 1996). Ironically, there is no official statistics about the displacement (Jyanta; 2006), few conservative estimates between 1951-90 suggested that more than 213 lakh people have been displaced by various development projects (Fernades and Paranjepe; 1997), however these figures are based on Project Affected Families (PAFs) having revenue record and not included those who does not

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fall in the category of PAF in revenue record, in fact they are the main sufferers and Slariya (2011) termed them Not-Project Affected Families (Not-PAFs). They are those people who are facing all sorts of problems even today and they will be compelled to face till their last

breath, if Not-PAFs includes, the estimate would increase many fold (Slariya; 2011). Kothari (1996) called it secondary displacement and he estimated it up to four crores in India (Kothari; 1996).

Hydro Power Development in Himachal Pradesh

Himachal Pradesh is one of the ten States that makes up the Indian Himalayan Region (IHR). Himachal Pradesh, located in Northern India, share its border with Jammu and Kashmir in North, Punjab in West and South West, Uttar Pradesh in the South East, Tibet in the East, and Haryana in the South and is located between 30° 22'4" – 33° 12'40" North latitude, 75°47'55" – 79°04'22" East latitude. Although a relatively small state within the Indian Union, it manifests wide ranges in altitude, climate and geology. The altitudes ranges from 350 m to 6975 m above mean sea level the area is 55673 Sq. Kms and can be divided into three broad zones: The Outer Himalayas or Shiwalik foothills, the inner Himalayas or mid- mountain zone and the greater Himalayas or alpine zone.

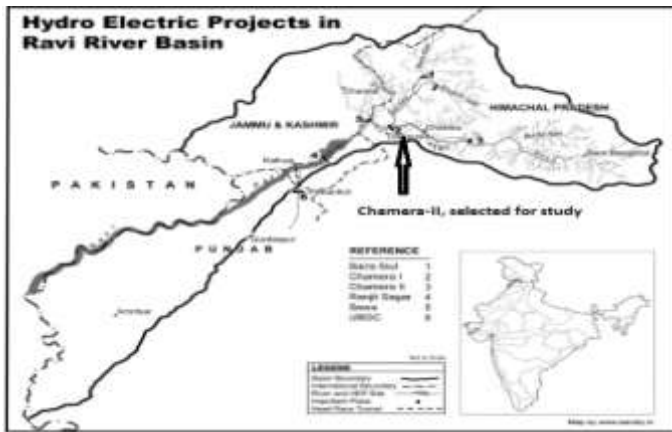
The first hydropower in Himachal Pradesh is in Chamba named as *Bhuri Singh power plant* was built in May 1904. Himachal Pradesh is extremely rich in its hydroelectricity resources. The state is having about twenty-five percent of the national potential in this aspect. It has been estimated that about 27,436 MW of hydel power can be generated in the state by the construction of various hydel projects on the five perennial river basins no matter they are major, medium or small. Out of total hydel potential of the state, 8,418MW is harnessed so far, out of which only 7.6% is under the control of Himachal Pradesh Government while the rest being exploited by the Central Government.

Table Showing Hydro-electric Projects in Different Stages in Himachal Pradesh

Sr. No.	Name of Executing Agency	Name of Power Project (s)	Generation Capacity (MW)	Sub-Total (MW)
1.	BBMB (Bhakhra-Beas Management Board)	Bhakra Project	1200.00	2550.00
		Beas Satluj Link (Slaper project)	0990.00	
		Pong Dam	0360.00	
2.	PSEB	Shanan	0110.00	110.00
3.	NHPC (National Hydro-electric	BairaSiul	190.00	
		Chamera-I*	540.00	

