

## A BRIEF OVERVIEW OF IMPACTS OF RIVER REGULATION ON RIVERINE VEGETATION

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Natural rivers together with their associated riverine habitats are considered as one of the most diverse, dynamic and complex ecosystems in the world. Vegetation is a key component of a riverine system, as it involves in regulating the microclimate, aquatic and terrestrial food webs and also a source of woody debris. Riverine plant communities show high diversity and also include rare plant species as well as plant species restricted to riverine habitats.

Any kind of disturbances can have a large impact on species diversity and abundance in any plant community [1]. Riverine communities experience two main types of disturbances: natural disturbances and anthropogenic disturbances. Natural disturbances in riverine ecosystems include fluvial disturbances due to flooding or debris flow, canopy gap creation due to falling trees and landslides [1]. Anthropogenic disturbances can be caused by construction of dams and reservoirs across rivers, clearing for agriculture, sand mining, excessive livestock and human [2]. Alterations of flow regimes due to damming can affect riverine communities in the downstream of dams and reservoirs. Riverine ecosystem is broadly defined as the boundary of the river channel that is periodically flooded and dried out [3]. Therefore, the river margin communities are highly influenced by the changes in hydrology and flow patterns. As a result, riverine communities are considered as good indicators of the environmental changes caused by long-term river flow regulations [3]. Large dams can reduce the frequency and the intensity of overbank flooding in downstream areas, and also it reduces the groundwater recharge in riverine zones. The groundwater level is often considered as a critical factor contributing to the maintenance of riverine zones. When dams are built to facilitate the diversions of water, downstream channels and streams are left with significantly reduced water flows. As riverine plant species are adapted to moist habitats, they are relatively intolerant to water stress compared to other terrestrial plants. Therefore, repeated or prolonged reduction of water flow from the river systems can cause severe impacts on riverine vegetation. Another important issue is the island formation in formerly active floodplains, which is a common occurrence in regulated rivers. The island formation results widening of the channels and narrowing of the riverine forests along the river banks [4]. Biological invasion has been identified as a threat to all types of ecosystems throughout the world. Studies revealed that riverine habitats are more prone to invasion by alien plant species compared to many other ecosystems [5]. Dam-induced flow alteration is considered as a major factor promoting invasion of non-native species in riverine and aquatic habitats [6]. For instance, according to a study carried out in arid southwestern United States, the deep rooted, stress adapted invasive shrub *Tamarix sp.* is more adaptive than *Populus* and *Salix* which are common riverine species, to survive in deep alluvial water tables caused by river regulation [7]. A study carried out in San Pedro River in USA also has showed dominance of invasive, *Tamarix ramosissima* as a result of hydrological changes [6].

However, over three decades, since the initiation of the Accelerated Mahaweli Development Project (AMDP) in Sri Lanka, which involved in construction of five major dams and reservoirs across the Mahaweli River and some

of its tributaries, a comprehensive evaluation of the impacts on riverine vegetations has not been carried out. It is important to study whether the flow alterations in river Mahaweli have changed the composition and distribution of riverine vegetation in downstream area or not. Such information can be useful in implementation of conservation practices to restore riverine plant communities in the future.

## References

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