The Forum and its Work

The Forum (Forum for Policy Dialogue on Water Conflicts in India) is an effort to bring together all those interested in working on issues related to water conflicts in India into a loose network for action and interaction. The Forum began its work towards the end of 2004 as a collaborative effort of a few organisations and independent researchers and was supported by World Wide Fund for Nature (WWF). Presently the Forum has more than 150 organisations and individuals and the present phase of Forum's work is primarily supported by Arghyam Trust, Bangalore. The Forum's work covers the four broad areas of conflict documentation, conflict resolution, conflict prevention and network and outreach.

Contact

Forum for Policy Dialogue on Water Conflicts in India
c/o Society for Promoting Participative Ecosystem Management (SOPPECOM)
16, Kale Park, Someshwarwadi Road,
Pashan, Pune 411 008 Maharashtra, India

Phone: 0091-20-25880786, 25886542

Fax: 0091-20-25886542

Email: waterconflictforum@gmail.com

URL://conflicts.indiawaterportal.org

WATER CONFLICTS IN ODISHA

A Compendium of Case Studies

edited by

Pranab R. Choudhury, Bhupesh C. Sahoo, Jinda Sandbhor, Suhas Paranjape, K. J. Joy, Shruti Vispute

Forum for Policy Dialogue on Water Conflicts in India

Water Conflicts in Odisha:
A Compendium of Case Studies

Pranab R. Choudhury, Bhupesh C. Sahoo, Jinda Sandbhor,

Suhas Paranjape, K. J. Joy, Shruti Vispute

Forum for Policy Dialogue on Water Conflicts in India

February 2012

Water Conflicts in Odisha:

A Compendium of Case Studies

Pranab R. Choudhury, Bhupesh C. Sahoo, Jinda Sandbhor,

Suhas Paranjape, K. J. Joy, Shruti Vispute

First published in February 2012

Supported by: ARGHYAM Trust, Bangalore

Cover Design and Layout: Marion Jhunja

Printed by: Mudra

Published by: Forum for Policy Dialogue on Water Conflicts in India, Pune
c/o Society for Promoting Participative Ecosystem Management (SOPPECOM)
16, Kale Park, Someshwarwadi Road, Pashan, Pune 411 008
Maharashtra, INDIA
Tel: +91-20-2588 0786/ 2588 6542
Fax: +91-020-2588 6542
Email: waterconflictforum@gmail.com
URL: http://conflicts.indiawaterportal.org

Copies are available at the above address

Citation: Choudhury Pranab R., Bhupesh C. Sahoo, Jinda Sandbhor, Suhas Paranjape, K. J. Joy, Shruti Vispute (Ed.), 2012, Water Conflicts in Odisha: A Compendium of Case Studies, Pune: Forum for Policy Dialogue on Water Conflicts in India.

Contributory Price : Rs 200/-

Contents

Acknowledgements

On behalf of the Forum for Policy Dialogue on Water Conflicts in India (Forum) we would like to thank all those who have contributed to the preparation and production of 'Water Conflicts in Odisha: A Compendium of Case Studies'.

First of all we would like to thank all the authors. We are deeply grateful for their contribution, patient response and clarifications to our persistent queries.

The critical remarks and suggestions from the peer reviewers comprising Prof. R M Mallick, Tapan Padhi, Prof. Smita Mishra Panda, Pranab R. Choudhury, Prof. S. Janakarajan, Suhas Paranjpe, K. J. Joy and Shripad Dharmadhikary greatly helped improve the case studies. We sincerely thank the reviewers for the kind cooperation, inspirational support and valuable inputs they provided in spite of their busy schedules.

We acknowledge the contribution of the organisers and participants of the four regional workshops at Sambalpur, Jajpur, Keonjhar and Koraput. We thank MASS who co-hosted the workshop at Sambalpur, Prakalpa for their collaboration in the Keonjhar workshop and Jana Samiti and CDRT for their support at the Koraput workshop. These workshops helped us to identify the conflicts and potential authors.

We are also thankful to the organisers and participants of write-shop held at Bhubaneswar during July 2010 which helped in sensitizing, mobilizing and motivating resource persons who were in the process of water conflict documentation. The documentation effort benefitted substantially from deliberations in the workshop on "Water Conflicts in Odisha: Issues and Way Forward" held at Bhubaneswar in March 2011, where all the case studies were critically discussed and comments were provided to all the authors. We are thankful to the participants of this Workshop who extended their intellectual support in making the workshop successful.

We acknowledge the moral as well as physical support of Odisha Water Forum and the guidance from our State Steering Committee Members Achyut Das, Dr. R M Mallik, Dr. Shambu Prasad, Dr. Sisir Behera and Prof. Smita M. Panda in this initiative of documentation of water conflicts.

We thank Priyabrata Satapathy and Suvendu Acharya, past team members of Odisha State Center, who co-ordinated and laid the foundation for this documentation in its initial phase. Priyabrata steered the process of documentation and the organising of all the workshops and coordinated with the authors, reviewers and other members of the Forum.

We sincerely acknowledge the administrative support and guidance of Ranjan Mohapatra, Executive Director of Shristi, and support from Brahma Nanda Panda and Sukadev Dehury, who looked after the logistics of the workshops and documentation working silently behind the scenes. We are also grateful to Suchita Jain for working on the maps included in this compendium and the other SOPPECOM team members for their help in bringing out this compendium.

We would like to acknowledge the financial support and encouragement provided by Arghyam Trust, Bangalore. Special thanks to Amrtha K. of Arghyam for her support and inputs in this effort.

We thank Marion Jhunja for the cover and layout of the report and Mudra for its production.

Preface

There is now a growing awareness of water conflicts. However, most of it is of the doomsayer variety, given the regularity with which it is predicted that the next or the third world war will be over water! However, this growing concern and anxiety is not matched by systematic work on documenting water conflicts. While individual cases have been studied intensely -- for example, the material available on the studies of the Narmada Bachav Andolan and the conflict around the Sardar Sarovar dam on the Narmada River would comprise a bibliography running into several pages -- there is very little systematic and sustained effort at documenting water conflicts. The Forum for Policy Dialogue on Water Conflicts (the Forum) has been engaged in a sustained initiative of documenting several kinds of water conflicts in India in several parts of the country as one of the components of all phases of its work. The present compendium of case studies of water conflicts in Odisha is part of the same initiative.

In fact, the Forum owes its emergence to the first such attempt in India. In 2004, R. Doraiswamy and Biksham Gujja collected and put together the information on a few of the better known water conflicts in South India and published a summary of the cases as a small booklet called Understanding Water Conflicts: Case Studies from South India [1] . At a meeting called to discuss the booklet, it was decided to set up the Forum as a loose network-cum-platform and to continue the work on water conflicts. Today the Forum has more than 150 members -- individuals as well as organisations spread all over India.

In its first phase, the Forum concentrated on the documentation of water conflicts in India at a national level. In that phase, the Forum documented 63 cases of water conflicts in India, concentrating on Peninsular India with the participation of nearly 100 authors. These have now been published as a book, Water Conflicts in India: A Million Revolts in the Making by Routledge [2] . The book was released at a function held at India International Centre in Delhi on 13 December 2006 where Prof. Saif-ud-Din Soz, the then Minister, Water Resources, Government of India, released the book and a panel discussion was organised with senior scholar Dr. Kirit Parikh as the chairperson and a panel comprising eminent experts in water sector research including Professor Y. K. Alagh, Mr. Suresh Prabhu, and Dr. Mahesh Rangarajan.

The book is a modest, first attempt to capture in compendium form, a large number of cases representing a wide variety of water conflicts across India. It is largely a pre-analytical documentation that aims at building up an information base that can later make possible a deeper analysis. Its sixty-three case studies are classified into eight broad themes with eight thematic reviews and one overarching introductory article. Economic and Political Weekly also brought out a special issue on water conflicts based on the Compendium featuring 18 of the case studies included [3] .

In the present phase of its work, about to end soon, the emphasis is on moving from understanding water conflicts to water conflict resolution. It has now four broad areas of work: a) conflict documentation, b) conflict resolution, c) conflict prevention and d) networking and awareness. The Forum has set up two resource centres in Kerala and Odisha. It had also set up two working groups to work on two themes identified in its national deliberations as being of central importance in resolving water conflicts,

[1] Doraiswamy R. and Biksham Gujja, 2004, Understanding Water Conflicts: Case Studies from South India, WWF-ICRISAT Project, Patancheru (Andhra Pradesh) and Pragthi, Bangalore

[2] Joy K. J., Bikasham Gujja, Suhas Paranjape, Vinod Goud, Shruti Vispute, 2008, Water Conflicts in India: A Million Revolts in the Making, Routledge, New Delhi

[3] See Economic and Political Weekly, 18-14 February 2006, Vol. XLI, No. 2

namely, 1) equity and allocations for ecosystem needs and livelihoods; 2) legal and institutional issues related to conflict resolution. The Report of the first working group has now been published and the second one will be published soon.

The Forum has a central secretariat housed in SOPPECOM, Pune and of the two resource centres - the one in Kerala is managed by the Chalakudy River Samrakshan Samiti and the one in Odisha is managed by the Odisha Water Forum and Srishti. The forum has Steering Committees and Advisory Committees at the central and state levels that oversee and guide its work. It also has a tie-up with Megh Pyne Abhiyan, Bihar for documentation of conflicts around floods and Aaranyak, Guwahati for documentation of water conflicts in the North-East. The Forum has a portlet within the India Water Portal of Arghyam, namely, http://conflicts.indiawaterportal.org.

Though the Forum has added more components to its work, the work on documentation is far from over. For example, the first compendium left out, though not wholly, non-Peninsular India; or it did not cover urban water conflicts or flood related conflicts. We are finding that there is a great diversity in the local contexts around which water conflicts take place. Secondly, the process of documentation is as important as the documentation itself. The process of documentation itself can become a process of awareness raising and networking and this is a valuable asset for any grass roots work on water conflicts. It was with this in mind that the Forum decided to document conflicts in Odisha, led by the Odisha State Centre of the Forum, conflicts around floods led by Megh Pyne Abhiyan in Bihar and conflicts in the North-East led by Aaranyak in Guwahati.

The process of documentation in Odisha

The process of documenting water conflicts in Odisha involved a host of activities and instruments which included regional stakeholder workshops, secondary reviews/peer consultation, rapid documentation using formats through Focus Group Discussions, exploration with Partner-CSOs, participatory tools, hydrological and allied investigations, stakeholder analysis. A summary of these findings is included in the following chapter: An Overview of Water Conflicts in Odisha.

Four regional workshops were held in Sambalpur, Jajpur, Keonjhar and Koraput to identify water conflicts of the region with the inputs from local participants. Since Hirakud dam is the locus of a major conflict in the state around allocation of water for industry and agriculture, the first regional workshop was held in Sambalpur in April 2009 in collaboration with two local NGOs - Odisha River Network and MASS. More than 42 participants from various NGOs, CSOs, academicians, researchers, farmers and media persons from Sambalpur as well as the different parts of Western Odisha participated in the workshop. This workshop gave us a broad picture of water conflicts in Western Odisha which centred on dams, displacement, diversions, pollution and conflicts due to water sharing.

The Second Regional Workshop was organised at Jajpur in May 2009 in collaboration with the Odisha Water Forum. The workshop aimed at mapping various conflicts around water in Coastal Odisha which forms the Eastern portion of the state. Nearly 40 participants from the coastal region (the districts of Balasore, Bhadrak, Kendrapara, Jagatsingpur, Jajpur) discussed various problems of the region which

centred on issues like water logging, inadequate drainage system, water pollution due to mining, pollution, river bank erosion and salinity, loss of livelihoods and problems due to water escape.

The third regional workshop on water conflicts in northern Odisha was held at Keonjhar in July 2009 in association with the Odisha Water Forum and Prakalp, Keonjhar. The workshop was attended by 24 participants from Northern Odisha who identified monsoonal aberrations, groundwater depletion, soil erosion due to the loss of forest cover and increasing mining as the major causes of water conflicts in the region. The fourth regional workshop was organised for Southern Odisha, in Koraput in September 2009 in collaboration with Odisha Water Forum and two regional NGOs named CDRT, Koraput and Jana Samiti, Koraput. The major issues highlighted during the discussions in this workshop were inter state disputes, conflicts between upstream and downstream communities, unequal access to government schemes of water supply, untouchability and exclusion of lower castes from access to water sources and drinking water and pollution due to industrial effluents.

With the help of the proceedings of the four regional workshops and references provided by experts, about 30 potential cases of conflicts were identified for documentation. The potential authors identified for documentation of the cases of water conflict were requested to submit concept notes and research plans. The concept notes and research plans were placed before a peer review panel (PRP) comprising Prof. R. M. Mallik as the Chairperson and Prof. Smita Mishra Panda and Tapan Padhi as members and their responses were provided to the authors for further improvement. MoUs were signed with the selected authors. A write-shop was organised on 26 July 2010 at Bhubaneswar to share the preliminary drafts and write-ups developed by the authors with the PRP as well as resource persons from within Odisha and from SOPPECOM, Pune and Arghyam, Bangalore.

The revised drafts of the case studies were also discussed at a two-day workshop on "Water conflicts in Odisha: Issues and way forward" organised on 28 and 29 March, 2011 at Bhubaneswar. Environmental activists, thinkers, academicians, Government officials, farmer leaders and Civil Society Organisations from different parts of the state along with members of the National Steering Committee of the Forum participated in the workshop that discussed the ongoing and emerging water conflicts in different geographical regions of the state. The revised drafts were then sent to members of the Peer Review Team that comprised Prof. R. M. Mallick, Tapan Padhi, Prof. Smita Mishra Panda, Pranab R Choudhury, Prof. S. Janakrajan, Suhas Paranjape, K. J. Joy and Shripad Dharmadhikary and the write ups were finalised on the basis of their feedback before being sent for copy editing.

The final list of case studies that made it through the entire process comprises 19 case studies as described in the table below. It should be emphasised that the case studies have not been carried out by professional academicians and are more in the nature of pre-analytical documentation similar to the earlier mentioned Routledge compendium. They have been written by non-academicians ranging from journalists to activists to concerned citizens to experts and engineers. And though we have striven for uniformity in treatment, each of them has brought their own emphasis to the case study. We need to keep this in mind while reading the compendium.

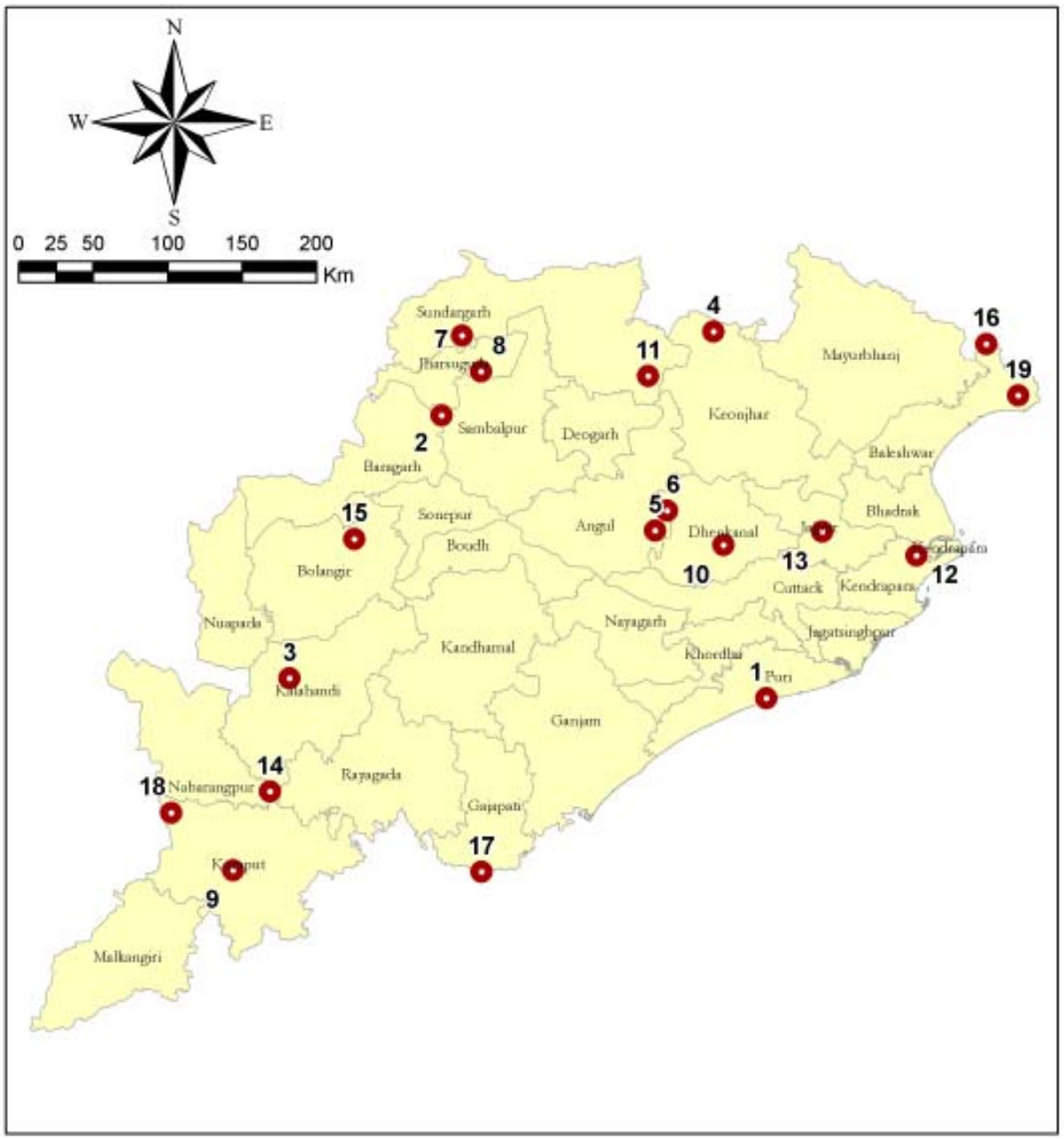
The Compendium opens with a preface (this chapter) followed by a Chapter that

provides an overview of conflicts in Odisha and is followed by the nineteen case studies and concludes with the bio-notes on the authors. It needs to be stated here that the views expressed by the authors here are their own and not of their organisations nor of the editors of the compendium or of the Forum.

Table P.1: The Odisha Compendium Case Studies and their Types

Sr. No.	Author	Type of conflict
1	Tapan Padhi	Contending uses
2	Pranab R. Chaudhury, Bhupesh C. Sahoo and Jinda Sandbhor	Contending uses
3	Aditeswar Mishra	Contending uses
4	Kiran Sankar Sahu	Contending uses
5	Ashis Kumar Das	Pollution
6	Santosh Kumar Mohanty	Pollution
7	Bimal Prasad Pandia	Pollution
8	Mehboob Mehtab	Pollution
9	K. Sudhakar Patnaik	Pollution
10	Sisir Tripathy	Pollution
11	Himanshu Sekhar Patra	Mining induced effects
12	Bijaya Kumar Kabi	Man versus Nature
13	Bamadev Padhi	Drainage related conflict
14	Nrusigha Nanda Panigrahy	Dams and displacement
15	Sanjaya Kumar Mishra	Dams and displacement
16	Bikash Kumar Pati	Inter-state
17	Bighneswar Sahoo	Inter-state
18	Nrusigha Nanda Panigrahy	Inter-state
19	Bikash Kumar Pati	Privatisation

It also needs to be acknowledged that there are many many areas -- both geographical and typological -- of water conflicts which stand in need of documentation. The Forum encourages institutions and individuals to undertake this work. However, there is a need to have clear guidelines about the documentation so that the information is reliable, is not one-sided and will contribute to conflict resolution and prevention. There is a need for widest possible participation and access but also to maintain quality, reliability, authenticity and utility. Documentation carried out by the Forum is already available on the website. We would like as many people to contribute case studies as they can. The format that we used in our earlier compendium is available and for the time being you may contribute a case study in this format and send it to us at waterconflictforum@gmail.com. We will put it up on the website after it is reviewed. You can also help us evolve methods and guidelines. Send us your suggestions at waterconflictforum@gmail.com.



Legend

1: Sara lake case study
2: Hirakud
3: Hati-Tel-Indravati diverson
4: Kanhupur case study
5: Anugul water pollution
6: Talcher Coal Conflict
7: IB river pollution
8: Bhiden river pollution
9: Kolab Pollution
10: Brahamani River Pollution
11: Khandadhar conflict
12: Kendrapara river bank erosion
13: Drainage around Kelua-Bada Genguti
14: Impact of Indravati reservoit
15: Lower Suktel
16: Rajabandha
17: River dispute MahendraTanaya
18: Joura River inter-state Dispute
19: Groundwater market in Balasore

Location map of 19 case studies: Water conflicts in Odisha

Introductory Overview

Terrains of Resistance: An Overview of Water Conflicts in Odisha[1]

Pranab R. Choudhury [2] and Priyabrata Satapathy[3]

'*Pani bihune sarbanasa; Pani bahule sarbanasa*' which translates to "*Water, in excess or in absence leads to mass destruction*" is a familiar Odia proverb; so familiar that almost every student in primary school in rural Odisha will quote this proverb when she writes her essay on 'flood' or 'drought'! This saying expresses in simplest terms an understanding of the delicate-relationship between 'water' and 'destruction' metaphorically reemphasizing the dual role that water has played in sustaining and in threatening lives in rural Odisha. It underlines the situation that can arise if water is not managed and governed properly. And while the 'floods' and 'droughts' continue to visit Odisha, now more frequently and with greater intensity and heavier damages, the state's water fronts are being taken over more and more by hydro-politics and market-economics affecting the biophysical and socio-cultural realities of water.

Earlier situations[4] and assumptions of water in the state being plenty and pure[5] are being replaced with discourses and concerns over water-scarcity[6] and deterioration of water quality[7] . Traditional and local ways and institutions[8] of water governance and management are making way for centrally imposed investments and institutions[9] , state regulations[10], privatisations[11] and market control. The mainstream engineering paradigm in dealing with water continues to be dominant within the state agencies but is increasingly being contested by alternate paradigms like holism, environmentalism and right-based approaches that are emerging and consolidating around water issues.

Water-users and stakeholders are getting segregated along sectarian lines with increasing competition and contestation over water. The hardening of such alignments and the unprecedented political patronization[13] they receive are fuelling social movements and shaping new terrains of resistances[14] . Conflicts around the state's rivers are spreading fast of late, from north to south, from big rivers down to small drainage channels and involving structural to environmental, economic and cultural issues. Interstate water conflicts, which were hardly an issue in the state, now draw overwhelming political and media attention.

Increasing appreciation of the importance of water, the realisation of stakes/rights involved, and increasing perception of vulnerabilities around water are keeping disputes and water conflicts simmering at different scales and intensities, from local to regional to river-basin level, and they have become an obvious and conspicuous presence in the state's landscapes. Evolution and manifestation of these conflicts or social movements around water can be attributed to development of local 'convergence spaces [15]' between them, the interaction/negotiation of space and strategy among local, national and global discourses and actors as well as the globalisation[16] of the terrains of resistance (Routledge, 2000). On one hand, the

increasing water conflicts around industrialisation probably reflect the challenges or oppositional forces that civil societies and social movements pose to the power and development trajectory of the state, corporate and neo-liberal forces. On the other hand, with grassroots globalisation providing connecting terrains through internet and media,, 'Save or Free the River' and 'anti-privatisation and commoditisation' movements and campaigns seem to be evolving around particular 'places' or 'local contexts of resistance' but drawing from experiences elsewhere in interplay with national/global processes. (Routledge, 1996)

Though conflicts are taken to be bad or negative; they are also logical developments in the absence of proper democratic, legal and administrative mechanisms to handle issues that are at the root of water conflicts (Joy et al, 2006). On the other hand, conflicts are also an unavoidable part of processes of social change in all societies. (OECD, 2005) Conflicts around water in a state can be interpreted as reflections of the inadequacies in the existing water governance mechanisms and management framework and/or realisation by stakeholders of the inability of existing arrangements to address the changing development contexts and stakeholder aspirations. The increasing number, types and intensity of water conflicts in Odisha are pointers that the time has arrived for bringing in changes in the way water is understood and used by the society, government and the development processes.

In this chapter we try to provide an overview of ongoing and emerging water conflicts in the state, drawing from our ongoing desk survey and documentation of water conflicts in Odisha, the comprehensive information that has emerged from the four regional workshops[17] organised on water conflicts in Odisha organised with the initiative of the Odisha State Centre of the Forum for Policy Dialogue on Water Conflicts in India and the subsequent ongoing interaction with civil society and grassroots groups. Presenting a broad overview of those conflicts, their typologies, patterns of manifestations, their location in the geographical, political and socio-cultural contexts, we argue for greater political and academic appreciation of these conflicts and for concerted interventions around them. We feel there is a compelling need to interpret them analytically and situate them within the present development roadmap, state policy and concerns and the double globalisation of neo-liberalism and grassroots resistance.

