

River Conservation in Western Ghats

River Kali and Sharavati

Study conducted by:

PRAKRUTI/PSK

BASAVRAJ NILAY

CHOWKIMATH, SIRSI-581401

UTTARA KANNADA

KARNATAKA

AUGUST, 2005

**WITH THE FINANCIAL SUPPORT FROM THE NETHERLANDS COMMITTEE FOR
IUCN/TRP**

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Tropical Forests and sustainable use of Water

1.1. Water dialogue One:

Uttara Kannada district, which is located in *Western Ghats*, receives highest rainfall in the state. Average rainfall is about 2500 mm in eastern plains to 4500mm in the crest line. Even after the area receives such high rainfall it is now facing water scarcity. The authorities responsible for the water management and supply have determined to tackle the problem by resorting to technology like digging as many as bore wells and building dams across the streams/ tributaries. However, these technologies have created more problems rather than solving the water scarcity.

Privatisation/ Globalisation of water:

The local community is losing control over the water resources as the government has taken control of these systems. *Sirsi* is one of the towns in India that is on the verge of privatising water utilities. Under such circumstances water dialogue was held in *Sirsi* on May 30th & 31st 2002. '*Prakruti*' *Sirsi* and '*Ashoka*' Bangalore, jointly organised the meeting.

Apart from the written submissions of the participants a face -to- face dialogue has provided a document on de bureaucratizing water and action plans for local, regional and national initiatives.

The experts present in the dialogue are:

Laxman Singh, Rajasthan; His integrated community mobilisation and efforts on conservation of water has benefited an estimation of 40,000 families implemented in 30,000 hectares of land.

Dr. Sudhirendar Sharma Based in New Delhi: Author and water expert, member of global water partnership.

Dr. Tarak Kate, Maharashtra: Scientist, working for alternate technology and rural development.

Vishwanath, based in Bangalore, Karnataka: Constructing engineer, adopting several rain water harvesting structures in various cities.

Shree Padre, Former editor of '*Adike Patrike*': Published several articles on rain water harvesting and recharging of ground water technologies invented by local community.

Dr. Shivaram Pailoor: Editor of '*Madhu Prapancha*'. Artist in All India Radio, Dharwad

The participants urged to initiate local people's involvement in managing the water resources. Currently the government's policy is to have bigger schemes like construction of dams and digging of bore wells. Instead of this local people's need water recharging and rain water harvesting should be given priority.

Participants visited *Balagar* village from where the government authorities are planning to build a dam across a stream to supply water for town. In order to help the local people fighting against

this dam as this would affect the tropical forests and livelihoods. It is decided to bring out a *white paper* on this issue of unsustainable use of water resources.

In the concluding session, villagers of *Balagar*, citizens of *Sirsi* town participated in a meeting to evolve peoples plan to restore water for the region.

1.2. Water dialogue two:

Objective:

1. To understand the causes and effects of mismanagement of water in the region.
2. To evolve a strategy for forest conservation practices, ground water recharging, rain water harvesting and other sustainable use of water.
3. Networking people, NGOs other institutions involved in water conservation for advocacy, lobbying with government and to understand/ carry out research on water management issues.

Two day Water Dialogue was held in Goa on January 18, 19 2003. Over exploitation of the forest resources has caused degradation of the forest. Monoculture plantations, breakdown in traditional management practices of natural resources and farming system have resulted in to depletion of soil fertility and low yield in agriculture crops. Low income in agriculture has forced the people to look for alternative livelihood opportunities and obviously the pressure on forest increased. Unsustainable use of forest resources and illegal cutting of trees are also happening. Depleting forest cover and mono culture plantations leading to soil erosion. On the other hand increased population in urban area and industries demand more water supplies and several small dams are being proposed in forest regions to fulfill this need.

Water dialogue aims to look for alternatives like rain water harvesting, ground water recharging to reduce the problem of water shortage and drought situations and to reduce the soil erosion problem.

The participants of water dialogue II asserted the inalienable rights of people over the water resources and resolved to work together to denounce anti-people policies of the state through innovative initiatives at the grassroots. Participants were unanimous in their view that the current water crisis is mainly a crisis of water governance. 'Unless action at the grassroots is up-scaled to policy at the highest level, the crisis is unlikely to be resolved,' the dialogue concluded. However, enhanced grassroots action through innovative projects; research through case studies; lobbying through informed debates; and advocacy through networking were identified as the strategic steps to create micro-macro linkages for impacting public policy. Capturing the essence of the first dialogue, Pandurang Hegde reiterated how it had helped his group lobby against a water-

diversion project for Sirsi town by simultaneously focussing on low-cost water harvesting systems as an alternative to the Asian Development Bank (ADB) funded-project for the coastal Western Ghats. At a time when negative impact of privatisation is becoming all too evident and when the government is ignoring community's interests for mega projects, the dialogue sought to re emphasise on grassroots action that reinforced peoples' commitment for water governance. There is an urgent need to upscale grassroots initiatives that ensure a fair, transparent and inclusive process in identifying solutions for existing and future water management dilemmas. Though the goals of the Water Dialogue are ambitious, the participating fellows have no illusion on the difficulties that lie ahead. The intention has been to identify critical issues that plague the water sector and pitch them against the grassroots initiatives that have clues to resolving them. Building upon the recognized body of knowledge, the Water Dialogue will identify research questions through field visits that will need to be researched through a set of case studies to arrive at tangible solutions/approaches that can then be fed to enrich the dialogue process. The two discourses of the Water Dialogue held workshops on highlighting and examining the paradox of development where non-monetary interventions (policies) have significant impact (often negative) in contrast to monetary interventions (grassroots projects), which have limited reach both in impact and expanse. These contemporary issues constitute the learning framework that will not only guide the dialogue process but will be expanded to evolve research questions. The list of questions is not closed but will be reviewed and expanded as research progresses.

"Getting to see the big picture on water in the company of senior colleagues makes one feel empowered and inspired," commented Rakesh Jaiswal on the Water Dialogue. Villagers all along the coastal and mid-ridge zone of Goa have found an ingenious way of ensuring livelihoods security, not from better crop harvests but from trading water from their private wells. While exact number of those selling water is not known, the trend is quite common across the ultimate travel destination.