	Power Corporation Ltd)	Chamera-II	300.00	1261.00
		Chamera-III (to be completed very soon)	231.00	
4.	UPSEB	Yamuna Project	237.37	237.37
5.	HPSEB	Giri	060.00	324.01
		Bassi	060.00	
		Sanjay Vidyut Jal Pariyojna	120.00	
		Ganvi	022.50	
		Andhra	016.09	
		Thirot	004.50	
		Binwa	006.00	
		Holi Hydel Project	003.00	
		Killar	000.30	
		Baner	012.00	
		Gaj	010.50	
		Mini/micro HEP (12 No.)	009.12	
6.	SJVNL (Satluj Jal Vikas Nigam Ltd.)	NathpaJhakri H.E. Project	1500.00	1500.00
7.	JHPL	Baspa Stage-II	0300.00	0300.00
	Total		6282.38	6282.38
Projects Under Construction				
1.	HPSEB	Bhabha Aug. P/H	0009.00	2792.00
2.	HPSEB	Khauli	0003.00	
3.	HPSEB	Uhl Stage-II	0010.00	
4.	Harza, USA	Dhamwari Sunda Project	0070.00	
5.	NTPC	Kol Dam	0800.00	
6.	NHPC	Parbati	1900.00	
		Total	2792.00	
		Grand total		9074.38

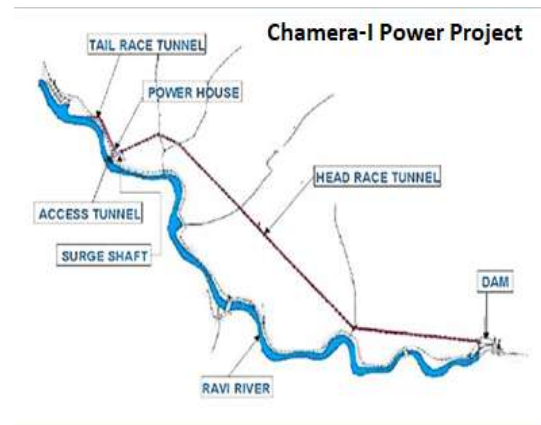
*taken for study



Whole power potential can be divided in two major categories i.e. large or major power projects which are also known as multipurpose projects are there in form of Bhakhra dam and Pong dam in the state since 1960s. And the second category is of small power projects, which gained more importance after sixth five years

plan when state plan to be the power state.

Chamera-I Hydroelectric Power Project: Chamera-I Power Station of 540 (3 x 180 MW) is a pondage scheme situated on river Ravi located in Chamba district of Himachal Pradesh. The project comprises of a 121 m high, 295 m long concrete arch gravity dam with 9.5 m dia., 6.414 Km long head race tunnel. The underground power house with installed capacity of 540 MW houses 3 units of 180 MW capacity each designed to operate under the net rated head of 185 m and designed to generate 1664.56 million units in a 90% dependable year with 95% machine availability.



All the three generating units of the power station were commissioned in the month of April-1994. The beneficiary states/UTs of this power station are Uttarakhand, UP, Delhi, HP, Haryana, J&K, Punjab, Rajasthan and Chandigarh. With the construction of the project, the area has also been benefitted by development of infrastructure, education, medical facilities and employment avenues (www.nhpc.com).

This project has created 29 km reservoir and affected the lives of thousands of people living on left and right sides of the reservoir. Some of the people (1554 families) officially have been displaced and reside out the area somewhere in other parts of the district or state who called as PAFs but still today some people (not counted by neither Govt. nor by NHPC) are living the vicinity of this reservoir and facing all sorts of deprivations and they are compelled to live till their last breath or unless they got economic mobility, only then they can leave and move from their original places of residences.

Deprivations Received Because of Chamera-I: The deprivations received by the displaced as well as the people who are living in the vicinity of the reservoir has received a considerable amount of trauma after the installation of this project. People, whose land has been acquired by the executing agency way back in 1990s, are still waiting for the compensation. The impact on the local people can be divided in two broad categories; one, project affects people, who have got displaced and got compensation, jobs in National Hydro-electric Power Corporation Pvt. Ltd. (NHPC) and resettled somewhere in the part of the district or state. The second category is of those who have not affected as per the revenue/policy document and can be called as Not Project Affected People. But in real sense, they are the people who are facing ill-effects of this developmental activity and at present, they are dying every moment, every hour and every day and their concerns have never listened and never answered.

