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# The bid for the Natural Sponge ...

## VALUING ECOSYSTEM SERVICES OF KUNIGAL WETLANDS IN TUMKUR DISTRICT, KARNATAKA

*The Kunnigal Wetlands in the Tumkur District in Karnataka offers a host of benefits in the ecosystem services to the local community, most of which are not acknowledged. Monetary valuation of the ecosystem services of the wetland reveal that the community gets higher benefits from the ecosystem services than their own incomes. No doubt, the destruction of the wetland will cause a great economic loss for the community. Apart from this, there is tremendous tourism potential that is yet to be tapped. The Kunnigal Wetland, therefore, creates immense opportunity for the local governments for community well-being enhancement and tourism revenue generation. A community-based approach to wetlands governance will help the goals of conservation and development.*



## VALUATION OF ECOSYSTEM SERVICES OF WETLANDS

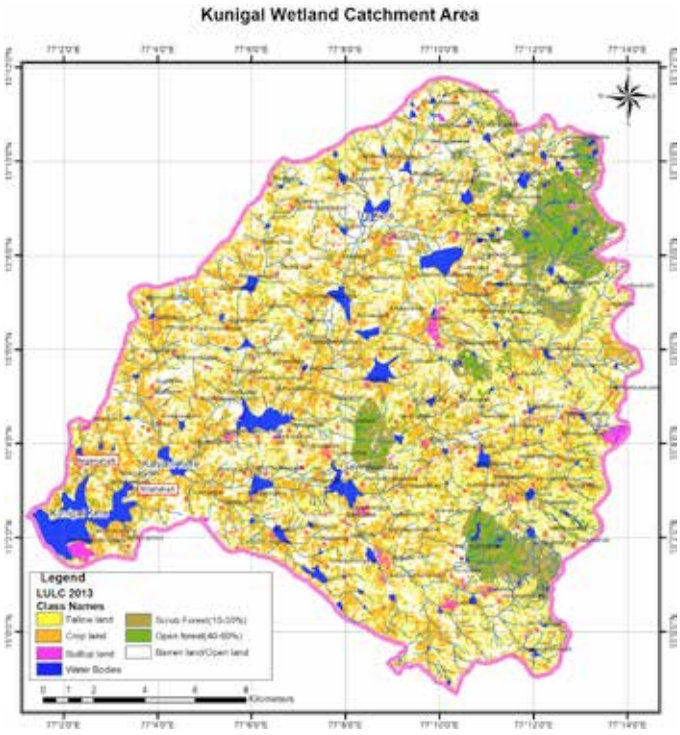
Wetlands play an important role in sustaining human society by providing a host of services that range from provision of food items to generating income through selling raw material. Majority of poor people in the world rely directly on wetlands for their livelihoods. Often called “natural sponges”, the wetlands absorb water and filter pollutants. They also improve crop productivity and yields for livestock and regulate the climate. Apart from the various provisioning services, wetlands support various regulating (carbon sequestration, microclimate regulation) and cultural services (tourism).

Despite their massive importance in sustaining human habitat, wetlands have been victims of human encroachments due to unbridled forces of urbanisation and are increasingly disappearing in many parts of south Asia.


While conservation of wetlands is critical, valuation of ecosystem services of wetlands offers a basis of understanding the role that the wetlands play in the livelihoods and sustenance of human community in and around the landscape. Hence, it is very important to assess benefits derived from wetlands and assign the monetary values to them. This creates the case for economic valuation. A better understanding of the cost and benefits of utilizing wetland resources will not only address the economic causes of wetland degradation and loss but will also entail the costs and benefits of alternate use of the wetlands.
This brief talks of valuation of ecosystem services of one such wetland in the southern part of India, i.e. Kunnigal wetland, on which a rural population especially those involved in primary activities like fishing and agriculture are largely dependent.

## STUDY SITE AND SURVEY

The Kunnigal Lake is located in the Tumkur District in the state of Karnataka in India. It is a peri-urban wetland at an average elevation of 773 meters. The lake has a total spread area of 416.20 ha and a gross water storage capacity of 532.2 MCFT. The lake provides many ecosystem services that include providing habitat for fish-breeding, water for domestic and agriculture, support for local biodiversity including migratory birds, aquatic vegetation, flood control, purification of wastewater, and groundwater recharge, among other services that are of immense value to local communities.




