

## Dhauladhar Mountain Range: The Perennial Source of Water



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### Abstract

This study was conducted on the Neugal rivulet which is a perennial source of water and a sub-tributary of the river Indus. It originates from Dhauladhar, a southern branch of the main outer Himalayan chain of mountains and flows through Kangra valley in Kangra District of Himachal Pradesh. The main objective of the study was to know about the purposes for which water of the rivulet is used and also to understand threats to this precious natural resource. The information was elicited through primary and secondary sources. It was observed that more than three dozens of Kuhls, the channels diverting water from the Neugal, including the Kripal kuhl, which has the unique distinction of being the oldest, longest and the largest such water course in the state of Himachal Pradesh, have been developed. These together provide irrigation to 33,528 hectares of land which comprises 89% of the total irrigated area in the district. Besides, a couple of hydroelectric power projects have come up on the banks of it during recent years. Apart from its water being used in domestic chores, drinking purposes and running several Gharat/Panchakies (Watermills), it is also used to irrigate tea gardens of Palampur, the tea capital of North India. Tourist throng Sourabh Van Vihar and other picnic spots developed along the rivulet and its Kuhls. However, construction of buildings and littering into the Kuhls by inhabitants, siltation, landslides and seismic tremors tend to pose threat to optimum utilization of its water. It calls for immediate checking of wastage of water, dissuading/ penalizing garbage throwers, beautifying more spots, and declaring more than three century old Kripal Kuhl as a national heritage.

**Keywords:** The Himalayas, Rivulet, Kuhls, Irrigation, Littering,

### Introduction

Being live to the essentiality of water, human kind has chosen to inhabit near sources of water since time immemorial. Water is not just a chemical-physical substance<sup>1</sup> but a critical part of socio-economic life of the people. Celebration of '*Water for Life: International Decade for Action (2005-2015)*' reinforces imperativeness and usefulness of water for human life. Dhauladhar mountain range, one of the branches of Outer Himalayan chain of mountains, is a perennial source of water to significant populace and geographical region in the state of Himachal Pradesh. The range abruptly shoots up like a wall with its face towards Kangra valley. Steep rise of mountain from average height of about 1100 meters to more than 4500 meters above mean sea level has twin effects on climatic conditions of the region. First, it tends to stop clouds moving towards mountain resulting in heavy snow fall on higher reaches and incessant rains in the foothills and the valley. Second, clouds formed from its blanket of snow result in rain and snowfall making the region witnessing one of the highest rainfalls on the globe. Thus this white range becomes perennial source of water to rivers and rivulets originating from it.

### Aim of the Study

Main objectives of this research endeavor are as under.

1. To know about the purposes for which water of Neugal rivulet is used.
2. To understand threats to this precious natural resource.
3. To suggest measures to preserve heritage of Kuhls.

### Methodology

This study was conducted on Neugal which, apart from Binwa, Gaj, Baner and Chakii rivulets, originates from Dhauladhar mountain range and flows through the length and breadth of Kangra district of State of Himachal Pradesh. The rivulet, after traversing a distance of about thirty three odd kilometers joins Beas river, a tributary of mighty Indus river. Significant portion of its water is diverted through three dozen Kuhls- a

system of gravity flow of water and is used for a number of purposes. Therefore, it was decided to take Kirpal Chand Kuhl as a sample of the study. It is among the oldest and longest surface channels diverting water from a natural flowing stream in the entire state. The information for this study was elicited through primary and secondary sources. Primary information was obtained using participant & non-participant observation and interviews from stakeholders- farmers, governmental officials and local residents. However secondary information was collected from various government departments. Apart from scanning books, journals, magazines and newspapers information was also retrieved from various sites. Exploratory and descriptive designs have been used in the study.