Though Goa had enacted its Ground Water Regulation Act in 2002, delay in framing the rules have allowed people like the Kudnekar brothers to sell water from their private well in village Saligao. Once a popular hippie haunt, Saligao is now home to a brimming controversy in water trade that has brought the entire village up in arms against the duo.

Says geologist A G Chachadi of the Goa University, "Overdraft from shallow sandy aquifer has impacted the groundwater level." Ignoring the lowering of water table in most other wells in the village, tankers have continued to extract about 435 cubic meters of water from Kundekar's well every day. Ironically, the Kudnekar brothers have been selling the precious community resource to the resource-hungry tourism industry for just 10 paise a liter.

Trade in well water isn't unprecedented though. Tankers carrying door-to-door potable water supply are common in most metropolitan cities including Delhi, Chennai and Bangalore, where water tankers supplement the shortfall in municipal supply. Without doubt, the water is ferried from wells in the nearby villages. Most often, the contractors pay a pittance to the well owners. But the World Bank has long argued that water vending has the potential to reform the monopolistic water sector by bringing in much desired competition. Over-exploitation of groundwater was thus far limited to agriculture but the emerging commercial dimension is stressing the already dwindling groundwater reserves in the country. Currently, around 50 per cent of the total urban and industrial demand are met through groundwater. An assessment by the National Institute of Urban Affairs found that 21 per cent of the urban water demand was met through wells.

Clear acknowledgement that the majority of the country's (or world's) water poor (for whom ecosystem functionality is crucial) live in rural areas, and a commitment to address their problems first and foremost without creating a rural-urban divide in water access and distribution. Regional and local initiatives to protect and restore hydrological ecosystem functionality for the benefit of local and indigenous communities, downstream communities and biodiversity, and fund programmes of action that work to sustain these through public involvement and integrated water resource management. And plans get developed in compliance with the integrated water resource management principles ensuring equity and lasting peace.

Requiring polluters to pay, sound investments in water conservation. The reduction of subsidies and reformulation of market policies that encourage water-intensive agriculture. Full cost accounting of water resources (subject to paragraph 18.8 of Agenda 21) to encourage efficient use of water (especially for profit making activities), including the maintenance of natural water flows and levels that are essential to the needs of ecosystems (including wildlife and wildlife habitat). An International Framework on Freshwater (IFF) that recognizes the interconnectedness of water and human security; establishes water as a fundamental human right; and ensures that water is kept outside the purview of a tradable commodity under the World Trade Organisation.

Pandurang Hegde's revisit to the 184-km long river *Kali* in the Western Ghats after two decades to Laxman Singh's community marches in the drought hit areas of Rajasthan; and from continuing efforts by Dinesh Mishra to document the water-rich rivers of Bihar to Sudhirendar Sharma's media advocacy against the US\$ 120 billion river-linking plan of the government, a series of ongoing and proposed actions were listed as follow-up to the dialogue at Goa. Shree Padre mentioned that all his future campaigns on rainwater harvesting advocacy would have a liberal dose of the emerging threats of globalisation of water. For Arvind Pitre, the dialogue

offered a unique learning opportunity wherein he got clues to engage micro-credit groups at the village level in management of water resources. Others fellows who contributed significantly to the deliberations at the dialogue were: Janardhan, Nandeesh, Jyoti Mhapsekar, Kiran Kulkarni, Swamy, Vijay Uttarwar, JP Rao, Vasudev Sharma and Santosh Ghondalekar. Following field visit to Saligao village facilitated by local activists Mario and Ambrose along with journalist Frederick Noronha, exposed the participants to the grim spectre of water trade by a village well-owner. The participants resolved in one voice that in their work they would continue to oppose 'commodification' of water at all levels. Ronald Martins explained how the demand for freshwater by the bursting hotel industry in Goa was indeed forcing vulnerable villagers to resort to selling well water as a livelihood security option. In the absence of proper legislation and the unwillingness of the state to act promptly, the trade in well water is indeed on the rise in the coastal regions of Goa. Recognising that many of the existing development policies favour the elite and corporate interests, the Water Dialogue vehemently opposed the proposed river-linking idea of the government. Anamaria, who joined the dialogue at Goa, noted a strong synergy between the participants, and a willingness to work through the biggest challenge that the environmental movement has: setting a common platform. She further observed that it's very important that this type of dialogue becomes regular, and not a sporadic occurrence, and to have continuity.

Impact:

- 1 Creation of awareness on the issue of water and its linkage to forest resources.
- 2 A forestation as a means of water harvesting was emphasised.
- 3 Networking on the issue of inter linking of rivers.

2. Report on river conservation:

2.1. Report on Kali

Chapter One: Introduction

2.1.1: The river

Kali is one of the four major rivers in Uttara Kannada district of Karnataka. Its total length is 184 kilometres, longest among all four rivers. It originates from the Kushavali in Joida taluk on the border of Karnataka and Goa.

Pandri, Tattihalla, Nagi, Vaki and Kaneri are the main tributaries of *Kali*. Finally it joins into the Arabian Sea near Karwar. The name *Kali* (black) is probably because of the colour of water, which is black. It flows through the thick tropical forests of Western Ghats. The draining of leaves and forest bio-mass and the presence of minerals along the river may be the reason for black colour. Total catchment area of *Kali* and its tributaries is about 4841 sq. kilometres.

2.1.2: The ecology

The river flows in the Western Ghats region and hence it hosts several endemic species of both plant and vertebrates. The mosaics of deciduous and evergreen forests are the richest in biodiversity in Uttara Kannada (Daniels, 1980). A wide range of animals varying from Tiger to Elephant inhabits in these forests. The forest area are particularly known for the occurrence of three varieties of hornbills (DCF letter, 2001). There are several islands in the river *Kali* and these are untouched by human interventions. The islands and its surroundings form a unique ecosystem and are repository for the flora and fauna of the area (DCF letter, 2001). Several important medicinal plants are also found (some traditional medicinal person claim that there are medicinal plants, which could be treated to cure cancer) in these riverbanks. It also has one of the very ecologically important forests, the mangroves. These mangroves are breeding centres for several fish and other aquatic animals.

2.1.3: Communities

Kunbi, Gowli, Kharvi, Moger and Siddi, these are the communities settled in this region. Most of them are forest dwellers living in small hamlets in midst of forests. Kunbis are traditional cultivators and labourers. Gowli were nomadic until recently and now main occupation includes buffalo rearing, milk selling and agriculture. Kharvis are traditional fisher man and good sailors.

