

Viability of CDM Projects in India: A Study of Chanju CDM Project in Chamba District of Himachal Pradesh India

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Abstract

The Clean Development Mechanism (CDM) is introduced by US government as flexibility mechanisms under Kyoto Protocol and allows developed countries to meet their emission reduction commitments by promoting clean development in developing countries. As a policy mandate, it aims to design project-based mechanisms to reduce emissions. These reductions are produced and then subtracted against a hypothetical baseline of emissions which are predicted to occur in the absence of a particular CDM project. India as a signatory of this protocol have been registered 2313 projects up to August 2010, out of these, 64 projects are of hydro power generation and Chanju power project of 36 MW is one of the CDM project in India.

The present paper is an attempt of the researcher to make a comparative analysis between the expected benefits received by the executing agency under CDM and the actual benefits people are expected to receive from Chanju-I Hydro Electric Project. Based on primary data based research project concentrating on 8 administrative wards, 50 villages and 200 respondents, by using interview schedule and psychometric scale and using exploratory and observation research methods collecting from two sub-basins, will highlight the perception of the poor people and analyze viability issue in CDM led projects in Himalayan region.

The results revealed that at the initial stage of project, people were happy because of their illiteracy and not knowing the facts, but when respondents have been told about the factual situation they are expected to face, and then their response was altogether different. Because in the stretch of 25 km there are 7 power projects expected to produce some 56 MW power, putting lives, livelihood and age-old profession of water milling, and putting environment of this virgin area at stake, are some areas of the concerns of present paper.

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Key words: clean development mechanism, viability of small projects, indigenous people, eco-psycho perception

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Concept of Clean Development Mechanism

Kyoto Protocol (IPCC, 2007) has defined Clean Development Mechanism (CDM) as one of the "flexibility" mechanisms. The Article 12 of the Protocol defined CDM which aiming to meet two the most important objectives round the globe. The first objective is to assist parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC), which is to prevent dangerous climate change; and the second is to assist parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments (greenhouse gas (GHG) emission caps). "Annex I" parties are those countries that are listed in Annex I of the treaty, and are the industrialized countries. Non-Annex I parties are developing countries. This is to be achieved by allowing the Annex I countries to meet part of their caps using "Certified Emission Reductions" from CDM emission reduction projects in developing countries (Carbon Trust, 2009, p. 14). This is subject to oversight to ensure that these emission reductions are real and "additional." The CDM is supervised by the CDM Executive Board (CDM EB) and is under the guidance of the Conference of the Parties (COP/MOP) of the United Nations Framework Convention on Climate Change (UNFCCC).

The CDM allows industrialized countries to invest in emission reductions wherever it is cheapest globally (Grubb, 2003, p. 159). During the first year of project through renewable energy, energy efficiency, and fuel switching (World Bank, 2010,

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p. 262). Carbon capture and storage (CCS) was included in the CDM carbon offsetting scheme in December 2011. However, a number of weaknesses of the CDM have been identified (World Bank, 2010, p. 265-267). Several of these issues are addressed by a new modality, the Program of Activities (PoA) that moves away from accrediting single projects but bundles all projects of one type of activity and accredits them together.

Under the CDM, the developer can make a deal for carbon credit. Under the UNFCCC, charter any company from the developed world can tie up with a company in the developing country that is a signatory to the Kyoto Protocol. These companies in developing countries must adopt newer technologies, emitting lesser gases, and save energy. A portion of the total earnings of carbon credits of the company can be transferred to the company of the developed countries under CDM. At present Indian stand on CDM projects:

| Country | State | No. of Projects | Capacity (in MW) |
|---------------------------------|--------------------|-----------------|------------------|
| Afghanistan | Not defined | 0 | 0 |
| Bhutan | State not defined | 2 | 1314 |
| China | Gansu | 60 | 3116 |
| | Guizhou | 25 | 1128 |
| | Hunan | 46 | 2260 |
| | Quinghai | 10 | 392 |
| | Shaanxi | 11 | 955 |
| | Sichuan | 141 | 9497 |
| | Xinjiang | 19 | 1898 |
| | Yunnan | 124 | 6346 |
| | Total | | 436 |
| India | Himachal Pradesh | 11 | 2076 |
| | Jammu and Kashmir | 2 | 89 |
| | Meghalaya | 1 | 84 |
| | Sikkim | 6 | 2111 |
| | Uttaranchal | 8 | 818 |
| | Total | | 28 |
| Myanmar | Kachin | 1 | 240 |
| Nepal | | 1 | 15 |
| Pakistan | Khyber Pakhtunkhwa | 1 | 15 |
| | Azad Kashmir | 1 | 84 |
| | Total | | 02 |
| Total HKH Region | | 470 | 32,420 |
| HKH Share of total Value | | 58.60% | 60.60% |

Source: CDM pipeline, 1 April, 2011, UNEP Rise Centre, 2011.

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India comes under the third category of signatories to United Nations Framework Convention on Climate Change (UNFCCC). India signed and ratified the Protocol in August, 2002 and has emerged as a world leader in reduction of greenhouse gases by adopting Clean Development Mechanisms (CDMs) in the past few years. As it is evident from the above table that all countries of South Asia are having CDM projects and India and China are countries with maximum projects and India Himachal Pradesh is a state having maximum projects (11).

According to Report on National Action Plan for operationalizing Clean Development Mechanism(CDM) by Planning Commission, Govt. of India, the total CO₂-equivalent emissions in 1990 were 10, 01, 352 Gg (Giga gram), which was approximately 3% of global emissions. If India can capture a 10% share of the global CDM market, annual CER revenues to the country could range from US\$ 10 million to 300 million (assuming that CDM is used to meet 10-50% of the global demand for GHG emission reduction of roughly 1 billion tonnes CO₂, and prices range from US\$ 3.5-5.5 per tonne of CO₂). As the deadline for meeting the Kyoto Protocol targets draws nearer, prices can be expected to rise, as countries/companies save carbon credits to meet strict targets in the future. India is well ahead in establishing a full-fledged system in operationalizing CDM, through the Designated National Authority (DNA).

The Indian market is extremely receptive to Clean Development Mechanism (CDM). Having cornered more than half of the global total in tradable certified emission reduction (CERs), India's dominance in carbon trading under the clean development mechanism (CDM) of the UN Convention on Climate Change (UNFCCC) is beginning to influence business dynamics in the country. Analysts claim if more companies absorb clean technologies, total CERs with India could touch 500 million. Out of the 391 projects sanctioned, the UNFCCC has registered 114 from India, the highest for any country. India's average annual CERs stand at 12.6% or 11.5 million.

India being Annexure-I country and signatory of the Kyoto Protocol can invest in projects that both reduce GHGs and contribute to sustainable development in non-Annex I countries. A CDM project provides certified emissions reductions (CERs) to Annex I countries, which they can use to meet their GHG reduction commitments

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under the Kyoto Protocol. Article 12 of the Kyoto Protocol in Indian perspective sets out three goals for the CDM:

- To help mitigate climate change;
- To assist Annex I countries attain their emission reduction commitments, and
- To assist developing countries in achieving sustainable development.

