

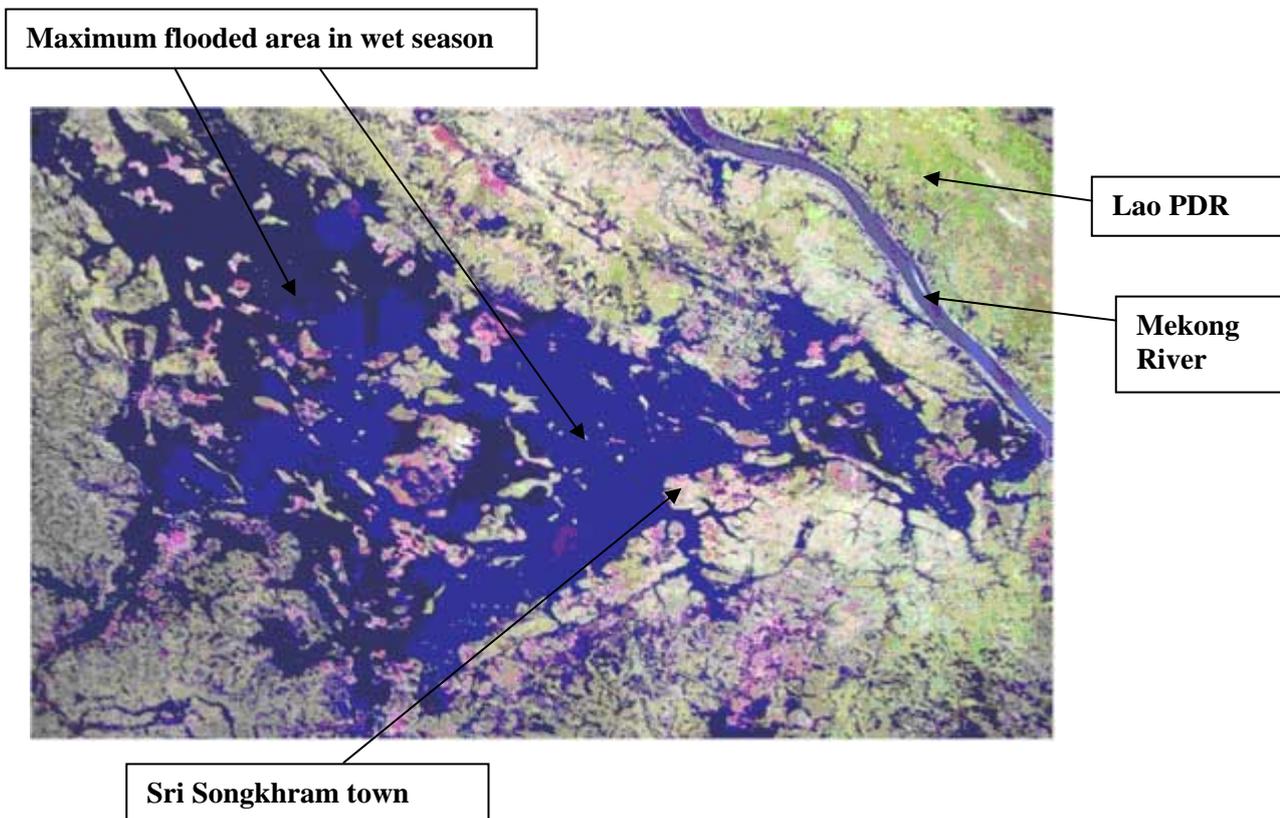


## Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme

### FLOODS - OBSERVATIONS FROM THE LOWER SONGKHRAM RIVER BASIN

There has long been a tendency for the media to report floods (*nam tuam*) in Thailand in a negative light, no matter when, where or what the underlying causes or circumstances are. Headlines include “Flash floods wreak havoc in North”, “... fight against floods”, and “New disaster agency ‘a must’”. Hence, it is perhaps no surprise that this negative perception about flooding has come to dominate discussions amongst the public, government staff, donors and various development agencies with a responsibility for water resources management. Flooding occurs every year in Thailand as part of a natural, age-old pattern. Sometimes this causes impacts such as destruction of property, damage to agricultural crops, occasional loss of life or injury and general disruption to daily life; however, there are also positive outcomes from the natural pattern of flood and recession. Hence, it is valid to enquire if the negative image is deserved in the case of the Lower Songkhram River Basin in Northeast Thailand, where annual flooding is an integral part of the natural hydrological cycle and wet season landscape.

**Fig. 1 Landsat image of Lower Songkhram River Basin in wet season at peak of floods (month and year unknown)**



The Lower Songkhram River Basin, covering parts of Nakhon Phanom, Sakhon Nakhon, Udon Thani and Nong Khai provinces, experiences heavier annual rainfall than most other parts of Central, Northern and

A JOINT UNDP - IUCN - MRC GEF-FUNDED PROGRAMME



CAMBODIA



LAO PDR



THAILAND



VIETNAM



IUCN  
The World Conservation Union



Northeast Thailand. The annual average precipitation varies between 1,600 – 2,400 mm/year, 90 % of which falls in the six month rainy season (May – October). As a result of the highly seasonal rainfall pattern, there is a distinct peak in the Songkhram River's hydrograph during the months of August and September with prolonged overtopping of the riverbanks occurring at any time between July – October. A second factor leading to annual flooding, which is perhaps more important than in-basin run-off, is the influence of the Mekong River's level in inducing a backwater effect in the lower Songkhram basin, when river levels rise above a certain critical level. According to a study conducted by Khon Kaen University, the Mekong River actually flows back into the Nam Songkhram river (i.e. reverse flow similar to that experienced on the Tonle Sap in Cambodia) in 10 out of 23 years (KKU, 1997). Many villagers along the lower river report seeing these reverse flows carrying sediment rich waters from the Mekong flood into the Songkhram and believe it helps maintain the soil fertility on the floodplain.