Mogers are also fishermen and cultivators. The Siddis are the descendants of Africa now live in small clusters. Main occupation is agriculture and collecting forest products. Their dependency on forest resources (NTFP) is about 22 to 23% in these areas. (Hegde, et al, 2000).

2.1.4 Kali Valley

Kali Valley is unique in many ways. It has Anashi National Park with tropical evergreen forests and numerous wildlife. The Dandeli Wildlife Sanctuary is very well known for Wild animals like Tiger, Berar and Elephants. The upper catchment of *Kali* river, in the tributaries of Kaneri is covered by thick evergreen forests.

Near the coast the back waters have created mangrove ecosystem as well as vast area of Wetlands.

The abundance of forest resources is the main reason for establishment of large scale industries in Dandeli, a important town situated on the banks of *Kali* River.

The first phase of industrialisation started in 1945 with establishment of plywood factory. Later, Ferro Allays Factory was established using manganese ore found in the adjacent catchment areas of *Kali*. The biggest industry is the West Coast Paper mill which produced 119750 Metric Tons of paper annually (officially only 85500 MT is allowed by the government). This factory uses the hardwood from the forests to make pulp. The valley is also power house which generates 1600 MW of electricity. The nuclear power plant is situated on the banks of *Kali* River at Kaiga. The district headquarters on the banks of *Kali* River

Chapter Two: River ecosystem and bio-diversity

Mining and submerge of vast forest areas due to construction of six hydel dams are threatening the ecosystem of *Kali* river basin. Industries situated in the banks of *Kali*, West Coast Paper Mills, Dandeli Ferro alloys, Indian Plywood and other small are the major source of pollution of *Kali* river. The water quality has deteriorated up to such extent that people residing the down stream are not using it for drinking purpose and cattle, agriculture and horticulture crops are severely affected by this water.

2.2.1: Dams

- Total submerged area :32708 acre
- Catchment area :1889 square kilometres
- Displaced families: 1376
- Affected Peoples :25000

Over the decades more than 32,000 acres of forests have been submerged in this district to build the six dams across *Kali* River. Karnataka Power Corporation is proposing to build seventh dam at Mavalangi near Dandeli. Construction of this new dam would also be in absolute violation of the 19th May 1987 Government of Karnataka Order (No. FFD 242 FGL 83) that no further projects involving diversion of forestland for other uses will be undertaken on *Kali* River or its tributaries.

Totally 1665 MW electricity is produced in *Kali* valley including that of the Kaiga Nuclear Power Plant. Power generated from the district is exported to other regions. Uttara Kannada uses only 17 MW of the electricity produced. Many parts of the region languish in darkness.

Apart from the submerged area several thousand hectares of forest are cleared for providing rehabilitation for the affected people. For the people affected in Supa dam 4500 acres of forest are cleared in Ramnagar. Unfortunately this is the catchment area of Pandari, a tributary of *Kali*.

2.2.2: West Coast Paper Mills Dandeli

The West Coast paper mills (WCPM) was started in 1955 located in Dandeli in Uttara Kannada district of Karnataka.

Wood consumption

WCPM uses the Kraft paper production process, which involves Cooking of wood chips by a sulfate process to delignify the wood. The pulp is then bleached with chlorine gas and is used to make paper. The wood chips come from hard wood trees such as Eucalyptus, Casurina, Acacia and Subabul. WPCM consumes about 1/3 of the Eucalyptus available in South India.

Power Consumption

In 2000-02, 1312 units of electric power were consumed to produce one ton of paper, and the total annual consumption was 158 MU, which is much more electricity than consumed in Dandeli or entire Uttara Kanada district. Most of the power demand of WCPM is met through internal generation in diesel gensets and coal based steam turbine generators. 20,000 KL of furnace oil

and 500 KL of diesel is used by WCPM every year to meet its energy needs. Most of the coal-based boiler waste of ash is being dumped in abandoned mines and in forest areas as well as near villages.

Water consumption

WCPM obtains its water from the *Kali* River. While the reported consumption of water is about 85,000 KL/day, actual consumption could be much higher since the water meters are not properly calibrated. About 240 KL of water is required to make one ton of paper. In contrast, the average water consumption in US paper mills was around 75 KL per ton in 1995.

Water pollution

WCPM releases its effluents from the paper making process in to the *Halamaddi Nala*, which flows through the WCPM and merges with the *Kali* river 300 meters from the mill. Report of the Central Pollution Control Board (CPCB, January 2003) shows that the mill has been discharging insufficiently "treated" effluent in excess of allowed quantities (almost twice as much) to *Kali* river. In addition, CPCB found that the flow of meters installed by the WCPM to be faulty. In fact, KSPCB (Karnataka Pollution Control Board, a government agency to control pollution) had already issued a show cause notice to WCPM regarding these meters in August 2002.

A December 1999 ISRO study commissioned by the mill to assess the possibility of ground water contamination found that one-kilometer stretch of the *Kali* River was affected and ground water was contaminated in villages situated along the river.

Health impacts

Analysis of effluent samples in 2001 to 2003 by the Central Pollution Control Boards show non-conformance of standards set by the regulatory agencies. They show that the output does not conform to stipulated standards for parameters like BOD, COD, PH, and suspended solids. The high levels of COD reflect the presence of excess chemicals in the effluents. The high levels of BOD reflect the presence of high quantities of organic matter in the effluent could have resulted in the recent outbreak of severe gastroenteritis in the Kariampally village. Death of cattle has also been reported previously. News paper reports and video footage show that the irrigated fields are covered with layers of pulp, which prevents growth of crops and makes the land uncultivable. Since WCPM uses chlorine for bleaching, organochlorines are a significant component of the effluents. Many organochlorines are linked to health problems, such as cancer, birth defects, endometriosis, low sperm counts, and impaired fetal development.

EIA report had recommended that the effluent treatment plant be upgraded. As of date, (April 2004) the ETP is yet to upgrade, although KSPCB has directed that the upgradation should be completed by September 30th 2003.

Conclusion

The pollution from the West Coast Paper Mills has been severely affecting the entire ecology of *Kali* valley and specifically having adverse impact on downstream villages. Despite being aware of the resulting dangers, KSPCB has been lax in its regulatory enforcement. The continued violation will result in more tragedy similar to the deaths in Kariampally. Therefore, it is critical that pressure on KSPCB and WPCM be sustained.