The biodiversity of the lake includes 63 species of resident and migratory species of birds such as Shovelers, Pintail, Pochard, Spoonbill, Painted Stark, Spot Billed Pelican, Sandpiper, Herons, Whistling ducks, Gadwal, and Teals among others. Similarly the fish species included Common Carp, Catla, Rohu, Mrigal, Silver Carp, Grass

Corp. Tilapia and Cat fish. The lake is surrounded by a number of villages and the town of Kunigal. For the current study, three villages-- Bagenahalli, Neelathalli and Mavanakatte playa were selected. According to the census 2011 the total population of these villages were 1903 (920 males and 983 females) in 530 households from which 160 houses were selected for survey. The study used both qualitative and quantitative methods for assessing the economic value of the lake. Data were collected based on focus group discussions (FGD), household surveys, key-informant interviews (KII), and secondary sources.

## METHODS

The study used various economic valuation techniques like market price method, productivity approach, surrogate markets, surveys, benefit transfers, etc. It employed structured interviews, participatory observation approach, focus group discussions and key-informant interviews for primary data. However, secondary data for the catchment area has been used for various estimates at the meso-level. Values of the benefits or services have been considered at various levels: micro (or local) level considering the three villages, meso-level considering the catchment and Kunnigal town, and the global level for carbon sequestration.

## RESULTS AND DISCUSSIONS

A majority of the families surveyed are engaged in agriculture from which they yield 75% of their income, with average annual income INR 76000 for the family of 4(average). However, the average income of the landless is far lower than the overall average. The lake has been found to contribute significantly to the household economy by providing food, cash income, regulating services, and cultural and spiritual services, among others for people living in the vicinity.

Only seven ecosystem services have been considered to avoid the problem of double counting and complex evaluation. The values of selected ecosystem services are given in table 1.

TABLE 1

| ECOSYSTEM SERVICES | VALUE (MILLION INR) | CLASSIFICATION | % OF EACH | LEVEL |
|---|---|---|---|---|
| Domestic water use | 25.56 | Provisioning | 2.96 | Meso |
| Water for agriculture | 11.8 | Provisioning | 1.37 | Local/ Micro |
| Fishery | 8.6 | Provisioning | 1.00 | Local/ Micro |
| Fodder | 1.4 | Provisioning | 0.16 | Local/ Micro |
| Water purification | 81.21 | Regulating | 9.41 | Meso |
| Carbon Sequestration | 749.26 | Regulating | 67.41 | Global |
| Micro-Climate Regulation | 152.61 | Regulating | 17.69 | Meso |
| Total Value of Existing Ecosystem Services | 1030.45 | | 100 | |
| Potential Tourism benefit | 159.37 (with 137.26 million as potential revenue) | Cultural | | |

Therefore, a very conservative estimate of the total value of the selected seven ecosystem services is 1030.45 million INR. On the other hand, there is untapped tourism potential in the region. Our estimates reveal that the potential revenue from tourism can be to the tune of 137.26 million INR, while the tourism benefits by adding the consumer surplus or well-being element would have been 159.37 million INR.

## ECOSYSTEM DEPENDENCY RATIO

We devise the ecosystem dependency ratio as the ratio of the direct values in the form of some important provisioning and regulating services and the income of households. Therefore, if ED is the Ecosystem Dependency Ratio, then where ESV is the value of the ecosystem services, and Y denotes household income.

ED = ESV/Y

We leave out carbon sequestration benefits as that is a global common(common pool resource), and consider the average income of the catchment (beyond the local surveyed zone) as equal to the average income of the local surveyed villages, then the value of ED is 1.24. This implies that the wetlands provide a higher value than the average incomes of the households. This creates a clear case for conservation, as the dependent community will lose out 24% more than their annual incomes if the lake is lost. The loss will be even more if one considers the global benefit of carbon sequestration.

## POLICY IMPLICATIONS

This study contributes to tackling under-investment in environmental assets through better economic analysis for environmental investments, including mobilization of government and donor resources for environment. In particular, it provides lessons for sustainably managing environmental resources to benefit local community which uses the wetlands as their main source of livelihood as well as improving its management for its sustainable use.

The positive attitudes and perceptions of the local communities observed during focus group discussions and key informant interviews indicate the high possibilities of successes of community-based conservation approaches. Therefore, policies and programs that accommodate local people in the decision-making process can make the wetlands conservation cost-effective and sustainable.

The other important contribution of the study is the revelation that there is immense tourism potential in the region. Policy makers need to devise adequate institutional mechanisms by way of which community-based-tourism through a benefit-sharing system can be promoted. A community-based approach to wetlands management and governance through revenue sharing will make the local communities more aware of the importance of the resource under consideration, and will help both conservation and development goals.



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