However, the first category has also received a considerable amount of impact on their socio-cultural milieu but the second category affected comparatively more than the first category. Mental health is most important health parameter. Only with good mental health one can enjoy each and every aspect of life. People who are living in the vicinity of the dam faces considerable amount of trauma. There is fear of living near the reservoir and also fear of cattle and children drowning in the water. Infact some cattle and humans have drowned in water. Alongwith these, the study area also becoming dumping sites for the Chamba town, because whatever garbage is thrown in the river is rested nearby the villages and accumulates along lower river basin due to stagnated water and stink foul. There is also threat of rise in water level during rainy season. Water level reach near the houses and water born water creatures like; snake, snail, dead fishes and other.

Research Methodology

To collect the data stratified random sampling has been used with non-participatory observation. However, it is difficult to measure the feeling of trauma, but for this study five-point based standardized tool has been used. Data was filled after watching the expression and intensity of feelings of respondents. To assess the real pace of the problem, an assessment of the trauma being faced by the people who have been either displaced or living in the vicinity of the reservoir of Chamera-I. Both categories of respondents i.e. displaced and native have been included in the study sample. Trauma faced/is being faced by the respondents has been measured on five-point scale i.e. very weak, weak, moderate, strong and very strong. Responses received through this scale on different sample variables such as; feeling at the

time of displacement or living in the vicinity of reservoir, feelings of the respondents after being displaced, symptoms of trauma as indicators of trauma, measures to overcome from the symptom of trauma, measures taken by the respondents to overcome from the feelings of trauma and each broad sample variable has been divided further in sub variables to get more acquaintance with the phenomena/ trauma being faced by the people of the Chamera-I.

Study Area and Sample

Study area includes villages along the Chamera-I Hydroelectric Dam in the Chamba Tehsil of



Himachal Pradesh. 8 villages have been selected i.e. Tipri, Bhanota, Chhamui, Kiani, Rajnagar, Thari, Chakloo and Palei. As shown in the figure villages of both sides have been taken for study. From 8 villages, 300 respondents were considered by using probability sampling method.

All social and economic segments got proper representation in the study.

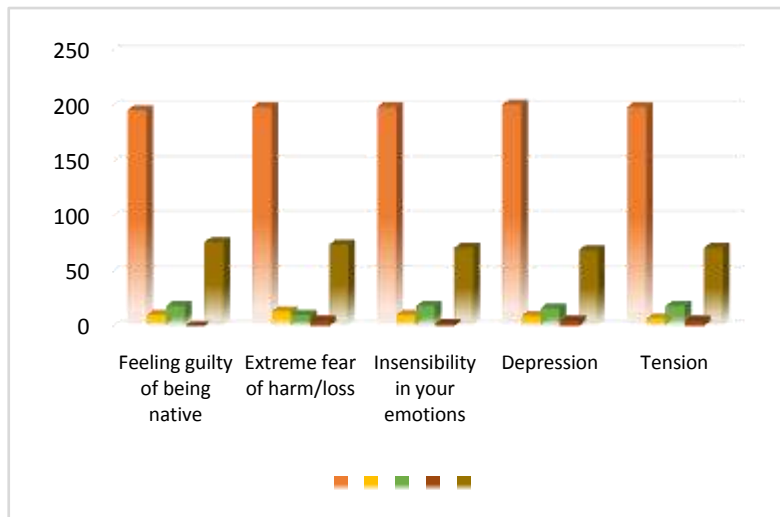
Results and Discussions

By using suitable research (as mentioned above) data was collected, tabulated and interpreted in different tables and research segments. It is an attempt to document the cost native people living in the immediate vicinity of reservoir are paying daily, every minute and every time. They are feeling trauma by residing there.

