annex 5

keynote address

Academician Dipak Gyawali, Minister of Water Resources, Nepal

It is a great honour for me to have this opportunity to speak before such experts from the HKH region. This level of expertise is reason enough to add extra importance to this occasion to help us address this vital issue of floods and to devise policies to tackle these floods. This high level consultative meeting is an appropriate forum to discuss issues to find solutions to the problems relating to floods, which are primarily, from my personal perspective, a humanitarian issue. It is incumbent upon all of us to help protect life and property, and scientists and technologists, in particular, can help in finding out ways to do so equitably and efficiently. Devastations caused by the monsoon rains falling on the Himalayas have been a matter of serious concern to flood control authorities of the respective governments. Especially serious is the fact that we depend on a complex monsoon regime. I have found that the more I study, the less I seem to know about it. It's a weather anomaly and there are serious concerns right now of the problems in this regime due to possible climate change impacts. We are worried here about some distinct indications of the enlargement of the boundary of extremes; extreme events from cloudbursts, which seem to be happening more frequently. Maybe that's because we have more infrastructure development works going on and they get damaged more frequently. It could also be that our communication systems have improved and there is better reporting. I don't know, but when you talk to villagers around, they do mention that extreme events and cloudbursts are becoming more frequent. Extreme events are getting more extreme. We are also facing the problem of droughts more often. When expected rain doesn't arrive in time or arrives later than expected even by a few weeks it can have severe impacts on the agricultural production system especially to subsistence farmers. The availability of hydrometeorological data at the required time could be used for early warning. However, that is neither available to that degree of certainty nor can be generated so easily. Especially on extreme events, we may have a rain gauge station somewhere, but when we had 540 mm of rain in 'officially' 24 hours in July 1993, I say 'officially,' because it fell mostly within about 9 hours, it is difficult to forecast such rainfall and the damage it could cause at any place. The Kulehani Reservoir, the only big reservoir in Nepal, had filled up 20 m between 5pm and 1am. In 1998, Nawal Parasi (plains) in Nepal recorded 463 mm of rainfall in a similar period. These are flat plains and when we have that state of downpour, the drainage capacity of existing streams, existing water channels, and other water courses is highly insufficient to take the impact away. So, when we say we don't have data or data is poor, try telling that to the poor gentleman assigned to keep records at times like that. His bigger concern would be how to save his family. Hence there is a need to find out better means, better scientific tools to be able to capture extreme events, especially of cloudbursts and floods. This is a common problem across the region and Nepal is keen to participate as well as help.

Regional cooperation in this field would be most important in the matter of facilitating forecasting of floods across manmade boundaries, whether international or within a country. We find equally serious problems of being able to transcend administrative boundaries as we do across international boundaries. Technical cooperation in terms of sharing technology and experience, capacity building of professionals, and establishment of a common scientific laboratory or lab data analyses, for improved understanding of the underlying processes are other matters that would be extremely beneficial. We are hearing some reports on floods which would need better scientific study. A few months back it was reported that when we had these extreme floods in Europe, someone had found a correlation between the late arrival of monsoon in South Asia and the late Mediterranean rains in Europe. This implies that much of

the research would have to be transboundary and international. That is more serious for us who are dependent, the billion plus people of the region, on the monsoon regime. It's time to think the unconventional. On the one hand, we have to move farther faster with high science such as the use of satellite forecasting and sophisticated techniques have to be brought to our region, and have to be applied, and on the other hand those results have to be made publicly available. It has been noticed by people who travel a lot across South Asia, that our TV weather forecasts compare badly with weather forecasts around the world. Why is that? Why have we not been able to be better at public forecasting? Reliable public forecasting makes a lot of difference to farmers especially the 30 million plus tube well operators in India plus a large number of such operators in other countries in our region. If they are reliably sure that there is going to be rain tomorrow, they will not operate their pumps. If some degree of reliability can be provided to these farmers, imagine the amount of greenhouse gas emissions we would have contributed to cutting down on.