**Neugal: The Perennial Rivulet**

A perennial river or rivulet is a stream (channel) that has continuous flow in parts of its stream bed all year round during years of normal rainfall.<sup>2</sup> Perennial<sup>3</sup> describes a stream based on its usual level of flow and is related to the steam being gaining system. Such stream is below the water table and receives groundwater flow through springs or seepage. It may have sections of each type, depending on the geologic area over which it flows. The perennial Neugal rivulet came into existence with the confluence of two streams originating in the high reaches of snow laden Dhauladhar Mountain range just opposite to the Palampur town. Within a kilometer of journey of Neugal, Subhash and Om, two hydroelectric projects have come up. A hanging bridge was constructed on the stream to allow smooth human and cattle passage to both of its sides. During first decade of twentieth century a huge bridge was also constructed just adjacent to the hanging bridge to facilitate vehicular traffic. Location of origin of Neugal and both the bridges is visible in the photo.



**Picture1:Location of origin of Neugal in Dhauladhar Mountain Range**

Besides, a sprawling Saurabh *Van Vihar* has been developed on the other side of the bridges. Known for its natural beauty and dancing stream flowing amidst boulders and young dense forest of oak, pines and variety of other types of trees, it is thronged by tourists particularly during the summer.

**Kuhls of the Neugal Basin**

Dozens of Kuhls have been carved from the Neugal. Two dozens of kuhls namely

1. Ghran
2. Diwan Chand
3. Mian Fateh Chand
4. Dai
5. Ghughrul

6. Kirpal Chand
  7. Raniya
  8. Mahang
  9. Loharal
  10. Taruhl
  11. Chamruhl
  12. Patnul
  13. Menjha
  14. Sangar Chand
  15. Masanol
  16. Spein
  17. Sulah da Cho
  18. Saldian
  19. Macchlana
  20. Kami
  21. Rein da Cho
  22. Bouru da Cho
  23. Upperli
  24. Bhjli) flow on the left bank of the Neugal
- However, one dozen kuhls namely
1. Bhradi
  2. Chanogi
  3. Bhagotla
  4. Kathul
  5. Sapruhl
  6. Pathan
  7. Rai
  8. Makruhl
  9. Samruhl
  10. Pangwan
  11. Sonia
  12. Gagruhl) flow on its right bank.

Table 1 exhibits information about right and left bank *Kuhls* of the Neugal basin and villages being covered by these channels of water.

**Table 1 Kuhls of the Neugal basin**

Sr. No.	Bank of Neugal basin	Name of Revenue village	Name of Kuhl
1.	Left	1.Bandla 2. Ghuggar 3. Sidhpur Rani 4. Sidhpur Sarkari 5. Khalet 6. Menjha 7. Battu Palam 8. Jasun Samola 9. Raipur 10. Henja 11. Aria 12. Saloh 13. Sulh 14. Paror 15. Garla Sarkari 16. Garla Dei 17. Bhawarna 18. Ninaon 19. Dahoh 20. Ghar Jamula 21. Mundi 22. Banahu	1. Ghran 2. Diwan Chand 3. Mian Fateh Chand 4. Dai 5. Ghughrul 6. Kirpal Chand 7. Raniya 8. Mahang 9. Loharal 10. Taruhl 11. Chamruhl 12. Patnu 13. Menjha 14. Sangar Chand 15. Masanol 16. Spein 17. SulahdaCho 18. Saldian 19. Macchlana 20. Kami 21. Rein daCho 22.BourudaCho 23. Upperli 24. Bhjli

2.	Right	1.Kandi	1. Bhradi
		2. Bhagotla	2. Chanogi
		3. Lalla	3. Bhagotla
		4. Paror	4. Kathul
		5. Kharot	5. Sapruhl
		6. Pamapar	6. Pathan
		7. Gaggal	7. Rai
		8. Dheera	8. Makruhl
		9. Naura	9. Samruhl
		10. Purba	10. Pangwan
			11. Sonia
			12. Gagruhl

