Slope instability in terms of landslides and subsidence along transport arteries in Kalimpong Subdivision of Darjeeling Himalaya are common problems during the period of present century due to unplanned growth of population and human activities. Therefore the researcher developed interest in initiating research oriented studies on these problems in the worst affected parts of study area.

Like rest of the Himalayan terrain, the geology of study area is varied and complex. The tectonic movements are also active and left their impression on the rocks in the form of intricate folds, faults and thrusts. So many workers from the Geological Survey of India have studied the area. The geological investigation of the region began in the middle of last century.

The contents of eight chapters dealing with Geology with Lithology and stratigraphic description, environmental setup, causes of landslide, hazard zonation map, individual slide and subsidence description, laboratory study, calculation of factor of safety, and concluding remarks in this piece of research work are based on the published work of several workers mentioned above and the sources from which the information have been derived are referred under the head “References” and are duly acknowledged in the text at the appropriate places.

For nearly the last three decades, parts of Kalimpong Subdivision of Darjeeling Himalaya ranges have suffered mass destruction due to initiation and aggravation of large scale landslides causing extensive damages to communication lines, land and forests, human habitation, etc. The problems have been aggravated since early sixties when human activities progressed at a faster pace in study area consequent to development of a network of roads. Thus parts of the slopes, after construction of road and deforestation, became unstable and susceptible to slope failure. A number of small landslides (in their initial stage of development) have turned into major landslides mainly because the causative factor and the mechanism could not be evaluated scientifically for design and execution of appropriate control measures and whatever remedial measures undertaken in the past, have proved to be either partly effective or a total failure.
So many workers attempt in understanding the landslide problem in study area, especially the worker of Geological Survey of India carried out the detailed studies along the Teesta valley road in Kalimpong subdivision, Thus vast amount of data on landslide problem and its remedial measures have been collected from the area. The researcher himself have made detailed studies of seven landslides along transport arteries of Kalimpong subdivision during his long tenure of assignment during 2010 to 2015 and attempted to evaluate the causes and mechanism of these slides and finally found out the value of Fs along the selected transport arteries.

The present work, so far as the slope instability along transport arteries of Kalimpong subdivision are concern, is based on the studies carried out by the researcher. The significance and the role of the different features observed by the other workers have been critically analyzed in relation to initiation and progression of the landslides in the study area. In doing so, the observations of other workers have been evaluated and partially incorporated, specially the historical aspects, classification, causes and the control measures adopted in the past, so as to adjust their efficacy in case of individual landslides studied by them. The workers, whose works have so been utilized, are duly acknowledged at appropriate places in the text of the thesis. Nearly 90 percent of the data incorporated in the chapter entitled “Morphological study of selected landslides and subsidence” are based on the original work of the author. Similarly, subsequent chapters of this thesis dealing with hazard zonation map of selected facet area, laboratory studies and engineering classification of slide materials, Investigation of Fs through CFC by grain size distribution approach are also based on the worth of the researcher. However, certain theoretical aspects dealt with under these headings are based on the published works of others and duly acknowledged.

There are several maps of the area dealing with various themes covering parts of Darjeeling-Sikkim Himalaya have been prepared modifying the earlier work of Dr. B. Chatterjee (1981 -88), The observations of Dr. Chatterjee have been supplemented with those of the present worker. Some of the thematic maps have been modified and additional interpretative data include in the explanatory text in the light of the experience of the author. The hazard zonation map demarcating moderately, high and very high hazard zone area can be used by the urban planners, landuse agencies, road builders, etc. However, specific developmental proposals shall continue to be investigated in detail and calculating the value of Factor of safety for evaluating stability of
the study area, as the hazard zonation maps give only broad regional picture about relative slope stability. Of late, awareness has developed for evaluating slope stability of a hilly terrain in advance over which new developmental activity is proposed.

Based on the identified cause and mechanism of landslide phenomena, effective protective / remedial measures should be devised to arrest the mass wastage in the area. It is, however, to be borne in mind that all control measures are needed to be executed for neither a particular slide nor all the landslides can be treated with the similar measures. Most suitable corrective measures are necessarily designed and executed based on the scientific understanding of the causes and mechanism of a particular slide by detailed site investigations.