

Forest Management, Ecological Imbalance And Landslides : A Case Study Of Colonial Darjeeling.

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ABSTRACT: Colonial Darjeeling had witnessed different types of natural calamities. But landslide was a major problem in this region. Landslides in early-colonial Darjeeling were less severe than the later colonial period. Severity of the landslides in early-colonial Darjeeling was less, because of the absence of deforestation and harmonious relationship between forest and people. Ecological balance of Darjeeling didn't disturb in early-colonial period by the anthropogenic reasons. Though there were natural factors behind the landslides in early-colonial Darjeeling, but anthropogenic factors were absent. But in the later colonial period anthropogenic causes were responsible for severe landslides. Though different anthropogenic causes (e.g. haphazard construction, unscientific slope use, urbanization, many other development programs etc.) were responsible for landslides in later colonial period, but deforestation was a major constituent which had a far reaching consequences for the ecological imbalance in this region. This imbalance resulted severe landslides in later colonial period. The commercial outlook and exploitative nature of the British forest policies were responsible for the failure of the conservation of forests which led to the ecological imbalance in colonial Darjeeling. British response or relief measures towards the landslides were not satisfactory.

KEYWORDS: Colonial Darjeeling, Ecology, Forest, Landslide.

Date of Submission: 20-07-2018

Date of acceptance: 04-08-2018

I. INTRODUCTION

In India, ecological history writing is a very new phenomenon. The ecological history writing in India has got a new height under Ramachandra Guha And Madhav Gadgil. They have proposed a general aspect of ecological history which discusses the changing human interaction with living resources, the different modes of resource use in pre-modern Indian history and damages caused by the colonial intervention in the ecology. Colonial intervention on the Indian forests raised popular resistance and conflicts. Both the authors have given enough importance on the detailed regional level studies for the reconstruction of ecological history. They opined that, '*ultimately, the ecological history of India must be constructed around detailed regional studies, sharply bounded in time and space.*'¹

Landslide is generally a situation when downward movement of earth materials take place. As defined by John J. Clague and Nicholas J. Roberts- '*The only commonality to landslides is captured in their generally accepted definition: the downslope movements of earth material under the influence of gravity.*'² In 'Landslides and Related Phenomena' (Sharpe, 1938); '*Landslides*' are defined as '*the perceptible downward sliding or falling off a relatively dry mass of earth, rock or a mixture of the two*'. So, we can say that landslide is a phenomenon of downslope or downward falling or sliding of earth materials.

There are two kinds of landslides- natural and man made. Intensive rainfall and earthquake are the primary causes of the landslides. But these are the natural and immediate causes of landslides. The anthropogenic activities may create background for landslide and aggravate the situation of landslides.³ Loose material forming landslides are often a result of weathering. It is a process of slow and gradual break up of outer soil.⁴ For this reason importance has been given to the protective measures.

Landslip or landslide is a very usual feature in most of the hilly regions in India like, Jammu Kashmir, Himachal Pradesh, Kumayun, Sikkim, North-eastern hilly states and Darjeeling etc. These areas of Himalayan region are regarded as the avalanche and landslide zone. Landslide generally take place in those areas of Himalayan foothills where rainfall is prominent. Among the foothills of Himalayas the Darjeeling and Sikkim Himalayas are the most vulnerable areas of landslide. Darjeeling Himalayas (Part of Eastern Himalayan ranges) is drained by many streams and rivers such as Tista, Rangeet, Mahananda, Jaldhaka, Balason, Mechi, Lish, Gish, Murti etc. and composed of soft phyllite, schists, and gneiss and this region are high susceptible to a

landslide. Historically this region had witnessed many landslides.⁵

Before 1835, Darjeeling was a part of Sikkim. The British got the nucleus of Darjeeling from Sikkim. The territory of Darjeeling was restored by the East India Company to Sikkim from Nepal in the Anglo-Nepal war of 1817. For this reason as a mark of respect and friendship the ruler of Sikkim gifted it to the then Governor General, Lord William Bentinck in 1835 (1st February). But later on gradually Darjeeling was completely annexed by the British. Kalimpong (Part of the kingdom of Bhutan) was annexed in 1865. Geographically this district extends from 26°31' to 27° 13' north latitude, and it is between 87° 59' and 88° 53' east longitude. According to W.W. Hunter the total area of the district in 1876 was 1,234 sq. miles and according to O'Malley's Gazetteer (1907) the total area of the district was 1,164 sq. miles.

