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Potential impacts of the super sea dike (barrage) at Rach Gia bay– Kien Giang province on the mangrove forest and aquaculture in the Mekong Delta, Vietnam

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As a country with a long coastline together with crisscrossed rivers and canals system, Vietnam is the country vulnerable to the effects of climate change, in which the Mekong Delta is one of three deltas in the world most affected by sea level rise. Proactive prevention, restriction adverse impacts of storm surges, flooding, salinization and water scarcity in the dry season is a major challenge in the Mekong Delta at present. To cope with these problems in the Mekong Delta, the idea of construction of a super sea-dyke (SSD)/barrage at Rach Gia bay, Kien Giang province has been proposed for studying with 3 options: (1) Option I: short route, creating a small reservoir with the surface water area (˜ ±0.0) of 416 km², the volume (˜ ±0.0) of 600 Million m3, and the length of 30.0 km directly connected from Hon Dat to Xeo Quao; (2) Option II: short route, track broken knee on Hon Tre, creating a reservoir with the surface water area of 467 km², the volume of 820 Million m3 (˜ ±0.0) and the total length of 31.8 km (Section 1: Hon Dat – Hon Tre: 15.5 km; section 2: Hon Tre – Xeo Quao: 16.3 km); (3) Option III (FA-III): long route and form large reservoirs with the surface water area of 911 km², 2.58 billion m3 in volume (˜ ±0.0), connected from Hon Chong to Hon Tre (section 1) and from Hon Tre to Xeo Quao (section 2) with the total route length of 47.5 km. Besides, there is a sluice gate or navigation lock (˜ -3.00 m) on each section of the barrage with the width (B) ranges from 300 – 700 m. MIKE models (1D and 2D) have been used to simulate and evaluate the effects of the SSD on water distribution in the whole Mekong Delta in the dry season as well as the salinity prevention to freshening the areas, as consequence affecting mangroves forest and aquaculture in the region. The results show that due to the reservoir, the water distribution affects to the total water volume at Vam Nao, Can Tho, My Thuan as well as at the mouths of Mekong and Bassac Rivers. Up to 245 million m3/month fresh water has been kept from flowing into the West Sea and supplied back to the regions; upto 121 m3/month can be able to transfer to the Ca Mau Peninsula where fresh water is very scarce. It also indicates that the reservoir water will turn into fresh after 2 months in high flood year, or 9 months in low flood year. But 57% - 76% mangrove forest in Kien Giang is affected (or lost); up to 19.260 - 21.738 ha of saltwater aquaculture (shrimp, crabs, mollusks) will be freshened, loosing about 12,587 – 23,872 tons productions/year, accounting up to 444 – 842 billion VND/year. In addition, it is also calculated that 683,900 – 887,600 tons of coastal fishery productions will be lost.

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