Ain Shams University
Institute of Environmental Studies and Research
Engineering Department

Environmental River Nile Bank Protection and Waterfront Projects Impact Assessment

By

Maha Adel Zaki

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Diploma in Environmental Science, Institute of Environmental Studies and Research, Ain Shams University, 2002

A Thesis Submitted for the Partial Fulfillment
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تقييم الآثار البيئية لمشروعات الواجهات المائية وحماية جسور النيل

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مها عادل زكى

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لإستكمال متطلبات الحصول على درجة الماجستير

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ABSTRACT

The River Nile is the unique sustainable source of water actually in use. The River Nile has suffered from the abuse of the environment changes in the River basin , due to scouring of the bed, erosion of its banks, and morphology. The river discharges to some extent are controlled after the high dam construction, water discharge and levels have now much lower peak than before. The peak monthly sediment concentration at Gaafra gauging station has been dropped due to the storage of water upstream dam. This reduction of the suspended sediment concentration has increased the ability of the river flowing water to erode the river bed and banks and reduce their stability. Some other morphological factors have also been changed because of the High Dam construction which affected the river bank stability analysis such as river meandering, navigation, water levels and water movement from agricultural lands adjacent to river course during low winter reason level and from river to agricultural lands during high summer period. Between Cairo and Aswan, many arable lands are lost or under threat, by the erosion of the river banks caused by the action of the Nile. A wide range of social and productive infrastructure such as settlement waterfronts, canal intakes, bridge works, ferries landing stages, are also subject to similar effects. The damage is aggravated by the river traffic.

An aggregate of 250 km of critical river bank points have been identified as needing protective works to cover and protect the river Nile's ecosystem and establish nationwide ecologically balance, environmental management of the water of the Nile is a must. The waterfront of the Nile is an essential community

asset of great value for all the communities connected to the shorelines of the river. The potential exists to initiate waterfront development along the Nile.

A project was suggested by the Nile Research Institute (NRI) of the National Water Research centre (NWRC), Ministry of water resources and Irrigation (MWRC), to protect a length of 100 km of river Nile banks that has priority for protection and a length about 30km waterfront towards villages along the banks of the river, the project was funded by the social fund for development (SFP) and Ministry of Water Resources and Irrigation (MWRI) In the present work and approach will be tried to access the environmental impact of the implemented bank protection and waterfront projects (1992-1955) along the river Nile by application a current check list matrix. Considering social and economical variation that may have responses on the environmental evaluation of the local village adjacent to the Nile sides in habitants for the three level (individuals, families and in general local population). Also Deigning a technical checklist matrix (Petry, 1999) for assessing the environmental impacts of the implemented projects (1992 – 1999) on the basis of the following check list point a) sources of impact b) receptors of impact c) environmental impact and e) mitigation measures.

The concluded comments indicated that EIA ensured that the implemented project is not suffering from positive impacts, and scanned to be positive and the project is environmentally sound.

In the present work we found that it is preferable to make stability analysis of a specific reach of a river Nile banks as example which could be repeated at similar locations. We take a study area of Beni-Mazar reach which suffering from

eroding banks on the west side of the river and a navigation problems for ferries between two sides.

We using a stable 5M mathematical model for determining the lowest factor of safety for there cases a) unprotected bank b) protected bank and a landowner prepared a narrow terrace above the placed stone c) protected bank and a landowner back-filled the area above the placed stone. Four boreholes were implemented for deterring the bank composition, and four wells for determining the ground water levels, typical cross section, and type of protection.

The output of this software include different slip surface and their corresponding factor of safety for each three cases. Form the combination of data regarding the different parameters were used. We find that the maximum mean minimum factor of safety is 1.526 for the developed traditional method with marrow terrace and it is preferable treatment because it increase the value of the minimum factor of safety for the unprotected river Nile banks by about 92.43% from the above we recommended that it is preferable for using a technical check list matrix for the assessment of the environmental impacts of the projects along the river Nile coarse, applying the developed traditional method with marrow terrace for river Nile banks protection, collection data be questionnaire for reflecting the geographic inhabitants, distribution, their education and environmental problem, also proper management of irrigation to help preventing excess irrigation and using satellite data for monitoring the river Nile environment.

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