The present study of landslide in colonial Darjeeling is a regional outlook to the ecological history. Though there is a large number of secondary works on landslides in colonial Darjeeling. But one thing noticeable here is that all the available works on landslip or landslide in colonial Darjeeling don't analyze the role, policy and response of the colonial government in the matter of forest management, ecological imbalance and its consequence as landslide. Through this paper an attempt has been made to analyze the role, policy, relief measures and response of the British in the matter of landslide in colonial Darjeeling.

II. LANDSLIDES IN EARLY-COLONIAL DARJEELING

Though much data on landslides in early-colonial Darjeeling is not available. But based on the available references it can be assumed that the landslides in early-colonial Darjeeling were not too much destructive as it was in the later colonial period. According to the gazetteer of Darjeeling (O'Malley, L.S.S., 1907) the greatest danger of Darjeeling district was landslip. Sir Joseph D. Hooker mentioned enormous landslips during his travels in the initial period of British Darjeeling. Anis Chattopadhyay, 1998 opines, '*Although landslides, prior to 1899, are not recorded in detail, it is evident from the travel accounts of Joseph Hooker that landslide scars have always been prominent features here.*'⁶

Sir Joseph D. Hooker was the first person who had given systematic report on landslides in the Darjeeling hills in 1854. He travelled Darjeeling in 1848-49 when he came across several enormous landslips. According to Hooker the most prominent effect of the steepness of the valleys was main reason for landslips.⁷ Sir Joseph D. Hooker writes, '*It is in the rainy season that landslips are most frequent, and shortly after rain they are pretty sure to be heard far or near.*'⁸ During the initial period of the colonial rule the destructiveness of landslide was not same as the later colonial period. As quoted in the gazetteer of Darjeeling (O'Malley, L.S.S. 1907) '*No great calamity (landslide) is, however, known to have been caused in this way, so far as the district of Darjeeling is concerned prior to the year 1899....*' (O'Malley, L.S.S. 1907, p. 101) We can say the severity of landslides in early-colonial Darjeeling was lower than the later colonial Darjeeling.

The major reason for less severe landslides in early-colonial Darjeeling can be regarded as non exploitation or destruction of forest reserves. Prior to the British occupation, the relationship between the forest and the people were harmonious.⁹

Before the colonial intervention in Darjeeling forests, this region was totally an untouched or virgin area with limited resources use by the minimal local inhabitants. In 1835, the population of Darjeeling was only 100.¹⁰ There was an eco-friendly and harmonious relationship between man and nature. As opined by Diganta Chakraborty, 2004, '*Not only the Indians, the Lepchas, Sikkimese and the Bhutias did not unnecessarily destroy forests. To do any harm to trees was considered as a sin in Bhutan. The superstition that forest is the habitat of the demons also helped to preserve forests.*'¹¹ Ram Prasad Sharma, 2012 opines, pre-colonial Darjeeling was dominated by virgin unspoiled forest.¹²

Lt. General Lloyd visited Darjeeling in 1824. He describes that Darjeeling was clothed from summit to base with virgin forests. The early Britishers were impressed by the great extent of the forests rather than by the benefit to be obtained from them. In 1848, J. D. Hooker had seen (Terai) as a dusky forest.¹³

So, the non destruction of forests in early-colonial Darjeeling was very helpful for less severe landslides. Natural causes of landslides may be present at that time, but anthropogenic causes were not present. But in the later colonial period anthropogenic causes played a major role in the matter of landslides.

III. LANDSLIDES IN LATER COLONIAL DARJEELING

Though there were large number of landslides in Darjeeling, but the landslides of 1899 and 1934 were remarkably most devastating ones. Sanghamitra Adhya, 2009, states, '*From the available records, it may be said that the first disastrous landslip occurred on 24.09.1899, which caused widespread destruction of houses, roads and properties. The second major event of landslips in Darjeeling took place on 15.01.1934 due to Bihar-Nepal earthquake which was responsible for widespread destruction, though not of equal magnitude as was experienced during 1899.*'¹⁴