Current Status of CDM in India

As per the Basic Information provided by www.igesorg.in up to 1 November 2011 the number of CDM projects registered with executive board in India is 738 and projects which are at and after validation stage is 1022. Out of these 83 projects are of hydro power based projects. Following is the detail of CDM projects in india as on 1.11.2011:

Table: 1 Basic Data for Registered CDM Projects in India (as of 1 November 2011)

| Type of Project | Registered CDM Projects | | | | | Rejected |
|--------------------------------|-------------------------|--|---------------------------|-------------------------------|------------------|-----------|
| | No. of Projects | Avg. Annual Emission Reductions (t-CO ₂) | Total ERs by 2012 (t-CO) | Amount of Issued CERs (t-CO) | Review Requested | |
| Wind Power | 233 | 32,055 | 33,996,009 | 9,854,826 | 56 | 8 |
| Biomass | 180 | 38,613 | 37,839,697 | 8,617,197 | 61 | 15 |
| Hydro Power | 83 | 88,199 | 20,586,368 | 2,877,343 | 23 | 5 |
| Energy efficiency | 75 | 113,814 | 13,099,874 | 1,385,897 | 21 | 8 |
| Waste gas/heat Utilization | 70 | 76,220 | 35,541,907 | 11,577,767 | 33 | 8 |
| Fuel switch | 20 | 358,053 | 27,760,522 | 7,637,476 | 7 | 0 |
| Cement | 17 | 114,708 | 16,806,437 | 1,382,047 | 2 | 4 |
| Biogas | 16 | 28,218 | 2,551,228 | 695,884 | 4 | 0 |
| Methane avoidance | 13 | 82,138 | 2,433,170 | 47,795 | 3 | 0 |
| Afforestation & Reforestation | 7 | 72,246 | 5,828,972 | 0 | 1 | 0 |
| HFC reduction/avoidance | 7 | 1,577,424 | 82,691,940 | 74,813,284 | 2 | 0 |
| Other renewable Energies | 6 | 18,503 | 419,763 | 0 | 2 | 0 |
| N ₂ O decomposition | 5 | 406,915 | 6,137,291 | 155,115 | 3 | 0 |
| Transportation | 3 | 211,355 | 1,065,277 | 82,317 | 0 | 0 |
| Methane recovery & Utilization | 2 | 94,254 | 1,174,219 | 88,873 | 0 | 0 |
| PFC reduction | 1 | 433,551 | 1,301,367 | 33,624 | 0 | 0 |
| Total | 738 | 82,915* | 289,234,041 | 119,249,445 | 218 | 48 |

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Since the establishment of the Indian DNA (Designated National Authority) in 2003, it has approved a significant number of projects. 738 projects have been registered by the CDM executive board, which account for about 21% of all the registered projects (as of 1 November 2011).

In the initial stage of CDM development in India, biomass utilisation projects, waste gas/heat utilisation projects, and renewable energy (wind, hydro) projects were mainly being implemented. Other than those projects, India has various types of registered CDM projects that include energy efficiency (cement, steel and etc.), fuel switch, HFC reduction, N²O decomposition, afforestation and reforestation, and transportation. Recently a number of Wind Power projects were registered giving wind power a top share in the Indian projects.

CDM promotion cells have been established at a state level. They conduct supportive activities such as information dissemination on CDM and coordination between local and national governments.

One of the features of CDM in India is its large share of unilateral CDM projects, CDM project developed by Indian stakeholders without the involvement (finance, technology) of Annex I countries. Indian project developers implement the project by bearing the transaction costs of CDM and taking on the risks of the projects. Therefore, the price of credits issued by unilateral CDM projects tends to be higher than bilateral or multilateral CDM projects.

1. The number of CDM projects registered at the CDM executive board (as of 1 November 2011)= 738
2. The number of registered unilateral CDM projects (at the time of registration) (as of 1 November 2011)= 603 (82 %)

India as a signatory of this protocol have been registered 2313 projects up to August 2010, out of these, 64 projects are of hydro power generation and power projects in Chanju sub-basin are one of the CDM project in India.

CDM Projects in Himachal Pradesh:

Most CDM dams can be found in the north-western state of Himachal Pradesh. Encompassing the upper reaches of the Sutlej, Beas, Chenab, and Ravi rivers, the total hydropower potential of Himachal Pradesh is estimated at more than 23,000 MW, out of which 6460 MW has been tapped so far (GoHP 2009: 68). After decades of comparatively modest hydropower expansion, state authorities plan to more than double the installed capacity by 2017 “to develop Himachal Pradesh as the ‘Hydro-Power State’ of the country” (GoHP 2010: 56). Because of the lucrative “export” of peak demand electricity to urban and industrial centers in the Gangetic plains, hydropower is playing an increasingly important role in the state's economy, and the CDM is considered to be facilitating the accelerated expansion of hydroelectric projects (GoHP 2009; Him Dhara 2011). With the majority of proposed dams being allotted to non-state developers, private corporations are expected to play a key role in the construction and operation of new projects. The importance of the private sector is further reflected in the ownership of CDM projects. Corporations are particularly active in applying under the CDM, and they account for 9 of the 11 large “clean development” dams in Himachal Pradesh. Most medium-scale CDM dams are to be found on tributaries of the Beas and Sutlej rivers, whereas the 2 largest projects, Karcham Wangtoo and Rampur, harness the hydraulic energy of the Sutlej River directly.

Power projects in Chamba District:

Chamba district is one of 12 districts of Himachal Pradesh, India. Himachal Pradesh is proceeding toward “Electricity State” and at present on five river basins of the state i.e. Satluj, Beas, Ravi, Chenab and Yamuna there as many as 401 projects of different magnitude are in different stage of installation. Like other river basins of the state, Hydro-electric power generation in chamba district has been started way back in 1980s with the installation of first power project owned by NHPC (National Hydroelectric Power Corporation Ltd.). At present there are 117 mini/micro power projects (Annexure-1) of different magnitude and are in different stages of its execution. Out of 117 Memorandum of Understanding (MoU) has been signed for 22 projects (Annexure-2) and Implementation Agreement (IA) has been signed for 42 projects meaning thereby there are still $117-64=53$ projects have been identified

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but still to be installed Along with these, as shown in table: 2 are small, medium and large categories power projects.

Table 2: Showing the Power Projects on Ravi basin in chamba district:

| Sr. No. | Name of Power Project | Name of River/ nallah | Classification | Installation Capacity (in MW) |
|---------|-----------------------|-----------------------|----------------|-------------------------------|
| 1. | Chamera-I* | Ravi | Large | 540.00 |
| 2. | Chamera-II * | Ravi | Large | 300.00 |
| 3. | Chamera-III | Ravi | Large | 231.00 |
| 4. | Baira Suil * | Baira Suil | Large | 198.00 |
| 5. | Tundah-I | Tundah nallah | Small | 015.00 |
| 6. | Tundah-II | Tundah nallah | Small | 030.00 |
| 7. | Sal Stage –I | Saal nallah | Small | 008.25 |
| 8. | Budhil | Budhil nallah | Medium | 081.00 |
| 9. | Bharmour | Budhil nallah | Medium | 045.00 |
| 10. | Harsar | Budhil nallah | Medium | 060.00 |
| 11. | Kugti | Budhil nallah | Medium | 045.00 |
| 12. | Kutehr | Ravi | Large | 360.00 |
| 13. | Sindi | Ravi | Medium | 120.00 |
| 14. | Bara Bangal | Ravi | Medium | 160.00 |
| 15. | Thein Dam | Ravi & Sewa | Large | 600** |

**Indicates power projects in operation in Chamba district.*

***Thein dam (Maharaja Ranjeet Singh HE Power project with 600 MW Capacity at Shahpur Kandi near Pathankot (Punjab) situated at interstate boarder of Jammu & Kashmir, Himachal Pradesh and Punjab.*

Power Projects in Churah Tehsil in Chamba district:

Churah tehsil is one of five tehsils of Chamba district. In this tehsil three main tributaries of Ravi basin are flowing i.e. Baira, Tarela and Chanju. The installation of power projects in this tehsil (administrative division) has been started with the installation of Baira-Suil hydel power project way back in 80s. This power project uses the water of Baira, Suil and Bhaled rivulets and generates 198 MW power on 90% dependable year. In 1990s the intensive surveys for the assessment of hydro power has been taken place and at present 8 projects of different magnitude are either commissioned or commissioning. The detail thereof is as under:

