Ganga

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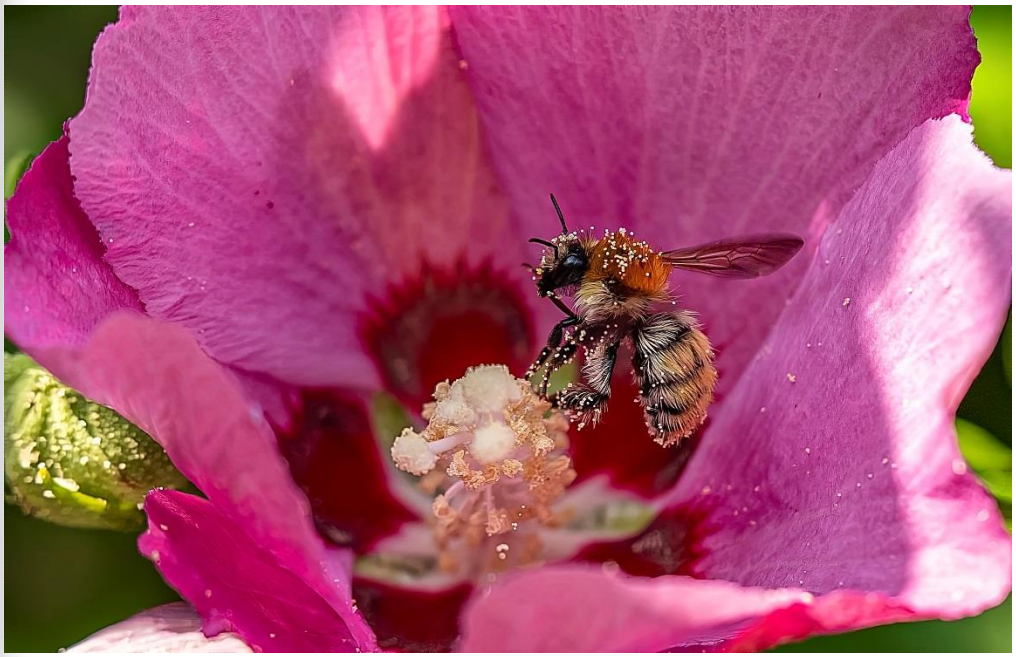


Bee on a Gul Khaira Flower, playing the Role of a Pollinator (Source: Pixabay)

Commentary

Pollination plays a crucial role in global food production. Biotic pollination engineers plant reproduction, agricultural crops, wild plant species, flourish biodiversity. Hence pollinators are key elements of ecosystems and contributing to food security.

Intensified agriculture, sprawling urbanization, deforestation, loss of habitats of flora and fauna and resultant environmental variabilities, changing climate parameters are reshaping the plant-pollinator functions in natural and managed ecosystems. Increasing use of pesticides, insecticides, harmful chemicals and detergents – all are responsible for destroying plant-pollinator interactions.

India possesses a rich diversity of pollination services hosting more than 800 species of bees besides butterflies, moths, beetles, birds, bats and flies. In 2018, the Ministry of Statistics & Programme Implementation (MoSPI) embraced the UN system of Environmental Economic Accounts (SEEA) Framework, an agreed international framework for the compilation of the Environment Economic Accounts.

Environmental Accounting Series of MoSPI, 2026, estimated that from 2012-13 to 2021-22, the monetary value of pollination services is around 8–10% of the total crop output reaching Rs.266.33 thousand crore from Rs.115.41 thousand crore in 2012-13. Fruits and vegetables have highest dependence on pollination services. Apart from that Oilseeds and fibers also indicate highest dependence on pollination linkages.

NEWS

Watershed Development Program in Eastern Side of Upper Kiul River

A watershed development programme is underway in 13 villages of Tisri Block, Giridih district, Jharkhand, located on the eastern side of the Upper Kiul River catchment. The villages, spread across nine micro-watersheds, face acute water shortages. The programme aims to improve water security through integrated watershed management and is being implemented by Savera Foundation, Koderma, with support from Sir Ratan Tata Trust.

Proposed location for Contour Trench

The team visited the newly established Saksakia office of Savera Foundation, where the progress of the watershed programme was discussed with project stakeholders. Community participation was also evident: villagers had prepared seed balls for forest regeneration, while Savera Foundation had distributed vegetable saplings to promote kitchen gardens. The team also discussed the role of community-level *change makers* and village women volunteers known as "Badlao Didis", who are expected to play an important role in the project.

The programme combines water-harvesting, soil and moisture conservation, and ecological restoration measures. Farm ponds, Dohas, contour trenches and an earthen check dam

Doha & Well should not be Side by Side

have been constructed at different locations. Community participation is also being encouraged through activities such as preparation of seed balls for forest regeneration, kitchen gardens, and the involvement of Badlao Didis.