Typologies and terrains of water conflicts in Odisha

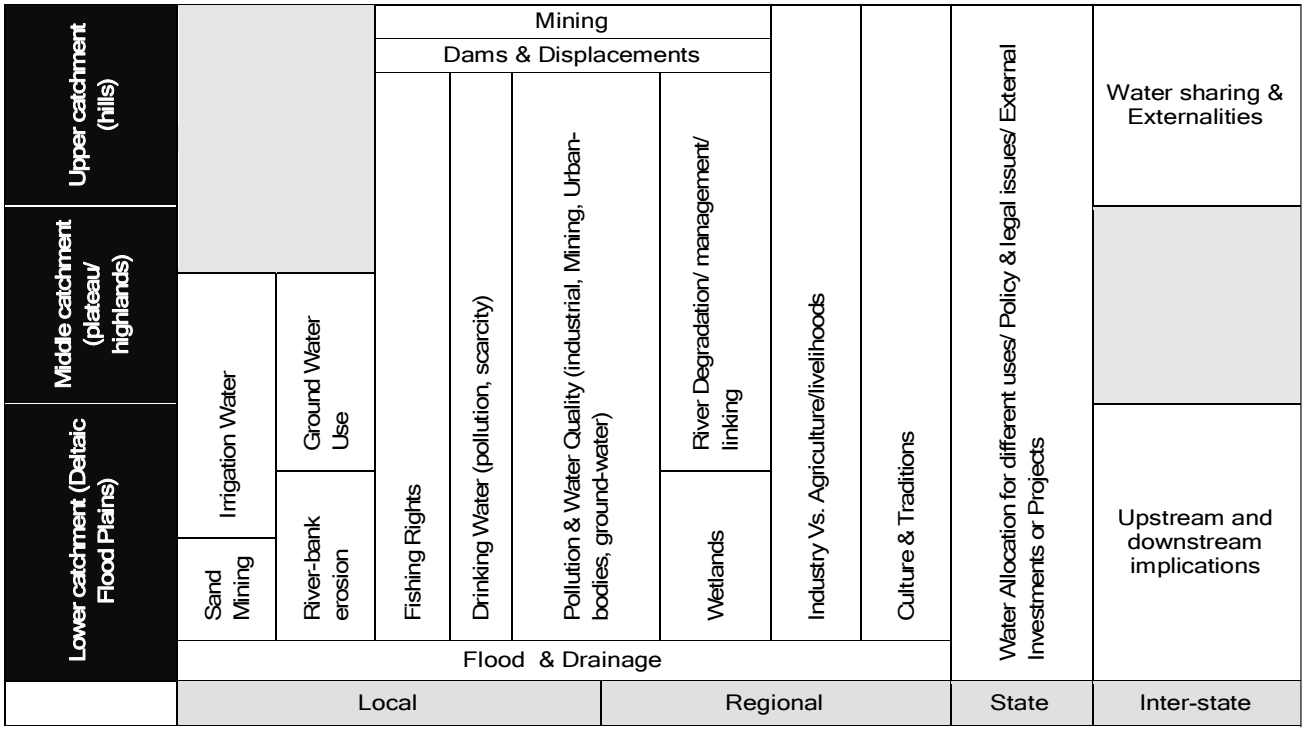
Water conflicts may be classified in many ways. The Routledge compendium on water conflicts in India[18] classified the conflicts into eight broad themes as follows: a) Conflicts over contending water uses; b) Conflicts over equity, access and allocations; c) Conflicts over water quality; d) Conflicts over sand excavation and mining; e) Micro-level conflicts; f) Conflicts over dams and displacement; g) Transboundary conflicts and h) Conflicts over privatisation. (Joy et al. 2008)

Brisco and Malik have organised the water conflicts under the following themes: conflicts at the international level, conflicts at the inter-state level, conflicts between upstream and downstream riparians in intra-state rivers, conflicts between communities and the state, conflicts between farers and the environment, and conflicts within irrigation projects (Brisco and Malik 2006).

Each classification has its own value, and gives a different `view' of the water conflict terrain. A holographic combination of different views is supposed to be the ideal and a variety of typologies bring more richness to the picture so long as the classification is relevant and meaningful in its own right. While we stick to the main thematic classification of Joy et al, 2008, it will also be interesting to look at the picture that is formed by a different grouping.

The supplemental classification is based on scale at two levels, one pertaining to the reach of the basin -- upper, middle, lower catchment -- and the second pertaining to the political-administrative geographical scale -- local, regional, state, multi-state, etc. It may be seen that different types of conflicts and contestations are not spread evenly across these spaces but form different associations and clusters. Across basin scale, they are manifested, from the river source on forested hills inhabited by tribal communities with underlying minerals and hydro-power potentials in the upper catchments to the deltaic flood plains, irrigated commands and the confluence-mangroves with densely populated politically influential coastal communities relying on water-based and aquatic-biomass-based livelihoods. They are seen to vary from local village level conflicts over access to drinking or irrigated water to regional, state and inter-state level over pollution and allocations. Before we go on to discuss the types of water conflicts in Odisha we present a possible mapping of conflicts in Fig. 1.1 below. It is hoped that such mapping will lead to better stakeholder definition and facilitate further analytical enquiry and decision making.

Fig 1.1 Locating water conflicts in Odisha within the river-basin and politico-geographic terrain



Conflict around water uses: industrialisation and mining induced conflicts

The escalating requirements of water for industry and mining in the wake of Odisha's ambitious industrialisation drive has led to tensions and conflicts all around the state

over allocation of water for industry versus drinking, agriculture and livelihoods and its quality. The rapid industrialisation through largely mineral-based extractive industries, including iron, aluminium and other mineral extraction, processing, and associated thermal power[19] generation is placing increasing demands on water required for processing, cooling, and hydropower and the consequent pollution is raising concerns about water quality. In the ongoing industrialisation drive, the Water Allocation Committee (WAC) of the state government has allocated 1419 cusec *(sic)* of water to 61 industries and other organisations in addition to those who were allocated prior to formation of WAC[20]. Out of these 61 industries, 37 are drawing water from Hirakud Dam alone. Of late, iron and steel industries like Brahmani River Pellets Ltd (BRPL) and Essar are laying pipelines in Keonjhar to transport beneficiated ore powder slurries, will reduce their cost but will draw and transfer huge amount of water, often across basins. Though the industrial demand[21], allocation and alleged pilferage[22] are going up and there are growing protests by the farmers, city-dwellers and civil society about industrial water use, the state government maintains that the industries are drawing less water than allocated. As it is more economical to lift water from rivers, reservoirs or canals, industry tries to acquire as much water from these sources as possible. However, since most of this water is already allocated for other uses like irrigation, drinking and other uses, it is threatening the availability of water for these uses, especially agriculture, bringing farmers face to face with the state and industry all over Odisha from Hirakud to Paradeep.

Water quality is also becoming a serious issue of contention. In terms of water pollution load, Odisha was fourth worst in India (Pandey and Ghosh, 2002). Union Ministry of Environment and Forest has identified three major rivers of Odisha (Mahanadi, Brahmani and Baitarani) as highly polluted and brought them under the purview of the National River Conservation Plan (NRCP). Reports by Odisha Pollution Control Board as well as recently released draft IWRM roadmap of the state[23] also confirm poor water quality in the state's rivers. Most of the industries and urban bodies in the state directly discharge their effluents into the rivers. For example, very high concentration of Chromium^{+6} (0.05 to 1.12 ppm; permissible limit 0.05ppm) has been observed in the seepage water from chrome based plants and also around mining area in ground and surface water in Sukinda Valley. With reduced flow in rivers like the Baitarani, the concentration of pollutants goes on increasing causing health problems for the downstream population dependent on it for domestic uses. For example, about 30 percent population of 2432 villages (17.55 lakhs) in 16 riparian blocks in 5 districts of the Baitarni basin depend upon surface flow for drinking water and 19 percent of them on the Baitarani river water directly (Choudhury et al 2006). The quantity of domestic and municipal waste is about 4 times the quantity of industrial effluent in Odisha, though it is not as potent a polluting source. In such situations, where the down stream rural poor are silently bearing the burnt of pollution by up stream urban, industrial and mining units, tensions and conflicts are only matter of time.

In mining areas, over burdens and in industrial (e.g. sponge iron, steel and aluminium) areas, beneficiated slurry and red mud ponds are causing heavy pollution of surface and groundwater. Incidences of embankment-breaks and heavy spill over of toxic materials into the local lands and water bodies are becoming increasingly regular. In mine belts, regular blasts are resulting in cracks in the rock layers surrounding aquifers affecting the local geo-hydrology. In many areas in Keonjhar, the tube wells are going dry or have started yielding poor quality water. Many perennial streams have suddenly disappeared.

Community protests many a times are being suppressed through the use of unfair means. The situation is quite tense in many villages and violence may erupt at any time.

Water quality and availability are going down continuously with severe health and livelihoods implications in peripheral and downstream areas of mining and industrial belts, leading to further alienation and dispossessions of local communities. The upcoming industrial hubs now have become the most common water-conflict terrains of the state, largely superimposed on or linked with the ongoing local and global struggles against the neo-liberalisation and privatisation. For a brief description of some of the important industrialisation and mining induced water conflicts in Odisha see Table 1.1.

Flood related and deltaic conflicts

Historically Odisha, the land of six river deltas has been prone to floods and flood induced vulnerabilities. Fifteen percent (3.34 mha) of the state's geographical area is traditionally flood prone. However, in the last decade, floods have also been witnessed in from Malakangiri to Kalahandi in areas that have not been traditionally flood prone. During a span of hundred years (1868-1967), there were 262 flood inundations in the state, of which 68 were high floods. Among the rivers, Mahanadi experienced the highest number of floods i.e. 99 times. Of late floods have been more periodic; occurring almost every alternate year during 1967 to 2003 and since 2006, almost every year.

Though the alluvium in the delta and its flourishing agriculture owe their existence and continuance to these recurrent inundations, over the years, changing demography, political economy and changing strategies of flood management have been continuously segregating the adversely affected and the beneficiaries and thereby have catalyzed conflicts. While the loss due to flood damage during 2002-07 was about Rs. 4,000 crore, the investment in flood control and expenditure on flood relief were about Rs. 15 crore and Rs. 600 crore respectively. The contractor-criminal-politicians nexus seems to have been the biggest beneficiary of flood at the cost of the common man's plight.

Embankments, which divide flood prone area from flood-excluded areas, are often the cause of conflict. Contractors are often found to encourage breaches to get more work and also engage in sub-standard repair work with an intention to get more work in the future. Often more breaches are reported after the flood peak. Breaches are also sponsored by political leaders to help their affiliate villages at the cost of others. Breaches are also the result of already conflicting communities who intentionally breach embankments to settle scores. In some areas like Puri district, there has been more damage due to flood after the construction of irrigation infrastructure[24]. Ingress of sea water is now becoming another threat.

Water escapes constructed by the Water Resource Department to prevent flood in its downstream, often create severe flood hazard in the immediate surrounding areas. For example, the distributaries in stage II delta of the Mahanadi i.e. Kuakhai system (Kushbhadra, Bhargavi and Daya) have flood escapes which are operated by flood water higher than 0.6 million cusecs at Naraj. When such a discharge takes place the water from these rivers escapes into the surrounding doabs and floods the land. In some instances, the upstream escapes have been constructed to save downstream cities, for example, Jajpur, often saving the urban dwellers at the cost of multiplying the miseries of the upstream villages.

Table 1.1: Industrialisation and mining induced water-conflicts in Odisha

#	Conflict	Location/ River Basin	Conflict Parties	Conflict Brief	Manifestation
1.	Industry Vs Agriculture around Hirakud	Hirakud, The Mahanadi Basin	Farmers, State Govt, Industries	This is regarded as the watershed event in the industry vs. agriculture conflict in the state. With massive participation of farmers' groups and other civil society institutions, protests over non-availability of water from the dam have snowballed into a social movement.	In Hirakud about 30,000 farmers stormed the reservoir in Sambalpur in November, 2007 to protest against increasing diversion of water meant to irrigation in favour of industry. The issue also rocked the State Assembly and Congress moved a motion in the house on alleged atrocities against farmers and diversion of water. The Chief Minister intervened and subsequently it became the election manifesto.
2.	Suffocation of Bheden River	Jharsuguda; Bheden River Mahanadi River Basin	Villagers, Industries, Govt (OPCB & Dist Admin)	The effluents from industries including fly ash are directly being dumped into the river severely suffocating it. Illegal withdrawal by industries also threatens the existence of the river	Locals affected by the pollution and dwindling flow have been regularly protesting against the industrial activities. Some organisations like Water Initiative of Odisha, Anchalik Paribesh Surakshya Samiti, Chetanashila Nagrik Mancha, Lok Mukti Sangathan, Ib Paribesh Milita Kriyanusthan Committee have also been regularly raising their voice against these issues.
3.	Pollution in Ib	Jharsuguda, Mahanadi River Basin	Industries, OPCB, Villagers in downstream	The first court case of Industrial pollution was filed on this issue in Odisha. The people from Belpahar, Brajaraj Nagar and Jharsuguda are regularly protesting against the pollution by the industries.	Heavy pollution of the Ib river water has caused innumerable problem to its primary users and this is the root of the conflict. Now the conflict - which first started over pollution of the river water - has now spread to include the effect on urban water supply to important townships in Jharsuguda and Sambalpur districts, and effect on fishery in the Ib River and Hirakud reservoir.
4.	Mining activities in the Brahmani catchment area	Sundergarh (Bonai area) , The Brahmani Basin	Mining Companies, Primitive Tribal Group (PTG), Activists	A number of small and medium scale mining activities are going on in this area resulting in drying up of perennial springs and mining activity is leading to pollution of water bodies apart from large scale water extraction. The livelihood of the PTG residing in this area is also affected.	Due to various mining activities livelihoods from agricultural land and the fishing have been affected and the people of this area have agitated against the mining authorities. Now many political parties and Civil Society Organisations are involved in this issue and have raised their voices.
5.	Non-availability of drinking water due to Pollution	Talcher, Angul, The Brahmani Basin	Mining Companies, Ground Water Board, Villagers, OPCB	People living in over 200 villages around 15 coal mines are experiencing acute shortage of potable water even in the rainy season. Such is the situation that tube wells dug up to 200 feet fail to supply a few buckets of water.	Protests and movements for the villagers have become an every day affair. A mass movement for drinking water was undertaken way back in 1994. The Mahila Jagaran Manch is spearheading its endeavours to unite women in the coal mine areas to virtually force the MCL authorities to provide sufficient potable water for survival of their families.
6.	Impact of pollution on fishermen' livelihoods	Dhenkanal, Brahmani Basin	Industries, OPCB, Urban bodies, Down stream Fishermen	For the Jhara, Girigia and Bahania communities, fishing is a traditional occupation. From one generation to another, fishing has remained their only occupation and the Brahmani, their sole lifeline. Presently, they have lost their traditional occupation due to pollution.	The fishermen from Dhenkanal District have regularly protested against the pollution by the industries. The pollution control board officials in Angul, however, said "The Brahmani waters are not as polluted as they were a few years ago. Now, officially its rating is bathing standard." Later they themselves have downgraded the classification.
7.	Water transfer through slurry pipes	Keonjhar, Baitarani Basin	BRPL, Essar, Villages, KCF, WRD	BRPL requires 480 cubic meter per hour for its pellet plant in Jajpur-Keonjhar and Essar for 12 million tonne iron ore slurry transportation to its plant site at Paradeep.	Keonjhar Citizen Forum (KFC) and other CSOs have made representations to the Water Resources Department (WRD) in this matter. Villagers suggest Essar to lay a parallel pipeline from Paradeep to bring water from sea for preparation of slurry.

Table 1.2: Flood-related and deltaic water-conflicts in Odisha

#	Conflict	Location/ River Basin	Conflict Parties	Conflict Brief	Manifestation
1.	Flood in non-traditional area due to river linkage	Boudha and Kalahandi, Mahanadi River Basin	OHPC, Dist Admin, Villagers in Catchment & Command	40 thousand people of 8 Panchayats remain waterlogged for four months in the rainy season due to discharge of Indravati water into Hati river after power production, which subsequently drains to Tel. Generation of power in Indravati, now causing flood in Hati around Dharmagarh in Kalahandi	The affected people are searching for a new place to reside. The administration is not taking this issue seriously and now these people have migrated to Tilakmal village to acquire land for residence, but they face stiff opposition from the Govt officials who have lodged a case against them. The district administration is also writing letter to the OHPC to stop the power generation.
2.	River Bank Erosion	Kendrapara, Mahanadi Basin	Villagers, WRD, Revenue Department, Sand miners	The Pattamundai and Rajnagar blocks of Kendrapara district are mostly affected by this type of erosion. The majority of the villagers are poor farmers and lack basic facilities. Over the years, their crops, livestock, and houses were repeatedly swept away by the rivers.	The protest of these river bank-eerosion hit villagers against the government has been attracting huge public participation. They have submitted memorandums of protest to the state government several times. The affected communities are demanding compensation package and a permanent solution towards the checking of river erosion.
3.	Water escapes	Jajpur, Baitarani Basin	Villagers, WRD, Urban dwellers	Escapes, while providing escape to downstream villages and urban areas, put tremendous pressure on upstream villages and agriculture lands. There is more than 4 ft of sand casting in thousands of acres of lands along with creation of new rivers near an escape in the Baitarani in Bhandari Pokhari, provided to save downstream Jajpur town.	Protests by villagers, application to politicians and Dist Administration, and Water Resources Department
4.	Waterlogging due to canal irrigation	5 blocks in Puri, Mahanadi Basin	Farmers, Politicians, Chilika Development Authority	Waterlogging is a perennial problem in 5 blocks of Puri district causing extensive damage to crops. Dredging of river mouths of Daya, Bharagabi, Makar, Luna, Ratnachira for speedy discharge of rain water into Chilika lake is taken up to address the issue. However the process is being stalled by some others and there have been farmers' protest around that.	Farmer rallies, protests, assembly questions, media coverage.

The Flood Enquiry Committee Report of Govt. of Odisha, argued for removing all obstacles that prevent flood water from moving safely towards the sea including all obstructions and embankments. There is provision under Section 8 of Odisha Irrigation Act 1959 for removal of obstructions in drainage by the executive and assistant engineers associated with irrigation works. However, of late, apart from encroachments and unauthorised constructions, myopic and massive use of development funds without land-use planning and drainage planning, has lead to choked drainages, more floods of higher durations and waterlogging.

Though river meandering and river-bank erosion are natural processes in the delta, their acceleration and segregation of gainers and losers into separate groups in areas where land is at a premium also lead to conflicts among communities and with the

state. Brief description of some of the important Flood-related and deltaic water-conflicts in Odisha has been provided in Table 1.2.

Water conflicts around dams & barrages

The Water Resources Department of the state functions within the dominant engineering discourse which seeks to dominate nature and the ecosystem and economically exploit water by treating it as 'resource'. Dams and barrages are important elements in this strategy of taming the rivers. Added to this is the recent dominance of neo-liberal ideas. The commoditisation of water is the next logical step in the liberalisation process in the water sector advocating maximization of the economic gain through 'more crop/cash per drop' or using water for best alternate economic use based on commodity pricing. This involves bringing in/reforming pricing and water-tariff, recovering cost on O&M and developing an institutional (corporate) arrangement for more gainful water use, sometimes at the cost of livelihoods and ecosystems. In many cases, the dams or barrages which are usually being constructed and augmented with 'engineering' passion to exploit, store and divert 'water resources' through increasing external investments, are strategically appropriated for best 'productive use' by corporate bodies (industrial or mining units), urban bodies or by rich and elite farmers. This leads to both displacement and dispossession of the poor, marginalised and voiceless farmers, rural and tribal communities. With the spread of these processes and the perceived threat they represent, voices of dissents are growing louder. Conflicts here are around the demand for dams and barrages as much as against the displacement and commoditisation they bring in. Brief description of the water conflicts around dams and barrages in Odisha is provided in Table 1.3.

Table 1.3: Water-conflict terrains around Dams and Barrages in Odisha

#	Conflict	Location/ River Basin	Conflict Parties	Conflict Brief	Manifestation
1.	Dams and displacement	Lower Suktel Project Bolangir, Suktel, Mahanadi River Basin	Activists, Affected peoples, prospective beneficiary farmers, political parties and govt	Nine thousand families will be displaced for this project. Some people of the displaced area allege that they were not compensated properly; others are still not ready to endorse the idea of irrigation project in the area. In the process, those opposing the project and those in support of project are at war with administration.	The affected people have now formed Lower Suktel Budi Anchal Sangrami Parishad to raise their voice against the project. Protests and movements are continuing along with court case for legal remedy.
2.	Irrigation divide	Anandpur Barrage, Keonjhar, Baitarani River Basin	Water Resource department, Keonjhar Citizens Forum, Farmers	The designed area of irrigation from Anandpur barrage is only 6200 hectares in Keonjhar, where as the same for Bhadrak and Balasore district is 53,800 hectares. The lean season flow of Baitarani at Anandpur is 3.900 Cusec, which appears to be far too inadequate for this barrage project.	The Keonjhar Citizens forum is continuously following this issue and has filed memorandum before Chief Minister and other authorities.
3.	Irrigation Vs Industry and Mining	Keonjhar, Baitarani River Basin	Industries, Water Resources Department, Villagers	Kanhupur is a long awaited irrigation project in the district. While it is yet to be completed, Jindal has almost laid a nine-kilometre pipeline to draw water from this. With mining predominant in its catchment, siltation rate is very high and it is expected to silt up very fast defeating the whole purpose of irrigation.	The Keonjhar Citizens forum is continuously follow this issue. Farmers and locals in the region have protested against the delay in project execution.

4.	Power project Vs Agriculture	Nabarangpur Indravati Basin	Locals, Farmers, WRD, Activists, OHPC	The commitments made at the planning stage of Indravati dam regarding recommendations of Harza Committee a) to release of water (7 cumec) into the river, b) area treatments and c) new dam construction at Telengiri have not been met so far. The dam has turned an area known for prosperous agriculture into a drought-prone area. More that 50 lift irrigation points are now defunct downstream of the dam. Major conflict is between power production and water supply for irrigation.	Protests, media coverage

Table 1.4: Inter-state water-conflicts in Odisha

#	Conflict	Location/ River Basin	Conflict Parties	Conflict Brief	Manifestation
1.	Polavaram	Malakangiri Sileru, Godavari	Government of Odisha and Andhra Pradesh (AP),	Polavaram conflict is lingering since 1980, when an agreement between Odisha and Andhra Pradesh was entered upon. Government of Odisha has now lodged a complaint with the Ministry of Environment and Forest to protest the forest clearance given for the Polavaram project. It has pointed to clear violation of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. Claim over settlement of forest rights, which was set as a pre-condition by the MoEF for according forest clearance to the Indira Sagar Project, was not followed. The project requires approximately 3,700 hectares of forestland. There has also not been any public hearing in the area to be affected in the state under the provisions of Environmental Impact Assessment (EIA) for getting environmental clearance. Odisha also opposed the decision of Andhra Pradesh to increase the storage capacity of the dam from 30 lakh cusecs to 50 lakh cusecs. Odisha is also not convinced with AP's suggestion of embankments as permanent solutions to effectively contain submergence in villages in Malakangiri during floods.	Supreme Court cases, media coverage, debate in assembly and Parliament, rallies, protest meetings by political parties, civil society workshops and consultations, expert visits and recommendations
2.	Interstate River dispute on Joura River, Koraput	Koraput, Indravati	Government and Peoples of Odisha and Chhattisgarh,	The conflict on Joura River is around reduced flows in Indravati. Chhattisgarh alleges that most of the water of Indravati is diverted through Joura. a. The locals call for a tripartite talk between both of the governments and the local leaders. The people of Kotapada area are completely dependent for their drinking water and irrigation water on this river. This conflict has also affected the people of Chhattisgarh (Jagdalpur area). The Chitrakuta Waterfall which is a famous tourist attraction will also not get sufficient water and lose its attraction and possibly existence	There is unrest among the people from both the States and sometimes it leads to violent situation. According to Joura Bachao Sangharsh Samiti of Kotpad, the Chhattisgarh Police has harassed the people of Odisha living at the border
3.	Dispute on the barrage over Mahendra Tanaya	Gajapati, Vamshadhara	Government of Odisha and AP, affected people	The project of AP will affect as many as 8,000 families living in 30 villages of Odisha. Moreover, 1,100 acres of agricultural land would be submerged with the project and Gajapati district would be hit severely.	Local people of Gajapati have formed Mahendra Tanaya Bachao Andolan to campaign against the project. The exchanges of letters between the Chief Miniter of both States are continuing without any result.

Table 1.5: Examples of Other water-conflicts in Odisha					
#	Conflict	Location	Conflict Parties	Conflict Brief	Manifestation
1.	Village level conflict over access to drinking water	Malkanagiri	Villagers of Nuaguda, Khairiput Block, Malkangiri	In tribal communities, practice of households migrating to other villages for different reasons is common. In Malkangiri, better access to drinking water is one such reason. However, in some cases, the migrants have entered into conflict with original inhabitants of their new settlement over water.	In many cases, violence has erupted among original inhabitants and migrants forcing migrants to go back to their villages.
2.	Irrigation Vs Pisciculture	Balasore	Farmers form Odisha and West Bengal, District Administration, Irrigation Departments	The conflict is between the farmers of Odisha and fishermen of West Bengal. The Minor irrigation Department is also involved in this conflict. The District administrations from concerned districts are trying to deal with the issue but there is not much success on that front.	The conflict took a violent shape in 1999 and from that date breaches in the embankment, stealing of keys of sluice have increased. The main purpose of the irrigation project is not fulfilled and the conflict is continuing.
3.	Marginalisation of the poor in Groundwater Market	Balasore	Rich and poor farmers, WRD	With the water table going down in this area due to heavy draw down of groundwater by rich farmers putting in deep bore wells, small and marginal farmers are suffering. They are often forced to buy water from the rich farmers having deeper wells. The farmers who had private shallow tube wells also faced the scarcity of water.	Regular instances of disputes are experienced by the farmers in the village on distribution of water from the tube wells. The conflicts were mostly seen among the small scale farmers (including those depending upon the government tube wells) and rich farmers.
4.	Urban-Rural Farmer vs. Water Supply Dept	Baripada, Mayurbhanj	Municipality, Farmers, Dist Administration	During last year's drought farmers have constructed many temporary check dams on streams which are source of water to Baripada town. As it reduced water supply into the town, the Water supply department staff asked these check dams to be dismantled which led to conflict between the farmers and the water supply department.	Protests, Media coverage
5.	Urban Water Conflict	Bhubaneswar	Builders, Municipality, Dug well/ shallow tube well dependents	The groundwater in and around Bhubaneswar has been rapidly depleting in recent years. Due to inadequate access to municipal supply, people have resorted to digging deep bore wells and pumping water indiscriminately. In the recent past, a large numbers of multi storied buildings have come up in and around the city along with a number of industries on the outskirts who have also started exploiting groundwater continuously. The long term depletion is causing the lowering of the water table making shallow dug wells go dry.	Media coverage

Inter-state water conflicts[25]

The Centre has a legal and constitutional right to set up tribunals in the matter of interstate river disputes (7th schedule). The Interstate River Water Disputes Act of 1956 has empowered the Centre to set up a tribunal in case such conflict

arises. These provisions are meant to protect the riparian rights of states, but their interpretation is often not uniform. Absence of a prescribed time limit for the states to arrive at a consensus also makes these disputes linger on unresolved.

For interstate rivers, Odisha has agreements with all its neighbouring states – West Bengal, Jharkhand (then Bihar), Andhra Pradesh and Chhattisgarh (then Madhya Pradesh). Among the interstate rivers flowing in Odisha, the state has agreements for the Mahanadi, Ib, Subarnarekha, Bahuda, Vamsadhara, Nagavali, Indravati and Kolab Rivers. Erratic rainfall induced by climate change, silt deposition due to land use changes and increased water harvesting and extraction have reduced the flow in many of these rivers over the years, making adherence to agreements difficult for both sides. The reduced flow and competitive water use has lead to creation of social unrest in the states.

In many instances, the neighbouring states have taken steps without consulting the Central Water Commission, the Odisha government or the local community. There are several instances like, for example, the illegal construction of the canal near Katragadda by Andhra Pradesh government to divert the water of Vamsadhara River, or sand bags in the mouth of Joura River, or construction of an off take sluice in Srikakulam district by Andhra Pradesh to divert the water of Mahendratanaya..

Through projects on interstate rivers, the people living downstream may be affected by water scarcity and people living upstream by submergence of land. waterlogging. Odisha has borne the brunt of both. The multiple constructions in Chhattisgarh on Mahanadi have an adverse impact on irrigation in Odisha. Projects like Polavaram and Neredi barrage on Vamsadhara have brought threats of submergence. Table 1.4 provides details of some of the prominent Inter-state water-conflicts in Odisha.