Table 1.3: Showing Power Projects in Churah Tehsil (Tarela sub- basin) in Ravi basin:

| Sub-basin | Sr. No. | Name of the Project | Generation Capacity in MW | Status | Executing Agency |
|-----------|---------|---------------------|---------------------------|---|--|
| Tarela | 1. | Tarela | 05.0 | Commissioning | Gini Global |
| | 2. | Tarela-I | 05.0 | Commissioned in 2007 | AT Hyro & Simran Hydro |
| | 3. | Dumas-II | 05.0 | Commissioned in 2009 | Simran and AT hydro |
| | 4. | Tarbai-I | 0.5 | Commissioned in 1998 | Himurja |
| | 5. | Tarbai-II | 06.1 | Commissioning | Gini Global |
| | 6. | Tarbai-III | 06.1 | Commissioning | Simran & AT Hydro |
| | 7. | Sai-Kothi | 17.0 | Under Construction | Venture Energy Technology Ltd, Delhi |
| Baira | 8. | Alwas-I | 02.5 | MoU signed on 16.2.2008 | M/S Sabeer Finanz Pvt. Ltd. |
| | 9. | Alwas-II | 02.5 | yet to be allotted | |
| Chanju* | 10. | Upper Chanju | 04.70 | Under construction MoU signed on 12.1.2005 | M/s Himson Power (P) Ltd. |
| | 11. | Lower Chanju | 04.00 | Under construction MoU signed on 5.2.2008 | M/s Daduji Engineering & Power Projects (P) Ltd. |
| | 12. | Kunda Sanjoy | 05.00 | | |
| | 13. | Chanju-I | 36.00 | Under construction Allotted in 2008 | Indo Arya Central Transport Limited |
| | 14. | Chanju-II | 17.00 | Under Construction, MoU signed on 29.2.2008 | Cosmos Hydro Power Limited (CHPL) |
| | | Total | 99.7 | | |

Source: Author's compilation from different sources

**basin taken for study by the researcher*

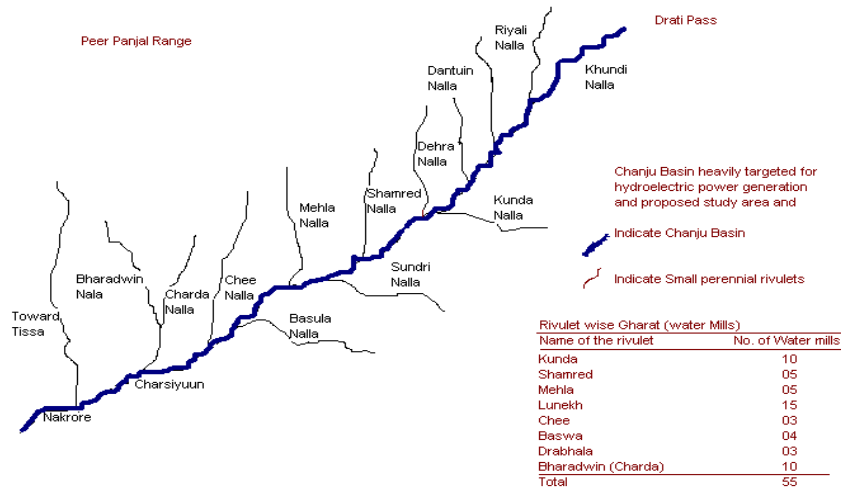
Power Projects in Chanju sub-basin: -

Chanju sub-basin is one of the three major basins of Ravi basin and situated below the Drati pass of the Peer Panjal range of middle Himalayas ranging from the elevation of 15,000 feet to more than 22,000 feet. Chanju sub-basin is a part of Baira-Suil basin, which is situated in the western Himalayas in 32° 47'' and 33° 2'' and north latitude of 75° 57'' to 76° 23' in Chamba district of Himachal Pradesh, India and spread almost in 35 kms toward Drati pass touching the inter-district boundary of Chamba and Kullu. The people of this basin are very poor and mostly depend on these rivulets/ nallas for their livelihood, which are the main sources of ecosystem services and these services, are raring 6000 people of the valley since

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ages. The water mills, who are serving the people of the valley are being threaten by the installation of these power projects (figure-1) and putting a question mark on the livelihood of the people for 67 MW power (table 4).

Figure: 1.1 Showing rivulets/nallas and watermills in Chanju sub-basin on which small/mini power projects are proposed:



This basin has eight perennial small and big rivulets whose installation capacity has been assessed 80 MW. On these rivulets there are more than 55 water mills that are serving the valley since ages and are the carrier of *Hatt and Gharat Culture* of Indian village community and at present raring more than 6000 people of the valley. The present paper is an attempt of the researcher to record the perception of people regarding the viability of power projects in chanju basin in specific and in whole hilly areas of Himalayas in general. The chanju sub-basin can be divided in two parts i.e. Chanju and Charda because of two streams. The native of catchment area of these two sub-basins have been selected for the study.

Methodology:

The present paper is based on exploratory study and primary data carried by the researcher with an aim to explore the relationship between installation of power projects and its impact on the ecosystem services and the snatch ecosystem services have definitely a detrimental impact on the lives and livelihood of the people. On the

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basis of these considerations, perception of the native of power projects has been measured by using structural interview schedule. Before actual research, variable have been identified by visiting and recording the responses of the respondents and discussing the results with different stakeholders and researchers at district, state and national level by using electronic as well as telephonic media, variable have been finalized and set for actual research. On the basis of validated variables, interview schedule for final research have been compiled and actual work started. For this work 200 respondents from two study sub-areas, nine research segments (panchayats) and 35 villages have been interviewed personally by using close ended as well as open ended questions in the tool in final research. The respondents were free to express/ record their views with the researcher. All the interviews have been conducted as per convince of the respondents and after being consented, interviews have been conducted during day-time. They have been told the purpose and objectives of the research before the starting of the interview.

Methods of data collection:

The present paper is being an attempt of the researcher to explore the relationship of installation of power projects with the people of area; exploratory research method has been used. The participant observation and questionnaire methods to collect data has been used to record the perception of the natives of chanju sub-basin by participating in their routine activities and the ecosystem services used by the local people has been recorded, quantified and an assessment has been made about the supposed impacts of the installation of small power projects in this backward area by developing a suitable psychometric scale.

Sampling:

This basin is spread in 50 small and large villages, which can be categorized in 9 administrative panchayats with approximate 5500 population. For the present study whole study area was divided in two sub-area (chanju and charda), 9 administrative panchayats (research segments) and 35 villages out of 50 small villages have been selected for the research by using cluster convince random sampling method. On the basis of population of the village, respondents have been selected. It is noteworthy that the density of population of the villages of study area is varies from 10 persons

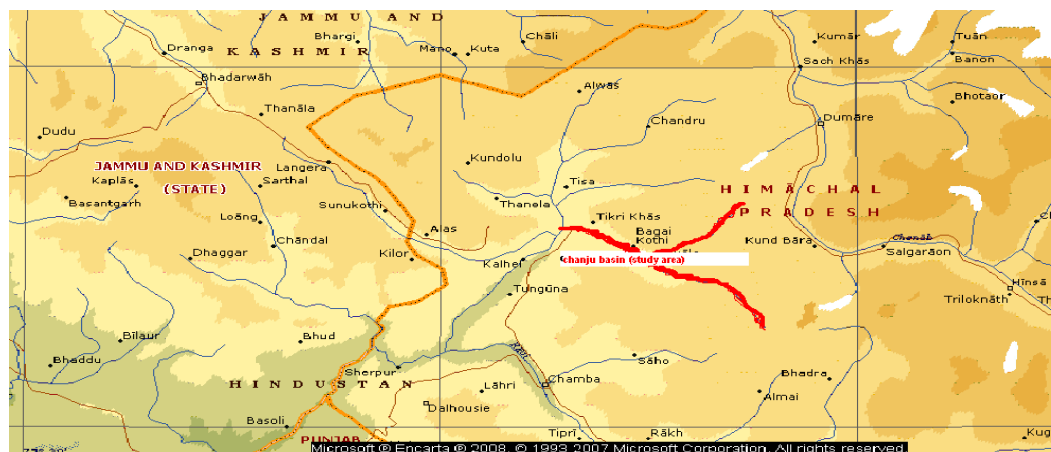
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to 300 persons. As it is evident from table: 1, all 35 study villages have got representations in the present work. The perception of people of these villages has been recorded by using open-ended direct questions. Collected data have tabulated, analyzed by applying percentage method and graphical presentation of the data.