One of our problems has been that when we deal with water resources and river courses, very often and sadly, the science has been overtaken by runaway technologies in the implementation of development projects. I have been travelling, both in my previous incarnation as well as now, visiting project sites where I have severe problems when I look at the design of irrigation of flood control projects where very conventional thought seems to have been implemented. It will require more and more heavy expenditure in the years ahead as structures fail, where embankments are improperly located and designed and get washed away.

We have a new department right now, the Water Induced Disaster Prevention Department, an offshoot of the Department of Irrigation's river training programme. They are in the process of defining the whole department's agenda as well as the flood protection and river training policy that Nepal would have to follow. It's in the process of being designed, but before this august gathering, I don't think it would be out of place to do some loud thinking because your feedback to our experts here as you interact will be very valuable to us. I am of half a mind to make sure that irrigation/flood controlled structures are planned for these rivers, especially on what I call marginal rivers. Marginal rivers are very small rivers. As you notice on the map, across the Terai, we have large rivers, we also have medium-scale rivers, but there are lots of small rivers. I call them marginal because no programme has gone into doing any work or gathering data on these small rivers. They seem to be used effectively by lots of people now, growing extra crops. And these rivers seem to wash out villages to quite some extent, but we don't have any projects on these rivers. I'm of half a mind to make it obligatory to have model testing of development structures before we give construction licenses to these small/medium hydro-power projects and irrigation projects because I have just calculated that the cost of model testing (we have two hydrological labs) will be inconsequential but it will ensure that the structures are robust in design. That capacity is there, but it has not been used because there has been no need to have designs tested. These designs need to be tested before we give construction approval because the costs are marginal and otherwise very expensive afterthought and remodelling work will have to be done where millions will have to be spent redesigning the intake or rebuilding the embankments. If we spend less than a tenth of a percent of the cost of the project we can do these modellings. And the certainty that comes with it would save millions down the road. This is the kind of high science that needs to be merged with policy and legislation to made sure we are getting it right. Together with the Department of Hydrology and Meteorology, data democratisation (the broad basing of hydrological and meteorological sciences in the low sciences area) will be necessary. The low sciences are easily forgotten. In one of the initiatives that I was a part of, this was part of a small school NGO kind of initiative where rain gauge stations were established with schools to figure out what the flood regime in one of these marginal rivers would be like. We set up these rain gauge stations both in Nepal and India. This is the river which flows between the place of the Buddha's birthplace, Lumbini, Nepal, and the place where he passed away in Kushinagar in Uttar Pradesh, India. So Buddha must have crossed this river many times. I am told the first case of water conflict resolution done by the Buddha himself was on this particular river. It so happened that the 1998 flood occurred just after we put the rain gauges in, so we have some very interesting data. This showed us that we can have a programme in high schools as part of a science curriculum for collection of simple data on rainfall, temperature, soil moisture, etc. We found out that for minimal costs you could increase data density many fold. In a kind of ecological varied zone like in Nepal, where within 100/200 km you can find almost all the climatic zones from subtropical to arctic, this kind of extension of data density is necessary for

two purposes. One is just to increase the data for modelling and other purposes, and the other is to be able to free higher level bodies like the government, like ICIMOD and others, to engage in the high sciences so that the raw data collected from the low sciences can be calibrated, studied, and analysed through high science means. This also brings me to the point of incorporating the results of both the high and low sciences into the policy and practice arena. How can we incorporate the dangers posed by extreme events and disasters into the design of our development programmes? How do we make sure that our irrigation canal designs, our road designs, our school locations, settlement locations take into account these extreme events, because most of them are not within normal social memory. If we do that, we would have made our development more sustainable. I believe that these present consultations at the high level will bring out appropriate ideas and methodologies. I believe that your commitment to pursue the understandings that you will develop will give life and energy to the policies of all of the governments in this region.