Other Water Conflicts

Water conflicts are not bound to a particular scale or geography in the state. From village level conflicts fuelled by caste, class or power divide over access, to conflicts within urban areas and between urban and rural areas, they are everywhere and growing with the ongoing trajectory of development. New contexts and grounds of conflicts especially around political and economic lines seem to be evolving side by side with traditional social and cultural divides. See Table 1.5 for some of these conflicts.

Conclusion

A remarkable development around water conflicts in the state is the sudden emergence of resistance movements around its rivers. From north to south, and from big rivers to small drainage channels, these ‘save/free the river’ campaigns are spreading very fast accommodating a gamut of structural, South Odisha to save Rushikulya (Rushikulya Banchao Mancha) by linking to the Mahanadi, protect Vamshadhara from mining and projects in Andhra, free Nagavali from pollution by paper mills are also manifestations of these aspirations.

To conclude, one may say that with the rising ‘economic’ demands for water, with the dominant neo-liberal paradigm of water-management and governance being

increasingly imposed and increasingly contested, with polarisation gaining strength, thanks both to greater information as well as ideological/political patronage, many such water conflicts and 'social movements' around water seems to be imminent in Odisha. The legacy of fragmented social structure, the skewed rights-regimes and the natural geo-hydrological divides mapped on to socio-economic divides threaten to fuel and aggravate the conflicts further. Kalinga Nagars,[26] Hirakuds (industry-agriculture), Chilikas (fishing rights) and the numerous Free/Save the River Campaigns represent these emerging terrains of resistance'.

It is time the Government takes note of these water conflicts and resistance movements, particularly their political geographic and political economic implications. The academia, civil society and intelligentsia also need to appreciate the need of an interdisciplinary and holistic approach in dealing with water. They need to get engaged critically with the right science and knowledge to bring about desired change towards an inclusive and secure water future.

As far as water conflicts are concerned, there is an urgent need of engaging with the ongoing, emerging and imminent water-conflicts in different parts of the state and the first step in this direction is to understand, document, analyse and disseminate the required information. As a first step towards this the Forum has taken the initiative of documenting 19 important water conflicts in the state – cases representing the different types water conflicts in the state discussed above – and are given immediately after this introductory article. We seek to draw attention of the water users and stakeholders in the state, to this critical ecosystem and livelihoods issue, whose time seems to have arrived. Involvement and contribution of all are required to take this initiative of documentation, analysis and dissemination of information on water conflicts forward and to engage with them to manage, resolve and prevent them.Water conflicts documentation and analysis are the need of the hour for the state, as they not only are the precursor to conflict resolutions and preventions, but also for creating a platform for bringing in right and desirable changes towards more responsive, democratic and inclusive water governance.

Understanding Water Conflict

Competition for water exists at all levels and is poised to increase with increasing demands for water for multiples uses. Access to water, and its allocation and use, are critical concerns that often leads to conflict. Water-related tensions occurs when water is scarce, but even when the resource is not severely limited, its allocation and use (physical and economic scarcity) can still be hotly contested. The coexistence of a variety of uses and users – such as agriculture, industry, different clans or ethnic groups, and rural and urban users – increases the likelihood of conflicting interests over water. (OECD, 2005) Increasing demand for water by some is taking toll on its availability, quality and implications for others, including humans, other life forms and the ecosystem. With water stresses and inequities on rise, water conflicts become natural offshoots.

Part of the cause of water conflicts owe to the specific nature of water as a resource: for example: a) water is divisible and amenable to sharing; b) contrarily, it is a common pool resource so that a unit of water used by someone is a unit denied to others; c) it has multiple uses and users and involves resultant trade-offs; d) excludability is an inherent problem and exclusion costs involved are often very high; e) it requires a consideration and understanding of nested expanding scales and boundaries from the local watershed to inter-basin transfers; and f) the way water is planned, used and managed causes externalities – both positive and negative, and many of them are unidirectional and asymmetric. (Joy et al, 2006)

Endnotes

[1] This chapter is largely based on Invited paper presented in Odisha Environment Congress, organised in Bhubaneswar, India during 22nd - 24th December, 2010 (published in the Proceedings of the Odisha Environmental Congress; Centre for Environment & Development, Trivandrum & Human Development Foundation, Bhubaneswar, India; p123-138)

[2] Project Coordinator, Odisha State Centre, Forum for Policy Dialogue on Water Conflicts in India and Baitarani Initiative

[3] Formerly, Research Associate, Odisha State Centre, Forum for Policy Dialogue on Water Conflicts in India and Baitarani Initiative

[4] The Mahanadi, Brahmani-Baitarani and the Eastern Flowing Rivers (EFR1) in Odisha were termed water-surplus rivers as per IWMI (Amarsinghe et al, 2005)

[5] Most of our rivers are treated as 'holy' in ancient texts and anecdotes and are worshipped for their purity, sanctity and ability to flush/wash away impurities with their flows.

[6] The Draft Integrated Water Resources Management (IWRM) Road maps of Odisha, says that per capita availability will decline by 34 percent by 2050 as per a calculation on water availability from 11 major river basins. The average surface and groundwater potential of the State, currently at 141 billion cubic meters (BCM), would fall by at least 10 percent to 129 BCM. Three rivers - Baitarani, Rushikulya and Budhabalanga will become water stressed.

[7] Various Reports of Odisha Pollution Control Board and National River Conservation Plan

[8]Examples of this are the kata, munda, bandha system of water harvesting of Western Odisha or the Jora, Pokhari system of drainage network in Coastal Odisha

[9] Externally imposed investments include bilateral and multilateral funds for Watershed Management as well as for Irrigation that also come as a package that includes so called and accompanied by sector reforms and institutions imposed from above like watershed committees, Pani Panchayats, etc.

[10] The proposed Draft IWRM roadmaps spell out proposals for prioritisation of water allocation, Water Regulatory Authorities, Water-pricing and tariffs for O&M cost recovery, formation of River Basin Organisation etc. Regarding flood, the state's policy continues the legacy of the colonial state policies on construction and maintenance of embankments and creation of flood exclusion zones, in spite of the warnings sounded against them by many colonial experts themselves on consideration of the geohydrology of the state. See, for example, Flood Enquiry Committee Report, 1928.

[11] Examples of growing private entry include the massive entry of private sector operatives into drinking water market especially packaged (pouch) water, water purification devices and exploitation of groundwater.

[12] One of the important elements of dominant and powerful engineering paradigm is the belief that all water going to sea is waste and therefore preventing this from happening by impounding water by construction of storage is of paramount importance.

[13]Viz. Former Deputy Speaker and Bhartiya Janata Party (BJP) leader Ramachandra Panda leading Rushikulya Banchao Andolan and Former Irrigation Minister and Senior BJP leader Bijay Mahapatra spearheading the Mahanadi Banchao Andolan

[14] 'Terrain of resistance', as per Routledge (1997) can be understood both in a metaphorical and in a literal way: it was the ground on which the protests took place, and the representational space in which the events were interpreted. As per Routledge (1996), the geographical concept of place provides

crucial insights into at least three aspects of social movement experience. First, the concept of place informs us about why social movements occur where they do and the context within which movement agency interpellates the social structure. Second, the concept of place informs us about the nature of specific movements, since the particularities of place inform and affect the character, dynamics and outcomes of movement agency. Finally, a research paradigm that is sensitive to place provides the means of understanding the spirit of movement agency, that which inspires and motivates people, the articulation of the experiences of everyday life. In 'The Art of War' texts of Sun Tzu, 'terrain', the intimate knowledge of 'the lay of the land' (1988, p. 159) is one of the key strategies or tactics employed in conflict situations to manoeuvre resistant forces against an opponent.

[15] Convergence space, as per Routledge (2003) is a heterogeneous affinity of common ground between resistance formations wherein certain interests, goals, tactics and strategies converge.

[16] Grassroots globalisation is a struggle expressly against the neoliberal form of globalisation and for inclusive, democratic forms of globalisation, using the communicative tools of the global system. (Routledge, 2003)

[17] Please see the preface for further details of these workshops.

[18] Joy et al, 2008

[19] Recently declared draft CCAP (Climate Change Action Plan) of Odisha, indicates a massive 60,000 Mega Watt (MW) of power production, a majority of which will come from coal

[20] Supply of Water to Industrial / Commercial Establishments, Annual Report (2009-10) Water Resources Department, Govt of Odisha. Available at http://www.dowrorissa.gov.in/WaterPricing/WatertoIndustries.pdf (last accessed 10 February 2012) Making and stating water allocations in flow terms, strictly speaking, incorrect and misleading and is generally discouraged but unfortunately it seems to be still quite prevalent in Odisha. It seems to be the practice to make allocations in flow terms and bill for actual usage in volumetric terms. Assuming that allocation of a cusec implies continuous flow all the year round, an allocation of one cusec is equivalent to about 0.88 mcm (million cubic metres) so that allocation amounts to about 1250 mcm.

[21] Current industrial demand for water in the State is 4.2 percent of the annual average flow as per the Water Resources Department http://expressbuzz.com/states/Odisha/industries-drawing-less-water-than-allocated/188920.html

[22] As per the Government, penalty to the tune of Rs. 2 crore was collected from 15 industries who were drawing water unauthorised from different rivers and during 2009-10. http://expressbuzz.com/states/Odisha/industries-drawing-less-water-than-allocated/188920.html

[23] Water quality of at least six major rivers rarely meets drinking water standards, reports the draft road map thanks to inadequate treatment of the municipal and industrial effluents. The report paints a grim picture saying the entire stretch of Mahanadi is in a state of slight to moderate pollution. Of the dozen monitoring stations of Mahanadi, all except five show water quality is below acceptable levels. http://expressbuzz.com/states/Odisha/Odisha-becoming-a-dry-state/217882.html

[24] There used to be floods in the past, e.g., in early 1900s, but damage was less as drainage was possible then. But now, non-flood zones have been converted to flood zones with natural drainage channels getting blocked. Even rainwater stands till end of December in most of the crop lands.

[25] Adapted from http://www.merinews.com/article/interstate-water-conflicts-creating-problems-in-resource-sharing/15794214.shtml

[26] A blot in the development history of the state, where 12 tribals died out of police firing while they were protesting against their displacement due to a TISCO factory on 2nd January 2006.

References

Amarasinghe, U. A.; Sharma, B. R.; Aloysius, N.; Scott, C.; Smakhtin, V.; de Fraiture, C., 2004, Spatial variation in water supply and demand across river basins of India, Research Report 83, Colombo, Sri Lanka: International Water Management Institute.

Brisco John and R. P. S. Malik, 2006, India's Water Economy: Bracing for a Turbulent Future, Delhi: Oxford University Press.

Choudhury P R, Sahu PK, Rout N., 2006, Water Quality Trends in the Baitarani River: Linkages & Influences on Development & Livelihoods, Paper presented in 7th Water Asia 2006, Nov 2-4 at Pragati Maidan, Delhi

Joy K. J., Biksham Gujja, Suhas Paranjape, Vinod Goud, Shruti Vispute, 2006, A Million Revolts in the Making: Understanding Water Conflicts in India, Economic & Political Weekly, Vol XVI (7) Feb 18-24, 2006

Joy K. J., Biksham Gujja, Suhas Paranjape, Vinod Goud, Shruti Vispute (Ed.), 2008, Water Conflicts in India: A Million Revolts in the Making, Routledge, New Delhi

OECD, 2005, Mainstreaming Water Conflict, Development Assistance Committee, OECD Issues Brief http://www.sdc.admin.ch/en/Home/Themes/Conflict_prevention_and_transformation/Conflict_prevention/ressources/resource_en_92767.pdf

Pandey and Ghosh, 2002, Estimating Industrial Pollution in India : Implications for an Effluent Charge, NIPFP

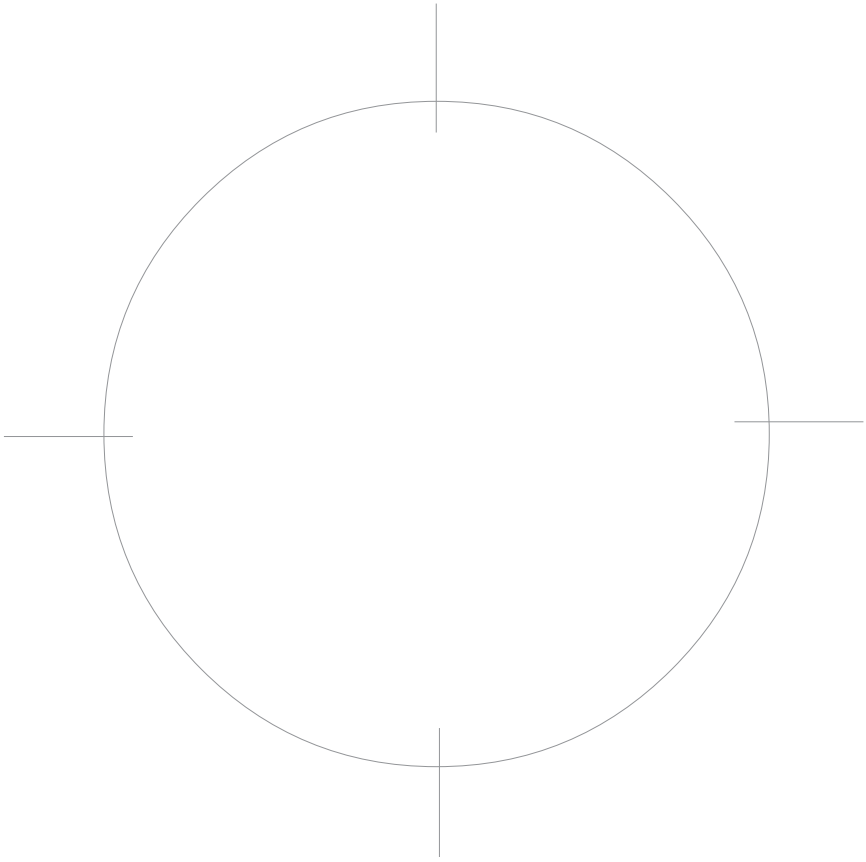
Routledge P., 1996, Critical geopolitics and terrains of resistance, Political Geography Vol. 15 (6-7) 509-531

Routledge P., 2000, Our resistance will be as transnational as capital: Convergence space and strategy in globalising resistance, Geo Journal 52: 25–33

Routledge P, 2003, Convergence Space: Process Geographies of Grassroots Globalisation Networks, Transactions of the Institute of British Geographers, New Series, Vol. 28, No. 3 (Sep, 2003), pp. 333-349

Routledge, P., 1997, Space, mobility and collective action: India's Naxalite movement, Environment and Planning A, 29, 2165–2189.

Sun Tzu, 1988, The Art of War. Shambhala, Boston.



Case Study 1

1

SARA LAKE:

Flood control vs. livelihood and wetland vs. university

Tapan Padhi

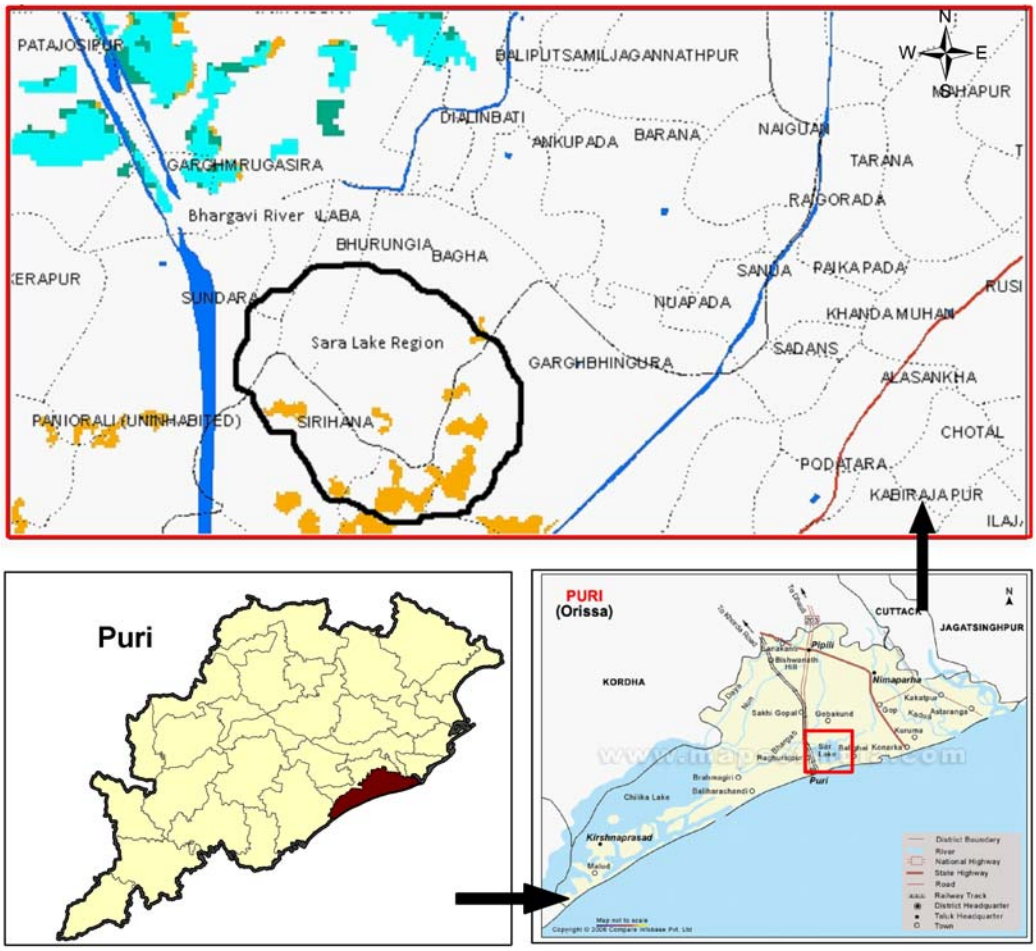


Fig. 1.1
The Sara lake region

Sara lake, locally called *pata*, is a vast inundated area that lies to the left of Beladala-Balipari on the Puri-Konark marine drive. The lake spreads across 11 Gram Panchayats of Gop and Puri Sadar blocks of Puri district. There are numerous human habitations in these two blocks around the lake. However, more than half of the area of the wetland comes under the Gadabhingura Gram Panchayat. This lake is more of a low land that swells with the flood waters and hence does not have a delineated area. Four rivers, the Bhargavi, Kushabhadra, Mugei and Dhanua, drain into the lake due to which it swells enormously during the floods.

At its peak, Sara lake stretched from Athantara on its west, to Atharanala on the

outskirts of Puri town on its east. Rain water from the Athantara area used to accumulate in it before being released into the sea through the now extinct Kanchi river. The elderly recall that some 70 to 80 years back, paddy used to be cultivated in the summer in the entire region. Farmers from nearly 100 villagers were growing *dalua* paddy (summer paddy sown around February and harvested by June), which is an indicator of the water storage capacity of Sara lake. The lake is a buffer space for the flood waters in this part of Puri district. In the past, it stored the entire floodwater brought by the four rivers. One-fourth of this excess water would find its way into the sea through river Kanchi near Atharanala, while the rest would return to the sea through river Kushabhadra after its water level receded.

Decline of Sara lake and the death of Kanchi river

At one point, Sara lake spread over 1700 square kms. However, at present, the area of the lake has reduced to 200 to 300 square kms. Repeated hydrological interventions by the Water Resources Department, which are described further in this case study, have reduced the wetland and its functions of flood moderation. It has also affected the livelihoods of people dependent on the lake.

As mentioned, the flood water of four rivers is buffered in Sara lake. People living in the upper reaches of the lake, called Kodadesha in local parlance, have agricultural land which is usually not inundated when the lake swells during the flood. They require the flood water to be cleared as soon as possible, without waiting for the flood waters from the Bhargavi river to recede in order to facilitate a reverse flow of water from the lake into the river. However, the accumulation of water in the lake suits the villagers in the lower reaches of the lake, who cannot cultivate Kharif paddy. The longer the agricultural land is inundated, the more is its silting and water holding capacity which yields a good crop of summer paddy.

Giving in to the long standing demand of the people of the Kodadesha area as well as the pressure built by the local MLA (Member of Legislative Assembly) , the Water Resources Department dug a channel from Siaracut to Beladala (on the Puri-Konark marine drive), thus extending the Dhanua river in order to release the flood water from Sara lake into the sea. This artificial channel, called *Kholanai* (*Khola* - dug, *nai* - river), is like an artificial river. This move has facilitated early clearance of water. At the same time, it has altered the wetland in fundamental ways leading to its rapid degradation.

As Sara lake was drained by *Kholanai,* the flood water did not reach the Kanchi river, which was silted up and filled with weeds. Over a period of time, the Kanchi river was relegated to history.

Decline in the fish catch and the cultivation of summer paddy

Due to interventions of the Water Resources Department, water is now available in Sara lake for only seven months a year, instead of nine months a year as in the past. Summer paddy has to be sowed two months in advance. Also, due to less silt and water availability, along with salinisation of the land, the paddy production in this area has fallen. Moreover, since the cultivation of Kharif paddy is already a

risky proposition due to flooding and waterlogging, a fall in the summer paddy crop has been a big blow to the farmers of this region.

Sara lake had plenty of fish and crab which provided livelihoods to the people of the adjoining villages for three to four months a year. However, freshwater fish has almost vanished from the lake after the *Kholanai* was dug. Moreover, interventions by the Water Resources Department have affected the migration of birds to the lake. A wide variety of birds which used to visit the lake every year have stopped coming.

Dhanua becomes a menace

After the devastating floods in 1982, there was a vociferous demand for further clearance of the flood waters of the Bhargavi river. The Water Resources Department constructed two causeways at Bainchua and Achyutpur to divert floodwater from the Bhargavi and Kushabhadra into the Dhanua. The Dhanua drainage that originates from the paddy fields of Puri and Cuttack districts was never taken seriously by the people of the locality. However, after the diversion of water from the two rivers, the innocuous Dhanua became a major menace as a huge amount of water from both rivers during the flood created havoc for thousands of people downstream.

Embanking Dhanua river

In another ill-advised move, an embankment was built on the Dhanua though there was no need for it, since water accumulated naturally in Sara lake. To tide over the communication problem created by the digging of the *Kholanai,* two bridges have now been constructed on it. This has led to the waterlogging of vast areas on both sides of the river.

Conflicting parties

The villagers in the Kodadesha area

One of the parties involved in the conflict over Sara lake are the villagers in the Kodadesha area, the area in the upper reaches of the wetland. They have benefitted by the interventions of the Water Resources Department through the early release of flood water. At present, their problems have been addressed to a significant extent, and they do not have much at stake with relation to the management of Sara lake.

The villagers on the periphery of the lake

The villagers who are living on the periphery of Sara lake, and especially, villagers at the lower reaches, are one set of stakeholders who have been at the receiving end. The interventions by the Water Resources Department have adversely affected the wetland, thereby threatening their livelihood security. They are the aggrieved party at present.

The Water Resources Department

The Water Resources Department is another important stakeholder. The mandate of the Water Resources Department warrants that they should protect, conserve and sustain the wetland. At the same time, they also have to protect the people from floods. The department has the legal, technical, and financial wherewithal to address the issues on the ground. However, they are more susceptible to current exigencies instead of following a long term vision with respect to Sara lake.

Vedanta Alumina Ltd.

Of late, Vedanta Alumina Ltd. is another stakeholder that intends to acquire part of the Sara lake land.

Initiatives to address the conflict

While the *Kholanai* was being dug, the people of Gadabhingura Panchayat in which most parts of the lake lie, opposed the move as it would severely hamper the fragile wetland ecosystem. Though the people were led by a powerful MLA of Puri, Harihar Bahinipati, the government turned a deaf ear to their plea. It did not even accommodate their minor demand to dig the channel behind the village to save the highly productive paddy fields.

Residents of the area opposed the move to embank the Dhanua tooth and nail, but to no avail. The embankment was converted into a stone causeway that divided the water of the Bhargavi into two streams: one discharged water into Chilika, and the other released its water into the sea through Kholanai. After the construction of the embankment in 2002-03, the rice fields on both sides were inundated due to waterlogging. Hence, people refrained from cultivating dalua paddy and groundnut.

Apart from such resistance to the initiatives of the Water Resources Department, no systematic effort has been made to address the conflict

Vedanta University: the last nail

Due to these developments the Sara lake wetland has deteriorated substantially. The exchange of water with the major drainage lines has been affected. The Kanchi river is dead. The water spread area has declined substantially. Fish and other aquatic fauna have also declined substantially. The avian population now shuns this destination.

The last nail in the coffin has been that of Vedanta University. The land that was acquired for the university included around 1200 ha of land in the water spread area of Sara lake. That reduced the lake by another dozen square kilometres. Now that the land acquisition is contested in the High Court of Odisha, only a final verdict will determine which way the balance will tilt.

The legal aspect of land which comes under a water spread area is not well-

defined in the state of Odisha. And in the case of Sara lake, the water spread area itself is not defined. The area inundated depends on the volume of water in the system during the rainy season and peak floods. The government has taken advantage of this fact to acquire land.

High points of the conflict

The highest point in the conflict was when the Water Resources Department started digging *Kholanai* to drain the flood water of Sara lake. This was the beginning of a series of interventions by the Water Resources Department that caused deterioration of the wetland. As the digging started, the villagers opposed it. Even the local MLA and other political leadership were involved. There were other peaks when the two causeways were constructed to release more water into the Dhanua, and later when the river was embanked. People have resisted interventions, but later, such resistance has subsided.

The conflict has never come close to being resolved. In this case, there are conflicts of interest of different groups of villagers, but they themselves are not pitted against each other. The people in the lower reaches of Sara lake understand that the flood needs to be controlled for the people in the Kodadesha area. However, they resist the interventions that affect the nature of the wetland.

The opposing stands

People in the upper reaches of Sara lake want water to be released as soon as possible so that they do not suffer from floods. The villages in the lower reaches want the old nature of the wetland to be preserved so that they can cultivate summer paddy and catch fish, and so that birds will continue to visit the place. These people want that Kanchi river which is now silted up and filled with weeds should be renovated. They do not like the embankments that spell disaster for them. Villagers in the downstream of the Dhanua river want less water in the Dhanua and closure of two causeways so that they do not suffer from floods. Drinking water planners believe that Sara lake should have bountiful water so that it can be used as a source for drinking water for Puri town.

Current status of the conflict

The villages on the periphery of Sara Lake suffer the brunt of the flood. This was the case in the past as well. However, the floods would yield good crop in the past. Now, the acreage of summer paddy, the number of households which grow summer paddy, and the yield has fallen. The freshwater fish, crab and migratory birds have either declined or vanished altogether.

