

Water Quality Monitoring in the Chindwin River Basin

Introduction

The Chindwin River is a major tributary of the Ayeyarwady River in Myanmar and provides critical ecosystem services for domestic water use, irrigation, mining, transport and local livelihoods. Over the past two decades, Myanmar's rapid economic development has resulted in a number of changes to the socio-economic and ecological conditions in the Chindwin Basin including pollution, river bank erosion, sedimentation and decreasing river flows that affect both water quality and quantity.

Since 2015, the Stockholm Environment Institute (SEI) Asia Centre, in collaboration with Myanmar Environment Institute (MEI), along with other state and local partners, undertook water quality monitoring at various sites along the Chindwin River. The monitoring and assessment of water quality in the Chindwin River was undertaken bi-annually during the wet and dry seasons between 2015 -2017.

Water quality study

The main objectives of the Chindwin River water quality study were to build capacity of local stakeholders in water quality monitoring, to understand the current status of water quality, and to support local government agencies in developing a water quality management and monitoring strategy for the Chindwin Basin.

In collaboration with Pollution Control Department (PCD), Thailand, we conducted training on water quality sampling and monitoring for the Directorate of Water Resources and Improvement of River Systems (DWIR) and MEI staff through workshops, exchange visits and field surveys.

17 locations in the upper, middle and lower parts of the Chindwin River were selected for water quality monitoring. These sites are located near Homalin, Kalewa, Kani and Monywa townships where human activities and interventions affect water quality.



Preservation of water samples from the Uru River, Homalin, Myanmar in September 2016 (Thanapon Piman, SEI).

Key findings

- The Chindwin River is vital for the transport of people and goods, providing water for household use including drinking water and farming (agriculture and livestock), and local fisheries.
- Water quality is deteriorating caused by land-use changes, including deforestation, leading to increased soil erosion, sedimentation and turbidity.
- Upstream mining operations for gold, jade and copper are leading to heavy metal contamination of the river.
- Standard water quality tests near dense rural settlements, show low levels of dissolved oxygen and high levels of organic matter along the entire stretch of the Chindwin River.
- Laboratory results of water quality monitoring confirmed elevated levels of heavy metal contamination of mercury, copper and arsenic, which pose serious health risks to people and the river ecosystem, particularly in the Uru river, a tributary of the Chindwin.
- The Chindwin River Basin lacks a coherent and systematic water quality monitoring system to assess the extent and sources of water pollution. This makes it difficult to effectively address issues of river basin degradation and concerns for public health and safety.
- A major constraint to effective water quality monitoring is that a number of different government bodies are currently tasked with water quality monitoring, with limited integration of expertise and knowledge sharing arrangements.

Monitoring parameters

Testing was done across a number of different parameters including: a. in situ measurement of water temperature, air temperature, Rapid Dissolved Oxygen (RDO), and pH levels; b. laboratory measurement of Total Dissolved Solid (TDS), arsenic (As), cyanide (CN), lead (Pb), mercury (Hg), copper (Cu), iron (Fe); and, c. portable test kits that assessed bacteria and heavy metal contamination such as lead and mercury.