The lower 250 kilometres (or so) of the 420 km long Songkhram river has a very low gradient of just 3-4 cm fall every kilometer, so flows are naturally quite slow and the river is typified by large meanders and oxbow lakes, as testimony to changed river channels over the millennia. Due to the low-lying nature of the landscape and extensive floodplain, the floodwater's reach far inland from the riverbanks, once they are breached, covering broad areas of seasonally-flooded forest (*paa bung paa thaam*), water resources like reservoirs and natural ponds and paddy field landscape. At the peak of floods the landscape of the Lower Songkhram River Basin resembles one large shallow lake, no deeper than 1 – 2 metres at most points, with trees and bamboo shoots protruding above the water level. The floods may extend up to nearly 2,000 km<sup>2</sup> in a particularly "wet" year, although are more typically around 1,000 km<sup>2</sup>.

Villages have traditionally been located on levees or slightly elevated spurs of land above the floodwaters and are very rarely inundated, although access roads may be temporarily flooded requiring boat transport. Because of the regular annual nature of the floods the villagers are used to flooding and have adapted their livelihood strategies accordingly. For example, cattle and buffalo are moved to elevated areas known as "*dawn*", which offer safe grazing and shelter, or are stable-fed under houses for the duration of the flood period. Rice cultivation in the rainy season (*naa bee*) is mostly limited to areas of low-risk to flooding, although some villagers do take the risk of planting seedlings in low-lying areas and losing their crops in higher than average flood years. By only seeing floods as a problem leads to emergency interventions being implemented to alleviate or reduce flooding and in turn undermines the natural benefits that flooding provides.

Although the negative perceptions of floods are well known and reinforced through the media, the beneficial side of normal, predictable annual floods of tropical rivers are less well understood or reported. Each year when floods spill the banks the waters carry with them a rich mix of suspended sediment and nutrients which are deposited in a thin layer over the floodplain, thus enhancing and rejuvenating the soil. The same nutrients also enter into complex food chains, including numerous species of aquatic fauna and flora which are then harvested by humans at varying levels. The most economically important of this aquatic biodiversity are the fish species which migrate upstream with rising water levels at the start of the rainy season, enter the tributaries, flooded forest, paddy fields and other temporarily inundated habitats to feed, spawn and nurse juveniles before the floods recede and later migrate back downstream at the end of the rainy season to permanent water bodies or the mainstream rivers, including the Mekong. People have also developed a wide variety of fishing gears to harvest the flood recession migration for income and preservation for later consumption, while in the case of certain species of migratory fish-eating birds, their arrival in the Nam Songkhram wetlands from northern Asia would appear to coincide with the period of maximum fish migration.

Other aquatic organisms which are abundant locally, popular for consumption and have life cycles associated with flooding patterns include many amphibian species, mollusks, gastropods, shrimp, crabs, insect larvae and various types of aquatic plant. This pattern affects whole ecosystems, not just aquatic habitats or species; for example earthworms, which thrive in the alluvial soils of the lower floodplain areas are harvested with lights at night, as they try to escape the rising floodwaters and are found stranded on small islets exposed above the water level. The earthworms are then sun-dried, bundled up and sold to traders, providing a significant source of income for local villagers.

Floods in the Songkhram river basin are thought to play important roles in the maintenance of natural wetland ecosystems, remineralisation of nutrients, groundwater recharge, sediment and nutrient retention (Barbier et al, 1993). They also likely offer a level of protection from flooding for other land further down the Mekong valley, through temporary storage and gradual release of floodwaters which would otherwise flow directly downstream. Ultimately, the wide aquatic and terrestrial biodiversity and wetlands-based livelihoods found in the Lower Songkhram River Basin are closely intertwined and dependent on the natural hydrological and geomorphological cycles of flooding. Any alteration to hydrological cycles or reduction in flooding duration and extent may have undesirable and negative impacts on biodiversity and local livelihoods. Given local development trends, there is a pressing need for basin planners and multi-stakeholders to openly discuss and research the various benefits and costs resulting from annual, predictable and natural flooding, rather than the current emphasis on negative aspects.

**Fig. 2 Sediment-laden waters carry soils downstream, some of which is deposited on the floodplain each year, rejuvenating soils and adding nutrients to the food chain**



**Fig. 3** As the floods recede in September - October villagers set up a variety of fishing gears to harvest the fish migrating off the floodplain. Vast catches may be made over a short window of opportunity – sometimes less than two weeks



## REFERENCES

**Barbier E.B, Acreman M, and Knowler D.** 1993. Economic Valuation of Wetlands: A guide for Policy Makers and Planners. Ramsar Convention Bureau, IUCN, Gland, Switzerland

**Khon Kaen University.** 1997. Study and Plan to Mitigate the Environmental Impacts of Mainstream Water Storage for the Nam Songkhram Project". Final Report. For Department of Energy Promotion and Development, Ministry of Science, Technology and Environment. September, 1997