The people in the Kodadesha have got respite from floods to some extent. The reverse flow of accumulated water in the Sara lake via the Kushabhadra has reduced substantially. The menace of floods in the downstream has increased. People on the banks of the Dhanua are living with the ever present possibility of a crisis, as the embankment runs the risk of giving way with a substantial increase in the flow of river. Waterlogging has emerged as a major problem in the area.

As of now, 70 percent of floodwater from the Bhargavi is being released into the sea through the newly created channel. However, the local villagers apprehend that over a period of time, the floodwater would not be released into Chilika at all.

The acquisition of the wetland area by the Vedanta University is subjudice.

Drinking water planners are toying with the option that Sara Lake along with Samagara *pata* could be the only viable source for fresh water round the year to provide drinking water to Puri town. However, this idea is yet to inspire the policy makers and the Water Resources Department.

To conclude, the Water Resources Department appears as indifferent as ever regarding this precious wetland.

Scope for dialogue

The conflict surrounding Sara lake might seem to be between two interests - maintaining the status quo with respect to the wetland and controlling floods. Both the parties are justified in their perceptions. However, the problem really lies with the perception of the Water Resources Department. Of all the stakeholders, at least the Water Resources Department should have understood the importance of the wetland in flood moderation, as well as its unique ecological value. Instead, the interventions made by the department from time to time seem to indicate that it fails to appreciate the value of this precious wetland. Hence any effort to address the conflict should start with the Water Resources Department appreciating the value of the wetland. Efforts should be made to address the existing flood problems and also the problem of the people living on the periphery of Sara lake without bringing in any substantive changes in the wetland. Informed dialogue with the different stakeholders will open the road to conflict resolution.

Now that the artificial canal is a reality and substantive changes have taken place in the hydrology of the system, only a fresh initiative to hold serious consultations with the local population who are the victims and the victors, and also those who understand the local topography and hydrology, can help to address the conflict.

Case Study 2

2

WATER CONFLICTS AROUND HIRAKUD DAM:

Industry vs. Agriculture[1]

Pranab R Choudhury, Jinda Sandbhor and Bhupesh C Sahoo

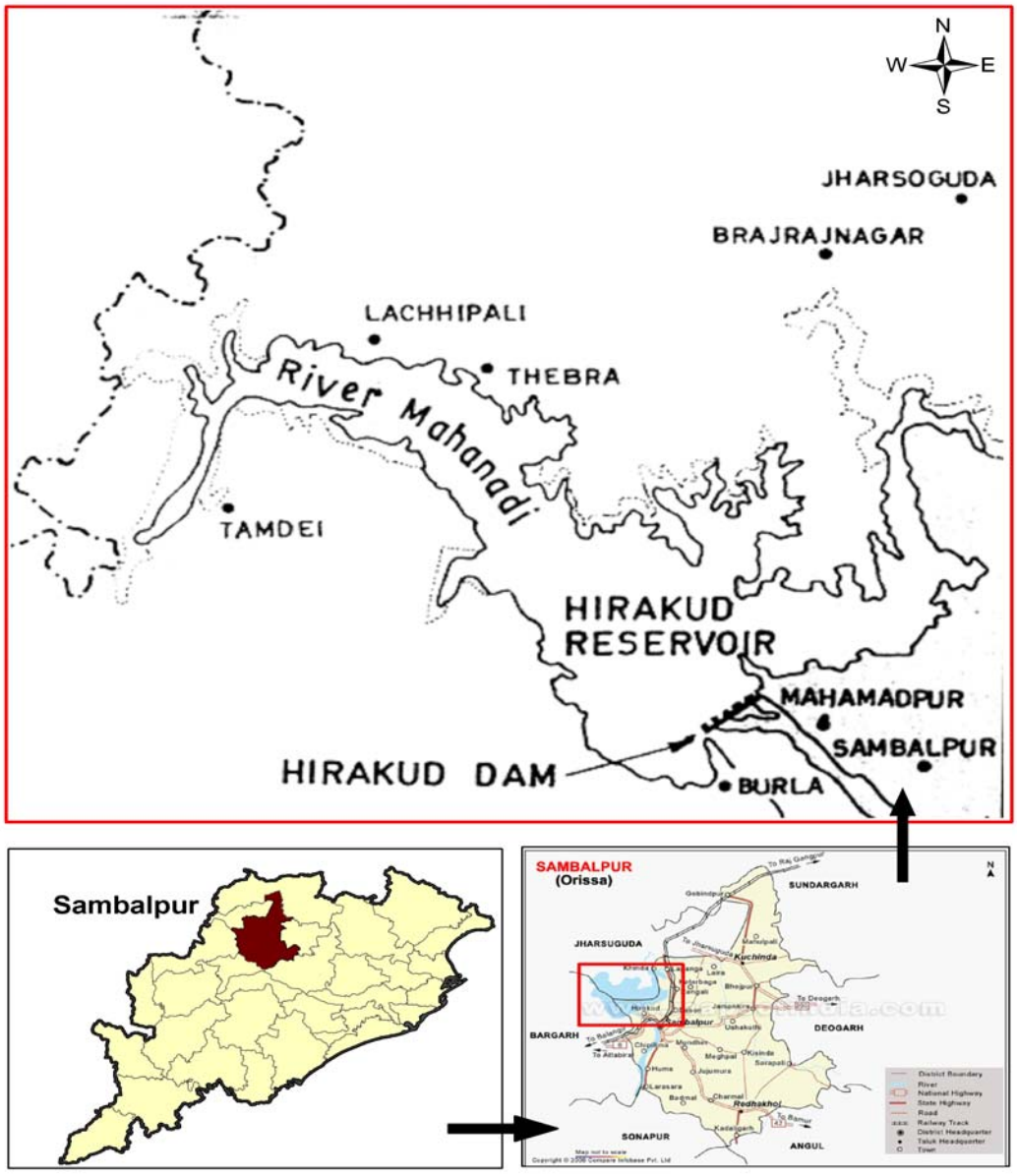


Fig. 2.1
Hirakud reservoir and surrounding region

[1] This case study is an extract of research on the Hirakud water conflict undertaken by the Odisha State Centre of Forum for Policy Dialogue on Water Conflicts in India.

The Hirakud dam on the Mahanadi river is located 11 km upstream of Sambalpur town in Sambalpur district in Odisha state. Constructed in 1957, it is the first multipurpose project of post-independence India. It was inaugurated by the late Prime Minister Pandit Jawaharlal Nehru in 1957, and it is here that he is said to

have called dams the temples of modern India. The dam has a designed live storage of 3.91 MAF (Million Acre Feet) and, according to a 1952 project report, its priorities are flood control, irrigation, drinking water, hydropower, fisheries and navigation. It provides irrigation to a total of 267,494 hectares in the districts of Sambalpur, Bargarh, Sonepur and small parts of Bolangir district in western Odisha through the Bargarh canal on the right bank, and the Sason canal and Sambalpur distributary on the left bank. The hydropower generation capacity of Hirakud is 275 MW (Megawatt), generated in two stages, first at the Burla power house, and later, at the downstream Chiplima power house. The water discharged from Chiplima into the Mahanadi irrigates 363,980 hectares in Puri, Jagatsingpur, and Cuttack districts of coastal Odisha through the Mundali and Jobra barrages at the head of the Mahanadi delta.


Source - The Hindu archives (www.cogitergosumworld.com)

Fig. 2.2
Late Prime Minister Jawaharlal Nehru launches the Hirakud dam.

Before 1991, industrial water use from the reservoir was nominal. Anticipating industrial development following liberalisation, the Government of Odisha (GoO) allocated 0.350 MAF water from the reservoir for industrial purposes. This amount accounts for nearly 8 percent of the total storage capacity[2]. The Ib valley coal fields in the vicinity and water availability from the Hirakud reservoir make it a logical and attractive destination for thermal power and aluminium industries. With the progress of neo-liberal policies, by 2010 several industries including heavy industries such as alumina smelters, captive and independent thermal power plants, sponge iron units, and steel plants have been established around the Hirakud reservoir in the Jharsuguda and Sambalpur districts.

Fig. 2.3
A view of the Sason canal taking off from the reservoir

Roots of the conflict

In June 2005, though newspapers were reporting the release of water for *kharif* irrigation into the Sason canal, farmers in the Sason canal command area were surprised and disappointed that there was no water in the canal. When farmers went to the head of the Sason canal to find out what had happened, they saw that the mouth of the canal had silted up, and that the water in the reservoir was about 1.5 km away from it. At the same time, they also saw that Bhushan Power and Steel had constructed an earthen approach road right inside the reservoir to draw water from the intake well. Farmers were afraid that this embankment would obstruct the flow of Ib river water into the Sason canal. That year, the district administration ordered the removal of the earthen embankment, and dredging for desiltation around the mouth of the Sason canal.

[2] The Government of Odisha's Water Resources Department has allocated 0.35 Million Acre Feet of water from the Hirakud reservoir for industrial use vide Lr. No. Irr-III HKDW-6/90-40945.

However, the same problem reoccurred in 2006 and 2007. Livelihoods of nearly 60,000 farming families in the Sason canal command were affected. During the same period, a number of industrial units such as Vedanta Alumina, Aditya Alumina and HINDALCO were also laying pipelines and constructing intake wells well inside the reservoir to draw water. These developments lead to a belief among the farmers that the increasing intake by the industrial units from the reservoir is the cause of irregularities and reduction in irrigation water supply in the canal.

The frequent irregularities of irrigation water supply to the Sason canal command from 2005 to 2007, and growing industrialisation and increasing water intake from the reservoir by industry, led to several protests by the farmers. In 2005, farmers organised a huge gathering at Sambalpur and Bargarh towns against industrial water use. Later on, farmers in western Odisha joined the protest to make it a massive farmers' movement over their right to irrigation water. On 15th August 2006, farmers' organisations and unions from the Sason canal command and other parts of western Odisha came together and formed the Western Odisha Farmers' Coordination Committee (WOFCC), which coordinated the farmers' movement from then on.

The Hirakhand Nagarika Parishad, a senior citizens' forum from Sambalpur, wrote to the President of India on the impact of growing industrialisation around the reservoir, highlighting the increasing pollution of the reservoir and the growing unrest among farmers. The President forwarded the letter to the Government of Odisha, which subsequently appointed a Technical Expert Team[3] to probe into the issue. This team reported that the industrial allocation of 0.35 MAF/yr from the reservoir would not affect the irrigation potential of the reservoir, though hydropower generation would be affected[4]

The conflict escalates

On 26th October 2006, nearly 20,000 farmers from western Odisha formed a human chain around the Hirakud reservoir asserting their right to its water. Farmers felt that the state government did not demonstrate substantial willingness to resolve the conflict. Farmers organised a postcard campaign in 2007, through which thousands of farmer and their family members sent postcards to the Chief Minister of Odisha and other concerned departments appealing to them to stop allocation of water to industry at the cost of irrigation in the command area.

On 6th November 2007, while the winter session of the Odisha Assembly was in progress, the WOFCC announced a civil disobedience movement. Hirakud dam and its water spread area are a notified area with restricted public access. The farmers decided to break the notified area regulations and walk down to the water and touch it. Nearly 40,000 agitating farmers flooded the dam site as they gathered at Nehru Minar near the Burla power house. The situation went out of control and the police *lathi*-charged the agitators, injuring nearly 50 farmers. The opposition parties boycotted the assembly session, after which the session was adjourned. On 11th November 2007, farmers constructed a wall to obstruct the pipeline being laid by Vedanta Alumina to draw water from an intake well from inside the reservoir. The wall is now named as *Chasi Rekha* (farmers' line), to

[3] Letter of an engineer in the Chief Water Resources Department, Odisha, Lr. No. WG-HKD-9/06-11305 dt. 21st July, 2006.

[4] Report of the Technical Expert Team on the memorandum submitted by the Hirakhand Nagarika Parishad, 21st July 2006.

Fig. 2.4
A view of the Hirakud dam from near the Nehru Minar

assert the priority to irrigation water from the reservoir, and prohibit industries from usurping the water.

Reacting to these events, the Chief Minister announced that the farmers would have priority over water usage from the Hirakud reservoir, and only surplus water will be supplied to industries, without obstructing the farmers' share of irrigation water. GoO announced a High Level Technical Committee under the chairmanship of R. Jeyaseelan, retired Chairman CWC (Central Water Commission), to investigate the issue of industrial water allocation and its effects on irrigation water for the command area of the Hirakud reservoir. The Chief Minister of Odisha announced Rs 200 crores for the renovation of the distribution system of reservoir and its command area.

Table 2.1: The chronology of events

Time	Description
January 2003	Accelerated Irrigation Benefit Programme (AIBP) renovation work started in the Sason command region of the Hirakud reservoir.
January 2003 to June 2005	Closure of rabi irrigation in the Sason command for renovation work
June 2005	Sason canal was unable to deliver water for Kharif irrigation, as the intake mouth of the canal had silted up. Farmers apprehended that the obstruction was due to the earthen embankment constructed inside the dam by industries.
24 October 2005	The Sambalpur Krushak Sanghatan and farmers organised a relay fast in front of the district collector's office for 28 days demanding a probe into the lack of irrigation water supply in the Sason command, and corruption charges in renovation works of the Sason command.
22 November 2005	Farmers staged a dharna related to issues in the Sason command.
June 2006	Sason canal faced water shortages again.
15 August 2006	Western Odisha farmers formed WOFCC and planned a number of agitations against the state government on industrial water intake and allocation from the Hirakud reservoir.
26 October 2006	More than 20,000 farmers from the region formed a 20 km long human chain around the Hirakud dam asserting their right to dam water.
10 January 2007	WOFCC organised Chetavani Samavesh at Bargarh warning the state government about Hirakud water issues.
6 November 2007	More than 40,000 farmers gathered at the dam site for a civil disobedience movement and were lathi-charged. The Odisha State Assembly winter session was adjourned.
11 November 2007	Farmers marked a Chasi Rekha on the bank of the reservoir asserting that the reservoir water is only for farmers.

Current status of the conflict

After 2007, the Water Resources Department and Hirakud Dam authorities became more conscious about irrigation water supply to the Sason canal. Periodically, they removed sediment deposited at the mouth of the Sason canal and ensured normal water supply. As a result, the protest movement has died down. The High Level Committee, 2007[5] also reported that industrial water

[5] *Water Resources Department, Odisha Notification No. Irr-II-HKDW-11/07-19692/ WR dt. 22nd June, 2007.*

allocation is not hampering irrigation water supply, and that more water can be given to the industries from the reservoir.

The farmers planned another agitation during March 2008 against the installed intake well of Vedanta Alumina inside the reservoir at Pithiapalli village. At the same time, farmer groups such as the Ma Samleshwari Krushak Sanghatan and the Vir Surendra Sai Krushak Yubak Sanghatan began to be formed and promoted by political parties and their local political representatives as a counterweight to the farmer unions. The agitations led by WOFCC were blocked by these groups. (The farmers protest march towards the Vedanta intake well, for example, was blocked by the Vir Surendra Sai Yubak Sanghatan.) There was a possibility of conflict between farmer unions and these politically motivated groups, which was avoided by the farmer unions for strategic reasons. However, after this point, agitations by farmer unions began to slow down, especially as the people from the region got involved in the assembly elections of 2008.

Though farmers acknowledge that other technical, social and political issues in the command area also affect their supply, they strongly feel that the industrial water intake from the reservoir is the main reason for the shortages they face.

The conflict is dormant at the moment, though opinion is strongly divided. However, a shortage in the irrigation water supply in the command area can provide the spark and reignite the conflict. The industrial water use now is almost equal to the suggested allocation of 0.350 MAF, and further increase in water allocation from the dam for industrial purposes may trigger a conflict.

Conflicting parties

The conflict is largely between the farmers in the Hirakud command and the GoO over the allocation of water from the reservoir to industries. In many ways, the conflict is a classic case of contestation over natural resources in developing countries, where the state pushes market and reforms within a neoliberal framework and local communities struggle to maintain their livelihoods and institutions.

However, there are also many intra-sectoral and inter-sectoral water conflicts within the region which are not so visible. In the canal command area, distribution of irrigation water between head and tail areas, among different farmers, and among different kinds of crops also leads to conflicts. The lack of irrigation water in the tail areas is now a decade-old problem. Water distribution below distributaries, minors and sub-minor channels is also a subject of contestation, where power, interests, profits and dominant cropping patterns play a big role. Waterlogging, land use changes, land degradation and fall in crop productivity due to polluted water are important factors adversely affecting farmers' livelihoods and sustainability of agriculture. Increasing pollution and concentration of fly ash is threatening livelihoods of fishermen. Though the dam is now more than 50 years old, issues related to displacement and rehabilitation are still unresolved. Recent appropriation of surplus land[6] (budi anchal) acquired for the reservoir by industries including coal mines is adding a new layer of conflict. At the reservoir management level, there are conflicts around reconciling the objectives of flood control, power generation and irrigation. Almost 85 percent of Hirakud's catchment

[6] During construction of the reservoir, there was acquisition of land up to 632 feet of the reservoir level. After construction, the reservoir water was impounded up to 630 feet of the reservoir level. The acquired land remained with the dam authorities (under Water Resources Department). This land is inhabited by people displaced by reservoir construction.

lies in Chhattisgarh, and increasing water appropriation upstream is affecting reservoir inflow and changes in land use, leading to increased rates of siltation threatening the life of the dam. If we delve deeper, there are a host of latent conflicts cutting across one another that are not so visible as the conflict between agriculture and industry.

Parties involved in the dominant industry-agriculture conflict are:

1. The Government of Odisha: The Government of Odisha is the sole authority to take decisions related to the Hirakud dam water distribution and allocation.

2. Water Resources Department: The Water Resources Department is the nodal authority of the state government which is responsible for managing the water resources of the state and hence controls the operation of the dam.

3. Hirakud Dam Project authorities: The dam authorities are in control of the daily Hirakud dam reservoir operations. They implement the decisions related to the Hirakud reservoir taken by the Water Resources Department.

4. Farmers from Hirakud command region: Farmers cultivating lands in the command region of the Hirakud reservoir, who belong to three districts of western Odisha, are severely affected by the conflict.

a. **Western Odisha Farmers' Coordination Committee:** This coordination committee is an alliance of farmers' unions from western Odisha. It represents famers in the Hirakud water conflict.

5. Political parties: National and regional political parties such as the Congress, the Bharatiya Janata Party and the Biju Janata Dal organised demonstrations during the Hirakud water conflict.

a. **Regional and local politicians:** Regional and local politicians who were active during the peak period of the water conflict played a crucial role in shaping the water conflict in the region. They joined the struggle for socio-political gain.

6. Industries: Mainly heavy industries are using water from the reservoir. The major share of industrial water use is consumed for thermal power generation. At present, there are 15 industrial units taking water from the reservoir.

7. Academics, researchers and activists: They write about different issues related to the Hirakud water conflict, and play a major role in making information about water availability and reservoir operations accessible.

8. Media (print and electronic): Local newspapers aggressively report news about the Hirakud water conflict. They play a key role in disseminating information about the current development of the Hirakud water conflict.

The opposing stands

The farmers unions under the banner of the Western Odisha Farmers Coordination Committee are against industrial water intake and allocation from the

[7] Hirakud Dam Project Report 1952

[8] Many industries are drawing water from key locations having strategic hydro potential, constructing illegal infrastructure, illegally drawing water from reservoirs and upstream rivers, and dumping solid waste (fly ash) and untreated pollutants into the reservoirs, making the state machinery silent spectators or tacit supporters.

[9] Loss of power generation on account of this diversion (0.334 MAF in non-monsoon period) for industrial use would be 46.90 M units which is 47 percent of the total power generation. Cost of power loss per annum @ Rs. 1.00 per unit is Rs. 4.69 crores. There would be no impact on irrigation as per the Committee. It also recommended that water actually drawn shall be charged at the rates fixed along with compensation for the loss of power generation on the water consumed during the period October to May. The industries could draw water up to a reservoir level of 592.0 below which it may not be possible to draw water from the reservoir as industry intake wells are situated in the peripheral (shallow) region of the reservoir.

Hirakud reservoir. They are demanding that the GoO should ban all industrial water intake from the reservoir, and scrap all MoUs with industries which provide them with water from the Hirakud reservoir. They assert that there was no provision for industrial water use in the original project report of 1952[7]. In the command area, there are a number of villages that are not getting water for irrigation. The provision of lift irrigation in the peripheral region of the reservoir has never been met. They are not ready to tolerate the priority accorded to industries, without first providing water to all the promised regions as mentioned in the project report of 1952.

Industrial houses have not been very vocal about the water allocation from the Hirakud reservoir, but they have been able to secure their share of water from the reservoir by strategically influencing the state government or by bypassing legal frameworks[8]. The industrial units are demanding more water from the reservoir for expansion and for their captive thermal power plants. Through intake wells and irrigation canals, industries are using water from the reservoir. In March 2011, the Confederation of Indian Industries (CII) demanded a white paper from the GoO on water availability from different reservoirs in Odisha. However, industrial units are already drawing water from intake wells as well as irrigation canals. Moreover, they are also polluting the air, water and soil, and the biota by releasing untreated effluents directly into the reservoir.

The GoO supported farmers during the peak period of the conflict. The GoO's view is that surplus water may be given to industries without affecting the farmers' share. The Jayaseelan committee has recommended increasing the allocation to 0.50 MAF per annum until further review, say after five years[9], and later, a back up storage by industries of about a month's minimum requirement during the dry season. As of 2010, the Water Allocation Committee (WAC) of the state government has allocated an additional 1419 cusecs (sic)[10] of water to 61 industries, of which allocation from the Hirakud reservoir is about 500 cusecs. With the proposed entry of aluminium and thermal power plants, the projected level of water withdrawal is estimated to be 0.645 MAF per year against 0.35 MAF per year.

Scope for dialogue

The GoO claims that the irrigated area[11] has increased over the past few years. However, this increase in area is in the head reach[12] of the system, while the irrigated area in the tail reach is actually falling due to the deterioration in the physical system and inefficient management. There is a need to take up land consolidation, carry out repair and maintenance of the irrigation system, design and implement a more efficient irrigation management system, increase water use efficiency, promote crop diversification and crop rotation, address the issues of cross-bunds and deliver irrigation water to the entire command area including the tail reach. It is also essential to empower the pani panchayats to make them more effective. Along with the above conflicts, there are many other conflicts (Choudhury *et al.*, 2011), some of which have been briefly described earlier. These conflicts will have significant impacts on the local communities and livelihoods, unless addressed effectively in a participatory and just manner. If this is not done, the conflict between industry and agriculture will continue to be triggered by shortages.

[10] See footnote 20 in the Chapter Terrains of Resistance: An Overview of Water Conflicts in Odisha

[11] Rabi *coverage is (1.07 lakh ha) 67 percent against designed 50 percent of command; Paddy – 158 percent of Culturable Command Area (CCA) in* Kharif *and* Rabi *against 103 percent; High Yielding Varieties(HYV)– 95 percent against planned 70 percent area; Oct-May irrigation – 1.35 MAF in last 25 years against average withdrawal – 1.25 MAF during previous 15 years (Jayseelan Committee Report).*

[12] There is a significant increase in the command areas in the villages situated at the head end of distributaries; the area under Rabi has also increased significantly in these villages. These villagers have developed most of the uplands and made them suitable to access irrigation water. The lands such as gochar, gram jungle, and kata area are now being cultivated by villagers. Unauthorised cultivation on government lands, canal acquired lands, gramya jungles, and gochars account for 10 percent more of total ayacut for which water is now being used. (Forthcoming Action Research Study by the Odisha State Centre)

GoO also needs to review the industrial water allocation from the reservoir. The industrial units should re-treat and reuse their water, and should claim only the water lost to evaporation (about 10 percent of their water use) for their captive thermal plants (High Level Committee 2007[13]). The industries should have their own water storage facility to meet their water demand during the lean period. GoO needs to engage in a continuous dialogue with farmers and industries to work towards conflict resolution. Mechanisms like joint coordination / monitoring committees to monitor adherence to norms, and to bring about more effective and productive use of water, could be explored. The Baitarani Initiative through the Odisha State Centre of Forum for Policy Dialogue on Water Conflicts in India is also actively working on the Hirakud water conflict issues through conflict analysis, stakeholder interaction and stakeholder dialogues.

[13] As per the committee report (general recommendation: section 6.1.6), while giving permission to industries for drawing water from the reservoir, adequate safeguards are to be incorporated. Return flows are generally high in industrial use, and could be over 80 percent. A zero based approach needs to be implemented by suitable recycling of water, and only the requirement for consumptive used and the topping of water balance after recycling shall be drawn from reservoir.

Key institutions and people

1. Western Odisha Farmers' Coordination Committee: This committee was formed during the peak period of the water conflict. It represents the farmers of the western region of Odisha.

2. Sambalpur Krushak Sanghatan: This is a farmers' union in Sambalpur district. It participated in the Hirakud water conflict by raising farmers' issues.

3. Odisha Rajya Krushak Sanghatan, Bargarh: This farmers' union represents farmers of the Bargarh district. It took an active part in farmers' agitations during the water conflict.

4. Hirakhand Nagarika Parishad: This is senior citizens' forum from Sambalpur city, working on pollution and Hirakud reservoir related issues in the region.

5. Baitarni River Initiative: This organisation is working on river basin management in Odisha. At present, it is working on the Hirakud water conflict project, supported by the Odisha State Centre of Forum for Policy Dialogue on Water Conflicts in India.

6. Confederation of Indian Industries (CII), Odisha: This organisation is working on industrial issues in Odisha.

7. Ashok Pradhan: Convener of the Western Odisha Coordination Committee from Sambalpur district, he is a farmer leader from the Sambalpur Krushak Sanghatan. He worked as a key leader in the farmers' movement around the Hirakud water conflict.

Address: Ashok Pradhan, Sambalpur Krushak Sanghatan, Near Directorate of Agriculture office, Modipada, Sambalpur

8. Lingaraj: A farmer leader from Baragarh, he belongs to the Samajwadi Jan Parishad. He was a leading figure in farmers' agitations during the peak period of the Hirakud water conflict. He is the convener of the Western Odisha Farmer Coordination Committee, Bargarh District.

Address: Lingaraj, Samata Bhavan, Bargarh

References

Choudhury P. R., P. Satapathy and J. Sandbhor, 2011, Water Justice in Hirakud: An Enquiry from Socio-Environmental Perspectives. Paper presented in Workshop on Water Justice in South Asia organised jointly by Wageningen University, SOPPECOM and the Forum for Policy Dialogue on Water Conflicts in India, held in Pune, Maharashtra, India from 18th to 22nd April 2011

Hirakud Dam Project Report 1952.

