建立河川污水排放計量模式作為許可及管理基準

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摘要

在產業發展時期,越南政府把重點放在平衡社會經濟發展以保衛國家與政策,然而污染來自工業、農業、城市、家庭以及工藝村的廢水已經嚴重讓水資源退化,尤其是在Day/Nhue 河流域,因此,本計畫的目的是在計算該河川被許可的污廢水排放量和水質管理。 這項研究發現,越南已實施有利於環境影響評估(EIA)、環境標準、法規和經濟手段的議程,越南也採用別的方法,包括:重整行政組織、增加管理廢水排放的預算、考慮人力資源的開發、處理廢水的方式。然而,在廢水管理的權限上有數量的限制,如:實施不明確的指導方針、環境標準微弱的執行、很淺的處罰違法者、各機構之間管轄權的重疊。此外,在大多數的組織中缺乏資金、設施及人力資源。 針對這條Day/Nhue河,本研究主要採用文獻及水質評價,此外,選擇MIKE11水質模式來模擬計算沿著這條河污染的排放量,根據MIKE11計算的結果評估各河段污染的程度,在現實條件下,當管理者或計劃者在該領域的專門知識不足下使用該模型,本論文提出用查詢表的模型計算,調查表中將建置相關圖表來顯示排放流量的變化,以及上游水流量和污染物的濃度改變後的結果。這些應用將根據不同的計劃而被建置,會帶給使用者方便,協助管理者可以檢討和考慮規劃、許可或規定流域的污廢水排放許可。

關鍵詞: Day/Nhue流域、水質模式、MIKE 11、污廢水排放許可

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參考文獻

1.Andersen, L. S. (2003). Introducing water rights in Vietnam, Vietnam-DANIDA water sector program, International working conference on water rights. 2.Alan, K. J. T. (1999). Preliminary assessment of Vietnam 's environment law, Faculty of law National University of Singapore, from: http://sunsite.nus.edu.sg/apcel/dbase/vietnam/reportv.html 3.Alabaster, J. S. and Lloyd, R. (1982). Water Quality Criteria for Freshwater Fish. 2nd edition. Published on behalf of Food and Agriculture Organization of the United Nations by Butterworth, London, 361 pp. 4.Canadian Council of Resource and Environment Ministers. (1987). Canadian Water Quality Guidelines. Prepared by the Task Force on Water Quality Guidelines of the Canadian Council of Resource and Environment Ministers, Ottawa. 5.DHI, Water and Environment, (2007). MIKE 11 A