No great calamity of landslips have been taken place before the 1899. The unprecedented rainfall of 1899 from 24-25th September resulted landslips, which caused loss of lives, destruction of houses, roads and property. Heavy rainfall along with cyclone on 23th September was devastating one. At Rangbi, the landslide extended from an altitude of 7000 feet to the bottom of the valley and it had a width of 250 yards. The number of loss of life in Darjeeling was 219 (all natives) and in Kurseong subdivision it was 9. The Tista river came down heavily and all the houses at Tista Bazar were swept away. Tea gardens suffered heavily. Nearly 2000 acres of tea gardens were destroyed. Total value of loss was more than 10 lakhs of rupees. Large stretches of forests were swept away. Three quarters of Balason forest was washed away. The roads were breached in the all directions. The Cart road was seriously damaged from whole of its length from Darjeeling to Ghum and many places between Ghum to Kurseong. Tista valley road completely disappeared. The railways also terribly damaged. In some places it was hanging in mid-air over gaping chasms. There was numerous places where paths were blocked by electric wires, debris and trees. The stoppage of communication system resulted high price of food items. In Darjeeling, itself the loss of life and property was appalling, 62 natives and 10 Europeans being killed, while the value of property destroyed amounted to lakhs of rupees, it is noteworthy that there were more than 72 deaths recorded.¹⁵

Deaths occurred more or less all over this area, but the loss of life was greatest at Pul Bazar, where 67 deaths were recorded. Here, the bazaar was situated on the banks of the Little Rangit, which rose some 30 to 50 feet, carrying all before it; and it is presumed that numerous landslips dammed up its waters further up stream, with the result that huge masses of water precipitated when the dams burst. At the same time, the Tista came down in flood of unprecedented height, and over flooding its banks caused widespread damage.¹⁶

Though earthquakes are common in the Darjeeling Himalayas, they were never a cause for landslides, until the earthquakes of 1897 and 1934, which affected the region near Tindharia Station. Landslips also occurred at several places in the Tista Valley below Kalimpong. Prior to 1897 and 1934 the foothills had never been damaged by earthquakes.¹⁷

Gradual deforestation loosened the protective cover of the soil. The shocks of earthquakes were fatal to the hill areas specifically in those which were less protective by forest cover. Earthquakes of 1842, 1849, 1863, 1869, 1930 didn't cause immediate landslides, but it destabilized hill slopes. It was the earthquakes of 1897 (Assam earthquake, 12th June) and 1934 (Nepal-Bihar earthquake, 15th January) which destabilized hill slopes and caused for immediate landslides. During the earthquake of 1897 landslide took place at Tindharia. Earthquake of 1834 caused for landslide at several places in the Tista valley below Kalimpong.¹⁸

It's clear that the immediate causes of landslides were rain or earthquake. But the responsibility of deep rooted anthropogenic causes like deforestation, unscientific land or slope use, haphazard construction can not be denied. But it was mainly deforestation which aggregated the dangers of landslides most in later colonial Darjeeling and created a chain reaction to other related causes of landslide.

IV. ECOLOGICAL IMBALANCE

Ecology is a branch of science which defines the relationship between biotic (plants, animals and bacteria etc.) things and their physical environment viz abiotic factors (soil, air, water etc.). When the natural balance of an ecosystem disturbed by natural or human caused activities or action it led to the ecological imbalance.¹⁹

Deforestation is a major anthropogenic factor for ecological imbalance. Felling of trees can destabilize protective cover of the soil. This situations can be more dangerous during the rainy seasons. Because of absorption of moisture due to this hard soil can be loosened. Deforestation can loosened the protective cover of soil. Partial clearing and shifting cultivation is less disruptive. Deforestation also can affect in drainage system and soil erosion. Conversion of forest into cultivation land destabilizes root strength of soil.²⁰

British occupation in Darjeeling, had destabilized its ecological balance. The colonial government initiated different development programs in this region in the cost of destruction of forest. Gradual and huge destruction of forests for commercial use had a negative impact on the ecology and environment in Darjeeling. Huge destruction of forest, destabilized the ecological balance in this region. This resulted ecological change, loosening of hill slopes and protective cover of soil etc. For this reason, during heavy rainfall or during the earthquakes a large number of landslides were caused.

Now the questions are - why the process of deforestation took place in Darjeeling and how the British encountered to this phenomenon? Was their policy towards forest conservation effective? How far they were successful in preventing landslides in Darjeeling hills?