Report of the High Level Technical Committee to Study Various Aspects of Water Usage for Hirakud Reservoir (Jayseelan Committee Report), August 2007. (http://www.dowrorissa.gov.in/NEWS/HirakudHLC/Report.pdf) accessed on 12th December 2011

Report of the Technical Expert Team on the memorandum submitted by Hirakhand Nagarika Parishad, Letter of Engineer in Chief Water Resources Department, Odisha, Lr. No. WG-HKD-9/06-11305 dt. 21st July 2006

3

Case Study 3

THE HATI-TEL DIVERSION:
River-linking leads to flood

Aditeswar Mishra

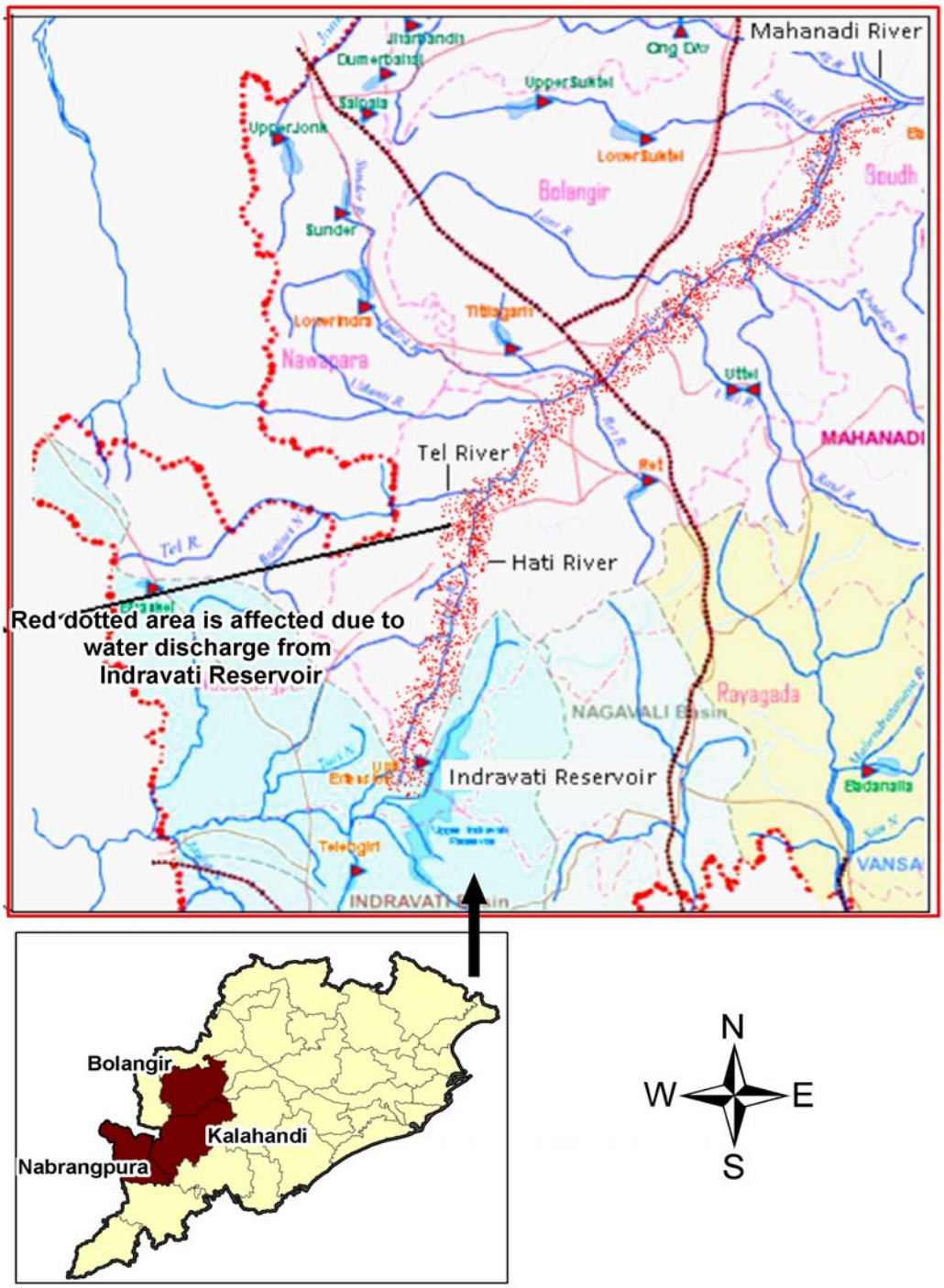


Fig. 3.1
The region affected by the Hati-Tel diversion system.

The background

The Tel river flows through the Nabarangpur, Kalahandi, Bolangir and Sonepur districts of Odisha. An important tributary of the Mahanadi, it meets the main river near Sonepur/Subarnapur and Manmunda town, after flowing about 25 km in Boudh district. The banks of the river are very fertile and inhabited by dense population. Hati, a major tributary of the Tel, drains an area of 1515.45 square km located in the Bhwanipatana area of Kalahandi district. The Khadanga river, a tributary of the Tel river, flows from Kandhamal district into Bolangir district and joins the Tel near the Kantamal block. Also, the Suk-Tel river merges with the Tel at Bijapadar, located on the opposite side of Subarnapur district.

The Indravati river which falls under the Godavari river basin originates from the Eastern Ghats of the Dandakaranya range in Kalahandi district, and flows in the western direction, entering Jagadalpur district in Chhattisgarh state. It further flows westwards and later southwards before meeting the Godavari at the border of Maharashtra, Chhattisgarh and Andhra Pradesh.

During the late 1980s, the Upper Indravati Hydroelectric Project, a multi-purpose river dam project, was undertaken at the tri-junction of Koraput, Nabarangpur and Kalahandi districts. The project envisaged inter-basin transfer of water from the Godavari basin to the Mahanadi basin (through Hati and Tel) to deal with the perennial drought situation in Kalahandi district, as well as electricity generation for the state. When the dam became fully operational in 2001, the waters of the Indravati were diverted to the Hati river which ultimately joins the Tel river. Though the intention of water diversion was for a noble purpose of alleviating the drought situation in Kalahandi district, the adverse consequences like water scarcity downstream of the dam in the Indravati, and floods in the Hati and Tel rivers, have led to major inter-state and inter-basin conflicts. Floods in the Hati and Tel rivers which affect thousands of people living on the banks of these rivers and their tributaries are the major points of conflict.

Kantamal: The severest impact

The Kantamal Assembly Constituency of Boudha district, where the conflict is at its severest, has been covered by this study. This is a densely populated region with about 140,000 people and is situated near the meeting point of the Khadanga and Tel rivers.

After power generation at the dam on the Indravati, water flows through a power channel to the Hati river, which merges with the Tel river at Naudula. As a result, the water flow in the Tel has now increased not only in the monsoons but also in other seasons. Due to increasing runoff and frequent floods in the Tel river, the water of the Khadanga river is not being released into the Tel river in a timely manner, because of which about 36 villages upstream are on the verge of submergence. Along with this, due to the earthen embankments on both sides of the riverbank in Bolangir and Sonepur districts, the course of the river is gradually changing towards the Kantamala region, thereby aggravating the flood situation for the population already affected by the Khadanga river flood. People alleged that the diversion of Indravati waters into the Hati and Tel rivers is the major cause of

increase in river flow. The surplus water from the Indravati project is now flowing through the Hati River ultimately into the Tel River. It creates an artificial man-made flood situation in this area. Due to the construction and strengthening of an embankment on the Subarnapur and Bolangir side situated downstream of Kantamal, the backwaters of the river flow towards the Kantamal side and erode its bank. Nearly 40,000 people residing in 18 panchayats of Kantamal block are facing waterlogging for months during the rainy season, which affects their lives both socially and economically. People are migrating out of villages which are on the verge of perishing, and are facing many problems. Many controversies arise when they relocate to a new place. Farmer communities do not want to be displaced as their agricultural land lies in the area. Farmers as well as others dependent on the Tel river are losing their livelihoods as their paddy fields remain waterlogged throughout the monsoons.

The river channel and embankments of the Hati (which has a narrow channel to drain less water from its smaller catchment) are unable to carry excess water from the Indravati. The increased flow creates floods and affects Bolangir, Subarnapur and Boudh districts which had never witnessed floods before.

Kalahandi district also faces the impact

The Hati and Tel rivers have become perennial with water from the Indravati. A little excess rain in the Hati catchment is now causing floods in the Hati, leading to inundation of the low bridge at Junagarh, and disruption of vehicular traffic along National Highway (NH)-201. This has now become a regular feature. Even a complete washout of the bridge cannot be ruled out. A proposal to construct a high bridge is pending for a long time. Also several other dilapidated bridges over NH-201 in Kalahandi are a matter of concern for the local populace. During 1991-92, there was a proposal to transfer the then Public Works Department (PWD) road from Jaipatna to Kesinga to the Indravati Project, so that the road, including the high bridge over the Hati, could be constructed. However, this proposed plan never materialised. The bridge is now the responsibility of the National Highways Authority of India (NHAI). The proposal for construction of a high bridge is pending before the centre since 2002.

Current situation in Kantamal

Every year, about twenty villages and a large area of croplands are affected due to the flood. The backyard of the historical Samaleswari temple at Ghantapada is now near the riverbed. The Tel river has already touched the back of the temple, and the Ghantapada village is going to perish into the riverbed soon due to increasing bank erosion. During floods, the situation worsens, as the entire area becomes waterlogged. Another village, Manikapur, is also faced with the same fate as Ghantapada during floods. All agriculture land becomes sand casted. In 2010, the flood situation was most acute. The state government had to evacuate people by helicopter. More than half of the houses of Tambasina village were destroyed in the 2010 floods. People of this village are now homeless and searching for a new place to reside. A similar situation prevails in Udepura, Dumbalipallli, Tendumela, Manamunda, Deuli and Basudevpurpalli. The croplands

are submerged in the flood waters for more than two weeks, which completely destroys paddy.

. . . and in Kalahandi

People residing in villages near Junagarh (Balichada, Karmeli, and Mandal, to name a few) face severe floods during the rainy season due to the Hati river which carries the Indravati water from July to September. The people from these villages are demanding the construction of a wall along the riverbank to avoid the menace of floods. No appropriate action has been taken so far by the Kalahandi district administration for the construction of roads and other measures for the welfare of people residing in this area. According to documents of the Upper Indravati Hydel Project, 3 percent of the income generated by the hydel project should be invested in Kalahandi's development. However, the villagers have to shift to other places due to the floods, and there is no progress towards embankment construction on the Hati.

People also feel a need for a bridge on the Hati. For example, to go to Kalampur from Moter, today it takes you 60 km via Junagarh or 50 km via Mukhiguda, though it would take you only 15 km via Karchala, but this would require a bridge on the Hati near Mandal village. In late 1999, when Hemananda Biswal was the Chief Minister of Odisha, he promised the construction of a bridge over the Hati near Karchala (2 km distance). In 2003, the Naveen Patnaik government visited the area and made many promises, but no action has been taken till date. In 2003, the cost estimate for the bridge was Rs. 4 crores, which was later revised to Rs. 9.37 crores. Uptil now, only 1.9 crores has been spent, and the construction of the bridge is at a standstill after the withdrawal of the contractor.

Members of a Kalahandi e-group dedicated to its development have identified the following reasons for the delay in executing projects for Kalahandi's development:

1. Lack of communication between people and the administration

2. No influential legislators

3. No influential member of parliament

4. Lack of proper administration

5. Lack of funding by the central government as well as the state government

Conflicting parties

The affected villages of Kantamal block are Ghantapada, Kuludajora, Narayanprasad, Khamarmunda, Ambagar, Khuntigora, Bargam and Uma. Over 40,000 people of eight gram panchayats have to reside in waterlogged areas for four months in the rainy season. Unlike the deltaic population, who face floods every year and have adapted to some extent, the communities in these villages have never witnessed floods till the river-linking happened. Therefore, they face much more difficulty and have become more vulnerable physically, socially, economically and also culturally.

The main connecting route, the NH-201, submerges in the flood waters at Kalimuhana, cutting off these villages from the outer world. The flood submerges the two ends of the Mallikuda bridge on the NH-201. The only way to provide basic health care to the people is through boat. The situation worsens due to the artificial rise in prices of daily necessities like kerosene, potato, and sugar. The price of 1 litre kerosene increases to Rs. 60, and the price of 1 kg potatoes jumps to Rs. 40. Due to deep forest and hills, it is very difficult to reach the Kantamal market. The people of this area migrate to Bauvagarh and Bivika as daily labourers. About 90 percent of the people of Mallikuda are affected by the flood waters, and are searching for a new place of residence. These people had migrated to Tilakmal village to acquire land, but faced stiff opposition from government officials, who lodged a case against them. The people of Guabehela village are residing in a new place on Gochar land, that is, land classified as pasture land. As the classification of the land has not been changed, the villagers are being deprived of education, electricity, and roads. The government is not providing any type of help to them. The huge croplands extending from Kuludajora panchayat to Guabehewla panchayat are frequently affected by excess water. Gushing floodwater has washed away about 12 hectares of farmlands of Ghantapada, Udepur, Malikuda, Tambasiva, Manikpur, Badarepalli, Guabehela, Dagala, Baghada, Lokapada, Paluarla, Godajora, Kirla, Tundhmala, Ratakhaudi. Devli, Manamunda, Kapasiva, Nuapada, and Basudevpur villages.

The other parties involved are the district administration of Kalahandi, which is responsible for managing the flood situations and arranging relief operations, and the Odisha Hydropower Corporation, which is responsible for power production at the Indravati Dam, and therefore instrumental in releasing water to the Hati, which causes flood.

The way forward

The loss of and threats to homestead lands need to be surveyed and compensation planned and provided. Due to floods and destruction of crops, the people of these areas are migrating as labourers. Nearly one thousand people have migrated permanently as labourers, and every year fifteen thousand people are temporarily migrating to new places for work. The reason for this migration is the Indravati-Hati-Tel link. Presently, five hundred people are displaced and have relocated to other places. Another five thousand people are ready to move out. Despite informing the administration repeatedly, success is yet to be achieved. The people who want to migrate should be properly rehabilitated by providing basic needs and livelihood opportunities. Building and strengthening the embankment over the Tel river is essential to check the flood situation.

Case Study 4

4

THE KANHUPUR PROJECT ON THE BAITARANI: Delays cause conflict

Kiran Sankar Sahu

Fig. 4.1
Location of Kanhupur dam on the Baitarni

The Kanhupur Irrigation Project is a major irrigation project presently under construction across the Baitarani river near Basudevpur village located in Keonjhar district in Odisha close to National Highway (NH) 215, about 55 km away from Keonjhar town and 220 km from Bhubaneswar. The project is expected to irrigate 47,709 hectares annually, with an estimated expenditure of Rs. 428.32 crores which has been revised now. An earthen dam 3247 metres long and with a maximum height of 39 metres will be built. The reservoir will have a storage

capacity of 331 million cubic metres. The single right canal will have a length of 78 km in the command area.

Delays in the project . . .

Drought prone north Odisha received the approval for the Kanhupur major irrigation project in its tribal district of Keonjhar almost three decades ago. The project is funded by the Planning Commission, under AIBP (Accelerated Irrigation Benefit Project) for Rs. 428.32 crores, which now stands revised at Rs. 1078.52 crores.

Though the Kanhupur Irrigation Project was included in the 8th Five Year Plan, it was repeatedly delayed till the third foundation stone was laid by the present Chief Minister on 23 March 2004. The project was expected to be completed before 2008-09, but the schedule was revised for completion by October 2010. As the date of completion approached, it was rescheduled once again to March 2013 without any valid reason.

The project appears to have been delayed deliberately at the behest of corporations who intend to mine the immediate catchment area upstream of the reservoir. A very large portion of the flow of the river is being offered to a number of water guzzling slurry units for piped transportation of iron ore to as far as Paradip (300 km), Kalinganagar (120 km) and Angul (200 km).

Originally conceived as an irrigation project to cover 48,000 acres of cultivable land of two lakh farmers in 238 villages, the distribution of limited water to industry is also a matter of concern which could breed future water conflict in the region.

. . . deliberate and unreasonable

Though the much awaited Kanhupur Irrigation Project was progressing smoothly towards completion by October - December 2010, it is now delayed by another three years, ostensibly by a central government decision and due to procrastination on the part of the state government. This action makes a mockery of all the promises to prioritise irrigation, food security, and the wellbeing of the farming community and others. The people of 248 villages of the Upper Baitarani Basin owning some 48,000 hectares of parched farm land are disappointed and aggrieved.

It is difficult to accept another delay when there was good all-round progress on all fronts of the project, including land acquisition and rehabilitation. An experienced chief construction engineer with three executive engineers and a full retinue of skilled staff and contractors are working full time at the fully operational project site for nearly four years. The district administration has been extending full cooperation to overcome all kinds of obstacles. Therefore, this delay for another three years is not understandable. When this is being done surreptitiously, it raises all kinds of doubts in the minds of the citizens regarding the sincerity of the government, and about whether there is undue pressure on the government machinery from the central government, state government or vested interests. The reasons for such delays need to be explained to the people of the district.

Introduction of a major design change to provide two sluice gates under the spillway structure as late as in March 2009 is awaiting approval by the Central Water Commission. At this stage, it could lead to further delay and escalation in cost.

The problem is further compounded

Silting of the reservoir

The exponential growth of mining activities in the catchment area in the immediate upstream of the Kanhupur dam, compounded by a poor Environmental Management Plan (EMP) by the miners leading to excessive erosion and siltation, is of very serious concern to the citizens. The catchment area of 1565 square km needs to be managed urgently by an appropriate catchment area treatment plan.

Several companies are planning piped transportation of iron ore by slurry (75 percent of water by volume) which will need a lot of water. Water for this purpose should not be sourced from either the dam-reservoir or the flowing Baitarani river, which would create a shortage in lean seasons. The companies should make their own reservoirs on the tributaries to harvest rain water, and thus, also trap most of the eroded silt material. Kanhupur reservoir could be protected from faster siltation in this manner.

Diversion of water for slurry transportation of iron ore

Permission has been granted by the Water Resources Department, Government of Odisha to Essar Steel's unit at Basantpur, about 15 km upstream of the dam, to draw 1200 cubic metres of water per hour. This water will be pumped from the Baitarani river, 9 km away, to meet the requirements of both the refining process and slurry preparation. Similar permissions have also been given for two more such slurry units nearing completion in the same area. People are expecting that there will be at least ten more such units coming up in the near future.

Dumping of solid wastes by the mining companies

The Kanhupur irrigation project is already facing a serious siltation problem which adversely affects the life of the dam. This problem is caused by an inadequate Environmental Management Plan of the mines spread all over the catchment area. The fine solid wastes from the tailing ponds of various mining companies also reach the flooded river water during the rains, aggravating the current siltation rate. Some of the slurry industries have located their tailing ponds on the bank of the river where the slime (solid waste in the form of muddy water) will deposit millions of tonnes of fine silt.

Water drawal by industry

Jindal, Essar, and BRPL together have been permitted to draw about 4300 cubic metres of water per hour by laying pipelines from the Baitarani river. The water will

be made available to the companies upstream of the Kanhupur dam project, which is to be completed soon. Almost the entire water will reach the company sites at Angul, Paradip and Kalinganagar. The resident citizens of Kendujhar, including farmers, wonder if there would be enough water left for irrigation, ecology and domestic use. The Kanhupur Irrigation Project, as its name specifies, is meant for irrigation, but the work on the canals is still to commence. However, the pipeline laid by the company clearly indicates the motive of the authorities to create a conflict situation.

Current status of conflict

For several years now, the Keonjhar Citizens Forum is following the slow progress of the Kanhupur Major Irrigation Project with disappointment. Another area of concern is that the excessive siltation is reducing the life of the dam substantially. The Forum has approached the district administration, the state government and the Planning Commission to address their concerns. Upon an Right to Information (RTI) application, in April 2008, it was communicated that the dam will be completed by October 2010, and the canal system by December 2010.

The Forum is currently concerned about the allocation of water to industries once the project is complete. Diverting such large quantities of water from the Baitarani river during seasons other than the monsoons by all three units, may lead to a shortage of water for the farmers downstream. It is doubtful whether government officials have considered this aspect seriously before consenting to water intake. The Forum has approached the officials to know the quantity of water to be shared with the industries. It is also possible that the government permission stipulates some restrictions during lean seasons, besides other terms and conditions. The Forum's request for a conclave for peaceful and equitable distribution of water is yet to be heeded, apparently because the government is hiding facts in favour of 'special interest' groups.

Conflicting parties

a. Farming communities: The 48,000 acres of parched and rainfed land, belonging to some 248 villages of 36 gram panchayats, are eagerly waiting, albeit, indefinitely for over three decades for irrigation water to reach their fields.

b. Government: After the design and the command area studies were completed in 1989, the project was languishing without direction, till the third foundation stone was laid on 23 March 2004, which revived the hopes of over two lakh farmers.

c. Irrigation department: As an AIBP project of the central government, there is no problem concerning funds. Yet, the apathy of the project management is evident in every aspect.

d. District administration: The district administration has been unhelpful in providing administrative support, mainly for resettlement and rehabilitation.

e. Miners and other corporations: Through partisan lobbying, they have been successful in cornering most of the water resources from the Odisha government.

f. The Keonjhar Citizens Forum is also involved in the issue, by drawing the attention of officials in the district and state administration about unkept promises, deliberate delays, and shrewd denials affecting the district and asking for remedial action.

How things stand now

Agriculturally backward Odisha largely banks upon the rain gods for farming 60 percent of the cropped area of the state. Irrigation is available to only 31 percent of cropped land, compared to the national average of 44 percent. Though both the state and union governments have been pumping in thousands of crores of rupees to extend irrigation facilities to the remaining areas, most projects have been inordinately delayed in implementation leading to a cost overrun of Rs 3537.26 crores, according to the latest report of the Comptroller and Auditor General of India (CAG), which was presented in the state assembly in 2010. The Kanhupur Project is one of the projects which have overrun the original budget. The CAG levelled serious allegations about the lack of proper planning, mismanagement of funds and non-acquisition of land; want of forest and environment clearance are some of major factors responsible for the delay. According to the report, "There was mismanagement of funds involving excess payment to contractors as well as extra/wasteful expenditure and fraudulent payments. No monitoring committee was constituted at the project level." The state government has not yet addressed the bottleneck in the implementation and suggestions of the Central Water Commission for speedy completion of the projects. The only solace for the state government is that the CAG praised the Water Resources Department for adopting good practices such as using remote sensing technology for verification of the irrigation potential actually created, and also for introducing e-procurement for early finalisation of tenders.

5

Case Study 5

ANGUL -TALCHER REGION:
Conflict over water and air pollution

Ashis Kumar Das

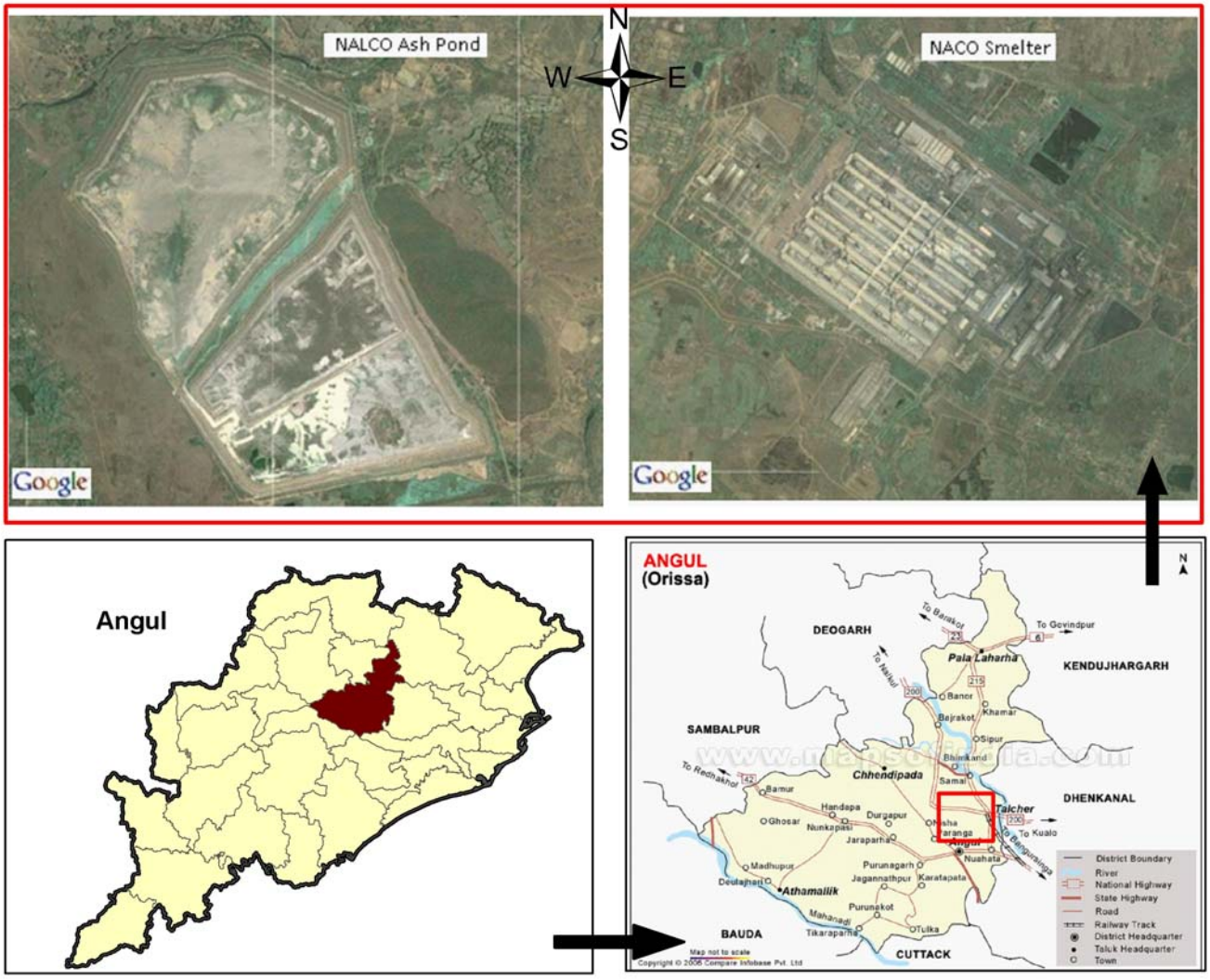


Fig. 5.1
Location of NALCO ash pond and smelters in Angul district

Angul is situated at an average height of 139 metres above the mean sea level, and lies between 20^0 31' N to 21^0 40' N latitudes and 84^0 15' E to 85^0 23' E longitudes. The Angul-Talcher area is one of the major industrial zones in the state of Odisha. The availability of coal in the Talcher coalfields and the abundant availability of water in the Brahmani river are the prime factors for the rapid growth of industrial activities in this area. The region is mineral rich and has attracted big industries to establish their plants. At present, more than 50 industries and mines are operating in the district. This includes Public Sector Undertakings like NTPC (National Thermal Power Corporation), NALCO (National Aluminium Company), MCL (Mahanadi Coalfields) and the heavy water plant at Vikrampur, and steel industries of Bhusan, Jindal and others.