modelling System for Rivers and Channels, User Guide and Reference and Manual. 6.European Economic Community. (1992). European Community Environmental Legislation. Volumes 1-7, L2985, Office for Official Publications of the European Communities, Luxembourg. 7.Wu, F. C. (2003). Development of remedial strategies for the Love River Watershed, Thesis, National Sun Yat-sen University. 8. Federal Environmental Protection Agency. (1989). Our National Environmental Goals. Special Publication No. 3. Federal Environmental Protection Agency, Lagos. 9.Federal Government of Nigeria. (1988). Harmful Wastes Decree No. 42 of November 30, 1988. Federal Government of Nigeria, Government Press, Lagos. 10. Foundation for Water Research. (1994). Urban Pollution Management Manual. Report FR/CL0002. Foundation for Water Research, Marlow, Bucks, 129 to 140 pp. 11. Food and Agriculture Organization. (1985). Water Quality for Agriculture. Irrigation and Drainage Paper No. 29, Rev. 1. Food and Agriculture Organization of the United Nations, Rome. 12. Federal Environmental Protection Agency. (1991). Proposed National Water Quality Standards. Federal Environmental Protection Agency, Nigeria. 13. Preul, H. C. (1997). Case Study XII -Kingdom of Jordan, in Helmer R. and Hespanhol I. (ed.) Water Pollution Control - A Guide to the Use of Water Quality Management Principles, WHO/UNEP, 433 to 444 pp. 14. Harkening, T. (1994). Danube Integrated Environmental Study. Final Report. 15. International Centre for Environmental Management. (December 2007). Improving Water Quality in the Day/Nhue River Basin: Capable Building and Pollution Sources Inventory, Ministry of Natural Resources and Environment Ministry of Agriculture and Rural Development and Ministry of Construction. 16.International Commission for the Protection of the Rhine. (1991). Konzept zur Ausfullung des Punktes A.2 des APR über Zielvorgaben. Lenzburg, den 2. Juli 1991 (Methodology to implement item A.2 of the Rhine Action Programme related to water quality objectives, prepared at Lenzbourg on 2 July 1991). PLEN 3/91, International Commission for the Protection of the Rhine against Pollution, Koblenz, Germany. 17. International Union for Conservation of Nature. (1994). Analysis and Synthesis of National Reviews. IUCN European Programme. Final report. The World Conservation Union, Gland. 18. Japan International Co-operation Agency and Ministry of Agriculture and Rural Development. (2004). The study on artisan craft development plan for rural industrialization in the Socialist Republic of Vietnam, International Development Center of Japan. 19. Kaohsiung Environmental Protection Bureau. (2009). Water quality protection and monitoring of the Love River. (in Taiwan) 20. Larsen, I. and Ulmgren, L. (1997). Guide to the use of water quality management principles, WHO/UNEP. 21.Linh, N. P. T. and Tien, T. V. (2003). Rural environmental management at central level, Center for Agriculture and Rural Development. 22.Laane, W. and Lindgaard-Jorgensen, P. (1992) Ecosystem approach to the integrated management of river water quality. In: P.J. Newman, M.A. Piavaux and R.A. Sweeting [Eds] River Water Quality. Ecological Assessment and Control. EUR 14606 EN-FR. Commission of the European Communities, Luxembourg. 23. Muschack, W. (1990). Pollution of street runoff by traffic and local conditions. Sci. Tot. Envir. National rural clean water supply and sanitation strategy up to year 2020, printed in the Central Fine Art Company. Organization for Economic Co-operation and Development, Paris, 93, 419 pp. 24.RCEP (1992) Royal Commission on Environmental Pollution, Freshwater Quality, Sixteenth Report, Comnd 1966. Her Majesty's Stationery Office, London, 65 to 67 pp. 25.Cruz, R. T. (1994). The Pasig River, Philippines, 315 to 331 pp. 26.Strategic Analysis in Science and Technology. (1992). Research and Technological Development for the Supply and Use of Freshwater Resources I. Kruger Consult AS and Danish Hydraulic Institute. Prepared for the Strategic Analysis in Science and Technology (SAST) Monitoring Programme, Commission of the European Communities, Luxembourg. 27. Shanghai Environmental Protection Bureau. (1985). Huangpu River Waste Water Integrated Prevention and Control Planning. Shanghai Environmental Protection Bureau, Shanghai. 28. Taiwan Environmental Protection Administration. (2009). Action, guidance, and evaluation of pollution remediation in southern Taiwan, (in Chinese) 29. Thang. N. V. (2002). Environment and environmental impact assessment. Hanoi Agricultural Publisher. 30.Nhan, T. V. and Nga, N.T. (2002). Curriculum Wastewater Treatment Technologies, Science and Technology Publishing House. 31. Task Force. (1994). Strategic Action Plan for the Danube River Basin, December 1994. The Task Force for the Programme. 32. United Nations. (1999). Looking ahead: A United Nations Common Country Assessment of Vietnam, Issued by Vietnamese Government and United Nations, 33. Vollenweider, R. A. (1968), Scientific Fundamentals of the Eutrophication of Lakes and Flowing Waters, with Particular Reference to Nitrogen and Phosphorus as Factors in Eutrophication. 34. Vollenweider, R. A. (1975). Input-output models. With special reference to the phosphorus loading concept in limnology. Schw. Z. Hydrolog, 27, 53 to 84 pp. 35. Vollenweider, R. A. (1976). Advances in defining critical load levels for phosphorus in lake eutrophication. Mem. Dell' Inst. Ital. di Idrobiol., 33, 53 to 83 pp. 36. Huang, Y. C., Yang, C. P., and Tang, P. K. and Lin, Y. J. (Nov 2009). A Study on Water Quality Survey and Simulation for the Love River in Kaohsiung, Proc. 4th NPUST-USTB Symp, B34 to B38 pp. 37.Lung, W. S. (2001). Water quality modeling for waste load allocations and TMDLs, Wiley, New York. 38.World Health Organization. (1984). Guidelines for Drinking-Water Quality, Volume 2, Health Criteria and Other Supporting Information. World Health Organization, Geneva. 39. World Health Organization. (1993). Guidelines for Drinking-Water Quality, Volume 1, Recommendations. 2nd edition, World Health Organization, Geneva. 40. World Health Organization. (1993). Guidelines for Drinking-Water Quality, Volume 1 Recommendations. Second edition, World Health Organization, Geneva. 41. World Bank, Asian Development Bank, Food Agricultural Organization, and United Nation Development Program. (1996). Vietnam Water Resources Sector Review, Report No. 15041-VN. 42. Warford, J. J. (1994). Environment, health, and sustainable development: the role of economic instruments and policies. Discussion paper. Director General's Council on the Earth Summit Action Programme for Health and Environment, World Health Organization, Geneva.