The responses of the respondents have been taken on 5-point scale. The feeling of living in the vicinity of reservoir is different from feeling of living as a displaced person in other area. People who are living in the vicinity of reservoir has direct implications of the people as they face the problems daily. Those who are displaced are now shifted to other area and are adapted to those conditions but those who are the native of affected area has to adjust according to the new setting. A major psychological shift has witnessed in the area due to power project i.e. Chamera-I owned by NHPC. This feeling is being presented as follows:

Feeling of Respondents while Living in the Vicinity of Reservoir

Feeling	Level of Impact					Total
	Very weak	Weak	Moderate	Strong	Very Strong	
Feeling guilty of being native	196	010	018	000	076	300
Extreme fear of harm/loss	199	013	010	005	074	300
Insensibility in Emotions	199	010	018	002	071	300
Depression	201	009	016	005	069	300
Tension	199	007	018	005	071	300
Percentage	66.2	03.3	05.3	01.2	24.0	100.0
Total	994	049	080	017	361	1501



As depicted in table and figure 66.2% of respondents had very weak feeling in all variables about living in the vicinity of dam. 24% of respondents had very strong feeling in all variables about living in the vicinity of dam. Followed by 5.3% moderate feeling, 3.3% weak feeling

and 1.2% of strong feeling in all variables about living in the vicinity of dam. This donates that majority of 66.2% of respondents donot have any problem in living in the vicinity of reservoir and these respondents are living happily. But 24% of respondents are not happy and satisfied by living next to the dam. They facing problems due to dam on daily basis.

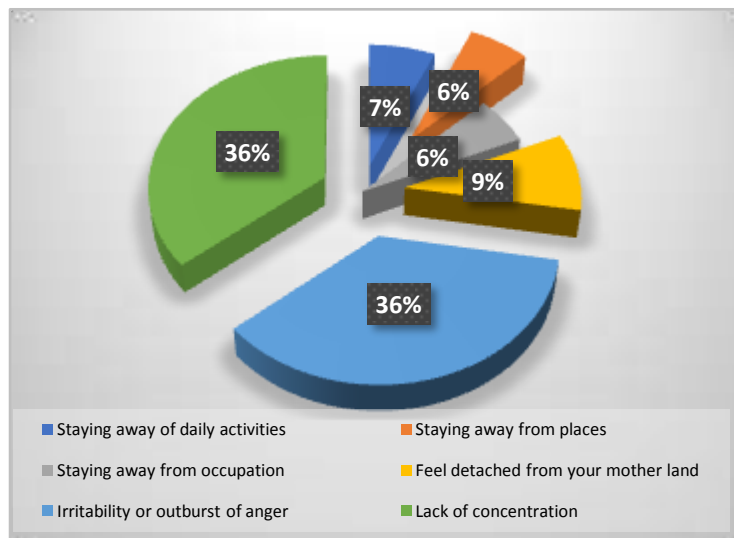
Feeling of Respondents after Rise in Water Level first Time

With the completion of civil work of the dam, the gates of the dam were closed and water level start rising on the day of commissioning of all three units on 1.5.1994, whole nation was celebrating the success of NHPC, but on the other side there was a chaos in the upstream of the dam. There was an announcement from the Govt. side to vacate their houses and leave the place immediately, as water was rising and move to safer places. They were forced to live in tents for some days, when their homes submerged. It was a situation like they were homeless in their own home. It was time of anger, hunger and helplessness. This rise in water level affected their daily activities, occupation, livelihood and drown their

everything which were theirs since ages and were compelled to start a new life in a new place which was not even known to them. The following table shows the reaction of the people at that vary time:

Feeling	Level of Impact					Total
	Very weak	Weak	Moderate	Strong	Very Strong	
Staying away of daily activities	037	002	007	000	254	300
Staying away from places	035	000	005	000	260	300
Staying away from occupation	032	002	005	004	257	300
Feel detached from your mother land	053	000	015	002	230	300
Irritability or outburst of anger	205	000	005	008	082	300
Lack of concentration	204	002	005	007	082	300
Percentage	31.4	00.3	02.3	01.2	64.7	100.0
Total	566	006	042	021	1165	1800

In the above table and figure, it is depicted that rise in water level had a very strong effect on the lives of 64.7% of respondents. Majority of people suffered great problem due to this rise in water level. These people use to live near to the river and was the first and worst affected. As we go up the village the severity of rise in water decreases. As 31.4% of respondents had very weak effect of rise in water level. They had no problem with rise in water level as their houses were at the upper areas of village. 2.3% of respondents had moderate effect, 1.2% had strong effect and 0.3% had weak effect of rise in water level due to dam.