2.2.3: Mining in the Kali valley

The government has given permission to 137 companies to undertake mining activity in 30,000 hectares of forest in *Kali* valley. Manganese, iron, limestone and atomic minerals like uranium are the major minerals and rocks are being exploited in this area.

Millions rupees worth of sand is being looted in *Kali* valley in the areas of Chandewadi and Ileyadabe forests, which surround the Pandari river, a tributary of *Kali*. This ongoing illegal sand mining is also affected the ecology of the forest area and the *Kali* river and its tributaries.

As per a recent Supreme Court order, the law of Ministry of Environment & forests, and the Department of Mines and Geology (DMG) mining in forest area is illegal. Yet, sand mining is rampant in the Chandewadi and Ileyadabe forests.

In an area of about 1200 acres of forestland in the Ileyadabe forests, mechanised sand mining is being done for several years. In this forest area, a minimum of 400 trucks haul sand every day.

In the Chandewadi forest area 22 machines operate round the clock and mine sand from the Pandari River. In the past six years since mining commenced here, the number of machines have increased from 3 to 22. Everyday 100 trucks of sand are hauled out of this area. In 2001-2002, it has been estimated that about 45,000 trucks of sand have been mined.

This illegal sand mining is leading to a loss of revenue to the tune of at least Rs. 10 crores. It is reported that each truckload of sand fetches about Rs. 4500 in the market. All this illegal mining is being ignored by DMG, Karwar, the Forest Department, the Revenue Department, as well as the Karnataka Power Corporation Limited.

While there are over 400 people working here, none of them are local people. In addition, if anyone raise their voice against the illegal mining, there is a threat to their life. *Prakruti* is trying to create awareness in local communities on this issue and we are bringing these issues into broad spectrum by launching *Kali Bachao Andolan* (KBA).

2.2.4: Kaiga Nuclear Power Plant

Kaiga Nuclear Power Plant is located in the crest line of Western Ghats and it is producing 440 MW electricity. The government has given 732 Hectares of Forestland for Nuclear Plant. The power line passes through one of the best natural forests of the Western Ghats in southern India. The stringing of the line will lead to further destruction of the fragile forest ecosystems of the Western Ghats. The construction of roads inside the thick evergreen forests would pave way for more encroachment in the forestland as well as lead to smuggling of timber. It would also cause disturbance to the wild life in the region. The maintenance of the power line in the hilly tract would require additional tree felling in the coming years.

The power line would also pose the hazard of radiation (non-ionising radiation) affecting the surrounding vegetation and human habitation. The authorities have not envisaged any protective measures to control the adverse impact of radiation.

The destruction of the forests on the steep slopes would cause opening up of the forest canopy leading to erosion of soil. The area is the catchment of *Kali* River and the hydel dam built downstream would be adversely affected by high siltation from the soil erosion. Under these circumstances the above project has no plans for soil protection measures.

Problem: There is fear among the villagers on the bank of *Kali* that water is polluted by radiation from Nuclear Power Plant. Though the government authorities claim that the water of *Kali* River downstream of Nuclear Plant is safe, no one believes this. They do not drink this water. KBA is planning to take up this issue and get the water analysis to check radiation in *Kali* River and its impact on aquatic and human life.

Chapter Three: History of conservation efforts

2.3.1: Mining

The *Kali* valley is rich in Manganese, iron, limestone and atomic minerals like uranium and rocks are being exploited in this area. Open cast mining in Bisgod was one of the major mining activities that was threatening the forest ecology. Lot of tropical forest has been destroyed for the mining. Opening up of huge pits in the mining site was left as it is without refilling or reforestation work and dumping of waste materials in the forest created lot of environmental hazard. Since this mining site was located in the crest line of Western Ghats, it promoted rapid soil erosion and subsequent silting in the downstream and reservoirs. After several years of protest this mining has been stopped now.

2.3.2: Kaiga Nuclear Power Plant

Protest was launched in 1980's to stop this project. But the government forced the project on people. After the construction of nuclear power plant the government is planning to build high voltage (440 KV) power line from nuclear power plant to Bangalore (500 KM). This line would cut through best tropical forests in Western Ghats. People have opposed the construction of power lines that would destroy best forest areas.

2.3.3: Dams

There is an attempt to build seventh dam on the *Kali* River near Dandeli. About 210 hectares of tropical forest will be submerged if the dam is built. The project proponents presented two fraudulent Environmental Impact Assessments, which was exposed by PSK (Parisara Samrakshana Kendra, Sirsi) and another NGO, ESG (Environmental Support Group, Bangalore) in the year 2000. In the Public Hearing people opposed the dam and construction has been stopped for the time being.

Chapter Four: Kali Bachao Andolan (KBA)

2.4.1: Objectives

- A. *Kali* Bachao Andolan or Peoples Movement to save *Kali* River was launched by the people of *Kali* Valley. Numerous development efforts of establishing industries, hydel dams, nuclear power plants have not helped the ordinary person in *Kali* Valley. In fact they are facing severe problems due to these projects.
- B. Two padyatras, first in 1983 and the latest in 2003, have confirmed that this short west flowing river cannot withstand any more external pressures, both to fulfil its own ecological functions as also to ensure livelihoods security to people and the wildlife. At a time when water is the key issue at international and national forum and the voice for the protection of freshwater echoes from all corners, the *Kali Bachao Andolan* was formally launched (in April 2003) to protect this river and to convey the message across the planners and administrators.

The specific objectives were:

- A. To organise the people in the *Kali* river valley against the problems of dam, paper mill and mining activities.
- B. To ensure the livelihood security of the people and to evolve an ecologically sound development plan for people and wild life in *Kali* valley.