V. REASONS FOR DEFORESTATION

The nucleus of the Darjeeling district was acquired by the East India Company in 1835 from the Raja of Sikkim. During this time this area had only 100 people. (Dash, A. Jules. 1947, p. 49) In 1839, Dr. Campbell

transferred to Darjeeling as superintendent from Nepal. He gave enough efforts to encourage people to come in Darjeeling. (Dash, A. Jules. 1947, p. 38) The Company's decision to make Darjeeling as a hill resort and sanatorium made opportunities to immigrate and take part in the development. In 1869, population of Darjeeling became over 22000. (Dash, A. Jules. 1947, p. 49) Kalimpong was added in 1865 after the Bhutan war. Then the population of Kalimpong was 3536, but in 1881, it became 12683. There was an expansion of population between 1872 to 1891. This huge population growth was due to development of tea industries and the influx of settlers to cultivate the waste lands. In 1872, there were 74 tea state in the district with 14000 acres planted, but in 1891, it changed into 177 and 45000 acres. There was improvement in the communications due to the building of railways and roadways. (Dash, A. Jules. 1947, p. 50) This huge population increase and development activities in Darjeeling were responsible for destruction of forest. With the growing population, forest land were turned into cultivation land. Different development activities needed forest clearance.

The year 1866 is a mark of epoch in the history of development in Darjeeling. Major development works took place after this period. Huge forest was brought under cultivation for political and agricultural expansion. Some new species like tea, cinchona, potatoes, cardamoms, oranges were introduced in Darjeeling. As quoted in the Darjeeling district gazetteer, "*Rapid extension of agriculture in the early days of development resulted in the clearance of large areas of forest at favourable altitudes.*" (Dash, A. Jules. 1947, p. 41) Opening of roads (1839) and railways (1881) were led to the deforestation and these destabilized hill slopes. Forest resources were utilized by the colonial government in different ways. The timber would be used for the manufacturer of tea boxes and charcoal, for bridge and house building and as fuel both for domestic purposes and drying of tea. (Dash, A. Jules. 1947, p. 123) The supply of timber was also for the war purpose. (Dash, A. Jules. 1947, p. 132)

Along with the Tea gardens, Cinchona plantations were initiated in Darjeeling which led to forest destruction. Between 1861-1869 Cinchona plantation was introduced in Darjeeling, but between 1880 and 1890 it gained much attention. (Dash, A. Jules. 1947, pp. 140-144) Charcoal making industry was in its flourishing stage. During the war time Darjeeling consumed over 350000 bags of charcoal per annum. Kilns were made near the forest for cutting of production price. There was also timber sawing industry in Siliguri. (Dash, A. Jules. 1947, pp. 148-150)

In the Kurseong division early management was mainly directed to the exploitation of Sal, sold for sleepers. This resulted disappearance of Sal trees above 5 feet. (Dash, A. Jules. p. 135)

Though minerals like coal, graphite, iron, copper were not very much profitable to the British, but quarrying of mines led to the destabilization of the ecology. Local stones were used for building purpose. (Dash, A. Jules. pp. 9-10)

The process of deforestation took place in Darjeeling due to the British developmental programs like construction of dams, construction of roads, establishment of railway link (from Sukna to Darjeeling railway line), urbanization, tea plantation and building factories, quarry/mines, felling of trees for fuel, clearing of forest for agriculture, industry and forest fires (Khasmahal forests of Kalimpong subdivision) etc.²¹

So, it can be said that huge population influx resulted clearance of forests for the cultivation. Along with this the introduction of tea, production of cinchona, urbanization, quarrying, mining, commercial use of forest, many other development activities etc. resulted deforestation.

VI. FOREST CONSERVATION

The need of forest conservation for protection against landslide was realised by different British officials. In the matter of landslide, divisional forest officer of Darjeeling observed that "*No year passes without landslips occurring to a greater or smaller extent in these hills. They would have been far more numerous and serious if the hills were completely laid bare of trees. The trees in the forest not only cover the soil and hold the force of the torrential rain but their roots bind the soil and keep it porous thus allowing the droppings from the crown slowly to percolate and feed the springs continuously.*"²²

The divisional forest officer of Kalimpong states – "*The dangers of soil erosion are becoming more and more evident in those parts of the Kalimpong Khas Mahal which have been given over to cultivation..... where the forest has been cleared away in the course of the last 80 years, the protective covering of the deep soil which was legacy of the primeval forest has now all been washed away, sheet erosion is rapidly taking place and in many places, gullies and landslides have started so that the evils of erosion, at first insidious, are now forcing themselves men's attention.*"(Dash, A. Jules. p. 136)

Afforestation or conservation was appreciated by the colonial government as protective measure. As quoted in the Darjeeling District Gazetteer of 1947 "*Landslips cannot entirely be prevented but they can be checked by proper protective measures. Turfing and afforestation of bare slopes, well-directed and efficient drainage, reduction of the steepness of hillslopes by terracing outward protection of the soil cap by means of revetments and buttresses, protection of the harder rock outcrops, systematic quarrying in hillsides and control*

of the erosive action of streams and waterfalls are some of the measures which give useful protection.” But the British didn't initiate forest conservation with this realisation. Their commercial motive played a major role in this process.