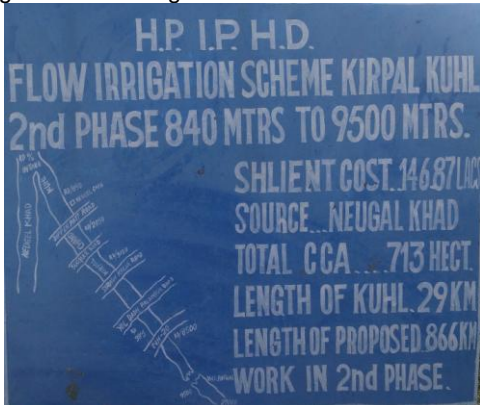
Kangra valley in Himachal Pradesh has the most extensive network of these engineering marvels. Approximately 715 major and over 2500 minor *kuhls* irrigate more than 30,000 hectares of land in the valley (Baker 1996). Pre-colonial Katoch rulers of Kangra sponsored the construction of 19 of the longest and largest *kuhl* irrigation systems in the region, which is why most of these *kuhls* are named after them.

Among these three dozen odd *Kuhls* some were constructed more than two to three centuries ago and each of them is at least twenty or more kilometers long. Information about such *Kuhls* has been compressed in table 2 to have snap shot view of their factual position.

Sr. No.	Name of Kuhl	Year of construction	Command area (Hect.)	Length (Kms.)	Bank of Neugal
1.	Kripal Chand Kuhl	1690-97	1713	33	Left bank Kuhl
2.	Dewan Chand Kuhl	1690-97	185	25	
3.	Dai Kuhl	1775-1805	357	25	
4.	Mian Fateh Chand Kuhl	1775-1805	256	20	
5.	Rai Kuhl	1775-1805	820	20	Right bank Kuhl

**Table 2 State Sponsored Large Kuhls**  
**Kripal Chand Kuhl**

'Kripal Chand Kuhl', which runs through Palampur town and the Palam valley, was named after Kirpal Chand, brother of Raja Bhim Chand who ruled erstwhile Kangra during the 1690s. It was constructed during 1690-97 and has a command area of 1713 hectare. The state sponsored Kuhl has a length of 33 kilometers and has a unique distinction of being oldest and longest *Kuhl* in the state.



**Picture 2: Track of Kripal Kuhl as developed by Government of Himachal Pradesh**

Weathering effects, intermittent tremors and host of other factors necessitate its maintenance. The state government earmarks funds for this purpose. Picture 2 gives a glimpse of road map of this flow irrigation system and salient features of the ongoing second phase of work being done on the *Kuhl*.

**Tea gardens at Palampur**

Lush green Kangra tea gardens spread greenery all around the Palampur town. The anti-oxidant properties of Kangra tea has made it popular drink among its lovers. Although Kangra cultivates both black tea and green tea, black tea constitutes around 90 percent of the production.



**Picture 3: Kripal Kuhl and tea garden at Palampur**

Tea was first grown in the Kangra region in the mid-19th century. After a feasibility survey in 1848 showed the area being suitable for tea plantation, a Chinese variety of *Camellia sinensis* was planted in this region. Kangra tea is renowned for its unique color and flavor. The unique characteristics of the tea are attributed to the geographical properties of the region.<sup>4</sup>

**Water Mill on Kripal Kuhl**

Several water mills have been developed on the Kripal Kuhls. These cater to the needs of wheat, rice and maize grinding needs of the local residents.



**Picture 4: Water Mill on Kripal Kuhl**

Grinding of grain in watermills is a millennia old practice. A watermill<sup>5</sup> is a structure that uses a water wheel or turbine to drive a mechanical process such as flour, lumber or textile production, or metal shaping (rolling, grinding or wire drawing). There are two basic types of watermills, one powered by a vertical waterwheel through a gearing mechanism, and the other equipped with a horizontal waterwheel without such a mechanism. The former type can be further divided, depending on where the water hits the wheel paddles, into undershot, overshot, breast shot and pitch back (back shot or reverse shot) of waterwheel mills. Other types of water mills include tide mills and ship mills.