2.4.2: Methods

- *Padayatras*: Padayatra or foot march is one of the important methods to understand the ground level situations and to discuss with various stakeholders. This Padayatra from the mouth of the river on West Coast in Karwar and it concludes in the origin of the *Kali* River at Kushavali. The Padayatra group walks continuously from one villager to another halting in the villages during night. They conduct focus group meetings, address school children and address public meeting with slide shows. Organising the people, creation of awareness, collection of data and information is also done through the foot march. In this process two-foot marches were conducted along the *Kali* River. One during 1983 when there was no dams on *Kali*. The second Padayatra was launched after two decades in February 2003. Organising affected people and meeting with Karnataka Pollution Control Board, meeting with Paper Mill Authorities, Field visit to affected places with media, government representatives and creating awareness through slide shows and meetings. School/ college children are involved in these activities and slide shows and lecture demonstrations were held at various places during Padayatra.
- *Agitation (Dharna)*: Protests against pollution of *Kali* River by the Paper Mill was held in Dandeli. KBA team with local people and media representatives visited Sakhsali, Harmoda, Kariyampalli and other villages affected by pollution on the bank of *Kali* River. These villages do not have the basic facility of road and drinking water. The villagers said that they face severe water problem in these villages. The bore well water is not potable. They showed the cattle affected after drinking the water from the river and the crops affected. There are several people with gastrointestinal problem and Jaanu is one amongst them who is taking treatment in hospital and the condition is very serious. In these villages the team discussed the issues to be addressed with WCP. Protest was launched in Bangalore against any new dams across *Kali* River, against pollution by WCPM and to stop illegal sand mining, which cause threat to the river and livelihood of the local people.
- *Lobbying*: Discussions were held with several senior officers in Forest Department and District Administration bodies; Ministry of Environment and Forests. A memorandum was submitted to Chief Minister explaining the various threats to the *Kali* River and urging him take action against these threats. District minister and Industry Minister for Karnataka state is also met and discussed various issues to overcome the situation. KBA team met the Chairman of Pollution Control Board Mr. J. Alexander on their continuing violation of the company.

- *Research:* PSI (Peoples Science Institute) Dehradun and KBA has carried out water analysis on various places in Dandeli where pollution is taking place. Study is also carried out on possibilities of alternate employment opportunities like conservation and development of NTFP (Non Timber Forest Produce), medicinal plants.

KBA protesters meet Shareholders at Annual General Meeting:

In a dramatic move, *Kali Bachao Andolan* led protest into the sprawling campus of the West Coast Paper Mills (WCPM) in Dandeli, on 30 September 2003, and met with the shareholders of the company.

The Annual General Meeting with Shareholders is an important day of accountability for any public company. For decades, the WCPM has suppressed evidence of the serious pollution that it is causing to the *Kali* River by discharging untreated trade effluents. Many efforts to force the company to follow legally required environmental norms have been in vain aided by lax regulation.

KBA with villagers from Kariampali, worst affected by recent pollution by WCPM, along with representatives of Environment Support Group, Parisara Samrakshana Kendra, Alternative Law Forum and Samvada, rallied through the Dandeli town and entered the WCPM campus in time for the Annual General Meeting. Heavy security and the presence of a large posse' of police did not deter the campaigners in their peaceful entry to the AGM, deep inside the campus. The day was also significant, as it marked the closure of the deadline of the Karnataka State Pollution Control Board for WCPM to install a secondary effluent treatment plant. When senior managers were pressed to show the plant, they deterred only to admit that it was unlikely that it would be ready any time soon. Clearly caught off guard, and deeply embarrassed, the Mr. Chandak, Executive Director of WCPM, offered to meet with a key 'leaders' of *Kali Bachao Andolan*. He was told that he must meet all, or none would meet him. Late in the evening he complied with this demand, and the protestors took their message into the company's Boardroom. Along with Mr. Chandak, all of his senior staff was present. In over two hours of deliberations that followed protestors of KBA and the affected villagers, charged the company with:

- Wilful negligence causing serious pollution of the *Kali* River, and its ecology. Also that of extracting water from *Kali* River far in excess of consented quantities, by tampering with water meters, both at the intake and discharge points.
- Causing grievous injury and harm to villagers downstream of the effluent discharge point.

- Criminal neglect of villagers affected by the pollution incident on 29/30 June 2003. Also of not providing drinking water facilities despite the pollution of surface and underground aquifers being reported to be serious for a decade now.
- Lax approach to statutory warnings requiring the company to install a state of the art effluent treatment plant. This involved violation of a key direction requiring the treatment plant to be ready by 30 September.
- Further, carelessly discharging fly ash from the power plant, including in a local college campus. Gross violation of production limits set, as the company was on record that it was producing more than twice the consented quantity. This resulted in more fresh water intake, and doubling of pollution, with consequent adverse impacts on public health and environment.
- The company has wrongly claimed that this increase in production will not increase the pollution load, in an attempt to dodge compliance with a full environmental review requiring public involvement. The past five years' environmental compliance reports filed by the company with the Karnataka Pollution Control Board has too many factual inaccuracies and is a copy-paste job across the years. It appears the regulatory authority has colluded with the company by not examining such details and taking appropriate action.
- Behaving in a manner as to threaten the local communities with dire action if they questioned the company's errant behaviour. It was also informed that Central Pollution Control Board and Ministry of Environment and Forests had on investigation found the pollution of the river to be extremely serious.

Mr. Chandak had little to offer in explanation. He was also unable to deny any of these charges. When the local villagers presented to him how difficult their life had become because of his company's utter lack of responsibility, he was constrained to offer some relief. Consequently WCPM Executive Director Chandak made the following commitments:

1. WCPM will undertake the expenses of providing drinking water to all villages affected by pollution of *Kali* due to discharge of effluents.
2. WCPM will invest in a mobile medical unit to provide immediate health relief to affected villages.
3. WCPM will accept monetary claims from all affected families. These claims would include cost of loss of income and livelihood due to disease, death and disease of cattle and failure of crops.

4. One year's livelihood support would be extended on claim to Jahnu, a Gowli who suffered acute renal failure, and also his sister-in-law, who lost a new born infant, due to pollution from WCPM.

5. To involve local people to bring transparency in pollution control measures.

The apparent motive was to present WCPM as the only economic option, and that implementing required pollution control technology would force losses on the company. To suffer in silence, despite a harsh existence, provided livelihood in the least. With this protest, local people have now been shown the way ahead in negotiating a better deal for themselves and those who work in this large paper mill.

Should WCPM fully comply with law and implement all environmental measures, as is clearly possible given its large cash reserves (about Rs. 150 crores in the least), then the serious pollution that it is causing for decades should be a thing of the past. For this a very strong regulatory regime is immediately required.