Increasing pollution in the Angul-Talcher region

Although these establishments contribute to the socio-economic development in the region, the area is burdened with many environmental problems. Release of untreated effluents from these industries and mines has already polluted the Nandira and Brahmani rivers. According to a publication of the Central Pollution Control Board of the Ministry of Environment and Forests, "The area is recognised as one of the 24 problem areas identified by Central Pollution Control Board, Delhi in respect of industrial pollution hazard. The Angul and Talcher Municipalities and townships of Food Corporation of India (FCI), Talcher Thermal Power Station (TTPS), NALCO, MCL, Talcher Super Thermal Power Project (TSTPP) consume approximately 19.3 mld (million litres per day) water, and are being met from Brahmani river and to some extent from groundwater sources, and discharge approximately 16.4 mld of waste water into the Brahmani river basin. Similarly, the major industries of the area consume roughly 368 mld of raw water from Brahmani and Tikira river and discharge 152 mld of waste water to Kisinda Jhor, Nandira river and Deojhar nallah which ultimately join Brahmani river. 42.5 mld of mine drainage water from the coalmines in the area is also discharged into Brahmani river basin."[1] Because of the pollution, the fish population has dwindled, ruining the livelihoods of about 5000 fishermen. The river water has become unusable both for human and animal consumption. Due to the fly-ash emission and frequent release of fluoride, the agricultural fields in the peripheral areas of big industries have become unproductive, and people are seeking alternative sources of income.

Table 5.1: Consumption of water and discharge of waste water from the major power plant in Angul-Talcher region

Name of the existing industry products	Products	Water consumption (1000 Litres/day)	Wastewater generation (1000 Litres/day)
National Aluminium Company-Smelter Unit	Aluminium	5,066	4,900
Captive Power Plant-NALCO (960 MW)	Electric Power	1,35,000	90,000
Talcher Thermal Power Station (460MW)	Electric Power	13,227	6,483
Talcher Super Thermal Power Plant NTPC, Kaniha (3000MW)	Electric Power	1,37,099	52,080
ORICHEM Ltd.	Chemicals	170	10
Miscellaneous	…….	45,883	16,608
Total		**3,36,445**	**1,70,081**

(Source: Environmental Statement (form-V), (2006-07). MCL, Orissa)

Fluoride emission and its impact

NALCO, the second largest aluminium producer in the country, established its smelter and captive power plant in the region in 1982. Abundance of cheap natural resources like coal and water is one of the major reasons behind the establishment of the plants. Both the smelter and captive power plants started their production in 1985 in an area of 3,390 hectares, displacing thousands of people of 39 villages. During the production process, electrolytic cell generates gases containing CO_2, HF and other particulate matter. In this process, fluoride is the main air pollutant that is emitted from electrolytic pots. The smelter plant has two pot lines consisting of 210 pots each. NALCO is using the prebaked technology to

[1] Groundwater quality series:GWQS/9/2006-2007, pg-86,Central Pollution Control Board, Ministry of Environment and Forest, Feb 2007

destabilise the effects of emission, which is much more successful than the Soderberg Technology. It has installed four fume treatment plants (FTP) for treatment of the gases emitted during the process which are connected to the electrolytic pots. However, despite all the precautions, the production of 1 tonne of aluminium will result in the release of 1 kg of fluoride in the ambient environment[2]. This implies that earlier, 230 Metric Tonnes (MT) of fluoride was released into the air every year, and currently 340 MT is being released. (Capacity expansion has taken place from 2.3 lakh MT/year earlier to 3.45 lakh MT/year in 2003-04. After completing the ongoing second phase of expansion, the capacity will go up 4.60 lakh MT/year.)[3]

Fig. 5.2
A view of the NALCO smelter plant

Fluoride has contaminated the groundwater in villages located near the plants. As a result, several people and cattle are suffering from fluorosis, which can result in skin disease and cause bones and teeth to grow brittle. The State Pollution Control Board had tested water wells and ponds and found fluoride well in excess of the regulatory limit. “In a study conducted by the scientist from G M College, Sambalpur in 1990, an astonishing 67 percent of men and 64 percent of women were found to be suffering from fluorosis in the area close to the plant establishment. The people most affected are the young in the 12 to 19 age group.”[4] Cattle population has also dropped drastically in the area because of a bone-weakening disease due to the impact of fluoride.

As per the State Pollution Control Board, at the present capacity of 3.45 Metric Tonnes Per Annum (MTPA), NALCO emits about 40 kg/hr of fluoride, which causes at least one incident of crop damage in two to three years[5]. Fluoride bearing dust gets deposited on the grass, and is likely to enter the human food chain through milk and drinking water. Through the agricultural produce and water use, fluoride is now in the food chain of the people living in the vicinity of NALCO. The contamination has spread to 51 peripheral villages. While cattle are suffering from exostosis on ribs, metacarpus, metatarsus, lameness, anorexia and debility,

[2] 3rd generation plants Aluminium smelter produce 0.3 -1 kg of inorganic fluoride ((NaF, AlF3 and Na3AlF6 - as particulates, and HF - as a gas) per tonne. http://www.world-aluminium.org/?pg=101 (accessed on 13th December, 2011)

[3] http://www.nalcoindia.com/NalcoCSRBrochure.pdf and http://ospcboard.org/CHAPTER-I-XI/CHAPTER-II-INDUSTRY.pdf (accessed on 13th December, 2011)

[4] Indo-Asian News Service (IANS) 14th October, 2003

[5] Desk Study conducted by the OPCB (Odisha Pollution Control Board) assessing the Environmental Impact of Industrialization in Sambalpur-Jharsuguda area, 2008

the human population showed signs of severe pain, stiffness in the backbone and joints, pain and rigidity in the hip region, yellowish white glistening teeth, loose teeth and delayed eruption of teeth[6]. The fluoride contamination and other effluents released from the plants have affected soil fertility in the area, thereby reducing agricultural productivity. Farmers are not able to get good yields and hence resort to other non-farming activities. Due to the contamination of surface water, the people in the vicinity are struggling for potable water. In 2003, NALCO initiated a project to supply drinking water to 11 villages which were affected the most, but due to lack of maintenance, it never achieved its desired objective. The unproductive agricultural land and over contaminated surface water resources have impaired the rural economy. Without sustainable livelihood options, the villagers spend more on healthcare, leading to a poorer life.

Conflict over pollution impact

Studies by government and private agencies show that about 51 villages within the periphery of 12-14 km are affected by fluoride and fly-ash pollution, of which 11 villages are affected the most. The loss from the emission of fluorine gas is more during the rainy seasons. During November 1999, October 2003, August 2004 and on 30th July 2005, people found severe air and water contamination. On many occasions, people staged protests in the area, including road blockades, demonstrations on railway tracks, and in front of NALCO. However, in every instance, NALCO officials denied their role in the problem. Protests against NALCO have caught the attention of agencies and organisations which have studied the problem. The Animal Diseases Research Institute, Phulnakhara, Cuttack researched the issue in 1996. Similarly, the Department of Medicine, Faculty of Veterinary Science and Animal Husbandry, Odisha Agriculture University and Technology, Bhubaneswar studied the fluoride level in land, water, human and cattle in 1994. They found that the fluoride level is much more than the permissible level and in many drinking water points the fluoride level is more than the permissible level, i.e. 1000 mg/litre. Their studies confirmed that the 12 peripheral villages Chauradiha, Jhajaribahal, Banda, Tulasipal, Languliabeda, Gadarkhai, Badibahal, Kankinali, Barasingha, Angarbandha, and Kulada, Turanga are the worst affected. These villages are located near the boundary wall of the NALCO smelter plant. Lack of specific initiatives to mitigate the problem has aggravated the situation.

Table 5.2: Chronology of events

Sl. No	Year	Incidents
1	1982	NALCO established its Smelter Plant in the region
2	1985	The Smelter plant started its production (Synthesizing Aluminium from Alumina)
3	1987	People started to complain about various health hazards among themselves and cattle.
4	1994	Resident of 41 villages lunched a series of rallies to stop the pollution by NALCO.
5	1994	Study by Orissa University of Agriculture and Technology (OUAT) and Odisha Environmental Society (OES) showed that the fluoride level in the water and air is above the permissible limit.
6	1996	Study by Animal Husbandry Department, Govt. of Odisha confirmed the fact that the cattle are suffering from fluorosis.
7	Nov.1999	Emission of fluoride gas resulted in crop burn, itching and other health hazards.
8	During 2001	NALCO started a project to supply drinking water to the peripheral villages of Rs. 5.30 cores and yet to function.

Case Study 5

Angul-Talcher region: Conflict over water and air pollution

[6]An environmental health impact assessment was carried out in 2005-06 at the request of officials from the Government of Odisha. The findings showed adverse effects on human, veterinary and ecological health. Human health effect manifestations included dental and skeletal fluorosis. Veterinary health effects manifested through skeletal fluorosis. Ecological adverse effects manifested through damage to paddy fields and crop yield. http://www. ijoem. com/article .asp ?issn =0019-5278 ;year=2011;volume =15;issue =2;spage =73;epage =75;aulast =Patil (accessed on 13th December, 2011; Patil R R (2011) Environmental health impact assessment of National Aluminium Company, Orissa. Indian Journal of Occupational and Environmental Medicine Vol.(15) 2 : 73-75

9	October. 2003	Emission of fluoride gas to the environment resulting in crop burning and contamination of land, water and forest.
10	October, 2003	NALCO compensated the peripheral farmers by donating Rs. 31,01,828/- (Rupees Thirty One Lakh One thousand Eight Hundred Twenty Eight Only) not directly but through the Chief Minister's Relief Fund. It also initiated a project to supply drinking water to the worst affected 11 villages of the periphery area.
11	August. 2004	Emission caused crop burnt and people agitated and staged protests in front of NALCO smelter plant.
12	February 2005	The state Govt. of Odisha constituted a task force on fluoride comprising experts from various streams.
13	30th July 2005	Emission caused crop burnt and resident of 11 villages lunched series of protests demanding to stop pollution, Compensation to affected farmers
14	August 2005	Constitution of a High Level Technical Committee by the Govt. of Odisha to find out ways to resolve the problem.
15	2008	Study by Rural Water Supply and Sanitation (RWSS) found that groundwater of 80 villages in the periphery of NALCO has fluoride level above the permissible limit.
16	August 2010	Health check up by the Department of Health and Family welfare, Govt. of India and District Health Department workers found that 35 school children of the Banda Upper Primary School are affected by fluorosis.

Current status of the conflict

Nalco dumps its ash slurry in its two ash ponds spread over 800 acres. On 31st December 2000 the wall of the second ash pond broke creating a flash flood of ash slurry in 23 villages damaging 1450 acres of agricultural land. The water then drained into the Brahmani river. Several such incidents have been reported. Recently, in October 2011, the residents of 32 villages on the periphery of NALCO in Angul district, along with NGO leaders, social activists, leaders of various political parties and leaders of the workers' union, strongly protested against the ash pond collapse and ash slurry contamination which led to property loss for the people and threat to their lives. They demanded immediate cancellation of the order of extension of the term of NALCO Chief Managing Director (CMD)-in-Charge BL Bagra up to December 2011. Pratap Pradhan, District Congress President, strongly condemned the "irresponsible acts" of the NALCO authorities resulting in frequent breaches in the ash pond and ash slurry leak. Ramesh Jena, Indian National Trade Unions Congress (INTUC) leader and president of the Nalco Shramik Union, called upon people to intensify their protests against the ash pollution. Sasmita Behera, president of the State Mahila Morcha, Swapna Sarangi, team leader of the Foundation for Ecological Security and Rabindra Prasad Pattanaik, president of the Citizens' Action Forum and president of the District Bar Association demanded stern action against the NALCO management.

Fig. 5.3
The NALCO ash pond

They pointed out that the State Pollution Control Board had earlier issued warnings regarding possible danger from the fly ash pond of NALCO. However, the company management intentionally disobeyed it, they alleged. The affected people of Baklaramprasad village panicked due to the burst of the ash slurry pipe on 15th October as polluted ash slurry entered into many houses and spread over a vast area. The gushing of ash

water into wells and tanks in the area has caused severe pollution.

The ash slurry from NALCO's captive power plant is presently discharged without any treatment. The fly ash becomes airborne and affects the ambient air quality beyond the prescribed standards.[7]

A similar episode of seepage of ash water reoccurred on 24th October 2011, which triggered protests from the residents of Kukudanga as it threatened to pollute the Nandira river. In the wake of stern opposition and protests, on 25th October 2011, the Orissa State Pollution Control Board (OSPCB) directed NALCO to stop discharging ash slurry into one compartment of its second ash pond at Angul. The Orissa State Pollution Control Board also asked the company to show cause why restrictions on power generation should not be imposed until the ash pond system management and disposal mechanisms are improved.

NALCO's Executive Director, Mr. Chaudhury, however, denied any breach and said that it occurred during the repair of the filter. "The seepage during the repair work was immediately stopped. We are following all the directions of the state pollution control board. There is no need to panic", said Chaudhury. The company has also been directed by OPSCB to stop discharge of ash slurry and initiate urgent measures to strengthen the dykes and prevent any possible breach. The Board found serious failures during an inspection earlier on 19th October. Moreover, seepage collected through garland drains was being released into the Nandira river without any treatment. The overall supervision and maintenance of the ponds were not satisfactory. The existing ash slurry pipelines ruptured at frequent intervals, the inspection report pointed out.

Nalco had made a presentation before the State Pollution Control Board in March last year on measures taken to improve fly-ash management. However, the proposed high concentration slurry disposal (HCSD) system over an area of 46 acres was yet to be constructed and disposal of fly-ash lean slurry in the mine void of Bharatpur would take at least a year. It was to be completed by November 2011.

According to a newspaper report on 26 October 2011, OSPCB had said that there have also been serious complaints from the locals on possibilities of breaches in the dykes which would cause serious damage to their agriculture fields, habitation and main river system and had given NALCO 15 days to reply.[8]

Conflicting parties

All 51 villages in the peripheral areas of the NALCO smelter plant are located within 12-14 km. The residents of the villages are fighting against the pollution through different forums known as NALCO Khayatigrasta Pariparswika Committee, District Action Group (a consortium of NGOs working on environment in the region), Brahmani Surakhya Parisad, Odisha Krushaka Mahasangha, and District Environment Protection Society. Besides NALCO's pollution, there are several other industries which are polluting the region and which makes Talcher town one of the ten most polluted cities of India[9]. People of the area are advocating the establishment of an Environment Court in order to stop pollution and put pressure on the industrial hubs that are polluting the area.

[7] The Pioneer, Sunday, 16th October, 2011 23:44 PNS | Angul

[8] The New Indian Express 26th October, 2011

[9] A recent study jointly conducted by Indian Institute of Technology, Delhi (IIT-D) and Central Pollution Control Board (CPCB) reveals that Angul district is among the top 10 most polluted Indian cities where the pollution level reached a 'very alarming' level.

High point of the conflict

Crop loss and pollution in water bodies due to fluoride emission by NALCO is a frequent phenomenon which seems to be a perennial problem impairing local livelihoods. Since 1994, residents of peripheral villages protested against NALCO in rallies in coordination with the District Action Group. During October 2003, fluoride reportedly released from a smelter plant damaged crops in at least 2,000 hectares of cultivable land in Odisha's Angul district. About 3,000 farmers who lost their crops demonstrated before the district collector's office, demanding compensation for the crop damage. The fluoride was released from the smelter plant of NALCO, and burnt the paddy crops in nearly a dozen villages in the Khalari area. The District Agriculture Officer Khirod Naik who visited the place to oversee the damage said, "I had been to the affected villages and saw the damage. It seems to be the impact of fluoride. I too felt a burning sensation in my eyes, which was due to the impact of the fluoride". Anil Pradhan, a resident of Ankuli village, said, "The crop was just getting ready for harvest. The impact of the fluoride was such that all paddy crops here have been burnt. We will not get any crop this year due to the fluoride."

Hundreds of farmers of about four affected villages took to the streets at Angul and Bhubaneswar, demanding stoppage of toxic gas emission, and suitable compensation to the farmers. The then state government, without establishing the cause of paddy crop damage, asked NALCO to pay compensation, which NALCO agreed to.

Once again, during March 2005, residents of several villages in Angul district have launched a series of protests coordinated by the District Action Group in the area over the hardships that they are facing due to the pollution from the NALCO smelter. Residents of at least five villages adjoining the NALCO factory staged a protest demonstration on the railway tracks against the unabated pollution in the area from the factory. The protesters claimed that fluoride contents from the plant are polluting the environment and contaminating the villagers' only source of drinking water. According to the villagers about 4,500 acres of agricultural land in 23 villages has also been damaged.

Sutar Dehri, a villager, said "We have been living here for the past 25 years and since the time NALCO came up, we have been facing problems. A team of doctors also visited our place. All ponds, lakes and wells have been polluted." Another villager, Purosottam Singh, said "Here we cannot grow vegetables or any crop. The cattle are also suffering due to pollution. Our crops have been affected due to pollution caused by NALCO."

The then district collector Arvind Padhee said, "We are definitely taking stock of the situation. We have also formed a committee to enquire into the matter, and we will advise the NALCO management to take steps to prevent pollution in the adjoining areas. We are also advising them to take care of the affected population." Even though no NALCO official agreed to comment on the issue, Padhi said measures were being taken to prevent further deterioration[10]

In September 2005, NALCO was again accused of releasing toxic gas in its peripheral villages. The agitating villagers of Tulasipal, Languliabeda met the

[10] New Kerala 18th March, 2005

Angul collector and complained against the release of toxic gases by NALCO which damaged the crops and trees in the locality. The villagers have been levelling the same allegations almost every monsoon. Earlier, on 30th July, 2005 the local villagers were up in arms over burning of some teak trees situated near the plant.

A similar incident occurred in 2004 leading to various protests in and outside the district, forcing the state and NALCO authorities to constitute a committee to inquire into the reasons for these damages to plants around the NALCO smelter plant. A couple of committees set up to investigate the issue were silent about the cause of crop or plant damage which fuels panic among the local people who feel that the silent fluoride emission is slowly and steadily affecting the flora and fauna, notwithstanding NALCO's denials. After the matter was raised in the Assembly, the government announced the formation of an expert committee to look into the charges, but no headway has been made in the matter. Meanwhile, NALCO executive director Mr. U. B. Patnaik flatly denied any toxic leakage from the smelter plant that has caused damage to plants on the periphery[11].

The opposing stands

Though it is established from various studies and surveys that the fluoride and fly-ash pollution is due to NALCO, the Public Sector Unit (PSU) is denying its role in the matter. Only on one occasion, it compensated the farmers in the vicinity for the crop burn, not directly but through the Chief Minister's Relief Fund. As for development of villages in the vicinity, NALCO has not done much except the provision of water supply to the 11 worst affected villages in 2005. Due to lack of maintenance and management, the water supply is poor and only some villages located nearby are getting water. Another water supply system by NALCO started in 2001 with a budget of 5.43 cores is still incomplete.

Scope for dialogue

On several occasions, the district administration tried to establish a dialogue between the affected people and NALCO officials, but the indifferent attitude of NALCO obstructed all such efforts. When asked about the fluoride pollution, the officials evade the issue by saying that fluoride was already present in Angul's groundwater. To deal with the problem, all the agencies fighting against the pollution along with Panchayati Raj Institutions (PRIs),, politicians, environmentalists, activists, and affected villagers should have a series of discussions with NALCO officials so that they adopt eco-friendly technology to stop fluorine gas leakage, along with regular health check-up of cattle and humans, supply of drinking water, and plantation of trees. The district administration can play the lead role in coordinating and moderating the process, as it had done earlier.

Key institutions and people

1. Mr. Bibhu Dhendra Pratap Das, former Member of Legislative Assembly

[11] *Statesman News Service 16th September, 2005*

(MLA), President, Brahmani Surakhya Parisad and Odisha Krushak Mahasangh

From the very beginning, he has been working on environmental issues in the area. Through dialogue at various levels as well as campaigns, he highlighted the problems and put pressure on polluters to stop pollution.

2. Mr. Sisir Tripathy, Convenor, District Action Group

As the convener of the District Action Group (a consortium of NGOs and environmentalists), Mr. Tripathy was the first to highlight the issue of fluoride pollution in the region. Through literature, awareness camps and health camps, he tried to bring attention to the issue of fluoride pollution by NALCO.

3. Mr. Girish Barik, At/Po: Turanga, District: Angul

Mr. Barik has worked for District Action Group in its campaign against NALCO's pollution, and now heads it. He is currently working on the fluoride issue and on sanitation issues in the peripheral areas.

4. Mr. Pramod Kumar Singh, President, District Environment Protection Committee, At: Kulada, Dist: Angul, Phone No: 9437291998

Mr. Singh leads the campaign against NALCO regarding fluoride contamination of land and water.

Some of the other parties involved are as follows:

1. RWSS, Govt. of Odisha, Bhubaneswar

Its study in 2008 on groundwater of the area showed that fluoride contamination in 80 villages is more than the permissible limit. Of these, 11 points are in the peripheral villages of NALCO.

2. Dr. S.N. Patro, Odisha Environmental Society, ND-4, VIP Area, IRC Village, Bhubaneswar-751015

Along with OUAT, Dr. S.N. Patro studied the cause and impact of the fluoride emission in the NALCO region during 1993 -1994. His study highlighted the impact of fluoride on human and animal health, and showed that there is excessive fluoride in the animals and in the environment of the region.

3. Animal Disease Research Institute, Phulnakhara, Cuttack, Odisha

The Agency studied the cause and impact of fluoride on the livestock of the peripheral villages, which directly pointed out NALCO's involvement in the process.

4. Department of Medicine, Faculty of Veterinary Science and Animal Husbandry, Odisha University of Agriculture and Technology, Bhubaneswar-751003, Odisha

With help of the Odisha Environment Society, Experts of Department of Medicine, Faculty of Veterinary Science and Animal Husbandry clinically examined the

impact of industrial pollution on livestock in the Angul and Talcher region. They found excessive fluoride in water bodies, fodder and animals.

5. District Health and Family Welfare Department

In August 2010, this agency, in association with the District Health and Family Welfare Department, Angul under the leadership of Dr. A.K. Mishra, Additional Chief Medical Officer, Angul, checked the health of 38 students of the Banda Upper Primary School. They found that out of 38 students, 35 students are suffering from fluorosis symptoms. Now they have taken up health check-up of all the school children in NALCO's peripheral areas.

Earlier initiatives at conflict resolution

In August 2005, the state govt. constituted a high level technical committee of experts from IIT Kharagpur, Chennai and Mumbai and the Indian Productive Council. However, the committee is yet to give its suggestions. In 2005, the then district collector Arvind Padhee also initiated the process of dialogue between the affected people and NALCO, but the initiative failed due to the indifferent attitude of NALCO authorities. The government also constituted the Fluoride Task Force in 2005, consisting of experts from different water and environment departments along with selected persons working on water and sanitation issues in the state. The objective of the task force was to find long term mitigation strategies. However, a lack of interest in this institution obstructed its functioning.

6

Case Study 6

THE TALCHER COAL MINES:
Black diamonds take precedence

Santosh Kumar Mohanty

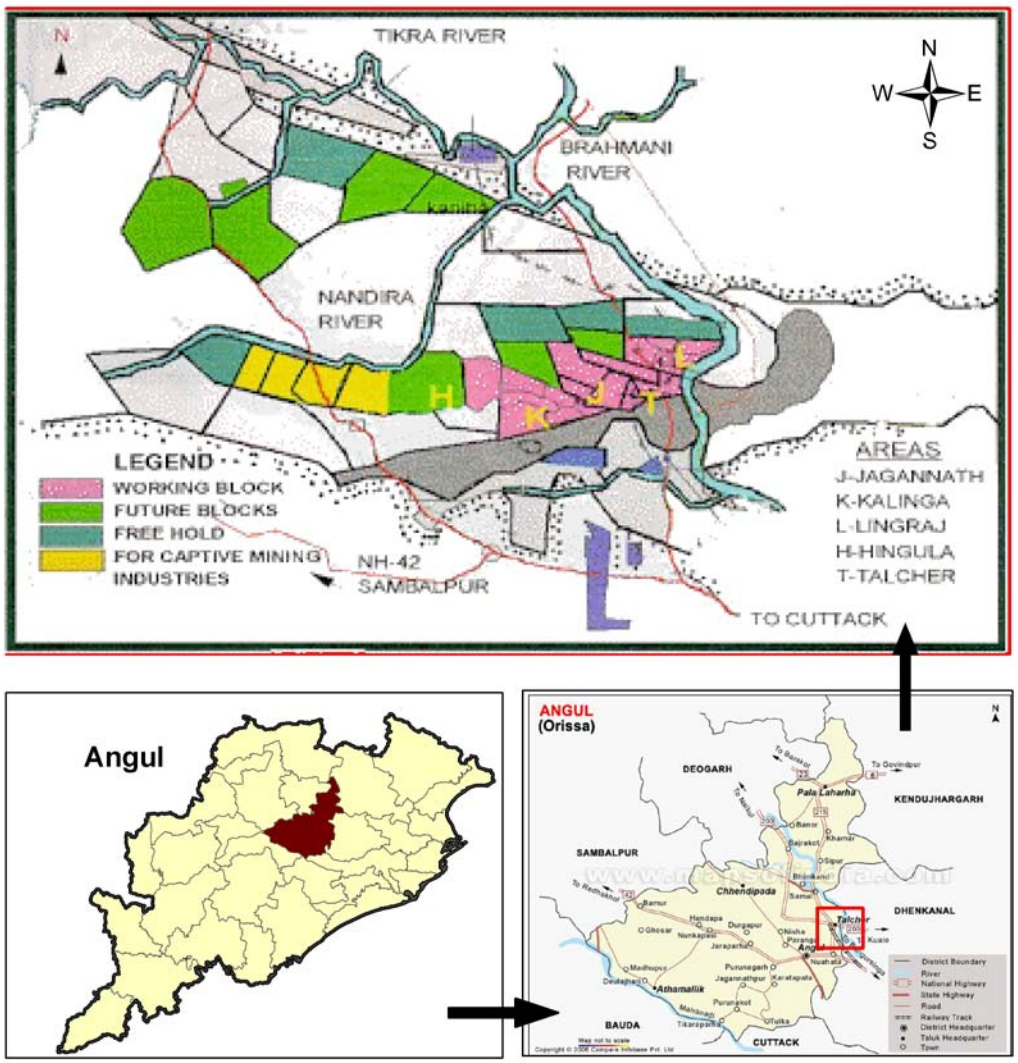


Fig. 6.1
The location of the Talcher coalfields

Talcher is one of the four sub-divisions of Angul district in the state of Odisha. Talcher town is located at 20.95°N 85.22°E, at an average elevation of 78 metres (255 feet) and, according to the 2001 census, it had a population of 34,984. Situated on the west bank of the Brahmani river, this capital of the erstwhile Talcher State is one of the fastest growing industrial and mining complexes of the country. It has Pallahara town to its north which houses the famous Malyagiri herbal mountain, Parjang tehsil of Dhenkanal district to its east, Deogarh district to its north-west and Angul, the district headquarters, to its south.