Study Area

The study area falls in Chamba district of Himachal Pradesh (fig. 1.2), India. It is one of the remotest areas not in the state but in the whole country. Chamba district is one of the twelve districts of the Himachal Pradesh and it falls in the 55 most backward district of India. Chamba district has seven tehsils and the study area is situated in Churah tehsil of the district and Churah developmental block falls in the 35 most backward blocks in India along with Kalahandi developmental block in Orissa state.

Figure 1.2: Showing the study area:



**red line indicates chanju basin, study area*

Location of Study:

Himachal Pradesh shares its boundaries with Uttaranchal on the southeast, Punjab on the west, China on the east, Haryana on the southwest, and Jammu and Kashmir on the north. It extends from the latitudes 30°22'40" North to 33°12'40" North and longitudes 75°45' 55" East to 79°04' 20" East. The entire region of Himachal Pradesh is hilly with the altitude ranging from 350 meters to 7000 meters above sea level.

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Chamba is bordered by Jammu and Kashmir to the north-west and west, the Ladakh area of Jammu and Kashmir and Lahaul and Bara Banghal to the north-east and east, Kangra to the south-east and Gurdaspur district of Punjab to the south. It has an average elevation of 1,006 metres (3,301 ft).^[16]

The town, the district and the valley where the town is located, share the name of Chamba. The town of Chamba is located at the junction of Ravi River and its tributary, the Sal River, with the Shah Madar hill forming the backdrop on its eastern side. The Ravi flows in east-west direction forming deep canyons. During the spring and summer months, the levels of the river rise significantly from snow melt and pose a flooding risk. Record levels were experienced in early July 2005, when the National Hydroelectric Power Corporation was forced to shut down the power generation on its 300-MW Chamera Power Station. Located on the right bank of the Ravi river valley, built on successive flat terraces, the town is bounded topographically by the Dhauladhar and Zaskar ranges, south of the inner Himalayas. Chamba, despite its hill location, is well connected by road to the rest of the state and country, including Shimla, Delhi and Chandigarh along several routes. The nearest broad gauge railway stations are at Chakki Bank and Pathankot, the latter of which is 120 kilometres (75 mi) away by road.

The temperatures in summer vary between 38 °C (100 °F) and 15 °C (59 °F) and in winter: 15 °C (59 °F) and 0 °C (32 °F). The maximum temperature recorded in summer is 39 °C (102 °F) and the minimum temperature in winter is –1 °C (30 °F). Climatically March to June is said to be the best period to visit Chamba, which is a well-known hill station. The average annual rainfall in the town is 785.84 millimetres (30.939 in).

Present paper is based on the study conducted by the researcher located at Chanju *nallah*, a tributary of Baira *nallah* and sub-tributary of the River Ravi. The access distance of the project site from is State Capital (Shimla) is 495 km, from district headquarter it is 70 km and the nearest rail head is 190 km (Pathankot) and nearest airport is Jammu (240 km). The geographical co-ordinates of the study are are: Longitude: 76°12'06" E to 76°14'52" E Latitude: 32°44'14" N to 32°45'43" N.

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Results and interpretations

As *David Inouye* of Ecological Society of America, has rightly stated that ‘The cereal we eat in the morning is being brought by the wind, or that the glass of clear, cold, clean water drawn from we faucet have been purified for us by a wetland or perhaps the root system of an entire forest? Trees in front of our house are always at work and trap dust, dirt, and harmful gases from the air we breathe to sustain our life. The fire of oak logs keep us warm in the cold nights and moreover, medicines we take to get relief from pain of an ailment come to us from Nature’s warehouse of services. Furthermore, natural ecosystems perform fundamental life-support services upon which human civilization depends. Unless human activities are carefully planned and managed, valuable ecosystems will continue to be impaired or destroyed. Moreover, ecosystem services are the processes by which the environment produces resources that we often take for granted such as *clean water, timber, and habitat for fisheries, and pollination of native and agricultural plants.*

Any developmental project aiming to bring prosperity in the lives of people must take care of these components, if not, then it put the native of that vary area into psychological traumatic conditions and put their livelihood options at stake and they start dying every minute, every hour, every day and on the basis of which viability of the said development projects can be tested/measured. Same is the case with the projects which have been studied by the researcher to arrive at conclusion.

Table Showing different Eco-system Services being used by the Respondents:

| Sr. No. | Eco-system Service (s) | No. of Response | | | |
|---------|--|-----------------|------------|-----|------------|
| | | Yes | Percentage | No. | Percentage |
| 1. | Fuel wood collection | 199 | 099.50 | 001 | 005.00 |
| 2. | Grazing and fodder for cattle | 199 | 099.50 | 001 | 005.00 |
| 3. | Timber wood for House construction | 198 | 099.00 | 002 | 001.00 |
| 4. | Clean drinking Water | 199 | 099.50 | 001 | 005.00 |
| 5. | Fishing in rivulets | 199 | 099.50 | 001 | 005.00 |
| 6. | Purification of water and Air | 200 | 100.00 | --- | ---- |
| 7. | Mitigation of Drought and Flood | 194 | 097.00 | 06 | 003.00 |
| 8. | Detoxification and decomposition of waste in the Nalla | 197 | 098.50 | 03 | 001.50 |
| 9. | Make use of rivulets for burning of dead bodies | 200 | 100.00 | -- | ---- |
| 10. | Use for religious purposes (for Rites and Rituals) | 200 | 100.00 | -- | ---- |

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| | | | | | |
|-----|---|-----|--------|-----|--------|
| 11. | Use for eco-tourism/recreational purposes | 200 | 100.00 | --- | ---- |
| 12. | Swimming in the rivulets | --- | | 200 | 100.00 |
| 13 | Taking stone, sand etc. | 200 | 100.00 | --- | --- |
| 14. | Irrigational channels | 200 | 100.00 | --- | --- |

The eco-system services provided by the nature can broadly be divided in four major components: *Provisioning, Regulating, Supporting and Cultural* which further can be seen as stabilization of climate, regulating of hydrological cycle, pollination, maintenance of nutrient cycle, water purification and decomposition of wastes etc. As it has been narrated by different scholars in available literature, the eco-system services are the primer determinants of lives of people. Availability of eco-system services in any area is a guarantee of sustainable and secure living standard and sustainable future. Area under study is self-reliant and self-sufficient and having no any dependency on outside of the villages. The available services are rearing the population of whole area. To assess the availability of eco-system services in the area 14 ecosystem services have been taken to get response of the respondents. As it is evident from above table the respondents are using 13 out of 14 eco-system services.

Few eco-system services related to mention four categories have been chosen to see the impact on coming power projects on them. On the basis of the data collected during the first phase (variable identification stage) of the research, these eco-system services have been recorded and found mostly prevalent and determining lives of people by giving meaning to them. Maximum number of respondents i.e. more than 97 per cent is of the view that they are using mentioned eco-system, which shows their direct dependence on the natural system which has been provided by the nature to man as free gift and now man has to use them sensibly with futuristic sustainable approach.

Table showing Response of the Respondents regarding their perception of eco-system services as main determinant of their life and livelihood

| Sr. No. | Type of Response | No. of Responses | Percentage |
|----------------|-------------------------|-------------------------|-------------------|
| 1. | Yes | 196 | 98.00 |
| 2. | No | 004 | 02.00 |
| | Total | 200 | 100.00 |

The perception of the respondents regarding eco-system services as one of the main determinant of their life and insuring livelihood shown in this table, emphatically stressed that 98 per cent respondents responded that mentioned eco-system services are the main determinant while very meagre number of respondents i.e. only 2 per cent responded negatively. This shows the importance of eco-system services to the people of the study area.

