

Floods and landslides: the emerging scenario

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A detailed review of the relevance of climatic change shows that the wet areas of Sri Lanka will face an increasing threat of floods and slides in the period ahead of 1990 to the future. More than 500 academic and technical publications bear witness to this scenario. The best available most recent academic and technical data are provided by the WMO/UNEP Report (1998) on the regional impacts of climatic change, which clearly indicates an increase of total and intensity of rainfall in the South Asian region.

In 1975, 1998 and 2002 one of the authors had warned that the frequency of flooding will increase in Sri Lanka, associated with climatic change and development.

In 1998 in an article which appeared in *Dinamina* about an earthquake near Kandy, one of the authors called for the establishment of scientific organisations to study and predict natural hazards, as most of the developing countries have done in the past two decades.

Most of the damage which occurred in the present flood situation could have been avoided, if the people who are responsible for safety of human resources of Sri Lanka watched radar weather maps and listened to predictions regularly for about four days before the arrival of the depression.

Information of the WMO reveals that the depression clouds can get stagnated when they are caught between two mountain ranges and that is what exactly happened in this situation. Some strands of the depression clouds were caught in between.

Samanala and Gongala-Hiniduma ranges in Denawaka valley: They kept on creating cloud streets and line squalls, which brought heavy continuous rainfall. One of the authors has published an article in 2000 (*Daily News*) on new detailed evidences of rain formation and line squalls in Sri Lanka.

In addition there are more than 300 research papers published between 1900 and 2002 on changing climate and dangers of poor environmental planning in Sri Lanka, which were also disregarded by the policy makers.

The destruction caused to lives and property due to the inability of the policy makers to grasp the value of scientific data and technical data is indicated well from the present disaster. The use of floodable land and geologically

unstable slopes for housing, neglect of heavy sedimentation of streams and rivers and forgetting that nature has its rhythm were the three major errors committed by the policy makers.

Grassroots also have to be blamed for their ignorance of nature and poor environment literacy. However, none of the developed countries in the world have not achieved the present status of balance of environment without strict environmental regulation and law.

One of the authors of this paper lived at Ratnapura in the 1960s and 1970s and is a regular visitor in the study of sedimentation and flood hazard and has predicted many times in his writings on the possible dangers. The lowlands in and around Ratnapura are built by Kalu Ganga to store its floodwater in the time of the its major flood (This applies to Gin Ganga and Nilwala Ganga also).

