SUSTAINABLE WATER RESOURCES – POPULATION GROWTH AND IMPACTS ON WATER RESOURCES IN THE MEKONG RIVER BASIN

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The Mekong countries are in the midst of a major transition in their population and human resource. In the coming decades, even though the population in the region is growing more slowly, the populations of the Mekong Basin will double its 1990 values (over 60 million people) to over 120 million in 2050.

Although the correlation between the key demographic elements (size, distribution, and composition), and the natural resources basis in the Mekong Basin cannot be over-simplified due to the influences of other intervening factors, the rapid population growth is inherently linked to the pressure on water and related resources. The simplified model for analysis this correlation was used to investigate that relation.

Food demand in the Basin is projected basing on the country's average per capita food supply (cf) derived from the FAO Food Balance Sheet (FAO AGROSTAT, 2004) as a tool for measuring long-term trends in national food demand/availability and diet composition. The per capita cereal/rice is multiplied by the Mekong population numbers (p) of those particular points in time.

Electricity supply will have to continue to grow rapidly in the Mekong Region to support economic growth, demographic change (population growth and urbanization) and improved electricification. All Mekong countries have recently built or are at more advanced stages of planning of many more hydropower dams. Among them Yunnan and Laos have the largest schemes.

Of late, a number of studies have been carried out to assess the impacts likely to result from individual development scenarios, such as hydropower, or regional highway and other infrastructure development, or irrigation growth. The present paper builds on those previous studies to assess the possible cumulative impacts of the existing and committed development of hydropower and high irrigation growth on the Mekong River's water availability.

Since the drier years pose more water irrigation problems, the differences between the baseline and hydropower and irrigation development scenarios' lowest minimum flows - both the extreme lowest daily flow over the entire 16 years, are presented. Impacts of high dry season irrigation growth on flows below Kratie as illustrated by reference to

representative flows in the year 2000 at Phnom Penh (Mekong) and Tan Chau can be significant. The minimum dry season flows at Phnom Penh, and Tan Chau are projected to reduce for about 97m3/s, and 279m3/s respectively. A simplified model was used to assess the critical dry season yet water availability in the Mekong Delta. Water consumption for crops and aquaculture in the Vietnam's Mekong Delta (2000) was estimated at 1528 - 1018.7 m^3 per second during critical dry period from February until May. The result shows than less than 1000m^3/s is available for other uses, including prevention of sea water intrusion, cleaning/flushing out saline water from rice field in Mekong Delta.

The expected increase flows to be generated by upstream dams could compensate for that. The results from Laos and China Dams show an increase of around 668m3/second to the minimum value of the Mekong river flow at Phnom Penh station.

The analysis of the maximum flow to be likely changed by the dams shows that both dam scenarios do not help much in flood protection as claimed by dam proponents, except for the upper most locations closer to the dams themselves.

Further study is required to expand the study on the accumulative impact of the development activities not only on the river hydrology, but also on the change of morphological conditions (sedimentation, river bank and river bed variation) and on the ecology, especially on fish resources.

In summary although current development of the Mekong Basin is limited compared to almost all world large river basins, the existing and committed development in the Basin will have an impact on hydrology, ecological and morphological condition of the river, as well as the people's livelihood. The result re-confirms the importance of a true form of cross-boundary, balanced and coordinated approach to water management, which is unfortunately not available at the moment in the Basin, if the sustainable water resources in the Mekong Basin are to be achieved.

Keywords: Mekong River Basin; Population growth; Food and energy demands; Sustainable water resources

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