Table showing perception of the Respondents on Availability of Eco-system Services:

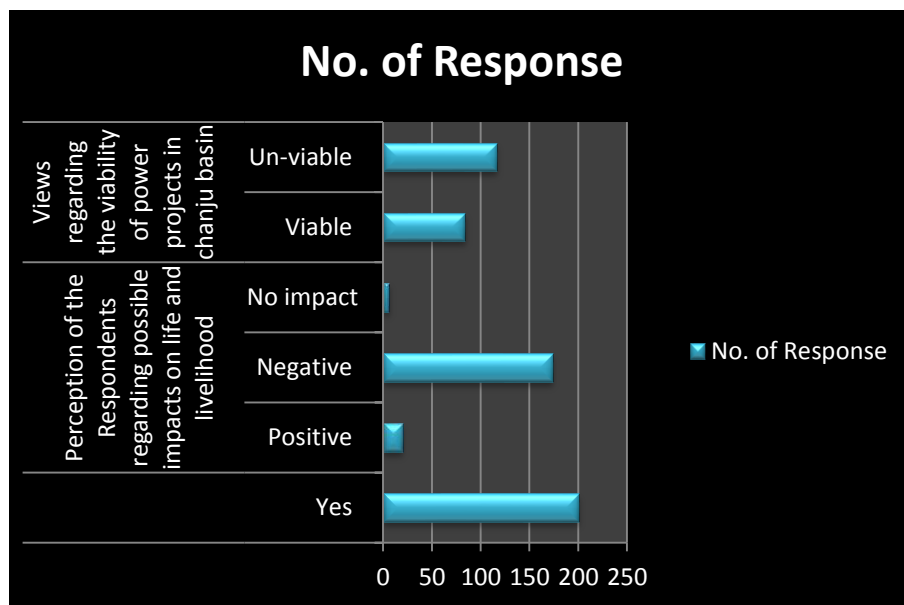
| Sr. No. | Sample Variable | Category of Response | No. of Response | Percentage |
|----------------|---|-----------------------------|------------------------|-------------------|
| 1. | Eco-system services as main determinant of lives and livelihood | Yes | 196 | 98.00 |
| | | No | 04 | 02.00 |
| 2. | Available eco-system services being used by the Respondents | Yes | 192 | 96.00 |
| | | No | 08 | 04.00 |

Availability of ecosystem services in any area is a clear indication of sound and healthy environmental surroundings. The availability of ecosystem services in natural form which is gifted by nature, but it is not necessary that people living there might be aware about the existence of these services. Same is the case with the respondents of the study area. As indicated in the table, two variables have been used to measure the perception of the respondent. The first variable received 98 per cent response which indicates that ecosystem services are the main determinant of lives and livelihood of the people/respondents and 96 per cent respondents responded positively that they are using eco-system services in their daily lives. On the basis of responses received it can be stated that people of study area are aware of ecosystem services and they are using these services since ages.

Table showing perception of Respondents regarding the Impact on lives and livelihood:

| Sr. No. | Sample Variable | Category of Response | No. of Response | Percentage |
|---------|---|----------------------|-----------------|------------|
| 1. | Knowledge of installation of power projects | Yes | 200 | 100.00 |
| 2. | Perception of the Respondents regarding possible impacts on life and livelihood | Positive | 020 | 010.00 |
| | | Negative | 174 | 087.00 |
| | | No impact | 006 | 003.00 |
| 3. | Views regarding the viability of power projects in chanju basin | Viable | 084 | 042.00 |
| | | Un-viable | 116 | 058.00 |

Figure Showing perception of Respondents regarding the Impact on lives and livelihood:



In view of above table and graphical presentation, it can be stated emphatically that the respondents at micro level and native at macro level are aware of the fact that this area is going to have power projects. Reasons responsible for this is people are very poor and are without employment and any opportunity they are knowing they rush behind that and try to grab it without knowing the positive/negative impacts.

Poor people have been allured by the representatives of corporate houses, at present they are very happy, but what would happen when they confronted with real situation. When they have been briefed about the possible impacts of forthcoming power projects, they were voiceless, then they respond to next question asked by the researcher and the question was related to the perception of the respondents regarding the possible impacts on life and livelihood and they have given three options i.e. positive impact; negative impacts and no-impact. 10 per cent respondents responded positively, 87 per cent negatively and 3 per cent stated that there would be no impact.

Respondents also have been asked the question of viability of such Clean Development Mechanism (CDM) based small power projects in the hills. The illiterate people have no any idea about CDM, they don't know the concept of carbon neutrality and they don't have any concern with the theoretical jargons of the concepts, they only know how such types of proposed developmental initiatives are going to affect their lives and livelihood.

In view of such considerations, 42 per cent respondent responded that such types of power projects are viable and should encourage in the hills, but the maximum number of respondents i.e. 58 per cent with different education level responded that such types of hydro development based projects are not viable in the hills. *Such CDM based should not encourage in the hills and hills should spare and keep far-away from hands of developers, planners and executors and the virgin hills should left without any intervention even in the name of development and local people should allow to live in the natural setting where they are living since ages from their forefathers and the required not desired development should be planned from the perspective of local people based on their needs and concerns and priority in any development particular in such virgin areas should be given to concerns of the local people not for the greater interest of the country. Their local interest should be served and given priority in planning as well as in execution* asserted by the youth of study area.

Recommendations for policy implications:

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The present paper is based on recently completed research project, submitted to UGC, New Delhi, India. To meet the aims and objectives of the project variables have been identified and later on developed in structured interview schedule and administered on the respondents of two research segments. The compiled data reveals that respondents in particular and people of chanju valley in general are using ecosystem services since ages and these services are corner stones of their lives and they are every inch dependent on them.

With the coming up of these development projects lives of people of chanju basin is going to be affected to greater extent, though there is no direct physical displacement because of geographical reasons, but the ecosystem services which are corner stones of their lives, are going to affect badly. People of the area have been allured by the developers that they have been given employment, and their concerns will be taken care of first of all and compensation is to be given. The question remained un attended and answered that if employment, for how many days? And to how many?

Mere providing monetary compensation is not going to help the people of study area and their livelihood options cannot be compensated by mere allocation of funds. It needs an intensive strategic plan to restore the services and must give them skill up gradation options so that they can live happily and with respect. People are hardly concern with the carbon credit or CDM considerations of the policy makers, they are not knowing anything about these technical jargons, they are simple people concerned with their small world which confined up to their families and extended up to the village only. They are very happy and would be happier if they are not disturbed even in the name of proposed development.

The researcher is aware of the fact the natural resource based development cannot be stopped for the sake of negative impacts on the lives of the people as these are sine-quo of any developing economy. The researcher strongly recommended his proposed model of development i.e. Benefit Sharing Participatory Model (BSPM) as an answer to existing lobbyist pressurised model of development. The benefit drawn developmental project should be shared with the local people and their concerns should be listen and taken care of first of all, I mean before the initiation of any development project and possible impact must be studied first of all not by

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the executing agency but by independent research team comprises of engineers, sociologists, ecologists, environmentalists, economists and local people. The team would decide how and where benefits are to be distributed and what would be mechanism of distribution. This distribution should be of such types that native of any development project should participate and contribute in positive way and extend their cooperation to the executing agencies which will help both stake holders. The executors will justify their CSR and better rapport with the local people and reciprocally the local people will be benefitted and they will realised the benefits of such types of developmental project and can realise the meaning of independence.

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Annexures

Annexure-I

List of Power Projects (mini and micro) in Chamba district:

