# CHAPTER 1
# INTRODUCTION

Problems of environmental changing are occurring in all parts of the world. Earth is getting warmer. The glacier melting has accelerated dramatically. Plants and animals are being forced to leave their habitat, and the number of severe storms and droughts are increasing. It is probably true to say that humans are causing the Earth's climate to change and now many natural phenomenal has directly affected back to human. From the effects of environmental changing problem, human are more concerned and interested in the environment to protect natural resources in many parts of the world.

One of the very important natural resources for humans life is water resource. Water resources are sources of water that are useful or potentially useful to humans. Water user include agricultural, industrial, household, recreational and environmental activities. Virtually all of these human activities require fresh water. However, freshwater accounts for only 2.5% of the Earth's water and most of it is frozen in glaciers and ice caps. Only few of unfrozen freshwater is found mainly as groundwater, with only a small fraction present above the ground or in the air. Water demand already exceeds supply in many parts of the world, therefore good management for water supply such as lake, reservoir, stream or river is necessary.

Presently, there are too many people on earth, who are using technologies that are destructive for the earth. We cannot continue to grow, and make use of limited natural resources. Therefore, it is urgently needed to develop more sustainable practices for the management and efficient use of water resources, as well as the need to protect the environmental ecosystems where these resources are located. So we should be continue to monitors our water supply for present and future before late.

The Mekong River is the heart and soul of mainland Southeast Asia. It runs through China, Myanmar, Thailand, Lao PDR, Cambodia, Vietnam and connects to the South-China sea. Many people who live along the Mekong River have used it for

a living in the form of irrigation, consumption, fisheries and transportation and including a raw water source for water supplies.

In Thailand, the Mekong River flows through Chiang Rai Province, in the North. As the Mekong River continues along its path in Laos, it once again flows back into Loei, Nong Khai, Nakhon Panom, Mukdaharn, Amnaj Charoen and Ubon Ratchadhani Provinces in the Northeast of Thailand. In Northeast Thailand, with over 20 million people, water resources are virtually fully developed. Problems are emerging associated with salinisation of arable lands as a result of over-clearing of native vegetation and poor irrigation, soil erosion, and declining of water quality in the rivers and streams. Therefore, the water quality in the Mekong River has been affected from the environment. There are many rivers which could be tributaries and connect with the Mekong River. So the water quality in its tributaries may affect the Mekong River. Thus, the water quality in the Mekong River and its tributaries should be monitored continuously. There are many methods use to monitor water quality. One of the method that successfully used for monitoring aquatic environments around the world is biological assessment of water quality.

Biological assessments are evaluations of water quality condition using surveys and other direct measurements of resident biological organisms such as algae, macroinvertebrates, fish and aquatic plants. Biological assessment data are used to answer the question of whether water quality support survival and reproduction of aquatic organisms. Thus, these method is widely acceptable and used throughout the world.

Algae is very important organism in aquatic ecosystem. Its importance is based on their fundamental role in food webs, oxygenation of surface waters and linkage in biogeochemical cycles. Besides that, algae are useful for human in many way such as food, agricultural, industrial, cosmetic, medicinal applications and environmental science. Currently, algae are wildly used to monitored water quality in both standing and running ecosystems. In running ecosystem, most of them are benthic algae such as macroalgae and diatoms, and it is the excellent choice for used to water quality monitoring.

Diatoms are benthic algae in Division Bacillariophyta. The sculptured parts of cell walls are composed of silica. Diatoms have special characteristics of their cell

structure known as frustules. The frustules include bivalves which are similar to a petridish. The color of the diatoms is yellow-brown. Single cells of diatoms are 5-500 µm. The shape of diatoms could be separated as being symmetrical and asymmetrical. The valve structure is called striae and include a range of little pores of panctae and longitudinal valves called raphe. These characteristics are major considerations to be used in their identification. Diatoms live as a brown color biofilm on substrates such as cobble or stones and some of them live as a filamentous colony within the river (Baber and Haworth, 1981, Round *et al.*, 1990).

In the rivers, benthic diatoms are the most common and diverse primary producers (Round, 1991). Besides that, benthic diatoms are being increasingly advocated as bioindicators because their communities respond strongly and sensitively to many physical, chemical and biological changes in running ecosystem (Whitton *et al*, 1991).

This study investigates diversity, distribution and succession of benthic diatoms in Mekong River in Thailand and its tributaries. Furthermore, the relationship between diatoms species and water properties in each parameter was studied to find the species of diatoms for monitoring water quality in these rivers. In addition, these relationship will apply to establish a diatom index for use as biomonitors. This index can be applied to another rivers in Thailand and the countries in tropical region.

The results of this study are the ecological basic data that can apply to develop secure sustainable water resources. Water quality data particular, can be used to identify trends over time in each season and determine any environmental impact to the river. Furthermore, diatoms data would improve more information about a study of diatoms in South-East Asia region which had very few documents.



**Proposes of this study**

1. To investigate the diversity of benthic diatoms in the Mekong River in the part of Thailand and its tributaries.
2. To study the relationship between the species of benthic diatoms and physico-chemical properties of water-bodies.
3. To apply the diatom index for the assessment of the trophic status water quality of Mekong rivers and its tributaries.