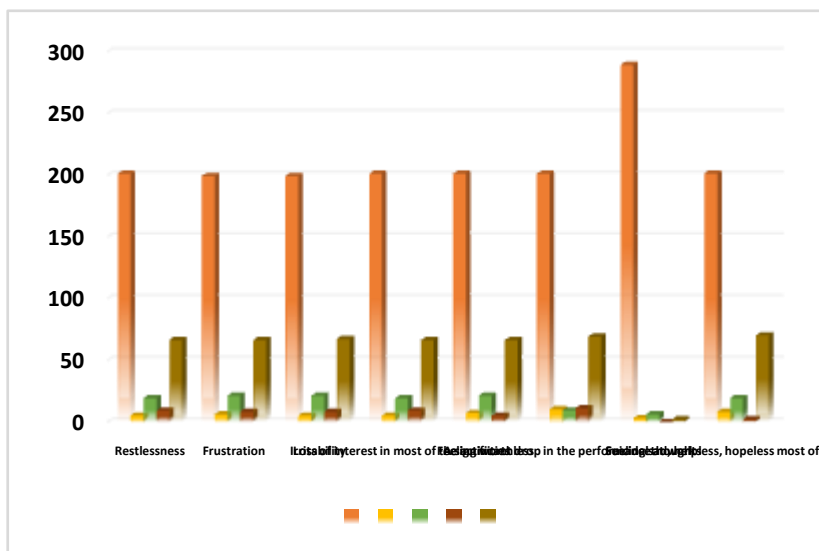


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Feeling of Respondents Living in the Vicinity of Dam

Feeling of people living in the vicinity of dam is mixed. The old generation who has seen the resettlement and rehabilitation phase feels anger and loss. But the new generation who were born after the construction of dam was happy and normal. They have not lodged any complain about anything it's just always like this for them. People who live just next to dam and has a continuous threat of submergence has tension and anger.

Feeling	Level of Impact					Total
	Very weak	Weak	Moderate	Strong	Very Strong	
Restlessness	201	005	019	009	066	300
Frustration	199	006	021	008	066	300
Irritability	199	005	021	008	067	300
Loss of interest in most of the activities	201	005	019	009	066	300
Feeling worthless	201	007	021	005	066	300
A significant drop in the performance at work	201	010	009	011	069	300
Suicidal thoughts	289	003	006	000	002	300
Feeling sad, helpless, hopeless most of the time	201	008	019	002	070	300
Percentage	70.50	02.00	05.60	2.20	19.70	100.00
Total	1692	049	135	052	472	2400



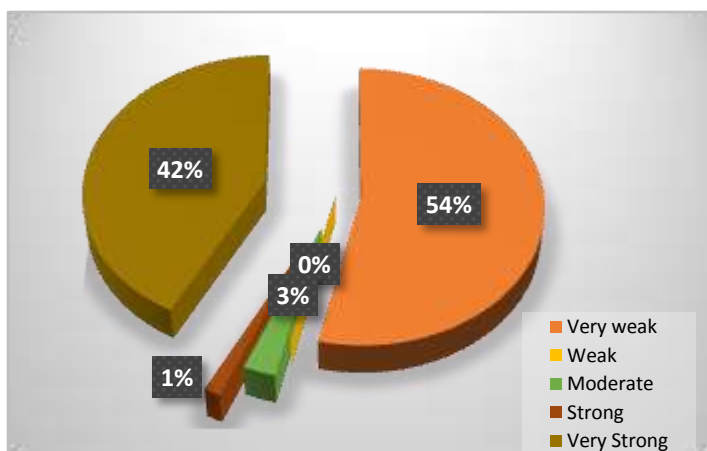
Majority of 70.5% of respondents didn't have negative feeling about living in the vicinity of dam. They live their lives normally and happily. Respondents from Tipri have more fear of living in the vicinity of dam than any other. 19.7% of respondents has very strong feeling against living in the vicinity of dam. These people do not like to live next to dam due to numerous threats to life. 5.6% of respondents has moderate feeling, 2.2% of respondents has strong feeling and 2% of respondents has weak feeling about living in the vicinity of dam.

