

Ganga



Summary of basin characteristics

The Ganga (Ganges) basin extends over more than 1 million square kilometres and encompasses parts of India (about 80% of the total basin area), Nepal, China and Bangladesh. The length of the main channel is some 2,525km, while altitude ranges from 8,848m in the high Himalayas, to sea level in the coastal deltas of India and

Bangladesh. The basin occupies a quarter of India's land mass.

Although the river's annual flow regime is subject to local variations, the predominant pattern is for a low-flow dry season from January to May and a wet season from July to November, with peak flows usually occurring in August. The waters of the Ganga carry one of the highest sediment loads anywhere in the world, with a mean annual total of 1.6 billion

tonnes, compared to 0.4 billion tonnes for the Amazon.

Socio-economic importance

The Ganga basin is one of the most populous regions on Earth, home to 450 million people at an average density of over 550 individuals per square kilometre. In the delta zone this rises to over 900 per square kilometre. As a result, there is strong demand and competition for natural resources, especially water for domestic use and irrigation, and most of the basin tributaries are regulated by barrages. Fisheries along the river are of considerable economic value and their output makes a major contribution to regional nutritional needs.

There are some 30 cities, 70 towns, and thousands of villages along the banks of the Ganga. Nearly all of the sewage from these population centres – over 1.3 billion litres per day – passes directly into the river, along with thousands of animal carcasses, mainly cattle. Another 260 million litres of industrial wastewater, also largely untreated, are discharged by hundreds of factories, while other major pollution inputs include runoff from the more than 6 million tonnes of chemical fertilizers and 9,000 tonnes of pesticides applied annually within the basin.

According to Hindu mythology, the Ganga River came down to Earth from the heavens. Today, the river symbolizes purification to millions of Hindus who believe that drinking or bathing in its waters will lead to *moksha*, or salvation. Many Hindus keep water from the Ganga in glass bottles as a sacred relic, or for use in religious ceremonies. The river becomes the final resting place for thousands of Hindus, whose cremated ashes or partially burnt corpses are placed in the river for spiritual rebirth.

Biodiversity values

The Ganga supports a rich fauna and flora, including the endangered Ganga river dolphin *Platanista gangetica* and at least nine other species of aquatic mammal. Reptiles include three species of crocodiles along with one species of monitor lizard and eleven different freshwater turtles. The Ganga also has the richest freshwater fish fauna anywhere in India.

The riparian zone supports many plant species that are of both ecological and economic importance. Some play an important role in nutrient and water conservation and in controlling soil erosion, while many also possess important medicinal properties.

Priority issues for river basin management

Threats to the continued functioning of the Ganga as a living system have reached a critical level, due ultimately to the exponential expansion of human populations. Among the key factors are:

- pollution
- competition for water
- habitat alteration
- introduction of exotic species
- commercial exploitation.

The first three of these, which often occur together, are the principal causes of the loss of aquatic biodiversity, but typically their effects are exacerbated by the introduction of exotic species and over-exploitation of resources.

Role of WWF and its partners

To address these issues, WWF established a pilot demonstration project along a 165km stretch of the upper Ganga, in the Indian state of Uttar Pradesh. This aimed to develop a methodology for tackling threats to one of the most ecologically valuable stretches of the whole Ganga system, known to support one of the highest-remaining densities of Ganga river dolphin – an indicator of the relatively good health of the ecosystem in this location.

Successful river management requires effective implementation and enforcement, which in turn depends partly on the resources, priorities and political will of those in positions of authority, and partly on the understanding and support of local people. WWF and its partners therefore sought to establish a new ‘social approach’ to the conservation of the Ganga River’s aquatic biodiversity and ecosystem functioning. This was based on informing and motivating local people through advisory work and education/awareness programmes for rural communities whose activities contribute directly or indirectly to degradation of the river system.

Public meetings were arranged, initially through building relationships with village leaders. During such meetings, local people were provided with detailed information about the river and the value of



Boys fishing on the Ganga River at Varanasi, Uttar Pradesh, India. WWF-Canon / Michèle Dépraz

aquatic ecosystems in general. Young volunteers were trained and given responsibilities to organize community-based conservation-related activities, including street plays, storytelling, slide shows, film shows and expert presentations in local languages. This work has been supported by a detailed socio-economic study of 29 villages in the project area to ensure that the full range of interactions between local people and the river are well understood.

Considerable emphasis has been placed on the religious symbolism of the Ganga and the river dolphin. A comprehensive education programme was designed using the dolphin to foster deeper understanding of the river ecosystem and to promote simple conservation measures – for example, the replacement of chemical fertilizers with cattle dung. Public opinion was largely swayed by the influence of religious leaders and other respected community figures. Although there was no direct economic incentive for local people to change their attitudes or behaviour, they realized that they stood to gain from the increased fish production of a healthier river system.