A recent technical review identified the need for some improvements, particularly in upland rocky areas where farm ponds may have limited water-retention capacity, and in maintaining pond outlets to prevent erosion and future siltation. The experience underlines

Earthen Check Dam & its poor Water Storage Capacity

the importance of appropriate site selection, scientific watershed planning and community participation for achieving sustainable water security in the Upper Kiul catchment.

Farm Pond in Upland Rocky Area

Beavers engineer Riverbeds as Powerful Carbon Sink

A new international study was conducted by the University of Birmingham in partnership with Wageningen University, the University of Bern, and other international institutes to see the role of Eurasian beavers or the (Castor fiber) in a stream corridor in northern Switzerland and noted them as natural climate-change mitigation agents.

A Eurasian beaver (Castor fiber) standing in water

After decades of conservation activities beavers are coming back to nature and rivers across the Europe. By constructing dams, beavers create wetlands by slowing down water flow, enrich groundwater and accumulate organic and inorganic materials with carbon in the form of vegetation,

sediments, deadwoods. The research group used high-resolution hydrological data, chemical analysis, sediment sampling, greenhouse gas monitoring and long-term modelling to calculate an efficient carbon budgeting in beaver activity ever generated in Europe. Over 13 years these wetlands trapped 1194 tonnes of carbon which is equivalent to 10.1 tonnes of carbon per hectare per year mainly by removing and soaking dissolved inorganic carbon. Interestingly, the percentage of methane (CH_4), the main harmful concern in wetland, were insignificant, only 0.1% in carbon budget. These carbon sinks showed seasonal pattern also – in summer with exposed sediments due to reduced water flow, more emission makes them source of carbon.

Source: ***www.downtoearth.org.in***

RIVERS OF INDIA

Krishna River (Part - 1)

The Krishna Delta is one of India's most productive agricultural regions and is divided into two parts - the Eastern Delta (274,600 ha)

and the Western Delta (198,100 ha). The Krishna Delta Irrigation Project primarily distributes irrigation water through an extensive canal network to approximately 375,391 ha during the Kharif season and 129,486 ha during the Rabi season, enabling cultivation of two crops annually. Water-use efficiency is improved through modern irrigation methods, canal modernization, rainwater harvesting, groundwater recharge, and watershed development. During the monsoon several dams and reservoirs manage excess inflow of water and floods, lives and properties. However, increasing population, industrial growth, climate change, groundwater depletion, and interstate water disputes continue to pose significant challenges, highlighting the importance of integrated water resource management.

The Krishna Basin extends from the Western Ghats to the Eastern Ghats, supporting rich forests and diverse wildlife. The Western Ghats are recognized as a global biodiversity hotspot because of their high concentration of endemic and endangered species. These forests play a crucial role in reducing soil erosion, recharging groundwater, regulating climate, maintaining ecological balance, and protecting the river's hydrological system. Important protected areas within the basin include the Sahyadri Tiger Reserve in Maharashtra (covering about 1,165.56 sq.km), which protects Bengal tigers, leopards, gaurs, sloth bears, deer, and numerous bird species; the Bhimgad Wildlife Sanctuary in Karnataka, known for conserving evergreen forests and serving as an important watershed; and the Nagarjunasagar–Srisailam Tiger Reserve, spread across Andhra Pradesh and Telangana, one of India's largest tiger reserves supporting tigers, leopards, wolves, wild dogs, reptiles, birds, and valuable medicinal plants.

The Krishna River Basin faces several environmental challenges - excessive water extraction, deforestation, urbanization, industrial pollution, sand mining, habitat loss, and climate change - all threaten biodiversity and water security ultimately leading to unsustainability and food security. Sustainable conservation measures such as forest protection, afforestation, habitat restoration, pollution control, watershed management, planned development activities and urbanisation, and active community participation are essential for conserving biodiversity and ensuring the long-term sustainability and food security of the basin.