Fear of Children Drowning into Water Accidently

After the construction of dam, people who are living on the border line of the reservoir and not displaced as they are residing above 750-meter mark created by the executing agency i.e. NHPC and administration. Whole reservoir is not bounded by boundary wall which is a threat to life of children as well as cattle of native people. Children can go nearer to reservoir during play and can drown as they don't know to swim and they are also not aware about the water beneath them. Respondents stated during interview that children have drowned while playing. Respondents are also of the view that there is every possibility and always risk of someone going into water due to non-availability of protection wall along the dam. Children need 24 hours' protection from their parents. Due to construction of dam playing grounds has submerged into water which forces children to play wherever the space is available which comes to be near dam. The felling of the respondents in regard is being shown in as follows:

Fear of Drowning Children/Cattle	Level of Impact					Total
	Very weak	Weak	Moderate	Strong	Very Strong	
No of Responses	161	000	008	004	127	300
Percentage	53.70	00.00	02.70	01.30	42.30	100.00
Total	161	000	008	004	127	300
No of Responses for Cattle	156	000	011	000	133	300
Percentage	52.00	00.00	03.70	00.00	44.30	100.00
Total	156	000	011	000	133	300

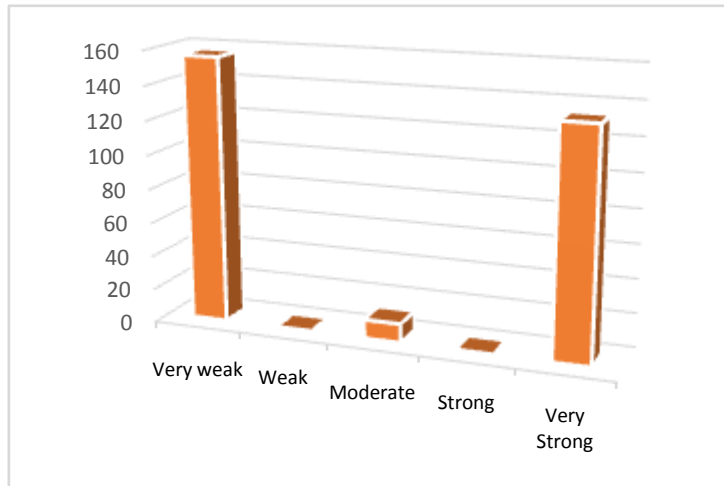
As shown in above table and figure, majority of 53.7% of respondents do not fear about their children drowning in water. These people live in down-stream, they donot have



any fear about drowning of children into water. Whereas people those who are living in the upstream, they are fearing to drown their children in the reservoir, the percentage of such respondents is 42.3% who has very strong fear about drowning of children into dam because these respondents lives in the vicinity of

dam. 2.7% of respondent has moderate fear and 1.3% of respondents has strong fear about drowning of children into water.

Cattle are non-conscious beings. They do not know that, they will drown if they go near to dam. Pasture lands used to be near to river. Cattle were habitual of going to graze but when water level increased and pasture land submerged, cattle still go to river side to graze. Many times people have pulled cattle from submerging into water in half-submerged condition. The main reason behind is still absence of security fencing around dam. 52% of respondents has very weak fear about drowning of their cattle.