While this project is very much a ‘work in progress’, there have already been some significant achievements. These have included:

- establishment of the *Ganga Sanrakshyan Samiti* (Ganges Conservation Committee), a local-level body composed of all project partners, responsible for conducting and monitoring river conservation activities.
- stopping the use of plastic bags in townships along the river near Narora, following a campaign by WWF-India in 2002.
- tree planting along some 5km of the main road and the bank of the river near Narora township, undertaken with support from the Narora Atomic Power Plant Corporation, the local administration and local NGOs – this will enhance riparian vegetation and help to control flooding and reduce soil erosion, both of which are a major problem in this area.
- construction of a sewage treatment plant at

Anupsahar township following pressure from local people on the district administration – untreated sewage was formerly discharged direct into the Ganga at this point.

In addition, the river dolphin population is increasing, with around 40 dolphins in the project area compared to just 20 in 1994/95. A proposal for formal protected area status has been lodged with the State Forest Department. The area has also been identified as a potential Ramsar Site (the designation of which is under way with support from WWF), both for its biodiversity values and as a demonstration of the Ramsar ‘wise use’ concept in practice. Regular surveys have been conducted to monitor aquatic biodiversity and habitat quality, and a scientific database has been established.

A conservation action plan for the project area is now being prepared with the active participation of key local stakeholders, such as villagers, fishermen and sand-mining contractors. There has been significant media interest, with wide coverage in leading national and regional newspapers and magazines, and some television programmes.

Conservation method demonstrated

This case study demonstrates a species-led approach to river conservation, with a strong focus on working at a local level and using the cultural and religious importance of the river as a means of engaging with rural communities. Although covering just a short section of the river, the project demonstrates the potential for applying similar approaches at a much wider scale to promote a locally based ‘stewardship’ ethos.

The project has required the establishment of strong partnerships with local NGOs, individual political and spiritual leaders and other local opinion formers, local administrative bodies, and local forest officials. Capacity building for these local project partners has been achieved through meetings, training workshops and provision of resource material.

Resources devoted

All technical and financial aspects of the project have been supported by investments from the WWF Network totalling some US\$208,000. Part funding for this work came from the Swedish International

Development Agency. Partners provide local-level support in the form of voluntary manpower and logistics.

Chronology

1997

- April: initiation of the ‘Conservation of the Ganga River Dolphin’ project.
- July: national consultation on conservation of river dolphin in India and formulation of National Action Plan.
- July: identification of project site on upper Ganga.
- September: protected area proposal submitted to State Forest Department.
- December: regular annual survey of project area initiated.

1998-1999

- Baseline information gathered from the project area; partners identified.
- Identification of threats to aquatic biodiversity.
- Development of target-specific education and awareness programme.

2000

- January: media campaign initiated.
- September: additional funding secured.
- December: implementation phase of project begins.

2001

- January: standardization of project methodology.
- April: orientation workshops for local NGOs and volunteers.
- May to November: building of relationship with local communities through targeted education and awareness programme.
- September: workshop to develop guidelines for preparation of an Action Plan for the project area in collaboration with the State Forest Department.

2002

- January: meeting with officials from State and local administrations to generate support for the project.
- September: workshop with village leaders, local NGOs and volunteers to evaluate progress.
- November: rally by local communities in support of river dolphin conservation.
- December: identification of potential Ramsar Sites.

2003

- January: establishment of *Ganga Sanrakshyan Samiti*.
- February onwards: socio-economic study of 29 selected villages.

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Lessons learnt

1. Before planning any conservation activities in a given area, understand and build confidence among local stakeholders

The project established a 'presence' in each village through regular visits by local volunteers, local NGOs and WWF staff. This resulted in the gradual development of trust and understanding of the project's aims. Partners and volunteers were carefully chosen on the basis of their public standing and extent of interaction with local people. It was of particular importance that the local implementing authority (in this case the State Forest Department) was one of the project partners.

2. Cultural and religious values can be very important in motivating community support for conservation efforts

The involvement of religious leaders in the project engendered public understanding, acceptance and implementation of conservation measures, reflecting villagers' strong belief in religion and rituals.

3. Preliminary research work must be carried out

Before designing specific project components, such as education and awareness programmes or biodiversity monitoring, preliminary research work is needed to establish the extent of existing knowledge, as well as stakeholder attitudes and practices.

4. Regular presence in the media helps to generate public and political support

Promoting visits to the project site by foreign journalists, tourists, scientists and other 'external' groups helped to raise the project's profile and to secure international support.