In 1837, coal was found at Gopalprasad about 37 km west of Talcher, and the area was mapped by the Geographical Survey of India in 1855. Mining operations were carried out extensively in the Talcher coal fields due to growing demand. At present, there are 15 mines of which 10 coal mines, seven open cast and three underground, are in operation. The entire reserve of coal, the black diamond, is spread over a stretch of nearly 120 km. It lies between Talcher town to the east and Rairakhol to the west in Sambalpur district. The coal belt is spread over an area of 1,814 square km. The Dera colliery is the oldest mine in the area. The coalfields are managed by Mahanadi Coalfields Ltd. (MCL), a subsidiary of Coal India Ltd. (CIL). The establishment of the Talcher Thermal Power Station (TTPS), Heavy Water Plant and the MCL Collieries have greatly enhanced the significance of the place.

Lack of potable water

Environmental pollution is rampant in the township, and a majority of people here do not have access to even a few buckets of clean potable water. Only 11 villages have been supplied with drinking water through pipes by National Aluminium Company Limited (NALCO) under its Periphery Development Programme. However, the Brahmani river, the major source for drinking water, is heavily polluted. During the monsoons the run-off from various stockpiles of materials like coal, minerals and solid waste is discharged into the river through its feeder streams: Nandira, Lingra, Kisinda, Banguru, Singda and Deojhar. The groundwater has been contaminated with fluoride in villages around the NALCO smelter.

Fig. 6.2
A dry pond near the mining area

The major component of air pollution in the region is suspended particulate matter (SPM). Sponge iron plants like BRG Iron & Steel and Bhusan Steel Ltd. also contribute to air pollution. Additionally, burning of large quantities of wood and coal for domestic purposes, rampant heavy vehicular traffic to transport coal, and emissions from the mines contribute significantly to air pollution. The area is blanketed by smoke throughout the year.

During summers, the ambient temperature of Talcher climbs to nearly 50°C. Thermal power plants, aluminium smelting units, steel as well as Ferro Alloy plants, and coal yards catching fire add to the summer heat.

Table 6.1 List of mines and industries in Angul district

Sl. No.	Name of the Company	Type of project	Project capacity	Expected investment (in crores)	Details of land (in Acres)			
					Govt.	Forest	Pvt.	Total
1.	Monnet Ispat & Energy Ltd.	Mining	2.2 MT PA	163.13	90.09	--	205.70	295.79
2.	-do-	Power Plant	1005 MW	4107.20	356.97	27.76	467.34	852.07
3.	-do-	Steel Plant	0.25MT PA	281.00	22.68	--	179.79	202.47
4.	Jindal Steel & Power Ltd.	Mining	5.5 MT PA	500.00	149.55	59.92	457.71	667.18
5.	-do-	Power plant & Steel Plant	900 MW & 6 MTPA	13135.00	1137.00	415.70	3727.00	5279.70
6.	-do-	Air Stripe	1900 MTR	--	40.00	--	59.47	99.47
7.	Kaling Coal Mining Ltd	Mining	2 MTPA	196.00	65.82	354.49	323.95	744.26
8.	Utkal Coal Ltd.	Mining	3.5 MTPA	150.00	219.91	408.39	817.90	1446.20
9.	NALCO Ltd.	Mining	2 MTPA	216.00	444.60	501.41	726.18	1672.19
10.	TATA Sponge Iron Ltd.	Mining	3.5 MTPA	1500.00	258.09	474.42	1240.55	1973.06
11.	ESSAR Power Ltd.	Power Plant	1200 MW	4928.00	329.26	--	770.380	1099.64
12.	Mahanadi Aban Power Co. Ltd.	Power Plant	1030 MW	4257.00	57.00	--	978.695	1035.695
13.	Jindal Photo Ltd.	Power Plant	--	--	--	--	826.270	826.270
	Total				**3170.97**	**2242.09**	**10780.935**	**16193.995**

Source: angul.nic.in/industry.htm (Official website of Angul, Government of Odisha)

As mentioned earlier, at present, 7 open cast and 3 underground coal mines are in operation. Coal mining in Talcher dates back to the 1920s when the underground mines were privately operated by BN Railways, MSM Railways, Villiers Ltd. etc. before they were taken over by the National Coal Development Corporation in 1956. The concept of opencast coal mining was introduced in 1961 when the South Balanda project took shape. The Nandira underground mine operations began in 1962, followed by Jagannath open cast projects (OCP) in 1972. Central Coalfields Ltd., a subsidiary of Coal India Ltd. took over control of all coal mines in 1975 as a result of nationalisation. Bharatpur OCP commenced operations in 1985. In 1986, all mines came under the purview of Southeastern Coalfields Ltd. Other opencast projects began operations from 1990 onwards. Mahanadi Coalfields Ltd. was formed in 1992 with jurisdiction over the Talcher and Ib valley coalfields.

The proliferation of mines

Prior to 1956, only 0.4 - 0.5 MT of coal was produced, which has increased to 36.5 MT today. The only fireclay mine located at Telisinga remains inoperative most of the time. The level of production has increased from 15.5 MT to 36.52 MT in the last decade, and the corresponding revenue has increased by a staggering 400 percent. A phenomenal rise in mining and allied activities has created prodigious employment opportunities in the region. Mega coal-based industries like power plants of National Thermal Power Corporation (NTPC) and NALCO have come up, with present operational levels of 1960 MW (mega watt) and 840 MW respectively. The capacity is likely to expand manifold in the years to come. A heavy water plant and a coal washery are also in operation. Prospects are bright for the establishment of a few more mega industries and several ancillary industries in the region.

Fig. 6.3
The Lingaraj coal field in Talcher

A proliferation of mines and industries will necessarily have an impact on the ecology and environment. Several measures are being taken to protect the environment and ensure sustainable development. Nevertheless, the regional environment management plan should be more pragmatic so that the goodwill of the people affected is not lost, and the economy of the state and the nation will flourish in a congenial atmosphere.

The villagers march in protest

Scarcity of groundwater in the Talcher colliery region has become acute since the early 1990s due to extensive mining by the MCL to meet the ever increasing demand for fuel for Captive Power Plants (CPPs), NTPC and thermal power stations. Industries have come up in the region at a much faster rate than in the past; 17 highly polluting industries now operate in the area.

Residents of over 200 villages around these 15 mines are experiencing acute shortage of potable water even in the rainy season. In most areas of Talcher the

water table has gone down to nearly 100 feet. The situation is such that tube wells dug up to 200 feet fail to supply even a few buckets of water. The scenario was quite comfortable before the 1990s because the groundwater level was charged owing to the lush green Sal jungles in the region. People could fetch water from a depth of 30 feet even during the scorching summers.

Table 6.2: Chronology of events

May, 2003	Protest rallies by affected Mallibandha, Danara, Kalamchhuin, Gobara, Solada and Naraharipur villagers.
April, 2005	Economic blockade by Solada villagers.
May, 2006	Talcher Suraksha Parishad headed by the then Member of Legislative Assembly (MLA) Mahesh Sahu spearheaded a general strike.
April, 2007	Kalamchhuin and Danara villagers disrupted work in the mines.
April, 2010	Workers' union of Lingaraj colliery stopped work in the OCP.
June, 2010	Danara villagers resorted to blockade of coal transportation from Hingula and Balaram mines.

Current status of the conflict

Acute water shortage continually afflicts the lives of the villagers. The adjacent villages like Hingula, Anant, Lingaraj, Balaram and Dera have time and again resorted to economic blockades like disruption of coal transportation from the mines, in order to protest against the MCL authorities who do not supply potable water. Protests and movements have become an everyday affair for the villagers. Irate villagers in and around Hingula, Kalinga and other coal mine areas would disrupt transportation of coal for several weeks to protest against the lackadaisical attitude of MCL. The Odisha Coal Mines Labour Federation and workers of the Lingaraj colliery are always trying to exert pressure on the authorities to pay heed to their demand by stopping work in the OCPs.

Conflicting parties

The Mahila Jagaran Manch is spearheading its endeavours to unite women in the coal mine areas to virtually force the MCL authorities to provide sufficient potable water for survival of their families. According to the Manch Secretary, Sabitarani Dhir, "Women in most villages of the collieries trudge miles to fetch a few buckets of water for their families from *nullahs* and rivulets. Our movement will go on till MCL provides sufficient water for our survival". Duryodhan Pradhan and Ranjan Sahu, members of Khyatigrasta Praja Sangha and Gana Suraksha Sangathan in Talcher and Kaniha have said that the industries have no right to deny supply of fresh drinking water. "They have usurped our land, houses and irrigation points for their factories", they assert. "It is their moral responsibility to give us water." According to the Talcher Sub-Collector, clear instructions have been given by him to the top brass of MCL to ensure the supply of potable water to all the affected people.

In 1994, a Norwegian government funded project for pollution control in undivided Dhenkanal district was jointly taken up by a confederation of NGOs. The confederation surveyed 407 villages in the undivided Dhenkanal district to

ascertain the level of fluorine content in the groundwater. The mass movement was followed by a number of rallies, *padayatras*, and road and rail blockades in the coal mines and the periphery of the NALCO plant. From 1995 to 1997, villagers marched in massive rallies to demand safe drinking water. However, villagers around the mining belt were overcome by a feeling of resignation in the years to come. Their agitation for water has brought frustration and fatigue, because the companies and industries make tall promises but fail to honour their word.

The opposing stands

MCL officials are of the view that the mining activities will continue till the coal reserves are fully exploited. They claim that they are trying to ensure that the villagers around the OCPs are not left thirsty. However, some rehabilitation colonies set up by the MCL have defunct pipelines. Of late, the district administration's water and sanitation wing is installing pipelines and erecting overhead tanks in the collieries for providing safe drinking water to the people. This gesture by the administration has been widely appreciated and people feel that the government has stood by them. People in the rehabilitation colonies and other settlements, however, feel that the MCL continues to abrogate its responsibility to supply potable water.

The Talcher Surakhya Manch which gained momentum in recent years, after the surface in the Champapasi area caved in, has also taken up the water issue forcefully. According to the former Talcher MLA Mahesh Sahu, who is in the forefront of the movement, "The High Court had directed the MCL to fill up underground pits following a writ petition two years ago, but the court order has not been honoured. In recent months, some places in Champapasi have caved in. The authorities have not cared to sand fill the mines." Sahu is the only politician in the coal belt who has been demanding the establishment of an 'environment court' in Talcher for resolving cases relating to the environment and ecology.

Scope for dialogue

The MCL has not demonstrated adequate interest towards initiating a dialogue on the issue of water scarcity in the Talcher collieries with citizen committees, women of Panchayati Raj Institutions (PRIs) or civil society organisations.

A permanent solution out of this vexed issue could be reached through the following measures:

1. Watershed management and rain water harvesting systems must be initiated to recharge groundwater. As a part of MCL's Corporate Social Responsibility (CSR), it should take measures to convert the abandoned open cast mines into big dams or lakes to ward off the water crisis. The soil must be flattened to halt erosion.

2. A regulatory authority comprising members from the government and civil society must ensure that tube wells of more than 100 mm diameter are not dug. It must also ensure that tube wells should not be dug beyond the prescribed depth.

3. Women organisations and women PRIs of the collieries and its periphery must be taken into confidence by the MCL authorities and included in the steps that are taken to recharge the groundwater.

Key institutions and people

P K Behera, Honorary secretary, Nature, Environment & Wildlife Society (NEWS), Tamrit Colony, Angul

Smitarani Patnaik, Secretary, Nari Suraksha Samiti (NSS), Gitagram, Angul

Earlier efforts to resolve the conflict

In 1994, the district administration was witness to a massive rally and road blockade by the villagers of Mangalpur which was spearheaded by the erstwhile District Action Group, a conglomeration of voluntary organisations in the undivided Dhenkanal district working for creating awareness on environmental pollution in the Angul-Talcher industrial belt. The women's movement was a grand success and forced the government to install a water supply system in Mangalpur. Another water supply project at Ghantapada panchayat funded by MCL was in operation for some time in 1995, but bureaucratic ineptitude and lethargy brought an end to it.

The press also joins in

Talcher based journalists working in a leading English daily as well as Odia dailies who write on water conflict issues say that the press is a stakeholder in the issue and has a significant role to play. According to the journalists, "The miseries of the affected people must be highlighted in the newspapers in order to exert pressure on the MCL and the government." According to Chaitanya Pradhan, a member of the Odisha Mining Affected Peoples Action Network (OMAPAN), who resides in Langijodi village near the Lingaraj OCP, "The government must allot a 'mining grant', like the kendu leaf grant, to the affected blocks. The MCL and private mine operators must provide funds for such grants."

Mr. P. K. Mohapatra, Assistant Environment Scientist, Regional Pollution Control Board in Angul, said that the MCL authorities have been cautioned by the Board to reduce the amount of dust pollution, preserve groundwater through watershed structures and resort to rain water harvesting, failing which they will be punished. Regular monitoring of the activities of the coal agency relating to the observation of environmental standards is being done by the Board, the scientist added.

According to the Central Groundwater Board report, out of 5723 units in blocks and districts in the country, 839 are over exploited, 550 semi-critical and 226 critical as far as water resources are concerned. It has instructed the industries which are drawing groundwater to undertake artificial recharge measures without resorting to the use of treated water.

Women take the lead

Women in the Talcher region have taken the lead in the movements relating to water. In fact, over the years, women groups of the Talcher industrial belt have become empowered enough to take on the MCL regarding water issues. These distressed women bear the onus of collecting water for their families. It is heartening to note that women from semi-urban and moffusil areas have joined voluntary organisations which spearhead the movement for water and virtually force the MCL authorities to supply potable water through pipes and tankers.

7

Case Study 7

IB RIVER POLLUTION:

Conflict over pollution turns more complex

Bimal Kumar Pandia

Fig. 7.1
The Ib river and the coal mines in Jharsuguda

The Ib river, an important tributary of the Mahanadi, originates in Chhattisgarh and joins the Mahanadi in Odisha. The confluence of the two rivers, located about 20 km downstream of Jharsuguda and 25 km upstream of Sambalpur, now falls within the water spread area of the Hirakud reservoir. The part of the Ib

river's catchment area which lies in Odisha is located in its western Sundargarh and Jharsuguda districts.

The Ib valley coalfield which is part of Ib river basin, falls within the administrative areas of Jharsuguda, Sambalpur and Sundargarh districts of Odisha and some parts of Chhattisgarh and has one of the largest coal deposits in the country. The Ib river basin drains parts of northern Chhattisgarh and Jhasuguda and Sundergarh districts of Odisha. The Ib River meets Hirakud reservoir at the Jharsuguda and Sambalpur border. No part of the catchment of the Ib river lies in Sambalpur district. The coal mine areas known as the Ib valley region extend beyond the Ib river basin. These vast coal deposits and the availability of ample water from a large source such as the Hirakud reservoir have attracted several coal-based and water-intensive industries, which have in turn polluted the Ib river and its tributaries. The pollution affects the lives of the villagers living in the mining heartlands, fishworkers, as well as habitations dependent on the Ib river and its major sub-tributaries like the Lilari Nala for their domestic water needs. While underground and open cast mining has impacted quantitative access to groundwater, pollution has damaged the quality of surface water. The availability of drinking water has reduced considerably, and livestock has dwindled. Overall, pollution of water sources has thrown communities into distress, and undermined their standard of living. Resentment among the local people has led to a series of movements which affect peace in the area.

The first environmental law suit of modern Odisha: The polluter is punished, protect the polluter!

While mining and the accompanying industrial rush has led to a tussle between conflicting interests, ironically enough, the first social movement to fight water pollution was neither related to mining nor related industries. Though mining of coal in the Ib valley began in the 1920s, the scale of operation was not large. A conflict between vested interests emerged for the first time in the 1950s, when Orient Paper Mill - a paper manufacturing industry in Brajarajnagar - began to discharge polluting effluents into the river. The severe downstream impacts on water quality caused resentment among the local population, because of which some politicians took up the matter. Two prominent political leaders, Shraddhakar Supkar and Prasanna Panda filed a suit in the District Civil Court at Sambalpur against the errant paper manufacturing unit.

As the case hearing began, Orient paper mill tried to subvert the truth. It bribed a *'Gauntia'* (a village head) to depose in the Court that the paper mill was not causing any pollution. One of the complainants, Prasanna Panda, threw his shoes at the *Gauntia* while shouting abuses. The judge pronounced Panda guilty of causing disrespect to the court, and stated that he will be punished. Without hesitation, Panda responded that if a fine was levied on him, he would pay twice as much, and still take another shot at the *Gauntia*. The Judge then asked Panda to stand for the remainder of the hearing. This case had a major bearing on the popularity of Prasanna Panda and Shraddhakar Supkar, another complainant, who became successful politicians in the years to come.

This case is also considered the first environmental law suit in Odisha. It was also

the first instance in which the polluter was found guilty. Orient Paper Mill was ordered a penalty of Rs. 100 for each day when it discharged effluents into the river, a significant amount in those days.

Subsequently, Orient Paper Mill approached the High Court and lobbied hard with the Odisha government to change the law to suit the mill's polluting operations. The Odisha government obliged by enacting a new law to the effect that only the state could file environmental cases. This new law became the justification for the High Court's negation of the District Court's judgment, and Orient paper mill was allowed to continue its operations despite its harmful impacts.

Conflicts become more complicated

With the closure of the paper manufacturing unit in 1996, its pollutants stopped flowing into the Ib river. However, problems of pollution increased in their extent and complexity, with coal mining and mineral-based heavy industries penetrating the area. Odisha accounts for 27.6 percent of an estimated 253.3 billion tonnes of India's coal reserves. These reserves are concentrated in two clusters, the Ib valley and Talcher. Of late, coal mining has increased rapidly. The Mahanadi Coalfields Limited (MCL), which operates most mines in Odisha, is in an expansion overdrive. After nationalisation of coalfields in India, 35 projects of MCL have been sanctioned with an ultimate capacity of 103.09 Metric Tonnes per Year (MTY), the highest among all Coal India subsidiaries. Production from MCL coalfields grew by over 88 percent since 2001. Besides MCL, at least 12 other coal blocks have been leased out for captive mining. Until 1990, only two major industries were in operation around the Hirakud reservoir. Now there are 26 large iron, power and aluminium plants in and around the Hirakud reservoir which adjoins the Ib valley.

Pollution became far more severe compared to its impact decades ago. "Pollution of the Ib river was the only problem till about a decade ago, but now, all streams and tributaries are also polluted", says Kumudini Singh, a resident of Darlipali village which is bounded by three big open cast mines: the Lakhanpur Open Cast Mine (LOCM), the Belpahar Open Cast Mine (BOCM) and the Lilari Open Cast Mine (Lilari OCM) of Mahanadi Coalfields Limited (MCL). Effluents from MCL's coal mines, coal washeries, industries, growing urban settlements, and washing of heavy vehicles in the river and streams are causing degradation of water sources to an extent far severe than that in the past. According to a 2008 report of the Pollution Control Board, "There are 10 coal mines that discharge around 33,065 Kilolitres per Day (KLD)of waste water into this river during the monsoons and pose a serious threat due to the presence of heavy metals and compounds of Sulphur."

The local people complain that they have been robbed of their water. The Lilari Nala, once a perennial and important stream passing through the heavily mined area, is gradually dying. "The Lilari Nala was the lifeline for at least 26 villages in our area," remembers Ashok Karali, a resident of Chharla village. "On one hand, the stream has been blocked at many places to facilitate water supply to industries and mining operations. On the other hand, whatever is left of the water has turned black due to pollutants, and is covered by a thick greasy layer."

Water pollution impacts health and living conditions as well. Around 25,300 patients visited the Odisha Power Generation Corporation (OPGC) run hospital last year. Malaria as well as respiratory and skin diseases including scabies, tinea cruris, tinea corporis, tinea versicolor, melasma, impetigo, urticaria, eczema, psoriasis and herpes simplex are rampant.

While surface water has been polluted, groundwater has depleted to inaccessible levels. Wells and tube wells have gone dry. Several ponds and surface water sources have been rendered useless or gobbled up by the mines. Many villages like Aamdarah, Junanimunda, Darlipali and Chharla are now at the mercy of the MCL to obtain a few pitchers of water.

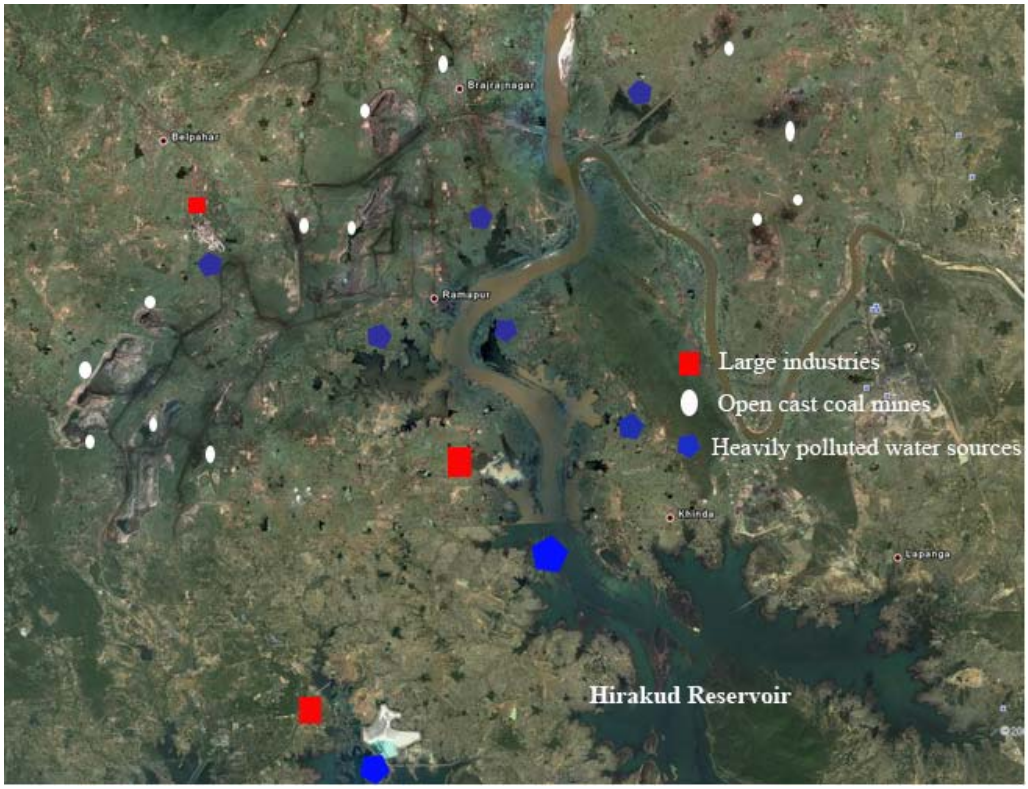
Fig. 7.2
The dry and polluted Lilari Nallah

Conflicting parties

Conflicts have arisen because opposing stakeholders have different views on water pollution, and the government is being perceived as an abettor to the polluters. “The government itself has a share in the Ib thermal power plant as MCL is a Government of India undertaking. Both are violating our right to water,” says Mandoi Munda, an illiterate woman from Darlipali village of Lakhanpur Block in Jharsuguda district.

The MCL authorities however have a different view. “Coal mines do not pollute rivers,” says A. K. Murthy, Area Environment Officer, MCL. “River water gets polluted by non-core activities. Thousands of trucks and heavy vehicles are washed in it. They cause pollution.” People are angered by such views. The MCL is a Navratna company which claims to have one of the best people-friendly and environment-friendly policies. Yet, complaints against it are accruing thick and fast. “Our water sources have become dry, dead and useless. Some tube wells that still work - as in Ramdera, Sanjob, Chuwaliberna and Madhubannagar villages - yield only deep black coloured and foul-smelling water,” informs Ashok Singh, a leader organising the affected people. “We have been forced to fight for our basic needs to stay alive.” There is a clear divide between the MCL and other industries with their core and allied activities on one side, and the local people on the other. People often resort to strikes which are on the rise. In 2010, three major coal mines - Lilari Open Cast, Lakhanpur Open Cast and Belpahar Open Cast - had to stall all operations for twelve, six and nine days respectively, causing losses of hundreds of millions to MCL. “Only a day of closure of a mine causes the company 1.5 to 4 crores rupees loss”, informs Mr. Murthy. The Ib thermal power station was *gheraoed* at least on seven occasions by local people demanding water. Industries complain of such frequent strikes. “People are making it a habit to stall our works. We are trying our best to address the problems but they always want more,” complains Mr. Murthy. Local residents are in no mood to agree. “Can a stop gap arrangement to supply water through tankers be an alternative to losing our own trusted sources?” questions Mr Singh.

Fig. 7.3
The location of major industries, open cast mining and polluted water sources



As the mining and industrial operations expand, the conflict zone too has spread. It now encompasses an area of about 90 square km. Some people are impacted by pollution due to mining; some are at the mercy of effluents from industries, while others have acute water problems.

Lack of leadership

Though the local people have tried to fight under the unified banner 'Ib Nadi Banchao Samiti' (Save Ib River Committee), the villages are for the most part waging their agitations independently through mine strikes, road blockades, locking offices, and demonstrations at the District Magistrate's office. Political leaders have intervened sporadically, often to remedy immediate water distress. They have not shown much interest in finding a permanent solution to water pollution. However, no political leader has conceded this fact. "We are with the people", said Anup Sai, local opposition member of Legislative Assembly (MLA). "Water pollution is a big problem and we are suffering. I have raised water problems many times in the Assembly, but the government is not responding." Because the movements are launched at the village level, they are at times becoming more violent but less effective. A concrete, cohesive and sustained movement to address the issue of water pollution is needed.

Conflict widening but slowing down

The conflict zone has further widened due to the pollution of the Hirakud reservoir. As a result, other groups including the Krushak Suraksha Sangathans, Fishermen

Federation, Hirakhand Nagarik Samaj, Odisha Sanskrutik Samaj as well as many individuals are taking up issues regarding pollution on various platforms. Also, MCL or Ib thermal power plant is not the only polluter as hordes of other industries and captive mines have come up.

Though the problems continue to become more serious, the movement lacks the kind of political patronage it received in the 1950s. People too have been withdrawing from it and resorting to extreme actions when pushed hard. In the absence of political patronage, the movement lacks sustained momentum. However, the scene may soon change, and the issue may become a mainstream political issue.

