

# STRATEGIES FOR DEVELOPMENT OF INDUSTRIAL WASTEWATER REUSE IN THAILAND

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## ABSTRACT

Majority of the industrial activities in Thailand are concentrated around Bangkok Metropolitan Area. The ever increasing industrial activities lead to over exploitation of water resources and discharge of significant pollution load. Therefore, it is important to identify the wastewater reuse potentials and develop strategies for its promotion within the industrial sector. Although technological advances have made it possible to treat effluents for industrial re-use, in practice the Thai industries do lack in implementation of such technologies. Promotion of cleaner production concepts and advanced new technologies such as membrane technologies in Thailand could assist the industry for the implementation of wastewater reuse projects. This paper discusses various technical, institutional and management issues related to promotion of industrial wastewater reuse, with few case studies.

## KEYWORDS

Industrial wastewater reuse, Thailand, industrial estates, cleaner production

## INTRODUCTION

The hydrological basin in Thailand covers approximately 512,000 km<sup>2</sup> of drainage areas, divided into 25 river basins (ESCAP, 1991), with an average population of 60 millions. Although, Thailand is traditionally an agriculture based country, in the recent years higher emphasis is given to the increased industrial activities. The major national water sources could be categorized as:

- *Surface water:* which is the major source of water, with an annual volume of 199 km<sup>3</sup>/year. 80 to 90 % of this flow is generated during the monsoon period. Chao Phraya river basin is the major surface water source providing the water from North to Gulf of Thailand, especially to the industrially concentrated Bangkok Metropolitan Area (BMA).
- *Ground Water:* The average volume of the ground water consumption is estimated around 8.99 km<sup>3</sup>/year. Hydrological balance studies indicate that only about 12.5 per cent of rainfall infiltrate the soils and about 8.75 per cent of rainfall eventually reaches the aquifers. The largest sources of ground water is found in BMA and its surrounding regions. To a large extent the industries located in this region depend on this ground water source. However in BMA, due to unfavorable geological conditions and excessive water withdrawal, contamination of groundwater due to salt water intrusion, and land subsidence are found to be the major environmental issues.

Thailand, like many of the rapidly industrializing South East Asian countries, faces seasonal water crisis problems. In the recent past, there was a significant conflict in water resources sharing between the agricultural, domestic and industrial sectors. In 1995, the ratio of water use to water availability exceeds 16 per cent of annual total renewable water resources, whereas the threshold limit is 20 per cent. The rapid growth of the population and the manufacturing industries, especially in BMA and surrounding province has