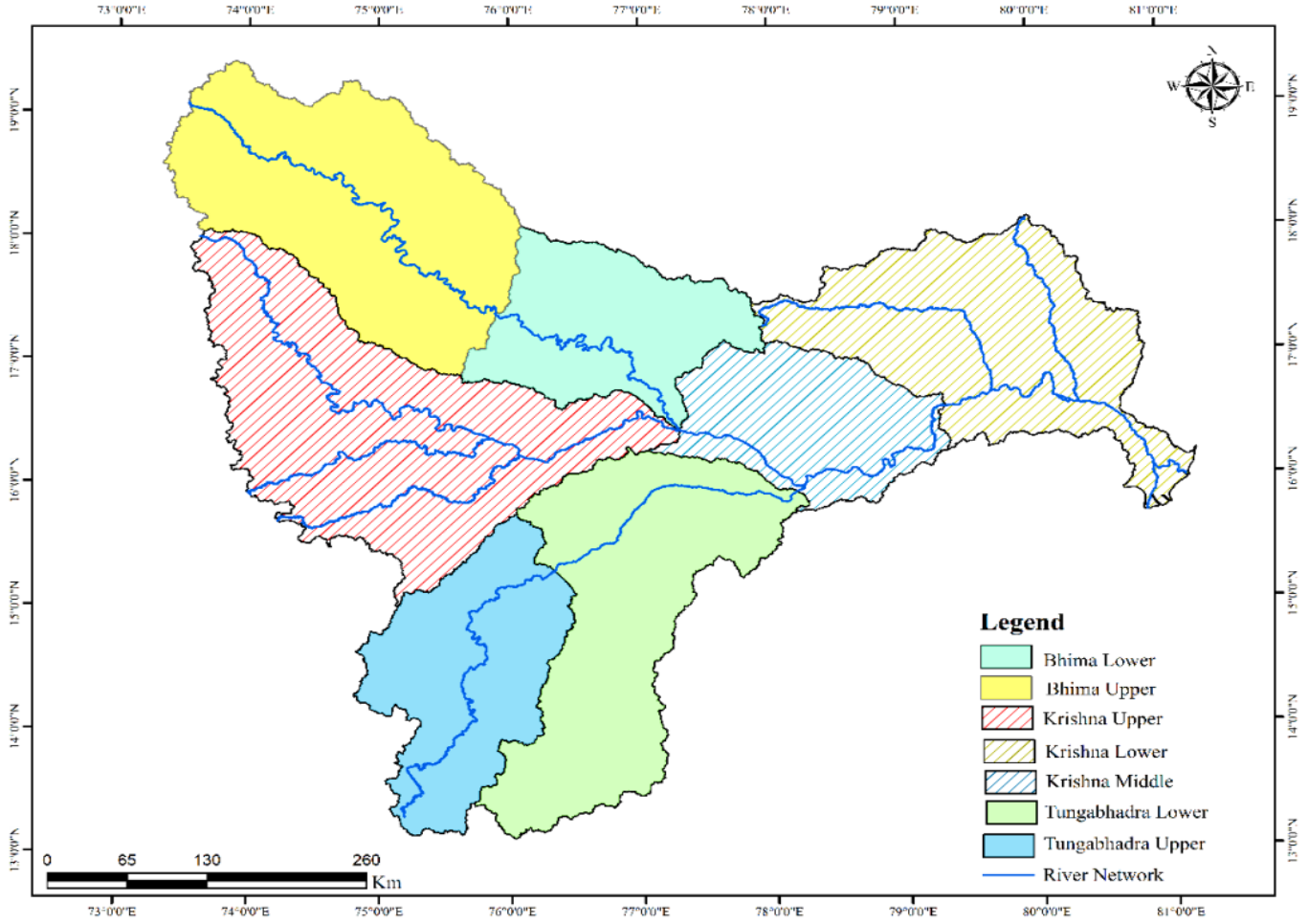
Shri Bhimashankar Jyotirlinga Wildlife Reserve

Sub-basins of Krishna

The Krishna River Basin, covering about 8% of India's total geographical area, comprises seven major sub-basins, each possessing distinct physiographic, climatic, hydrological, and socio-economic characteristics. These major sub-basins, as defined in the Watershed Atlas of India, are as follows:

1. Bhima Upper
2. Bhima Lower
3. Krishna Upper
4. Krishna Middle

5. Krishna Lower
6. Tungabhadra Upper
7. Tungabhadra Lower



These sub-basins play vital role in the distribution and management of water resources across the basin. Together they form an interconnected drainage network that supports irrigation, hydropower generation, industries, domestic water supply, and ecological sustainability. Water availability within the basin depends primarily on the southwest monsoon and exhibits considerable spatial and annual variability, making equitable distribution of water among the sub-basins a major management challenge.

Each sub-basin is further divided into watersheds, the smallest hydrological units defined by natural drainage boundaries. Watersheds form the basic units for soil and water conservation, runoff management, groundwater recharge, and integrated water resources planning, thereby contributing significantly to sustainable basin management.

Sources:

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(to be continued..)

Special Feature

Saving the Busy yet Silent Workers: India's 'Bee Corridors' for a Pollinator-Safe Future

Pollination is a fundamental ecosystem service supporting agriculture and food security, affecting crops like fruits, vegetables, oilseeds, and cereals. Pollinators include insects (mainly bees), birds, and mammals, though insects being the most significant group. A quiet environmental crisis is growing across the world as bees, butterflies, hoverflies and other pollinating insects face increasing pressure. Studies have reported a major decline in many pollinator species, with some already at risk of extinction in parts of Europe. Global evidence (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services-IPBES) shows widespread decline in pollinator populations which also highlights India-specific assessment and action. This is not only a problem for wildlife and flowering plants, but also can affect biodiversity, farming, food security and the health of ecosystems.