| Sr. No. | Name of Project | Rivulet/ Stream | Basin | Capacity (in MW) |
|---------|---------------------|------------------|--------|------------------|
| 1 | Ajog | Ajog | Chenab | 5.00 |
| 2 | Mansa | Angred | Ravi | 5.00 |
| 3 | Baleni Ka Nallah | Baleni Ka Nallah | Ravi | 2.00 |
| 4 | Dunali | Baleni Ka Nallah | Ravi | 5.00 |
| 5 | Balij-Top | Balij Ka Nallah | Ravi | 2.00 |
| 6 | Balij Ka Nallah-III | Balij Ka Nallah | Ravi | 3.00 |
| 7 | Balij Ka Nallah | Balij Ka Nallah | Ravi | 3.50 |
| 8 | Belij | Balij Ka Nallah | Ravi | 5.00 |
| 9 | Galua | Balsio | Ravi | 5.00 |
| 10 | Balsio | Balsio | Ravi | 4.95 |
| 11 | Bhararu | Bhararu | Ravi | 2.00 |
| 12 | Chakka | Chakka | Ravi | 5.00 |
| 13 | Chakki Chakran | Chakki | Beas | 1.00 |
| 14 | Chakki-Dadiara | Chakki | Beas | 0.50 |
| 15 | Chakka | Chakki | Beas | 1.50 |
| 16 | Lower Chanju | Chanju | Ravi | 4.00 |
| 17 | Kunda Sanjoy | Chanju | Ravi | 5.00 |
| 18 | Upper Chanju | Chanju | Ravi | 4.70 |
| 19 | Chanju Mehad | Chanju-Mehad | Ravi | 5.00 |
| 20 | Kalhel Chatri | Chatri | Ravi | 2.50 |
| 21 | Chattri-I | Chatri | Ravi | 5.00 |
| 22 | Balsio-Top | Chenni | Ravi | 5.00 |
| 23 | Chaini Tapa | Chenni | Ravi | 5.00 |
| 24 | Chate Ka Nalla | Cheta Ka Nallah | Ravi | 5.00 |
| 25 | Chirchand | Chirchand | Ravi | 5.00 |
| 26 | Choned-III | Choned | Ravi | 5.00 |
| 27 | Choned-II | Choned | Ravi | 5.00 |
| 28 | Choned-I | Choned | Ravi | 5.00 |
| 29 | Dand | Dand | Ravi | 2.00 |
| 30 | Daredi | Daredi-Bhour | Ravi | 1.20 |

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| | | | | |
|----|--------------|---------------|------|------|
| 31 | Dehar | Dehar | Beas | 5.00 |
| 32 | Dhugli | Dehar | Beas | 3.50 |
| 33 | Dehar-II | Dehar | Beas | 1.50 |
| 34 | Bhujal | Dehar | Beas | 0.60 |
| 35 | Kalyana | Dehar | Beas | 0.85 |
| 36 | Dera | Dera | Ravi | 3.00 |
| 37 | Dig | Dig | Ravi | 0.50 |
| 38 | Dug | Dug Nallah | Ravi | 3.00 |
| 39 | Dukrunda-I | Dukrunda | Ravi | 3.00 |
| 40 | Dakrunda | Dukrunda | Ravi | 0.96 |
| 41 | Dukrunda | Dukrunda | Ravi | 3.00 |
| 42 | Durghed | Durghed | Ravi | 1.10 |
| 43 | Gehra | Gehra | Ravi | 2.00 |
| 44 | Rack | Gharola | Ravi | 1.80 |
| 45 | Gharwan | Gharwan-Malin | Ravi | 3.00 |
| 46 | Ghator-1 | Ghator | Ravi | 2.20 |
| 47 | Ghator Top | Ghator | Ravi | 2.00 |
| 48 | Hal | Hal | Ravi | 2.00 |
| 49 | Hared | Hared | Ravi | 3.00 |
| 50 | Holi-II | Holi | Ravi | 5.00 |
| 51 | Hul-II | Hul | Ravi | 3.40 |
| 52 | Hul | Hul | Ravi | 4.50 |
| 53 | Upper Joiner | Joiner | Ravi | 3.00 |
| 54 | Joiner | Joiner | Ravi | 3.00 |
| 55 | Joiner-II | Joiner | Ravi | 3.00 |
| 56 | Lamyali | Kalm | Beas | 0.60 |
| 57 | Kalm | Kalm | Beas | 2.00 |
| 58 | Lower Kalm | Kalm | Beas | 3.44 |
| 59 | Kamil-II | Kamil | Ravi | 5.00 |
| 60 | Kamil | Kamil | Ravi | 2.00 |
| 61 | Kandei | Kandai | Ravi | 0.50 |
| 62 | Kihan | Kihan | Ravi | 5.00 |
| 63 | Kiri | Kiri | Ravi | 1.00 |
| 64 | Kiunr | Kiunr | Ravi | 2.00 |
| 65 | Kunkali | Kunkali | Ravi | 5.00 |
| 66 | Kurhed | Kurhed | Ravi | 4.50 |
| 67 | Kurhed-II | Kurhed | Ravi | 5.00 |
| 68 | Kuwarsi | Kuwarsi | Ravi | 5.00 |
| 69 | Lura | Lura | Ravi | 1.60 |
| 70 | Kachela | Makkan | Ravi | 5.00 |
| 71 | Makkan | Makkan | Ravi | 1.15 |
| 72 | Lower Makkan | Makkan | Ravi | 5.00 |
| 73 | Mangoli | Malin | Ravi | 3.00 |
| 74 | Malin | Malin | Ravi | 2.80 |
| 75 | Manjhal | Manjhal | Ravi | 1.00 |
| 76 | Mehled | Mehled | Ravi | 3.00 |
| 77 | Panchpul | Panchpul | Beas | 2.00 |
| 78 | Pher | Pher | Ravi | 1.75 |
| 79 | Puruveda | Puru | Ravi | 1.50 |
| 80 | Raula | Raula | Ravi | 1.25 |
| 81 | Alwas | Sach | Ravi | 2.60 |
| 82 | Sakti | Sakti | Ravi | 1.00 |

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| | | | | |
|-----|----------------|-----------------|--------------|---------------|
| 83 | Sal-II | Sal | Ravi | 3.00 |
| 84 | Dikleri | Sal | Ravi | 2.00 |
| 85 | Sahu | Sal | Ravi | 5.00 |
| 86 | Kuril | Sal-Kundli | Ravi | 3.00 |
| 87 | Salun | Salun | Ravi | 4.50 |
| 88 | Channi | Samwara | Ravi | 5.00 |
| 89 | Samwara | Samwara | Ravi | 2.50 |
| 90 | Bhent Sanghani | Sanghani | Ravi | 5.00 |
| 91 | Kurtha | Saridi-Kundi | Ravi | 5.00 |
| 92 | Satnal | Satnal | Ravi | 0.50 |
| 93 | Chobia –I | Seri Kao-Chobia | Ravi | 5.00 |
| 94 | Sewa | Sewa | Ravi | 5.00 |
| 95 | Siunr | Siunr nala | Ravi | 1.50 |
| 96 | Siul-I | Suil | Ravi | 5.00 |
| 97 | Siul-II | Suil | Ravi | 5.00 |
| 98 | Siul Baroti | Suil | Ravi | 4.50 |
| 99 | Sup | Sup | Ravi | 1.00 |
| 100 | Tanger Bhaled | Tanger | Ravi | 1.50 |
| 101 | Sach | Taraila | Ravi | 5.00 |
| 102 | Upper Taraila | Taraila | Ravi | 5.00 |
| 103 | Taraila | Taraila | Ravi | 5.00 |
| 104 | Taraila-II | Taraila | Ravi | 5.00 |
| 105 | Taraila-III | Taraila | Ravi | 5.00 |
| 106 | Tulang-II | Tulang | Ravi | 2.20 |
| 107 | Tulang | Tulunki Nall | Ravi | 3.00 |
| 108 | Ubhrah | Ubhrah | Beas | 2.40 |
| 109 | Kaithili | Kainthly | Ravi | 3.00 |
| 110 | Kainthly | Kainthly | Ravi | 5.00 |
| 111 | Kuwarsi-II | Kuwarsi | Ravi | 5.00 |
| 112 | Chachul | Makkan | Ravi | 3.00 |
| 113 | Upper Makan-II | Makkan | Ravi | 5.00 |
| 114 | Garoh | Garoh | Ravi | 2.50 |
| 115 | Joiner Top-I | Joiner | Ravi | 5.00 |
| 116 | Hysrud | Joiner | Ravi | 1.00 |
| 117 | Toral-Kundli | Toral-Kundli | Ravi | 5.00 |
| | | | Total | 383.55 |

Annexure-II

Table showing Power projects in Chamba District for whom Implementation Agreement signed

| Sr No | Firm Name | Address | Project Name | Stream | Capacity (in MW) | Date of IA | Status |
|-------|-------------------------------------|--|------------------|------------------|------------------|-------------|-----------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | Brahi Hydro Electric Power Projects | 214, Empire House (Basement) Dr. D. N. Road (Ent.) A. K. | Baleni Ka Nallah | Baleni Ka Nallah | 2.00 | 01/03 /2008 | Clearance Stage |