Consequently, we demand that the Karnataka State Pollution Control Board should immediately take cognisance of the non-compliance of the 30 September deadline for installing an effluent treatment plant, as per relevant provisions of the Water (Prevention and Control of Pollution) Act. Chandak explained the process of paper making in detail and that they have rebuilt the factory with modern machines and increased capacity. He tried to defend the factory and claim that there is no technology to overcome the problem of colour and odour in the effluent and claimed that it is potable. However, he does not have the answer to the problem of odour and colour why the people, cattle, crops and fresh water animals were adversely affected.

A memorandum was submitted to chief minister of Karnataka (see annex 3) after launching protest. These protests were held in the river valley, near the village where Paper mill is discharging untreated effluents, in those villages suffered from polluted water, in sand mining area and one in Bangalore, capital of the state.

Summary of the memorandum is as follows:

1. The pollution of the *Kali* River by West Coast Paper Mills at Dandeli must be stopped immediately.
2. The rampant and illegal sand mining continuing in Supa submergence area should be immediately stopped and the infrastructure engaged confiscated.

2.4.3: Collaboration

KBA is working closely with following organisations and NGOs to be more effective:

1. Parisara Samrakshana Kendra, Sirsi.
2. ESG (Environmental Support Group, Bangalore).

3. CEEDS (Bangalore)

ESG is partner organisation in Bangalore that is providing support base is the capital city to establish contact with officials and media.

2.4.4: Problems encountered

Goondas (Anti social elements) appointed from Paper mill were threatening life of activists of KBA, Luke worm response of District Administration, State Government and KPSCB (Karnataka State Pollution Control Board). The WCP mill is least bothered about the pollution.

2.4.5: Impact

The intended objective of the Andolan to organise the affected people in this region was achieved and the issue was brought in to the notice of media, communities, and administrators and to the bureaucrats. The Paper Mill agreed to install proper water purifying systems and agreed to give compensation to those affected. The Karnataka Pollution Control Board has issued notice to the Paper to take proper measures to treat the water. Discussions were held with government authorities including Chief Minister and cabinet ministers to conserve the *Kali* River. Sand mining has been stopped for the time being and it is important for us to watch and guard this activity.

3.0. Report on Sharavati

Introduction:

Sharavati is one of the important rivers in the Western Ghats. It originates in *Ambuteertha* in *Teerthahalli taluk of Shimoga* district and flows westwards. The river gives electricity to Karnataka State. A tributary namely *Haridravati* joins the river at *Pataguppa* near *Hosanagar*. Another small tributary *Enne* hole joins near *Barangi*. There are twelve such tributaries to the river until it joins the Arabian Ocean near *Honnavar*. Therefore there are other names to *Sharavati* like *Barangi hole*, *Banavati*, *Baraganga*, and *Gersoppa hole*. Total length of the River is 132 kilometers and the River flows along the prime tropical forest. The river is famous for its rich bio diversity.

Unique features:

- The world famous Jog falls is the gift of *Sharavati*. Here the River falls from a height of 960 feet.
- Honnemurdu project started in 1956 and later renamed as *Sharavati* Hydroelectricity Project. Major proportion of *Sharavati* water is used here for the generation of electricity. The role of

Sharavati in providing home for biodiversity, agriculture, electricity, vegetation and drinking water is unique and interesting.

- The catchment area of *Sharavati* was under the rule of 'Pepper Queen ' Bhaira Devi and was known as 'Gate way of trade'.
- *Sharavati* valley is popularly known as 'Silent Valley of Karnataka', it hosts several rare and endemic species like Lion Tailed Macaque and several 'Kan forests' (Sacred Groves) exist in the valley.
- Historically important 'Kanooru Fort' is on the bank of *Sharavati* River.

Objectives of the review/Foot march along the river:

- To understand the background and importance of the river in detail.
- Create awareness on sustainable use of water to achieve regular water flow in the valley.
- To study the social, environmental and cultural aspects in the river valley.
- To study the biodiversity and Forest resources of the region.
- Understanding the present condition and status of local communities residing adjacent to the river and in coastal regions.
- Create awareness for the conservation of the river valley.

The main objective is to create a wider platform for discussion, review and to take necessary actions for the benefit of the livelihood and conservation of the catchment forests in the valley.

3.3. Activities:

The program started from January 20, 2005 at Ambuteertha and ended on February 2, 2005 in Honnavar. The review has been done through organising foot march along the banks of the *Sharavati*.

Following activities were conducted during the foot march and Avalokana.

- Organising discussion meetings in the villages adjacent to the river, and organising street dramas on *Sharavati*.
- Understanding and documenting peoples opinion on development of the *Sharavati* valley and discussing benefit of the river to local people.
- Awareness creation on the status of rivers in Karnataka through slide shows in various places with emphasis on environmental issues along with river and riverine ecosystem.

Totally 76 people participated in the Avalokana.

Inauguration of Avalokana

The Avalokana was inaugurated at Ambuteertha origin place of River *Sharavati*. Mr. Aralu Surali Najaraj welcomed the gatherings. He said that the people surrounding the Ambuteertha feel proud because they belong to the place of origin of *Sharavati*. However he said that now they do not feel happy as surrounding environment is facing several threats.

Mr. Pandurang Hegde in his introductory speech said that the objectives of the Avalokana is to understand the present status of environment and livelihood situation of the people. This shall be done through interacting with the people; organising meetings throughout the villages come across the foot march. He said those villagers organising food and shelter during 14 days foot march.

Mr. Na.D' Soza, famous novelist and writer said that there was a time when people are recognized through the rivers along which they reside. River basin provided place for evolution of cultures and practices. However, *Sharavati* is river only in Teerthahalli taluk and then it has lost all its charioteers features of a River and rather it is a backwater due to construction of various dams.

Mr. Sundar lal Bahuguna, famous Chipko leader who had come from Tehri in North India to Ambuteertha to inaugurate the Avalokana said that we are in era of consumerism culture that is causing threat to the nature. Nature is mother of all kind of animals, birds, trees, plants, shrubs, insects, hills, river and mountains. However the human beings are killing the nature and rivers. He said that now the country is facing 'Jala Sankat' water problem and Rivers have two major threats. One is exploitation and another one is pollution. Rivers are flowing not only for the benefit of human but also for all the organisms. Damaging river means damaging our own life. All the Rivers are under threat and even do not see 50% of water flowing in the Rivers compared to the flow that was in 25 years back.

