Towards an understanding of Mekong River geomorphology
(Opening address: to **Regional Workshop on MRC's Discharge and Sediment Monitoring Project and Geomorphological tools,** Vientiane 21-22 October 2008
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Ladies and Gentlemen,

MRCS has gathered and processed hydraulics, hydrological and water quality data sets to support decision making for several years already; this work is very important, but not sufficient.

One should remember that a river is not only water. A river is an ecosystem; this means a combination of chemical and physical components - including water and sediment - as well as biological - or living components - such as plants and animals.
All those elements ensure the balance of the river, its integrity. And the integrity of the river sustains livelihood of the people, supports economic development.

Sediment is an important component of this balance, and plays a key role in the integrity of the river. But the role of sediment is not always fully understood or taken into consideration sufficiently.

What do we know about the big trends in sediment globally?

In most large river systems in the world, one can observe increased erosion upstream because of intensification of land use. More sediment load upstream causes changes in water quality and, also changes the shape and behaviour of rivers.

At the same time one can observe less sediment transported to the lower part of rivers, because it is trapped by infrastructure; mainly because it accumulates in reservoirs behind dams. This also causes changes in river shape and behaviour, and often translates into channel incision, river bank erosion, channel narrowing and modification of riparian vegetation and fauna.

Further more this means that less sediment reaches seas & oceans; this in turn affects the stability of delta and coasts. It is estimated that beaches are globally receding at an average rate of several m/yr; and this is not only because of sea level rise link to climate change : but also because river carry less sediment to the seas.

Some initial work has been conducted on the sediment transport of the Mekong - and the outcomes of this initial work will be presented during the coming 2 days - , but important gaps remain, and this workshop should assess the knowledge and address those gaps.

Present knowledge about the geomorphic history of the Mekong indicates an unusual river due to its natural shape and behavior. This means the Mekong is different from other rivers; one cannot just cut & paste the lessons from the rest of the world.

We therefore need to build an understanding specific to the Mekong context. Again, this is a necessity; natural processes link to sediment need to be understood in order to

achieve sustainable management of the River and its resources. If you alter sediment transport - let it be solution, suspended or bed load - consequences can be important for the economy and national security. If you understand those natural processes, then you are much better prepared to identify mitigation measures.

Why is it important?

1. Reduction of sediment load can translate in loss of land on river banks.
   An important proportion of the population of the Mekong basin lives directly on the banks of the River and its tributaries.

2. Reduction of sediment load can also translate in the sinking on the Mekong delta.

There are many precedents in the world; many deltas are currently suffering erosion: the delta of the Nile River is clearly eroding because of Assouan dam and the delta of the Volta in West Africa because of Akosombo dam. Plans to evacuate population are considered in the Ganga-Brahmaputra delta. Other deltas that suffer from sediment shortage include those of the Danube, Senegal, Mississippi, Ebro and Rhone.

The Mekong delta is also at risk. A recent report from the Intergovernmental Panel on Climate Change states the Mekong delta is one of the 3 deltas the most at risk globally.

> The Vietnamese part of the delta hosts 17 million people - the most density populated part of the Mekong Basin – and provides staple food for 50% of Vietnam: this means 40 million people.
> The Mekong delta contributes 17% of the GDP of Vietnam.

How to balance the benefits for agriculture from increase dry season flow from large reservoirs with the sinking of the delta because of lack of sediment?

3. Changes in sediment balance can also affect food security:

It can affect agriculture production. By causing loss of agriculture land and increasing salinity intrusion. Sediment is a natural fertiliser deposited annually on flood plains; its reduction means reduced yields. River incision can also affect the level of the water table and thus access to water.

MRCS has demonstrated how much the people of the Mekong are dependant on fisheries. Changes in sediment balance can also impact fisheries; impacts include loss of habitat & spaning grounds, and reduction of nutrient. Recent studies indicate that reduction of suspended matters changes water density, therefore affecting the buoyancy of fish eggs or larvae survival rates.

4. Remember the construction sector is based on sand & gravel extraction from the river bed.

5. The energy sector is also affected when reservoir of hydropower dams fill with sediment.

6. Biodiversity is also concerned; alteration of sediment balance brings changes in riparian habitats. This affects riparian vegetation and fauna. The Mekong's amazing biodiversity is at stake: 1300 species of fish and many more unique freshwater species.

In order to achieve sustainable development it is critical to measure natural sediment movement and understand how the river system will react to Climate Change or man induced changes. The natural resources of the Mekong River are vital for millions of people.

Understanding how this dynamic system works will allow to keep this balance, and will anticipate effects to people; including protecting life's from natural hazards.
It will also allow to realise more sustainable hydropower development.

For those reasons this workshop is critically important. MRC needs to address a gap in its knowledge data bases to better fulfil its role as a provider of decision support data and advice.
WWF is also dedicated to contribute to this initiative, and develop - in collaboration with MRCS - geomorphological tools that can inform decision making towards sustainable development and conservation of the unique biodiversity heritage of the Mekong.

I wish this workshop success and look forward to its outcomes