During the occupation of Darjeeling in 1835 the hill tracts between the Koyal and the Balasan on the east and the Rangit and the Mahanadi on the west was entirely covered with forest. (Dash, A. Jules. p. 123) The areas of reserved forests in Darjeeling district was approximately 280000 acres.

The colonisation and conversion of the forests into cultivated land and tea gardens were as rapid as increase of population. Prior to 1863, Bengal and Assam, or the lower provinces paid very little attention to the conservation of forests. Prices of both fuel and timber had greatly increased with gradual deforestation. The government introduced measures of conservancy against over exploitation. Dr. Anderson was appointed as the conservator of forests. The first reserves were notified in 1865 in Darjeeling division. The forest of Ghoompahar had been reserved for the local wants of Darjeeling. (Dash, A. Jules. pp. 123-124) Traditional methods of cultivation like Jhuming was banned by the forest laws. (Dash, A. Jules. p. 41) In 1875, Darjeeling forest was separated from the Cooch Bihar division and was made a separate division. In 1921, Taungya planting was introduced. It was a technique of clear felling and artificial regeneration under which patches of forests were clear felled of all trees and regenerated by sowing and planting valuable forests trees in combination with the cultivation of field crops. Up to the end of 1942, Taungya system had resulted artificial regeneration of 8463 acres of forest in Kalimpong. (Dash, A. Jules. pp. 134-135) Government engaged 10014 adult persons in the forest department for the regeneration and conservation of trees. (Dash, A. Jules. p. 148)

To save the forest degradation, the British introduced forest conservation in the Darjeeling hills. Many forest laws and acts had been implemented. The British implemented the first Forest Law (1865) in British Sikkim (Darjeeling). By this law they imposed certain restrictions on the deforestation and its related different aspects. Forest laws provided protection to the forest coverings in Darjeeling. The act was applicable in a certain forest area of Darjeeling such as all forests situated above an elevation of 6,000 feet above the sea level, the forests in the Lebong hill, the Sal forests in Rungeet and Teesta valley which were in an elevation of 3,000 feet above the sea level. The forests of the Terai (Sissoo and Sal), were outlined by the map and the boundary pillars.²³

According to the law within the area of the forests, the marking, girdling, lopping or felling of trees, shrubs, bamboos, or canes, and the removal, or attempted removal, of any natural produce of the forests, grazing of cattle, the cultivation, the burning of lime or charcoal, and the lighting of fires was absolutely prohibited under the penalty of confiscation provided by the act except with the permission of conservator of forests. Violation of these rules led to punishment like conviction before a magistrate and fines.²⁴

The Indian forest Act VII of 1878 was enacted replacing the first forest law of 1865. A new set of rules had been prepared for all the Reserved forests under the act. This act classified the forests into three parts – reserved forests, protected forests and village forests. This act tried to established strong hold of the state control over forests. Many activities were declared as offence which would lead to imprisonment and fine imposed.²⁵

Regular methods of treatment in small sections of the forest was introduced by the act of 1878. Mr. Gamble prepared a working scheme in 1882, for the Sukna working circle under Kurseong division. The scheme prescribed “*small thinning*”, “*improvement thinning*” and “*selection felling*”. But we don't have much information on this scheme. This scheme was abandoned in 1890.²⁶

Though commercial interest was major driving force behind the forest conservation policy of the British but they kept in mind the aspect like prevention of natural calamity too. As noted in the ‘*A Manual of forest law*’, 1906, -‘*Forest law provides for the prevention of natural calamity, by the issue of rules for the maintenance of forests as a protection against erosion, avalanches, winds, or by prohibiting the destruction of birds which live on noxious insects or by protecting forest vegetation on mountain slopes or in catchment areas. Hitherto this power has not been much used in practice, but it appears certain that as the close connection of forestry with agriculture is more fully recognised the law will be found to be extremely beneficial in its effects.*’²⁷

VII. FAILURE IN FOREST CONSERVATION

There was a gradual deforestation in colonial Darjeeling. It was one of the major reasons for erosion & landslips. We could see that much attention was paid by the colonial government in the process of afforestation. It was done due to restoration of the forest resources and making the natural calamities less effective. But their commercial motive was far greater than their environmental approach which resulted failure in forest conservation. Industrial mode of forest resource use was the main driving force for the colonial governance. Their commercial interest was immense on the forest resources.²⁸