Challenges in addressing the impacts of deteriorating water quality

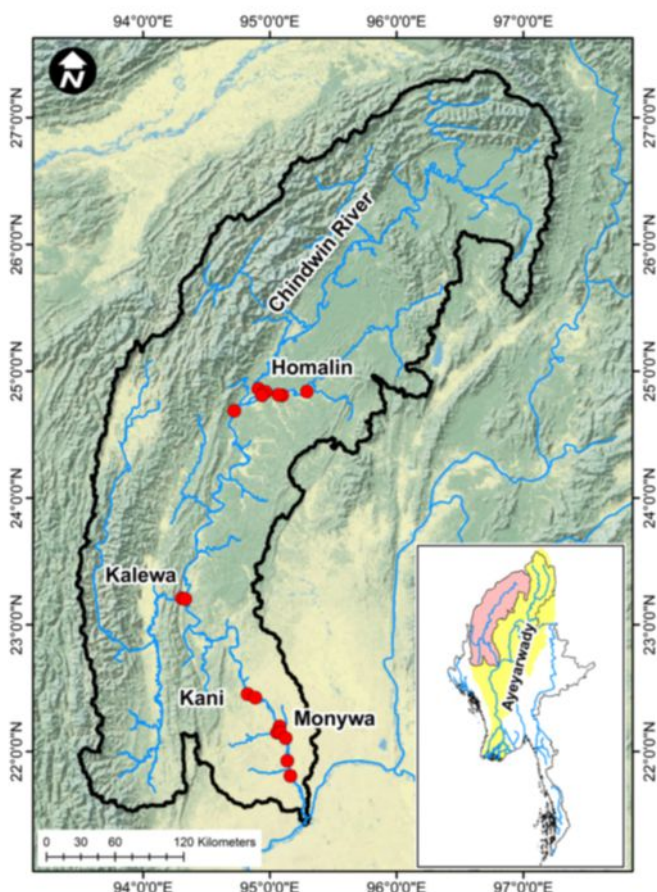
Water quality tests have shown elevated levels of organic matter and heavy metals, as well as low levels of dissolved oxygen in the river. These pollutants are likely to stem from local mining operations and untreated release of urban sewage. The water pollution may lead to health risks, such as infectious diseases and accumulative heavy metal poisoning.

It is therefore important to raise public awareness about water quality and associated health risks among the Chindwin Basin residents.

Current governance arrangements on water quality monitoring in Myanmar are extremely complex, with several Ministries and ministerial departments responsible for various aspects of water testing. There is limited data exchange and no central institution coordinating the water quality tests conducted by various organizations. Many departments possess their own testing facilities, but do not make test results public or enter them into a common database. Hence, water testing is carried out, but not in a systematic and consistent manner. Water quality monitoring arrangements are too complex and data is not easily accessible.

- National capacity to monitor, analyse and reliably interpret water quality test results is limited, and not coordinated in a central body.
- Water quality lab testing facilities are located only in Yangon, more than 700km from monitoring sites.
- Portable test kits can test heavy metal levels but the results may not be accurate compared with laboratory tests. It can be used only for early warning stages.
- Funds are limited for long-term water quality monitoring and sustainable water quality management.
- The Chindwin River Basin Organisation (RBO), recently established with the support of the Sagaing regional government, can provide critical advice on strategic water quality monitoring and data sharing in the basin. It does not, however, have a legal foundation and is not officially recognized by the Union Government.

Chindwin River: Water quality monitoring locations



Recommendations

- The Sagaing regional government to review and adjust complex governance arrangements for water quality monitoring with a focus on devolution of water quality monitoring to local or basin-wide institutions under a common strategy and in adherence to national water quality standards.
- DWIR to explore synergies to avoid duplication among government bodies tasked with water quality testing and establish a common regional laboratory testing facility.
- The Sagaing regional government, together with international development partners to establish a common water quality database, which is accessible to government bodies, water users, and researchers.
- National stakeholders to develop stringent water quality monitoring guidelines and national standards for surface water quality, including testing parameters, institutional responsibilities, and monitoring locations.
- National stakeholders to engage with the stakeholders in the Chindwin Basin, in particular, communities and industry, to address water pollution risks and causes as well as provide solutions.
- Chindwin Basin stakeholders to work with the Union Government, private sector, non-governmental sector, and international development partners to gain support, both financial and in terms of expertise, in order to build water quality monitoring capacity within concerned agencies and communities for the long-term in the Chindwin Basin.
- Chindwin River Basin Organisation (RBO) to develop an awareness campaign on safe use of river water, including knowledge on possible risks, how to detect them and possible solutions (e.g., boiling/filtration of drinking water).

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