Mr. Bahuguna called to live in harmony with the nature and hoped that the Avalokana would bring awareness at a larger scale and to try to reduce the problem. He hoped this message of conserving the river basin should be spread to whole India.

He inaugurated the book '*Sharavati* Eni Pristhiti' published by Parisara Sanmrakshana Kendra. Patamakki Mahabala, Smt. Vimalaji, President of local Gram Panchayat, Shri Hovayya Gowda Principal of Sahyadri college, Shimoga were present in the dais. More than 400 people including media were also present at the inauguration. A street drama organised by PSK called 'Hariva Nadi Teeratalli' played before the function.

Workshop at Sri Ramachandrapura Math Teertha Halli.

The workshop held on January 21, 2005, second day of the foot march. Koodli Jagannath Shastri, Sri Pandurang Hegde, Na D'souza, Sri Sundarlal Bahuguna, Jagadish Sharma, Gajanan Sharma, Smt Vimla Bahuguna, Professor Hoovayya Gowda, media people, villagers were participated in this workshop.

Objective of the workshop is to understand the over all problems in the *Sharavati* and views of eminent personalities regarding this and to discuss the issues that could be covered during the Avalokana.

Inaugurating the workshop Sri Bahuguna told that the politicians or bureaucrats sitting in Delhi couldn't do development of Indian villages in actual sense but only local people could achieve this. He said living with minimum requirements and not going for consumerism culture, looking for alternatives especially for fuel and afforestation are the three rules to solve or reduce the current crisis. He called to cultivate the fruit yielding plants, flowering plants that could be used as pollen from honeybees, and species that produces fodder and timber.

Mr. Gajanan Sharma an Engineer of Karnataka Power Corporation gave statistical details regarding the power production from *Sharavati* river.

He said that *Sharavati* has produced 200 billion units of electricity since last fifty years. Each 22 liters of water will produce 40 watt of electricity. Mr. Sharma however, agreed that the water of *Sharavati* was like 'Jeeva drava' meaning water of life to many organisms and people have self dependency. Now the construction of dams destroyed this self-dependency.

He informed that there are several projects have been proposed for electricity generation in the *Sharavati* valley. There is plan to divert Kogodu and Kerobi streams to Linganamakki dam and from Nanneeru, Dabbe streams to Talakalale. Mr. Sharma requested the Avalokana team to work to halt these projects as there is no water in these streams and main out come of the project would be loss of money and loss of environment.

3.4. *Sharavati* Avalokana concluding program

The program ended in Snehakunja ,Kasarkod at the mouth of *Sharavati*.

In the morning Sri Sundarlal Bahuguna with his wife Vimlaji performed worship to the river and added symbolically the fresh water brought from the Ambuteertha at the place where river joins the ocean.

Sri Shambu Hegde Keremane famous Yakshagana (folk dance) artist and Chairman of Karnataka Janapada Nritya Academy was the chief guest of the function. Mr. M.R. Hegde Chariman of Snehakunja and president of Uttara Kannada VFC federation presided the function.

Sri Shambu Hegde said that rivers are sacred and we Indians have the tradition of remembering the river by assigning rivers name to our sisters. No we have started exploiting the river in various accounts. He said that the *Sharavati* Avalokana has created awareness about the various problems that the river and people living on the banks of the river. Time has come to initiate actions to reduce the threat to the river.

Major findings of the *Sharavati* Avalokana

During fourteen days Avalokana foot march a distance of 182 kilometres was covered along the river. Discussion awareness meetings, slide shows and other activities of Avalokana were held in 58 villages along the *Sharavati* River.

- **Construction of Dams:**

Linganamakki, Gerusoppa, Hirebaskar, Kargal are the dams built across *Sharavati*. These dams brought several problems along with electricity. Natural flow of the river is restricted to just 10 kms.

Due to presence of dams vast forest area and tradition and culture of local communities also submerged and many people have become refugees.

Dams have been constructed for electricity generation. Now these reservoirs are silted, forest is degraded in the catchment area leading to water scarcity and reduced electricity generation.

There are several villages adjacent to these dams. However, due to dam and backwater and security reasons people do not have access to road to their villages. This has created serious problem to the local people.

Several villages have become islands due to *Sharavati* backwater after the construction of dams.

These Islands do not have basic facilities like road and other communications. There is lack of education facility and health care systems.

Change in the forest types

Over the years the spices present in the forest have changed. The forest cover is shrinking and the quality of forest reducing. In place of useful and diverse species forest weeds like Lantana, Parthenium are becoming dominant spices in the forest. The total wetness in the forest and

agriculture land is drying. The wetland swamps marshes and wet paddy fields have become dry in recent years. Several fruit yielding species and tubes have become rare or extinct.

About fifty years back there are several fruit yielding species like Tumburu mara, Churi hannina gida. Halige *Garcinia pictorius*, *Sylvestris phoenix*, *Cinnamomum zeylanicum*, *Flocortia montana*, *Cinnamomum macrocarpum*, *Santalum album*, *Vateria indica*, wild pepper and many others. Once these spices were dominant in the forest. Now their availability has reduced. Several tuber species like Gudde Genasu became extinct regionally due to less moisture content in the topsoil in the forest. In case of wild animals all the animals except monkeys and peacocks have become rare.

- **Coastal regions:**

In the coastal region salt water penetrated in to inland for about 20-30 kilometers bringing threat to livelihood of fisherman and farmers.

- **Problem due to *Sharavati* tailrace:**

Since last few years' saline water is intruding into the *Sharavati* and it is not useful for agriculture. There will be sudden discharge of water from the dam at Tailrace. This makes it difficult for the fishermen and people who are crossing the river through boats, as there will be sudden flooding. The KPC releases the water twice a day and this causes erosion along the banks. There are reports that when 720 hectares of forest submerged during the construction of *Sharavati* Tailrace dam, it is believed that 83 wild life species have become extinct.