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| | | | | | | | |
|----|--|--|-------------------------------|-----------------------|------|----------------|---------------------------|
| | Ltd. | Nayak Marg Fort Mumbai- 400001 | | | | | |
| 2 | Batot Hydro Power Ltd. | 214, Empire House (Basement) Dr. D. N. Road (Ent.) A. K. Nayak Marg Fort Mumbai- 400001 | Balij Ka Nallah | Balij Ka Nallah | 3.50 | 24/10 /2002 | Under Constructi on |
| 3 | Almi Hydro Electric Project Ltd. | 214, Empire House (Basement) Dr. D. N. Road (Ent.) A. K. Nayak Marg Fort Mumbai- 400001 | Balij Ka Nallah- III | Balij Ka Nallah | 3.00 | 01/03 /2008 | Clearance Stage |
| 4 | Ginni Global Ltd. | 2nd Floor, Shanti Chamber 11/6B, Pusa Road New Delhi- 110005.(India) | Balsio | Balsio | 4.95 | 22/12 /2005 | Under Constructi on |
| 5 | Belij Hydro Power Ltd. | B-14, 2nd Lane Sector-II, New Shima-171009 | Belij | Balij Ka Nallah | 5.00 | 14/06 /2007 | Under Constructi on |
| 6 | B.K.Saini Engineers Power Projects Pvt. Ltd. | Opp. Cheema Filling Station,Dhakki Road Pathankot (Punjab) | Chakka | Chakki | 1.50 | 07/06 /2007 | Clearance Stage |
| 7 | Chirchind Hydro Power Ltd. | V.P.O. Chhatrari, Tehsil & Distt. Chamba (H.P) 176324 | Chirchi nd | Chirchi nd | 5.00 | 16/05 /2001 | Commissi oned |
| 8 | Chatri Hydro Power (P) Ltd. | House No. 8-2- 293/82/O- 111/211, Road No. 76, Jubilee Hills, Hyderabad (A.P.)-500096. | Chhone d-I | Choned | 5.00 | 15.02 .2012 | Clearance Stage |
| 9 | Astha Projects India Ltd. | Plot No. 226, Road No. 78 Phase-III Jubilee Hills Hyderabad (A.P.)500033. | Dehar | Dehar | 5.00 | 30/03 /2000 | Commissi oned |
| 10 | Saini Techno Constructs. Co. (P) Ltd. | 236 Bajri Co. Burmah Shell Road, Pathankot (Punjab)- 145001. | Dehar- II | Dehar | 1.50 | 22/12 /2005 | Commissi oned |
| 11 | Sumitra Power | 17-B, Vasant Vihar,Talab | Dhugli | Dehar | 3.50 | 27/12 /2011 | Clearance Stage |

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| | | | | | | | |
|----|---|--|---------------|------------------|------|------------|--------------------|
| | Promoters Pvt. Ltd. | Tillo,Jammu (J&K)-180002 | | | | | |
| 12 | Mani Mahesh Hydel Power Project Co-operative Society (Regd) | Dhall House, Mohalla Sapri, Chamba (H.P.)-176310. | Dikleri | Sal | 2.00 | 12/01/2009 | Under Construction |
| 13 | Jala Shakti Ltd. | D-411, Kanchanjuga Block, Aditya Enclave, Ameerpet Hyderabad (A.P.)500016. | Dunali | Baleni Ka Nallah | 5.00 | 18/11/2002 | Under Construction |
| 14 | Global Corporation Ltd. | C/o. Tricolor Powers (P) Ltd., Near Fisheries Breeding Farm, Post office Sultanpur, Chamba-176310 | Durghe d | Durghe d | 1.10 | 01/03/2008 | Clearance Stage |
| 15 | Gehra Hydro Power Ltd. | B-14, 2nd Lane Sector-II, New Shima-171009 | Gehra | Gehra | 2.00 | 07/06/2007 | Clearance Stage |
| 16 | Hul Hydro Power Pvt. Ltd. | House No. 3-5-1105/102,First Floor, Behind Venkateshwara Motors, Hero Honda Show Room, Narayanaguda, Hyderabad-500029(A.P) | Hul | Hul | 4.50 | 26/12/2001 | Clearance Stage |
| 17 | First Hydro Generation (P) Ltd. | 128/B/1, Kilikari, New Delhi-110014 | Hul-II | Hul | 3.40 | 08/06/2005 | Clearance Stage |
| 18 | Upper Bari Power Generation (P) Ltd. | 8th Floor, Express Trade Towers, 15-16, Sector 16-A, NOIDA (U.P.)-201301 | Joiner | Joiner | 3.00 | 30.06.2011 | Clearance Stage |
| 19 | Joiner Hydro Power Projects Pvt. Ltd. | 214, Empire House (Basement) Dr. D. N. Road (Ent.) A. K. Nayak Marg Fort Mumbai-400001 | Joiner-II | Joiner | 3.00 | 01/03/2008 | Clearance Stage |
| 20 | Himpower Associates (P) Ltd. | Dall House, Mohalla Sapri Bazar, P.O.Chamba Distt. Chamba | Kalhel Chatri | Chatri | 2.50 | 05/08/2010 | Clearance Stage |

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| | | | | | | | |
|----|---|--|-------------|--------------|------|------------|--------------------|
| 21 | Sun Shine Hydro Power (P)Ltd. | Sahil Plaza Dalhouse Road, Pathankot-145001.Distt Gurdaspur | Kalm | Kalm | 2.00 | 08/06/2005 | Under Construction |
| 22 | Snowdew Hydroelectric Power Projects (P) Ltd. | Village Dhanotu, P.O. Mahadev, Tehsil S/Nagar, District Mandi (H.P.)-174402 | Kiunr | Kiunr | 2.00 | 09.02.2012 | Clearance Stage |
| 23 | Himachal Hydel Projects (P) Ltd. | SCO 263, Sector-14, Panchkula (Haryana)-134113 | Kurhed | Kurhed | 4.50 | 20/07/2004 | Under Construction |
| 24 | Sahu Hydro Power (P) Ltd. | Plot No. 103, 8-2-293/82/W/103,Road No. 7D, Jubilee Hills Hyderabad-500033 (A.P.) | Kurtha | Saridi-Kundi | 5.00 | 29/12/2011 | Clearance Stage |
| 25 | V.B. Hydro Projects Pvt. | 315-316 Sahil Plaza, Dalhousie Road, Pathankot-145001 PB. | Kuwardsi | Kuwardsi | 5.00 | 14/11/2008 | Clearance Stage |
| 26 | Virender Dogra Power Projects (P) Ltd. | 7 Green Colony Old Shahpur Road Pathankot-145001 | Manjhali | Manjhali | 1.00 | 30/03/2000 | Commissioned |
| 27 | Him Kalash Hydro Power (P) Ltd. | Plot No.-49,3rd Floor, Durga Nagar Colony, Panjagutta, Hyderabad-82 | Sahu | Sal | 5.00 | 03/09/2003 | Commissioned |
| 28 | Himgiri Infrastructure Development (P) Ltd. | 91/9 Trikuta Nagar Jammu Tawi Jammu (J & K) 180012 | Sal-II | Sal | 3.00 | 11/09/2007 | Under Construction |
| 29 | Swadeshi Distributors (P) Ltd. | 18, Sector-18, Near Maruti Material Gate, Gurgaon-122015 | Salun | Salun | 4.50 | 17/08/2010 | Clearance Stage |
| 30 | Shree Hydro Power Pvt. Ltd. | 193-A/S Sainik Colony, Jammu (J &K)- 180013. | Samwara | Samwara | 2.50 | 23/11/2011 | Clearance Stage |
| 31 | Suil Baroti Hydro Projects Ltd. | 214, Empire House (Basement) Dr. D. N. Road (Ent.) A. K. Nayak Marg Fort Mumbai-400001 | Siul Baroti | Suil | 4.50 | 06/09/2006 | Clearance Stage |