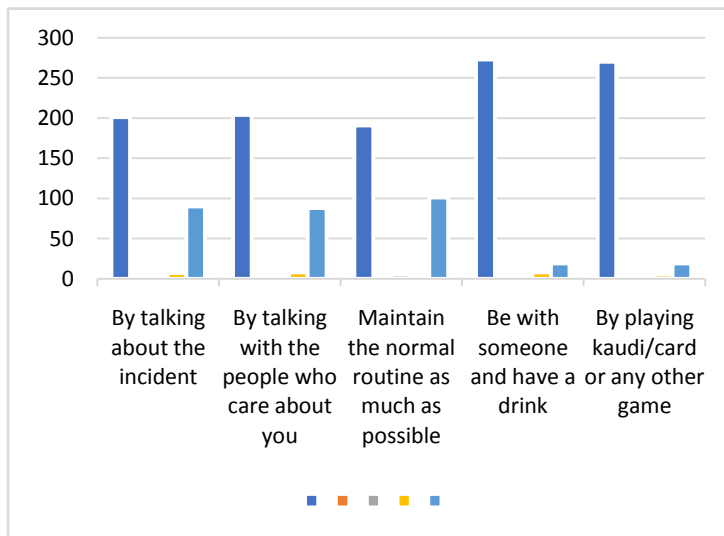
These people either do not have cattle or live in the upper areas. 44.3% of respondents who live in the vicinity of reservoir has very strong fear about drowning of their cattle into dam.

Coping Mechanism to Overcome

People in the affected area suffer from psychological trauma everyday due to dam. They live with the fear of their children, house, cattle etc. drowning into water. The new generation is comfortable with present situation but old ones has problem. They have sense of loss and dissatisfaction. These people do many things which could divert their mind from what they lost. The common things they do are talking with others, playing games, drinking etc. following are the measures taken by the respondents to overcome from the psychological trauma:

Measures	Level of Impact					Total
	Very weak	Weak	Moderate	Strong	Very Strong	
By talking about the incident	201	002	000	007	090	300
By talking with the people who care about you	204	000	000	008	088	300
Maintain the normal routine as much as possible	191	000	005	003	101	300
Be with someone and have a drink	273	000	000	008	019	300
By playing kaudi/card or any other game	270	004	002	005	019	300
Percentage	75.90	00.40	00.50	02.00	21.20	100.00
Total	1139	006	007	031	317	1500

As depicted in the table and figure, 75.9% of respondents uses very weak measures to



overcome from the trauma. They are happy with the situation and they don't do anything to come out of trauma. They live a normal life. These people were less than 50 years of age. 21.2% of respondents takes very strong measures to overcome the trauma. They are indulged in drinking, playing games and mainly discuss the matter with others. 2% of

respondents takes strong measures, 0.5% of respondents takes moderate measures and 0.4% of respondents takes weak measures to overcome the trauma.

Conclusion

On the basis of foregoing analysis based on psychological assessment of the native living in the vicinity of dam in Chamera-I it can be concluded that people living in the immediate vicinity of dam are the most affected and facing psychological trauma with the coming up of dam (reservoir) and are real affected. People living below the demarked line have been displaced and re-located somewhere else and got the status of project affected people as well as project affected family status. The people living on the demarked line are facing ill-effect of power project and their cattle, kids and other belongings are at stake and can be drawn any time and also there is an increase in water borne diseases and aquatic reptiles like snakes enter in their houses and put their life threaten.

People living a bit away from the first circle were affected relatively less and the amount of their deprivations has reduced and it decreased as and when respondents moved upward the amount of deprivation reduced and when the distance increased up to one km, the impact of dam (reservoir) reduced totally and people living there does not feel any impact in their life but they also realised that whole area (developmental zone) falling in the catchment of 29 km reservoir has overall experienced many changes in different spheres of life.

Mostly people experienced either highest or lowest trauma on four-point scale. The response received on four-point scale emphatically argued that the coping mechanism adopted by the respondents are of high level and at present almost all respondent either living

in the vicinity or displaced have copped and now if any one revive the memories of past only then they felt sad and start narrating the story of their deprivation. And the people as narrated by the respondents living in the immediate vicinity of dam still face problem during rainy days or in summer season when water level increased.

It is observed by the researcher during the data collection people who lived at that time had died now or some are very old and rest took birth after the installation of power project, they know few about the ill-effect faced at the time when the dam came up way back in 1994. Though there are some people still alive and struggling to get their dues, some have filled cases in the state high court and facing litigation and facing trauma. It is recommended that there should be a post-traumatic treatment centre in the catchment area of the project so that any traumatic event or feeling can be treated.

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