- **Water scarcity:** There is water scarcity over the years in Ambuteertha, the origin of *Sharavati*. In the *Sharavati* valley water resources has decreased at least for 50% compared to last 30 years. Ponds, lakes, small tributaries and all other water body facing similar problems.
- The rich **biodiversity is threatened** due to cultivation of monoculture plantations, construction of three major hydel electric dams and due to agriculture expansion in forest. Several families have become refugees due to construction of dams and *Sharavati* protected forest. Some people have resifted for four times due to these development activities and their livelihood condition is poor.
- World famous Jog Falls is under threat. Water in the falls reduced and forest adjacent to falls disappeared. Landslide near jog falls shall be an indicator of pressure on the area. There are attempts to take up recreation of Jog falls by unplanned activities. Constructing a small dam at the bottom of the falls and then pump the water back to the falls. People said that this is totally a funny idea and would destroy the Jog falls instead of its development.

- There is need to re think about any such projects and a new participatory development planning is essential for the improvement of Jog falls.

At the river mouth there is huge problem of silting and in the inland for about 25 to 30 kilometers. Fishermen communities (estimated more than 60,000 families) are in deep problem and due to saline water farming has become difficult.

School functions:

48 schools were visited and discussion held with students and teachers.

Aims and objectives of Avalokana, major problems in the *Sharavati* River, livelihood and socio-economic conditions of the villagers were explained to the students.

Then explanation was given to students to their questions like what could be the result of this kind of study or agitation movements, energy and alternate energy sources and how that could be popularized.

Meaning and definitions of environment, forests and importance of forests are also told.

Participants of the Avalokana tried to answer question like how does the river originate?

Major changes in the forest and problems in conserving the nature. How can the development activities and nature conservation go together? And how students can involve in nature conservation activity?

Discussion in the villages about the natural resources management:

It is known that the silting is a major problem in any reservoirs. Due to silting storage capacity of the reservoir decreases and life of the dams becomes shorter. Same thing is happening with all the dams across *Sharavati*. Dams get filled after few days of rainfall and dry very soon once the monsoon retreats. The power generation is taking place not even to the tune of fifty percent of the original capacity.

The reasons could be following:

Forest is degraded and monoculture plantations of *Acacia auriculosa* have replaced the natural forests. When these monoculture plantations are cut the topsoil is exposed to wind and water erosion leading to silting in the reservoirs. Modern farming method using machines are also accelerated the erosion.

Forest areas have decreased due to submergence under backwater of dams and then due to rehabilitation. Wild animals do not have enough shelter in the forest and their attack and damage to crops increased many folds.

Traditional herbal medicine

During the foot-march we have interviewed 47 traditional herbal medicine persons among them 18 are women.

Their address, treatment they provide for different diseases and some of the medicinal plants that they use for are also listed. The treatment offered by the traditional herbal medicine persons ranged from toothache and cavities in teeth, burns, dog bite, snakebite, diabetes, jaundice, asthma, nerve diseases and skin diseases. These people can cure several skin disease, fever, headache and throat pains.

Dams across *Sharavati* River

Linganamakki Dam: 59.13 meters height/ 2750 meters length.

Hirebhaskara Dam: Now submerged under Linganamakki Dam.

Gerusoppa Dam: 55 meters height/ 555 meters length.

Power Stations:

Mahatma Gandhi power station- 8 Machines- 120 Megawatt.

Linganamakki Power station – 2 Machines – 55 Megawatts.

Sharavati Power Station- 10 Machines – 1035 Megawatts.

Gerusoppa Power Station- 4 Machines- 240 Megawatts.

Rainwater harvesting: in several villages people have started harvesting of rain water using various techniques. Villagers believe that this would help improve the ground water level.

Protest against MPM and against mining: It is noticed that cultivation of acasia, eucalyptus and teak plantations has been done in large scale. In several villages Nagarkodige, Brahmana Taruve, Tumri and Hebburuli villagers protested the plantation of monoculture species for several years and in some places they got success. Protest against mining has been done in Ambargudda and other places.

Cultivation of tree crops: In Brahmana Taruve village people are interested to cultivate thousand seedlings belonging to broad leaf species every year.

Establishing of medicinal plant garden as in case of Nagarkodige: With direction of Dr. Geeta a medicinal plant garden has been established in Nagarkodige, which is a positive effort to conserve the natural resources.

Pollution due to discharge of sewage directly into the *Sharavati* River is taking place along the banks.

Follow up meeting in Jog falls to strategies conservation plans for *Sharavati*.

A follow up meeting was held in Jog falls in Shimoga district to discuss follow up actions that has to be taken after the *Sharavati* Avalokana.

People who participated in the foot march gathered here for the discussion.

In the beginning it is decided to consolidate the findings of the foot march, village meetings

And school programs. Five member editing committee has been formed. It is also decided to include relevant case studies for the various problems identified during the foot march.

Incorporating scientific study on various issues related to forests, water, livelihood of the people in *Sharavati* valley and cultural heritage, communities and their tradition.

Following action plans were made for the conservation and development of the valley and to improve the livelihood conditions of the local community.

1. Karnataka Power Corporation has provided compensation money for the environmental loss during construction of dams and other development activities. However, it is believed that this money has not been utilized properly by the Forest Department and concerned authorities. The Avalokan committee should look into this matter to find out the actual facts and figures.
2. Due to sudden release of water from the *Sharavati* Tailrace dam people in the downstream have always problem in crossing the river in boats. Karnataka Power Corporation should clearly inform the people downstream that at what time are they going to release the water from dam every day. Otherwise construction of foot bridges in essential to cross the river.
3. After the dam construction the salt water from Arabian ocean is inundating into the well, ponds and other water bodies and in to the agriculture field. This has created a difficult situation to the local farmers.
4. During the construction of lot of assurances were made to the people evacuated from the submerging site and have become refugees. However, several assurances like basic education facilities, communication and health facilities were not provided even after several years of dam construction. The committee is going to understand the situation and in the coming years shall try to implement these assurances through pressure building on policy makers and administration bodies.
5. In some of the places villagers need some kind of motivation to improve existing natural resources management aspects. It is decided to identify such villages and try to organise the concerned people.

Reference:

Hegde Pandurang et al (2000) Study of Non Timber Forest Products in Uttara Kannada District, Prakruti, Basavaraj Nilay, Sirsi -581401, Karnataka.

Deputy Conservator of Forests (2003) Joint survey Report Regarding Dandeli Mini Hydel Project, Haliyal Division, Haliyal, Uttara Kannada, Karnataka.

Daniels R (1990) PhD Thesis, Centre for Ecological Sciences, Indian Institute of Science, Bangalore.