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| | | | | | | | |
|----|--|--|---------------|---------------|------|-------------|--------------------|
| 32 | Gujarat Coastal Construction Limited | 610, Yashkamal Building, Station Road Sayajgunj Baroda (Gujarat) 390005 | Suil-I | Suil | 5.00 | 06/09 /2006 | Under Construction |
| 33 | B.K.Saini Engineers Power Projects Pvt. Ltd. | Opp. Cheema Filling Station, Dhakki Road Pathankot (Punjab) | Siunr | Siunr nala | 1.50 | 08/06 /2005 | Under Construction |
| 34 | KVA Hydro (P) Ltd. | 418-419, Paradise Complex, Sayajgunj, Baroda-390005 | Suil-II | Suil | 5.00 | 25/02 /2008 | Clearance Stage |
| 35 | Jala Shakti Ltd. | D-411, Kanchanjuga Block, Aditya Enclave, Ameerpet Hyderabad (A.P.)500016. | Sup | Sup | 1.00 | 19/09 /2001 | Under Construction |
| 36 | Ginni Global Ltd. | 2nd Floor, Shanti Chamber 11/6B, Pusa Road New Delhi-110005.(India) | Taraila | Taraila | 5.00 | 14/05 /2003 | Commissioned |
| 37 | Cimaron Constructions (P) Ltd. | Gymba House, South End, Lane-IV, Sector-I, New Shimla-171009. (H.P) | Taraila-II | Taraila | 5.00 | 22/12 /2005 | Commissioned |
| 38 | Taraila Power Ltd. | Plot No. 125, Road No.71 Nav Nirman Nagar, Jubilee Hills, Hyderabad-500033. | Taraila-III | Taraila | 5.00 | 31/12 /2007 | Commissioned |
| 39 | Himachal Hydel Projects (P) Ltd. | SCO 263, Sector-14, Panchkula (Haryana)-134113 | Tulang | Tulang | 3.00 | 20/07 /2004 | Under Construction |
| 40 | Shakti Hydro Electric Company (P) Ltd. | 204, Madan Lal Block, Asiad Village, Khel Gaon, Marg New Delhi-110049. | Ubahrah | Ubhrah (Beas) | 2.40 | 08/06 /2005 | Under Construction |
| 41 | A.T. Hydro (P) Ltd. | Plot No. 125, Road No. 71, Nav Nirman Nagar, Jubilee Hills Hyderabad (A.P.) 500033 | Upper Taraila | Taraila | 5.00 | 22/12 /2005 | Commissioned |

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| | | | | | | | |
|----|---|---|----------|--------------|---------------|------------|-----------------|
| 42 | Nanal Hydro Power Consultancy Pvt. Ltd. | Vardaan Cottage, Tuti Kandi Shimla:- 171004 | Hysruind | Joiner | 3.00 | 24.02.2012 | Clearance Stage |
| | | | | Total | 152.35 | | |

| Sr. No. | Name of the Firm | Name of project | District | River basin | Capacity (in MW) | Date of MoU |
|---------|---|-----------------|----------|-------------|------------------|-------------|
| 1 | Mercury Solutions (P) Ltd., 10, Gurudwara Rakabgan Road, New Delhi-110001 | Malin | Chamba | Ravi | 2.80 | 09/12/2000 |

Annexure-III

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rojects in Chamba district

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| | | | | | | |
|----|---|----------------|--------|------|------|------------|
| 2 | M/s Kapil Mohan Associates, Hydro Power (P) Ltd., 1602, Ambadeep Building, 14, Kasturba Gandhi Marg, New Delhi-110001 | Makkan | Chamba | Ravi | 1.15 | 23/03/2001 |
| 3 | M/s Global Corporation Ltd., F-301, Lado Sarai New Delhi-30 (A-8, Ist Floor, Park New Delhi:-91) | Kiri | Chamba | Ravi | 1.00 | 31/03/2001 |
| 4 | M/s Modline Constructions Ltd., 25, Industrial area Phase-II,, Chandigarh-160002 | Bhent Sanghani | Chamba | Ravi | 5.00 | 02/06/2001 |
| 5 | M/s Techman Infra Ltd., G-1354, L.G.F., Chittranjan Park, New Delhi:110019 | Purueda | Chamba | Ravi | 1.50 | 10/07/2002 |
| 6 | M/s Techman Infra Ltd., G-1354, L.G.F., Chittranjan Park, New Delhi:110019 | Kachela | Chamba | Ravi | 5.00 | 10/07/2002 |
| 7 | M/s Techman Infra Ltd., G-1354, L.G.F., Chittranjan Park, New Delhi:110019 | Gharwan | Chamba | Ravi | 3.00 | 10/07/2002 |
| 8 | M/s Techman Infra Ltd., G-1354, L.G.F., Chittranjan Park, New Delhi:110019 | Mangoli | Chamba | Ravi | 3.00 | 10/07/2002 |
| 9 | M/s Techman Infra Ltd., G-1354, L.G.F., Chittranjan Park, New Delhi:110019 | Sach | Chamba | Ravi | 5.00 | 10/07/2002 |
| 10 | M/s Techman Infra Ltd., G-1354, L.G.F., Chittranjan Park, New Delhi:110019 | Galua | Chamba | Ravi | 5.00 | 10/07/2002 |
| 11 | M/s JanaK Machines (P) Ltd., DBH Road Batala (Punjab) 143505 | Panchpuri | Chamba | Ravi | 2.00 | 12/01/2005 |
| 12 | M/s Himson Power (P) Ltd., 3rd Floor, sunama House, Opp. Shalimar Hotel Kemps corner, Mumbai:- 400036 | Lower Kalm | Chamba | Beas | 3.44 | 12/01/2005 |
| 13 | M/s Himson Power (P) Ltd., 3rd Floor, sunama House, Opp. Shalimar Hotel Kemps corner, Mumbai:- 400036 | Upper Chanju | Chamba | Ravi | 4.70 | 12/01/2005 |

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| | | | | | | |
|----|---|----------------|--------|-------|-------|------------|
| 14 | M/s Himson Power (P) Ltd., 3rd Floor, sunama House, Opp. Shalimar Hotel Kempes corner, Mumbai:- 400036 | Bhararu | Chamba | Ravi | 2.00 | 12/01/2005 |
| 15 | M/s Snow Valley Hydro Power (Partnership Firm) Vill. Mugla PO, Hardaspura, Chamba Distt.Chamba | Chobia - I | Chamba | Ravi | 5.00 | 03/11/2006 |
| 16 | M/s Daduji Engineering & Power Projects (P) Ltd., 21, Parkash Market, Dharampura Bazar, Patiala (Punjab)-147001 | Lower Chanju | Chamba | Ravi | 4.00 | 05/02/2005 |
| 17 | M/s Bhatiyat Chamba Hydro Power Venture Pvt. Ltd. Ranital Distt. Kangra H.P. | Chakki Chakran | Chamba | Beas | 1.00 | 03/11/2006 |
| 18 | M/s Pitambra Hydro Electric Project,Hydro Complex, Lane Opp. Embassy Hotel, Dhangu Road, Pathankot.(VPO Juanta Distt. Kangra H.P.) | Chattri-I | Chamba | Ravi | 5.00 | 07/06/2007 |
| 19 | M/s Pitambra Hydro Electric Project, Hydro Complex, Lane Opp. Embassy Hotel, Dhangu Road, Pathankot (Punjab) (VPO Juam Juanta Distt. Kangra H.P.) | Channi | Chamba | Ravi | 5.00 | 07/06/2007 |
| 20 | M/S Shree Hydro Power Pvt. Ltd., 193-A/S Sainik Colony, Jammu (J &K) 180013. | Ghator-I | Chamba | Ravi | 2.20 | 15/02/2008 |
| 21 | M/S Sabee Finanz Pvt. Ltd., 93, H.4/5 Suvisha Kunj Pritampura Delhi:- 110034. | Mansa | Chamba | Ravi | 5.00 | 16/02/2008 |
| 22 | M/S Sabee Finanz Pvt. Ltd., 93, H.4/5 Suvisha Kunj Pritampura Delhi:- 110034. | Alwas | Chamba | Ravi | 2.60 | 16/02/2008 |
| | | | | Total | 74.39 | |

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