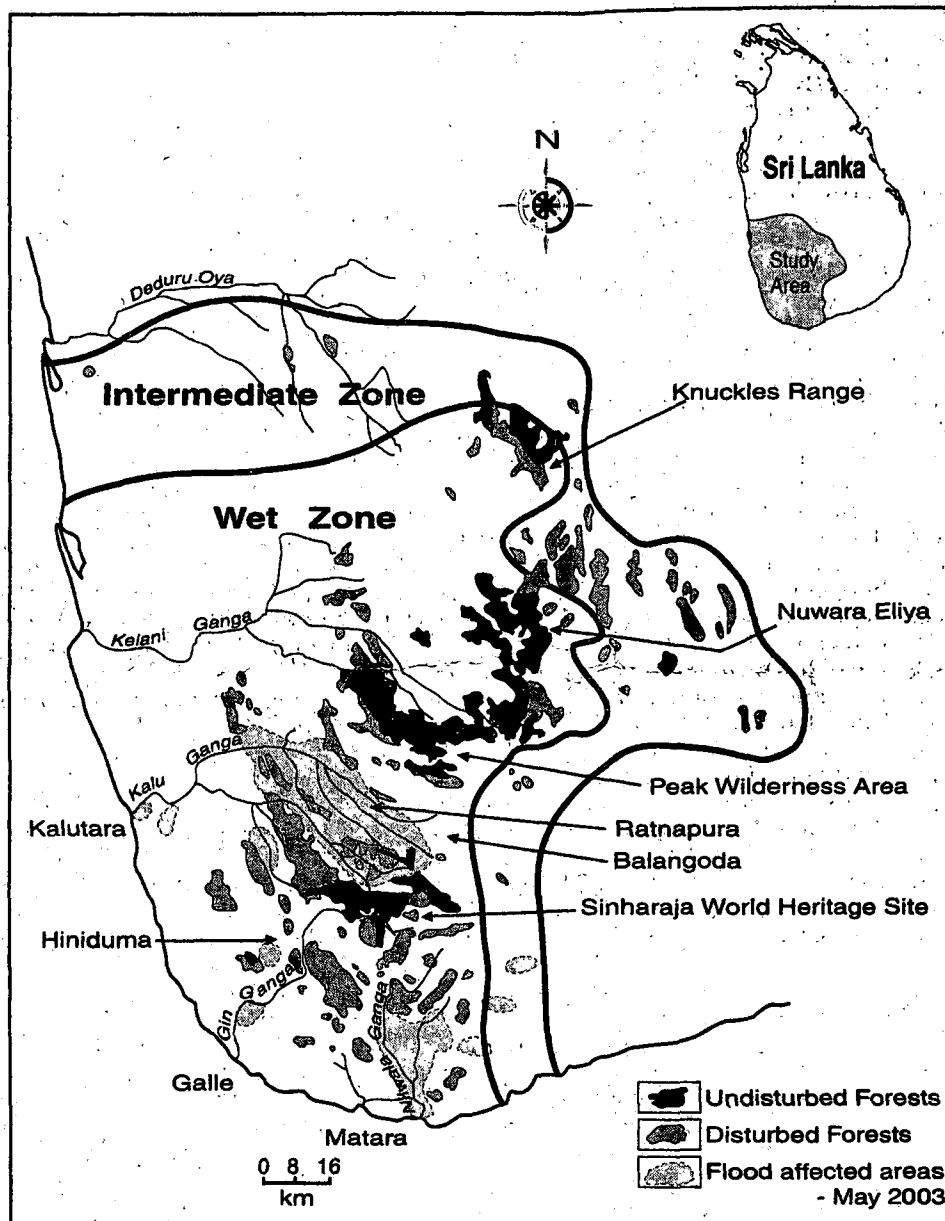
The mean annual rainfall of Ratnapura district is 3,000 millimeters. Kalu Ganga is a river in which the flood can be predicted easily, if there is a watch of rain in the Samanala range and Western slopes of Gongala ranges (Kalawana and Kukulegama areas). These three rivers have the steepest gradients in any river in Sri Lanka in their upper reaches, which leads to rapid flow of rainwater from the highland to the lowland. There are only limited virgin forests in the catchment areas of Gin Ganga, Nilwala Ganga and Kalu Ganga, (see Map 1).

These facts were forgotten in the modern development process, which became very rapid in the 1980s and 1990s. Information on floodable land was forgotten or disregarded by the policy makers and users, as Sri Lanka experienced a dry phase in its climate in the 1980s and 1990s.

One of the authors was alarmed on a visit to his old village area at Ratnapura in 1998 after a lapse of about 10 years, when he witnessed that the floodable area was thickly covered with housing of all types.

Most of the housing units on the flood plain belong to lower, middle and poor income groups. This was a disaster in the making as Kalu Ganga will always come back to its pre-prepared flood plain during its high flows. The frequency of this return of Kalu Ganga is fairly regular and repeats around 25, 50 and 100-year floods.

Almost all the landslides originate from heavy saturation of slope material. However, human activities like over loading of a slope with a thin weathered regolith or unconsolidated soil cover can also initiate landslides under heavy rainfall conditions. Both these have contributed to landslides in this disaster.



Distribution of undisturbed forests and disturbed forests in the Wet Zone and Intermediate Zone of Sri Lanka.

Quarrying may have contributed, but if only the regolith was too thin in which case the planning and environmental authorities should have recommended that the area is unsuitable for building or any other human activity.

There is news about slow pace of draining of floodwater and this is due to sedimentation of micro waterways and sub streams, which prevent outward flow in the flood plain. Ratnapura has no drainage system, which can cope with its own daily drainage, not to talk of flood drainage. This applies to all our towns and cities, where smells reign.

The poor drainage or sedimented waterways is again a result of poor policy application and maintenance of environmental law.