Selling of trees had a very negative impact over forest conservation. Though forest conservation terminated local inhabitants rights over forest land, but commercially they exploited forests in Darjeeling. The

act VII of 1865 marked the present Darjeeling division and Terai (Sal forest) as reserved for sale under the Waste Land Rule by the permit system. This meant selling of best saleable trees above a certain limit. This resulted removal of all the best trees. Trees were mainly supplied for the tea garden labourers and finally for the supply of timber (mainly sleepers) for the Railways.²⁹

British commercial and environmental outlook played a major role in the matter of forest policies. But the forest conservation process was highly motivated towards the commercial interest of the British. They conveyed a pragmatic sense of making money over ecology or environment. This led to their ignorant attitude towards ecology and environment.³⁰

So, commercial motive of the colonial governance was far greater than their environmental outlook. Even after the rigid forest rules, destruction of the forest resources continued. The failure of the British forest conservation paved the way for ecological imbalance in Darjeeling which culminated in landslides.

VIII. COLONIAL RESPONSE

After the landslide of 1899, the Darjeeling Relief fund, was started by the Rev. Mr. R. Kilgour and Mr. W. A. M. Lattey, agent of the Alliance Bank of Simla, disbursed a sum of Rs.10,692-14-3 among the Europeans and Rs. 16,238-14-8 among Indians who suffered by this calamity (Landslide, 1899). Great difficulty was experienced in distributing relief among the natives.³¹ We know that the European inhabitants of Darjeeling was minimal, even landslide affected population was very lower than the natives. But the amount spent as relief among the European was much greater than the natives in proportion. Even the census of 1931 shows that the people born in U.K. and Ireland was 486 and born in Europe outside U.K. and Ireland was only 130 compared to the total population of Darjeeling which was 319635. (Dash, A. Jules. p. 50) Loss of life in Darjeeling was 219 (all natives) and in Kurseong subdivision it was 9. In Darjeeling town, the loss of life was 72. Out of 72 deaths there were 62 natives and 10 Europeans. (O'Malley, pp. 102-103).

So, based on statistics in Darjeeling town we can say that the death rate of the natives were around 6 times greater than the Europeans. But the amount distributed among the natives was only one and half time greater than the Europeans.

The immediate action of government was making of enquiry commissions and investment of a large amount for the repairing of the damaged infrastructure. Government invested large amount for the repairing of roads. (Dash, A. Jules. p. 14). Dalapchan slip area was taken under protective measures against erosion. Landslides in this area was frequent and costing some thousands of rupees per year in repairs to an important road. In 1940, an area of 188 acres was made over to the Forest Department for reforestation. (Dash A. Jules., pp. 13-14). Soon after the landslide of 1899, government appointed a special committee to enquire into the causes of the landslide and preventive measures. The Government appointed an enquiry committee under T. H. Holland to enquire into the causes and preventive measures. The committee (Griesbach's Report 1899-1900) reported that the absorption of moisture during heavy shower or rainfall, cutting of hill slopes (natural/artificial) and defective drainage were the major reason for landslide. The committee recommend the need for drainage, building regulation, protective sloping of hillsides as protective measures (Dash, A. Jules. p. 22). The need for protective measures were reiterated by the different enquiry personnel or committees. H. H. Hayden visited Darjiling in 1906 and advised the Bengal Government for the need of protective measures in the Happy Valley Tea Garden. In 1912, L. L. Fermor carried out the detailed Geological survey of the Happy Valley and neighbouring hillsides. R.C. Burton continued his work in May, 1914. His work showed the physical condition of the rocks and soil etc. Burton had suggested for protective measures.³²

Though immediate response of the colonial government looked effective, but long term policies like afforestation or conservation of forest were not satisfactory.

IX. CONCLUSION

To sum up we can say that deforestation was one of the major anthropogenic factor for landslides in later colonial Darjeeling. Early-colonial non intervention policy towards forest didn't destabilize ecological balance in this region. Though there might have been natural causes for landslides in early-colonial Darjeeling, but anthropogenic reasons were not present. Huge deforestation in later colonial Darjeeling was responsible for ecological imbalance and severe landslides. The severity of landslides was quite high and destructive in the later colonial period. Though British government introduced various policies regarding forest conservation, but it failed to cope up with the severity of the landslides. It was unable to cope up with the ecological imbalance created by the destruction of forests. This was the result of greedy commercial outlook of the colonial governance. The gradual ecological imbalance created the background for the landslides. Colonial role, response, policies or relief measures to the landslides were not satisfactory.

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