Several major factors responsible for this decline can be identified as main drivers for accelerating the phenomena. Natural habitats are being lost because of cities, roads and changes in land use. Other drivers include intensive farming, excessive use of pesticides, changing temperature, rainfall, snowfall. The impact of these pressures often works together. For example, a plant may flower earlier because of warmer weather, while the insects that depend on it may not change their life cycle at the same speed. This makes pollinator conservation a complex problem requiring action at several levels.

Economic value of pollination in India is

under-studied but estimated to be very high, potentially up to USD 22.5 billion annually. Available evidence suggests a declining trend in pollinator populations, seen through increased manual pollination with reduced vegetation and lower crop yields. Along with main drivers of decline, other possible threats include invasive species, diseases, pollution, and competition from managed bee populations etc., though these factors are less studied in India. Recommended actions include sustainable farming practices, habitat conservation, pesticide regulation, pollinator-friendly urban planning, and improved beekeeping systems. Strong emphasis is placed on improving research, long-term monitoring,

Wall Hive: Traditional Bee Keeping Practices

data systems, and policy integration. A case study from the Nilgiris coffee landscapes in south India further shows that while local stakeholders recognize different pollinators and observe declining bee populations, awareness of their ecological importance is still limited, underscoring the need for conservation outreach, habitat restoration, and participatory monitoring systems.

India has now taken an important step by bringing pollinator protection into highway development. The National Highways Authority of India (NHAI) has announced plans to create 'Bee Corridors' along National Highways, marking a shift from ordinary roadside plantation to plantations designed to support nature. NHAI plans to develop at least three such corridors during 2026–27. Around 40 lakh trees are expected to be planted along National Highways during that year, and nearly 60% of them are planned under the Bee Corridor programme.

The proposed corridors will contain flowering trees, shrubs, herbs and grasses so that bees and other pollinators can find nectar and pollen during different parts of the year. Plants will be selected with different flowering periods so that flowers remain available for as long as possible. Species such as Neem, Karanj, Mahua, Palash, Bottle Brush, Jamun and Siris are among those being considered, depending on local climate and soil conditions. NHAI will also consider suitable vacant land under its control for these plantations. The design will go beyond simply planting trees in a straight line. NHAI proposes to keep a mix of vegetation and allow some natural elements such as flowering wild plants, dead wood and hollow trunks, which can provide food, shelter or nesting spaces for insects. Flowering tree clusters are expected to be placed roughly 500 metres to one kilometre apart, allowing bees to move between different food sources. The large highway network gives India a significant opportunity to create such habitats. Roads pass through agricultural areas, towns and different natural landscapes, and their roadside land can sometimes provide useful

additional space for biodiversity. These corridors cannot replace forests, wetlands or other natural habitats, but they can provide extra food and shelter for pollinators and may help connect fragmented green spaces.

Odisha is also being considered for an early phase of the programme. Plans are being prepared for pollinator-friendly plantations along selected National Highway stretches in Sambalpur, Dhenkanal and Ganjam, with nearly 20,000 flowering trees and plants proposed. As of April 2026, this Odisha initiative is in the planning stage. Its success will depend on choosing suitable local plants, ensuring flowers are available in different seasons, protecting young plants and maintaining the corridors over the long term. It could become an important example of how the national plan can be adapted to local environmental conditions.

Bee Corridors alone cannot solve the wider problem. Therefore, environmental planning needs to consider these connections instead of treating each issue separately. People and communities can also contribute by planting flowering plants in gardens, balconies and school grounds avoiding unnecessary use of pesticides. Schools and communities can observe local insects, take part in biodiversity activities and encourage pollinator-friendly management of green spaces. Such small actions, when repeated across many places, can create valuable pockets of habitat.

The success of the Bee Corridor programme, however, should not be judged only by the number of saplings planted. Their survival, growth, flowering and ability to attract and support pollinators will be more important. Regular monitoring, proper maintenance and careful management will be necessary. If young plants are damaged or flowering vegetation is removed unnecessarily, the ecological purpose of the programme could be weakened. The Bee Corridor initiative is therefore more than a tree-planting programme. It is an attempt to make infrastructure more compatible with nature. Highways are built for the movement of people and goods, but some of the land around them can also support biodiversity if it is planned properly. The idea shows that development and environmental protection do not always have to work against each other.

The fate of pollinators is closely linked with our own. Protecting them means protecting the natural processes on which human societies depend. If India's Bee Corridors are carefully planned, properly maintained and supported by wider environmental measures, the country's highways could become not only routes connecting people and places but also green links helping nature survive and recover.

Source:

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