#### Main Findings

Dhauladhar mountain range abruptly rising by more than four times the height of Kangra valley above the mean sea level creates unprecedented geo-climatic conditions and ecosystem on the globe.

The mountain remains snow laden for a significant period during the year and becomes perennial source of water to a number of rivers and rivulets. It gives breathtaking view to the entire valley. Persistent cool air flowing from it keeps the foothills and significant portion of the plains cooler during the summer.

Neugal a perennial rivulet originates from snowy water of Dhauladhar and makes a Palam valley, an integral part of Kangra valley.

Sauabh Van Vihar<sup>6</sup> located at the bank of Neugal in Kwat village is a wonderful nature park spread over an area of 13 square kilometers. It is dedicated to a great India martyr and hero of pre-Kargil war Captain Saurabh Kalia who was awarded Ashok Chakra posthumously.

Two hydroelectric power projects, harnessing the inexhaustible source of renewable energy for generating hydroelectricity, have been developed by private entrepreneurs diverting water of Neugal rivulet.

Three dozen Kuhls, originate from the Neugal and are great assets of this region. of these surface channels diverting water from the rivulet, length of five Kuhls is more than 20 kilometers and all of them came into existence more than two centuries ago.

Water of these Kuhls is utilized for irrigating tea gardens. The lush tea gardens give Palampur a distinction of being tea capital of North West India. These Kuhls together provide irrigation to 33,528 hectares of land.

The Kripal Kuhl, the longest Kuhl in the state of Himachal Pradesh, was constructed during 1690-1697. The 33 kilometers long Kuhl is also the longest one in the state. Apart from domestic use & drinking purposes, its water is used in running several *Gharat/ Panchakies* (Watermills) which substantially fulfills the need of people inhabiting the region in providing fresh flour of wheat, maize, rice etc.

It gives solace to the tourists taking dips in the cold water of Kripal Kuhl at the Neugal picnic spot. During the summer they feel like being in the heaven and find relief from the scorching heat by moving into the icy water of the Kuhl.

As of May 2015, there are 5,900 tea gardens in the area covering about 2,312 hectares of land in the slopes along Dhauladhar. The annual production of tea hovered around 9 lakh kg during 2015<sup>7</sup>. The Kangra tea was granted the Geographical Indication tag in 2005.

#### Suggestions

Construction of buildings and littering into the *Kuhls* by inhabitants, siltation, landslides and seismic tremors tend to pose threat to the Kripal *Kuhl*. It calls for immediate checking of wastage of water, dissuading/ penalizing garbage throwers, beautifying more spots, and declaring more than three century old Kripal Kuhl as a national heritage.

One of the policy options<sup>8</sup> to increase the efficiency in the provision of scarce water resources is a reduction in transaction costs in water chains by developing integrated forms of water management. Establishment of a river basin authority for an efficient co-ordination of policy measures in the relevant areas, developing a coherent policy addressing the entire water chain and integrated strategies regarding all water functions in relation to relevant spatial, environmental and socio-economic functions are necessary from theoretical and practical point of view. Spreading of public awareness<sup>9</sup> and boosting participation in order to ensure full benefit of the service through such activities as hygiene and health issues could go a long way in better utilization of perennial source of water. Besides, awareness of civil responsibility to ensure proper accountable governance and to ensure public support of the service which is essential to establishing the willingness to pay for services could also be important steps.

#### Conclusion

Efforts must be made at community and governmental level to check the draining water and to overhaul the Kuhls which are time tested and inexhaustible perennial source of water in the region. Private operators must be involved in beautifying these systems of gravity flow of water. A movement needs to be started to penalize those who overtly or covertly uglify the Kuhls and also to publically appreciate those who have contributed in their beautification. Keeping in view the usefulness of the Kuhls it is high time that the three century old Kripal Kuhls must be declared as a national heritage.

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