One of the authors read a paper on dangers of sedimentation of waterways recently at a seminar funded by a donor organization and its local area organizers, early this year, pointing out the real dangers of sedimentation of waterways with local monitored examples.

One of the more informed Ministers in the present government was interested in a proposal submitted by the same author about a year ago, but it is yet to materialise into action. As we know, the Pavithra Ganga programme has faced many obstacles due to disregard of scientific information.

Only a long-term (mini-

mum of 50 years) programme will minimize the effect of major flooding and landslides. As the wet areas of Sri Lanka are going to be wetter and dry areas are going to be drier the annual average damage from these hazards may be about a billion rupees.

This may rise if we are going to experience a major flood every 25 years. A fair estimate of 50 billion rupees damage has occurred in the present flood. Another 5 to 10 billion loss of income is yet to come from loss of farm crops and tree crops. The number of affected families by this flood is 162,800 (Ministry of Social Welfare, 2003).

It is the time that the policy makers listen to scientific advice on settlement planning, location and housing. An attempt to conduct this type of programme was disregarded by the Government and foreign loan and aid agencies many a time.

One of the authors who has wide experience in natural hazard studies has warned of this type of occurrence first in 1977 in a study of upper Mahaweli, funded by UNDP and Ministry of Plan Implementation and as recent as 2002 March has submitted a long-term work programme to the Government of Sri Lanka, SIDA and Sarvodaya and waiting for a response.

As Hancock, Nyerere and Bala Usman have indicated in their writings, the polity of natural haz-

ard is that the relief is cheaper and profitable for international agencies than the establishment of a long-term programme. The relief creates an avenue for the policy makers and administrators to get rich continuously as Bala Usman has observed in relation to corruption discovered in the relief programmes of 1983 drought in Africa, which involved some United Nations staff and Multinational companies.

However, developed countries from where these organizations originate have used draconian measures to organize the natural and settled environment through application of laws and regulations and invested heavily on canalization of rivers, control of household area erosion and sedimentation and use of concrete, bitumen and other chemical layers etc to control flooding and landslides.

Visits to their countries reveal that dams and weirs of various sizes and designs and even laying of stones on river beds and banks have been employed without much concern of the natural value of the area, but making the river-side safe. They hide their large dams in the mountainous areas fairly inaccessible to the visitor or cover it with a scenic arrangement through reforestation. Research into culture and financial management is important only if the living environment is free of its most

damaging natural disasters.

Though we cannot stop them we have the scientific knowledge to control them and bring the impact to a level, which will not affect, the economy of a region or a country.

As one of the authors has already proposed since 1990s, a household based environmental conservation programme must be initiated immediately to avoid more disasters of this nature. The same author wishes to inform the policy makers and public that the catchments of Maha Oya and Deduru Oya are also seriously eroded in the upper reaches and sedimented in the lower reaches.

A climatic occurrence similar to that which happened in the Denawaka Valley moving across this catchment may cause a similar disaster. The long-term data indicate the south-west monsoon is slowly shifting its path in a North-North-West direction and this may bring a cloud mass and block it between the Matale-Ambokka ranges and the lower ranges of North-western plains resulting in a massive rain storm. This will create a condition conducive to a major flood.

Recent research indicates that rainfall intensities in the intermediate zone are increasing rapidly and North-easterlies are associated with heavy rain in this region.

A recent 'Discovery' programme on the future has indicated a major destruction of human civilization may arise from environmental disasters than from a nuclear war. This has been proved correct by the total damage to Europe and USA in the last decade by floods, tornadoes, cyclones and droughts in the range of 2 to 3 trillion US dollars. Are we really heading for an environmental disaster of a mega proportion was the final question of that programme.

We in Sri Lanka have to suffer heavy economic damage amounting to about 30 billion rupees to bring back the areas to operational level and according to popular news, it may take about one third of our budgetary allocations this year to fully rehabilitate the damage over a period of five years.

Will we be able to sustain this programme in case of continuing natural disasters? The answer is no. We have to follow the scientific evidences and be ready for the future.

All the developed countries have mega plans to face the impending natural disasters. They have food, medical supplies and service stocks in hand with disaster prediction, control and management organizations.

Please begin a long-term restructuring of environment in the hazardous zones.