8

Case Study 8

BHEDEN:

Rapid industrialisation and a dying river

Mehboob Mehtab

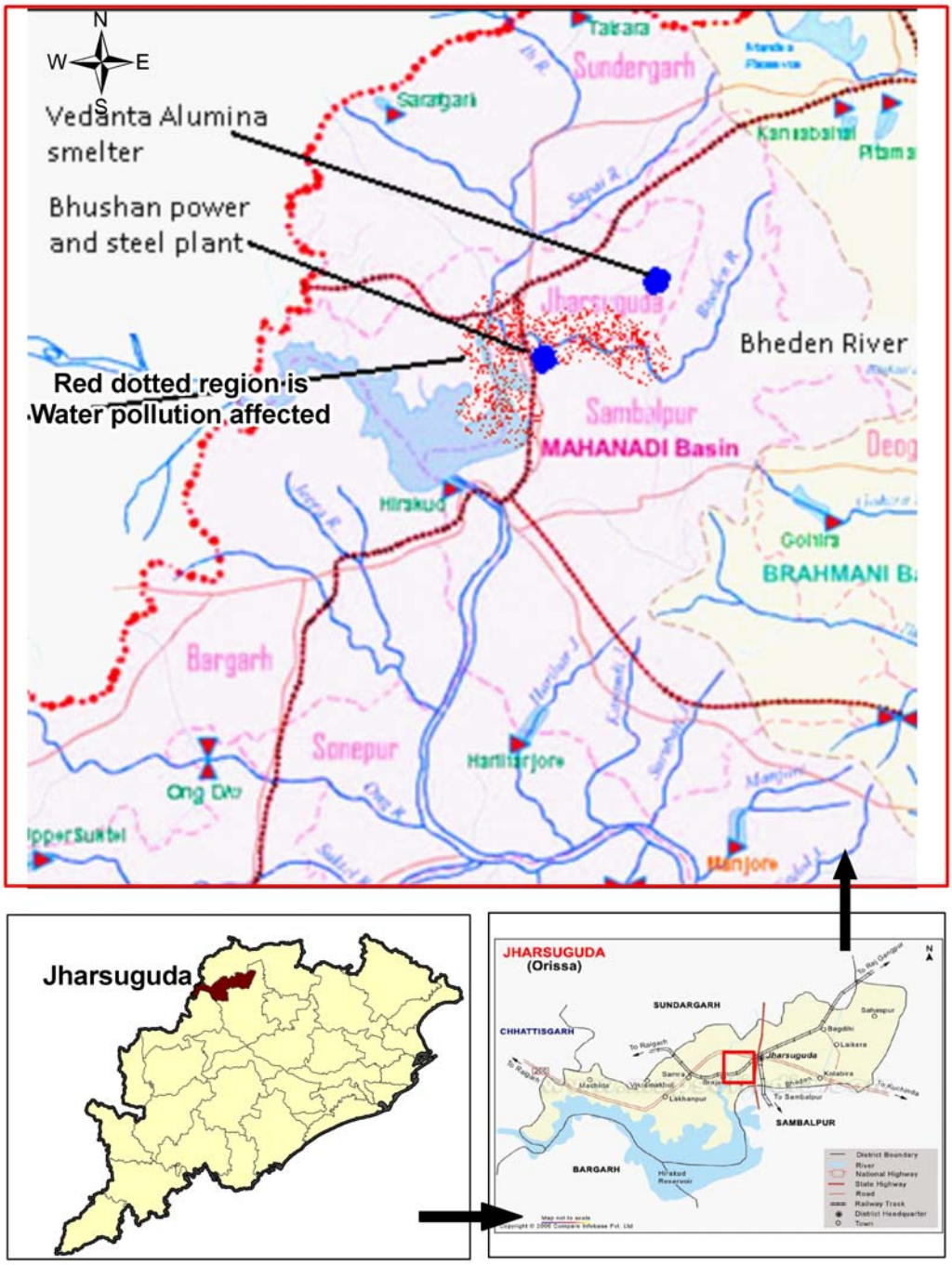


Fig. 8.1
The Bheden river and the conflict region

The Jharsuguda district (once a part of undivided Sambalpur) is situated in the western part of Odisha, surrounded by the neighbouring state of Chhattisgarh in the west, Sambalpur district in the east and south, and Sundergarh district in the north. A large area of the undivided Sambalpur district was submerged due to the Hirakud Dam Project on the Mahanadi. Most of the area submerged due to the Hirakud Dam Project falls under the Jharsuguda district. The area covered by water is now part of the Hirakud reservoir water spread area. The main rivers flowing into the Hirakud reservoir are the Ib, Bheden, Lilari, Kelo, and Telen. The perennial source of water for a large part of the district is the river Bheden which has been severely polluted due to rapid industrialisation from 2000 onwards.

The river Bheden (or Bonam), considered a principal tributary of the Mahanadi, flows from the Kuchinda sub-division of Sambalpur district and joins the Ib river near Rampur. The Bheden originates in the Bonai sub-division of Sundergarh district and joins the Ib river after flowing for about 129 km. Its total length in this sub-division is 64 km. The Kharla, one of its main tributaries originates within the Bonai sub-division and flows for 56 km of its length within the subdivision before it meets the Bheden near Kuchinda after travelling for another 9 km. The other tributaries and small nallahs of the Bheden river are the Telen river which meets the Bheden near Kolabira in Jharsuguda District, the Kharkhari, the Safei nallah, and the Kumudhapali nallah, which flow within Jharsuguda district and join the Hirakud reservoir through the Bheden river.

Bheden - once the lifeline of undivided Sambalpur, now drying up

Fig. 8.2
The drying Bheden

The Bheden river was considered a lifeline by the people of undivided Sambalpur district. The river supports agriculture in the region. On its banks, there are several lift irrigation systems which provide water and irrigation facilities for agricultural land. Drinking water as well as other requirements are also served. However, after the year 2000, rapid industrialisation has changed the entire scenario. Most industries like Vedanta Aluminium Ltd, LN Metallics, and SMC Power Generation Corporation directly depend on the river for their water requirements. River water is lifted through pumps by these industries. According to government reports, Vedanta Aluminium Ltd lifts 54.9 cusec of water per day from the Bheden river. SMC Power Generation Corporation's project at Hirma is drawing 2.45 cusec of water per day, while LN Metallics at Sripura is drawing 2 cusec per day.

The dependence of industries on the Bheden river is increasing, which has adverse impacts on agriculture, irrigation, groundwater as well as the water level of the Hirakud reservoir. As the dependence of the industry on the river increases, the water scarcity in the Jharsuguda and Kolabira blocks as well as the Jharsuguda municipality becomes acute during the summer season. Domestic animals are also severely affected due to the drying up of the river during summers.

The gram panchayats affected the most are Katikela, Dalki, Badmal, Sripura, Hirma, Rampur Patrapali, Malda of Jharsuguda block and Kulihamal, Sodamal, Samasingha, Kolabira, Pokhrasale, Parmanpur, Keldamal of Kolabira block as well as some part of the Jharsuguda municipality and neighbouring parts like Khinda and Thelkoloi of Sambalpur district. A large number of fishermen also depend directly on the Hirakud reservoir for their livelihood. Due to the decreasing water storage capacity of the Hirakud reservoir and water pollution which affects the fish population, fishermen are badly affected by the process of industrialisation.

Intake points for industrial consumption are mostly in the upstream region of the river, while effluents are discharged in the river, usually at about 2-3 km downstream of the intake point. During lean periods, the industries withdraw water from the Hirakud reservoir through intake wells and long pipelines. The effluents discharged by industries into the Bheden river directly flow into the Hirakud reservoir.

Fig. 8.3
Industrial effluents released into the Bheden

The pollution of Bheden

The effluents from industries discharged directly into the river, as well as the increasing population and urbanisation, has polluted the river water. Effluents from

Vedanta Aluminium Smelter and Captive Power Plant at Bhurkamunda have had a wide range of impacts on river water. The untreated water with petroleum wastes are directly discharged into the river through the Kharkhari *nallah*, and water containing ash released through an ash pond is polluting the river water heavily. Fluoride pollution has also been visible in this region. Vedanta as well as other industries including the Bhusan Steel Plant at Thelkoloi of Sambalpur district, the SMC Plant at Hirma, LN Metallics at Sripura, SPS at Badmal, and Singhal Enterprises at Hirma draw groundwater by digging deep bore wells, often in violation of stipulated procedures. Sponge iron industries cause heavy water, air and soil pollution. Coal dust, ash, and fluoride pollution seriously impacts agriculture. Due to soil degradation, the fertility of the land has decreased, and the agricultural production has been hampered. Bhusan Steel Plant is dumping soil mixed with ash and coal as well as other solid effluents discharged from the plant units into the riverbed, and both sides of the Bheden river have shrunk significantly. Finally, siltation due to such practices by the industries poses a serious threat to the Hirakud reservoir. The water storage capacity of the Hirakud reservoir is being reduced.

According to the table study undertaken by the State Pollution Control Board in 2010 on the Sambalpur Jharsuguda region, if industrial capacity increases as planned, aluminium production would increase to nine times the present capacity, and considering 1 percent spillage and related loss, about 800 tonnes of fluoride bearing materials may be washed into the reservoir. Besides, 3160 tonnes of fluoride will be emitted through stack room and pot room emissions, and 1,26,000 tonnes of fluoride bearing hazardous waste would be generated in this region annually, placing the reservoir under a significant risk of fluoride contamination. A fluoride level of more than 1.5 mg/litre in water is known to cause fluorosis, a deadly disease for which there is no cure, if contaminated water is consumed for a prolonged period. In areas around National Aluminium Company Limited (NALCO) (whose present capacity is 10 percent of what is proposed in Jharsuguda), signs of dental fluorosis in the bovine population have already been documented.

The conflict with industry

The conflict is created mainly due to water drawn from the river and hazards of pollution by industries. Before the summer season, the Bheden river dries up. The people who are directly or indirectly dependent upon the river are affected due to water scarcity. Most of the land on the riverbank irrigated by lift irrigation is impacted due to the shortage of water. Rabi crop and crop in the summer season (*Kharatia Chasha*) are also being damaged for the last 3 to 4 years. People find it very difficult to bathe in the river due to pollution. The dumping of ash, soil and solid waste by the industries on the banks of the Bheden has also had serious impacts on agricultural land. Most agricultural land has become barren in Kherval, Sripura area. The top soil has been polluted severely resulting in low level yield. This affects the financial condition of poor farmers, which is another reason for the conflict between farmers and industries.

Health hazards due to industrial pollution have also become a serious threat to the local population. People are opposing industries for their colonial attitude towards pollution. For their own benefit, they are avoiding the adoption of pollution control

measures. With the passage of time, the acute shortage of water is creating an alarming situation for the entire region, which is the basic reason for the conflict. The rapid loss of grazing fields for domestic animals and the green belt has also made people antagonistic to industrialisation. Another important aspect of the conflict is the loss of agricultural production and productivity, the diversion of water to industries instead of agriculture, and the loss of flora and fauna. The pollution of river water and other water sources is increasing rapidly. The government or the industrial houses have no alternative plans to compensate the affected people. It is important to mention here that due to land acquisition by Vedanta in the Jharsuguda area, two irrigation projects were forced to stop. One of them was Banjari Minor Irrigation Project (MIP), and the other was Debadihi MIP. The farmers are dissatisfied with the government which is trying to appease the industries.

Current status of the conflict

People have set their minds on opposing industries to save the river, agricultural fields, forests and the overall environment. Though there is no political support to the protest against environmental degradation, the people are forming groups and staging dharnas and rallies, organising meetings, submitting a memorandum, etc., in short intervals. Various non-government institutions and environmentalists are leading the affected population. People are not united under a single umbrella, but the process of unity is in progress. There are symptoms of violent rebellion in the future.

Fig. 8.4
A protest against the release of effluents into the Bheden

Conflicting parties

The local residents of both Jharsuguda and Kolabira block of Jharsuguda district

and adjoining areas of Sambalpur district as well as some part of Jharsuguda municipality are directly involved in this conflict. The other organisations who are fighting for people's rights are Water Initiative of Odisha, Anchalik Paribesh Surakshya Samiti, Chetanashila Nagrik Mancha, Lok Mukti Sangathan, and Ib Paribesh, Milita Kriyanusthan Committee. These organisations are leading the people separately. To safeguard the interest of industries, the government, the administration, political leaders and parties are involved implicitly. People are in a belligerent mood, staging dharnas before the administration and industrial houses. People are opposing the monopoly and carelessness of the industries towards the management of the environment and pollution control measures.

People are directly opposing the pollution caused by the industries and lifting of water from the river for industrial use. The impact of the opposing stands is influencing the people who are united and strengthening their capacities.

Key institution and people

Ananta Panda - Lok Mukti Sangathan, Jharsuguda

Upendra Jena - Ib Paribesh, Brajrajnagar

Ranjan Panda -Water Initiative of Odisha, Sambalpur

Scope for dialogue

The issues relating to the pollution of river water, the scarcity of water and other problems can be resolved through dialogue. First of all, the government and industrial houses should restrain themselves from acts which harm people. Industries should make their own arrangements for fulfilling their water needs by constructing water storage ponds and 100 percent waste water recycling plants, and minimising pollution by adopting pollution control measures and an eco-friendly attitude. The government and the administration should also take proper action as deemed fit against the industries in case of violation of environmental laws, pollution control measures, forest conservation, etc. The government should respect the people and their genuine demand, and come forward for dialogue as and when required.

9

Case Study 9

KOLAB POLLUTION:

Community and industry in conflict over the reservoir

K. Sudhakar Patnaik

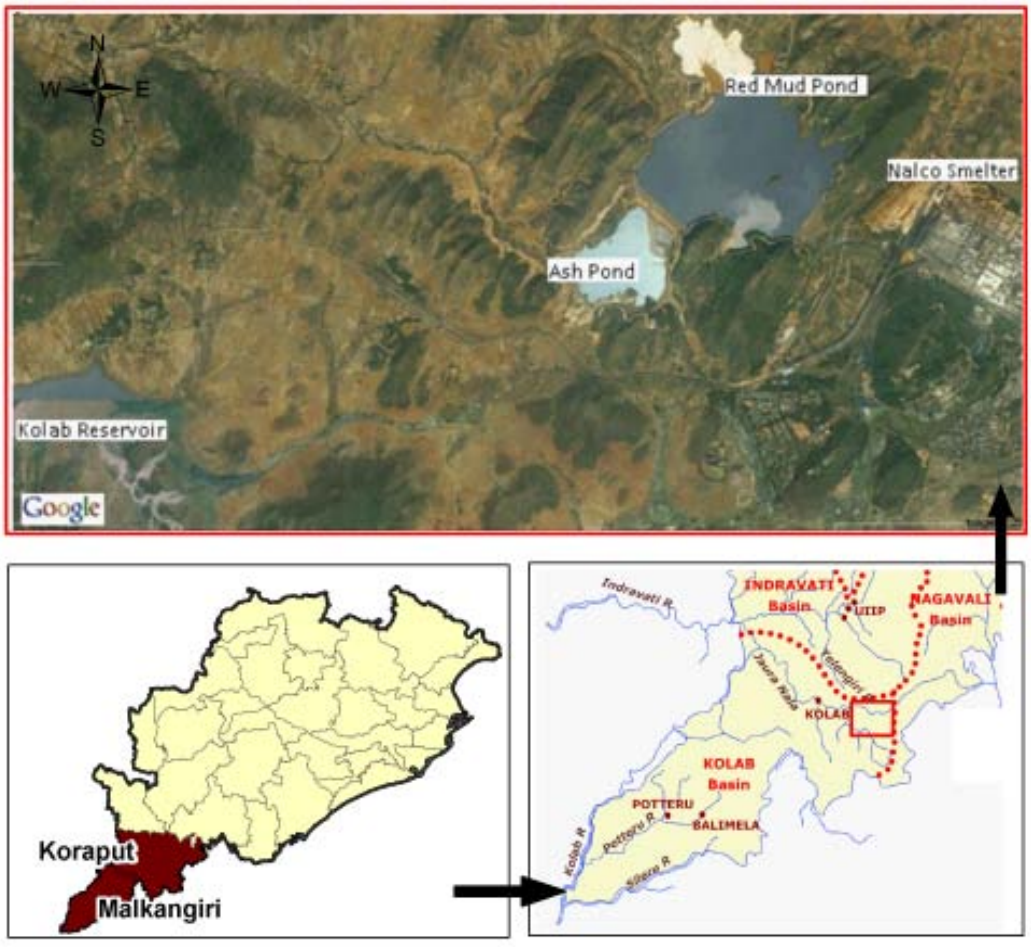


Fig. 9.1
Location of the NALCO smelter, ash pond and red mud pond and the Kolab reservoir

The dam on the Kolab and its catchment in which one of the most important aluminium plants is located lies in the southern belt of Odisha. This southern belt of Odisha comprising Koraput - Bolangir - Kalahandi (K-B-K) and Rayagada districts, once called the breadbasket of the region is now considered as one of the poorest regions in India. However, it has high bauxite reserves. Bauxite is the raw material for aluminium production. The region has attracted investments from some of the biggest aluminium corporations in India and abroad.

Mining of bauxite is mostly done by strip mining (opencast mining) from the top of hills. The adverse impacts of opencast mining threaten local lives and livelihoods. Mining uproots people from their settlements, causes health hazards; degrades air quality, water quality, ecology and biodiversity. The most visible impact of mining

and processing of alumina on the environment is pollution by red mud. Red mud is a waste product that contains a high amount of residue of sodium hydroxide which is used to dissolve bauxite from the ore. Sodium hydroxide is a highly toxic chemical. Experiences from other bauxite mining and processing units show that proper disposal of toxic waste is complicated and the pollution of river water by effluents is common.

The National Aluminium Company Ltd. (NALCO) is an integrated multi-locational aluminium complex that was incorporated in 1981 as a public company to exploit large deposits of bauxite discovered in the Eastern Ghats in the tribal areas (Koraput) of Odisha, which have 310 million tonnes of bauxite ore. The Mines and Refinery Complex of NALCO at Damonjodi is situated in the Semiliguda block which falls under Potangi Tehsil of Koraput District, Odisha. NALCO was set up in 1981 as a public sector enterprise, following a major investment decision by the Indian government to exploit parts of large deposits of bauxite discovered on the east coast in 1975.

Fig. 9.2
The NALCO plant at Damanjodi near the Kolab reservoir

The project was planned expeditiously, and different segments of NALCO went into production in a phased manner from November 1985. Sale of aluminium started from May 1987. NALCO produces calcined alumina at its refinery complex at Damanjodi which is in the catchment area of the Kolab river and reservoir. Alumina is extracted in two main stages, mining operation and ore refinery. Due to extensive mining and industrial operations, the region has been polluted. The red mud pond, ash pond, conveyer belt and smelter effluents are the major sources of pollution. Due to NALCO's industrial activities in the catchment area of the Kolab, the reservoir has been polluted by industrial effluents flowing into it directly or indirectly through various natural streams.

Geographical locations

Bauxite mines: On Panchpatmali Hills in the Koraput district of Odisha, a fully mechanised opencast mine of 2.4 Metric Tonnes per Year (MTPY) capacity is under operation since 1985, serving feedstock to the alumina refinery located at the foothills. The capacity has already been expanded to 4.8 MTPY. Now, the capacity is being expanded to 6.3 MTPY. Panchpatmali bauxite ore comes to Damanjodi by a 'flight cable belt conveyor' spanning 14.6 km over the hills and valleys.

Alumina refinery: It is located in the picturesque valley of Damanjodi, operating since 1986 with a capacity of 0.8 MTPY. The capacity has now been increased to 1.575 MTPY. Three production streams each of 0.525 MTPY based on Bayer's process with atmospheric digestion and 3 x 18.5 MW (mega watt) co-generation of power from the process steam are the main systems of this large refinery.

Kolab reservoir: The Kolab reservoir is situated across the Kolab river (tributary of the Godavari) in Koraput district of Odisha. The construction of this dam began in 1976-77 and was completed in 1984-85. This dam is 54.5 metres in height and 630.5 metres in length. It is a masonry gravity type of dam. The total catchment of the reservoir is 1,630 square km. According to a project report, the irrigation area in Malkangiri and Koraput district is 47,985 hectares of which 22,267 hectares land can be benefited by lift irrigation. At present, hydropower generation capacity of the reservoir is 320 MW.

The important processes

(1) Mining: The aluminium ore i.e. bauxite mine is situated at Panchapatmali in the district of Koraput, Odisha. NALCO has marked a 17 square km area for bauxite deposits of 370 Metric Tonnes (MT). The method used to mine bauxite includes mine planning, removal of top soil and over burden and excavation by blasting operations. The hard cap rocks at the surface are blasted to allow it to be mined together with the ore beneath.

The entire distance from the mining site to the refinery complex is laden with dust. Dust clouds the environment due to heavy dust loading from mining and open transportation by conveyer belt. This dust also pollutes the water bodies in the locality.

(2) Ore refining: The ore refining is done by a classical process called Bayer's Process in which the aluminium in the bauxite is digested in caustic soda at 105^0C and recovered by precipitation with the removal of impurities. After successive operation of digestion, desilication, setting and washing, the precipitated hydrate i.e. NaAl (OH_4) is filtered and calcined at $1,000^0$C. There are two production streams of 0.4 MTPY capacity each; atmospheric pressure digestion process is carried at 107^0C with energy efficient fluidised bed calciners of 1400 Tonnes per hour. 55.5 MW (3 x 18.5 MW) power is co-generated by using a back pressure turbine in a steam generation plant. The residual mud is separated and pumped to the red mud pond.

(3) Red mud pond / Ash pond: In the process of bauxite refining, the red mud, which is generated after digestion, is the major waste product. For 0.8 MT alumina

production, 1 MT of red mud is generated, and discharged into the red mud pond. To store such a huge quantity of red mud slurry, the Red Mud Ponds (RMPs) have been constructed towards the west of the refinery complex.

Conflict over waste disposal

The Red mud ponds are flanked by five earthen dams numbered 1, 2, 3, 8 and 9. Whether fortunate or unfortunate, the red mud ponds are surrounded by natural hill ridges with high elevation. The natural ridges are connected by these five earthen dams. Dam-1 is towards the east of the refinery, Dam-2 towards the north, and Dam-3 towards the west opposite Dam-1. Dam-1 separates the RMP from the ash pond area. High hill ridges cover the area to the south of the pond. Dam-2 has a natural hill ridge. Dams 8 and 9 are also developed beside Dam 2. The vast area measuring around 10,058 acres of land is acquired for the purpose of Red Mud Ponds and Ash Ponds. The authorities appear to have taken no steps to prevent or check spillage and leakage. All five Red Ponds are not constructed as per specifications, thus polluting the underground water.

Fig. 9.3
The NALCO red mud pond

Villagers have complained that whenever it rains both ponds overflow and their toxic material spills into their streams and rivers. Indeed, on 31 December 2000, a breach in the ash pond occurred. This is in sharp contrast to statements of the State Pollution Control Board that heavy monsoons will not lead to an overflow of the ponds.

NALCO's bauxite refinery releases waste water into the Kolab river by a drain passing through nine villages. On 31st December 2000, a breakdown of NALCO's 800 acre ash pond in Damanjodi created an "ash flood" (equivalent to a flow of 5,000 metric tonnes of ash).

Table 9.1: Affected villages near the refinery and their specific environmental problems

Sl.No.	G.P (Location with respect to Refinery)	Block	Villages	Problems
1	Litiguda	Koraput	1 Karadiguda 2 Bhejaput 3 Bhaluguda	1 Noise pollution due to conveyer belt. 2 Rapid soil erosion due to blasting
2	Bhitarguda	Laxmipur	1 Bhitarguda 2 Marichamati 3 Kasput 4 Badgoti	1 air pollution 2 water pollution
3	Tentulipada	Narayana patna	1 Metang 2 Taliamba 3 Sanogodti 4 Badgoti	1 air pollution 2 water pollution
4	Bijakati	Narayana patna	1 Kuttudi 2 Jaliamba	1 water pollution 2 soil erosion. 3 blasting rocks are being felled

Source: Vasundhara, Bhubaneswar, Odisha

Water Pollution

The villages located downstream of the refinery plant have been severely affected due to the pollution of their water bodies and streams by the effluents from the plant. Even though the NALCO factory has an ash pond and red-mud ponds, effluents are being discharged into the river regularly, causing cattle deaths and crop loss. The provision of a parapet wall division to check the spillage and leakage is found to be inadequate, thus leading to leakage and overflow of slurry from the precipitation chamber of alumina hydrate. The leakage from the effluent treatment plant passes through the Sabari lake and mixes with the natural *nallah* downstream, which feds the Rajamunda river. This has also been mentioned in

Fig. 9.4
Red coloured water being released from the Kolab reservoir

the compliance report dated 5 August 2005 of the Regional Environmental Pollution Control Board, Rayagada. It is found that a moderate quantity of liquor along with the hydrate comes out through the storm drain and spreads over the adjacent land and enters into the local stream. This has diverse impacts on the chemical composition of stream water in downstream villages like Mathapur, Vejaput, Gumalguda and Goudaguda. The sewage water generated from the NALCO colony is also discharged through the Rajamunda river. Villagers from Goudaguda are affected the most due to the discharge of effluents from the effluent treatment plant (ETP). Domestic animals as well as human beings exposed to such polluted water are severely affected with various types of skin diseases due to high pH of the water.

Groundwater pollution

During a visit to the NALCO ash pond and red mud disposal site (GPS location 18^0 46' 26" N 82^0 53' 37" E) it was found that the mandatory impervious polythene lining preventing the toxic red mud from leaking into the groundwater was absent. Earlier, the NALCO officials had assured that such a lining had been put in place. Absence of proper lining means that contamination of groundwater is unavoidable. This indicates that the company pays little attention towards the protection of groundwater.

Water scarcity

Due to rampant mining, blasting and other related activities, a number of natural streams originating from the rich Panchpatmali hills have gone dry. In villages like Kutudi and Kaspiput, a number of perennial streams have completely dried up. Streams like Paruajala, Bagmanijala and Popjala which used to flow from these mountains through the villages have completely dried up. The villages located on the slopes were the major beneficiaries as they used the water from these streams for cultivation purposes. The water level of wells was normal before mining. However, at present, drying up of these streams has led to reduction in the water level of wells and ponds in these villages and created severe water scarcity problems. During interaction with the villagers, it was found that due to drying of the wells and ponds, the cattle sometimes even drink the red water coming from the mines, which has serious impacts and has led to the death of cattle.

Water pollution due to mining activities in Panchpatmali

The waste water generated from the workshop and garage which contains a high percentage of oil and grease is being discharged at the adjacent hill slope without proper treatment. The oil and grease trap and other units are not found to be working properly due to siltation. The waste water finds its way to the hill slope and ultimately flows into the stream near Jholaguda.

The waste water from the canteen and other establishments situated in the mines is discharged into the stream near Jholaguda.

According to Sri Damodar Jani, Sarpanch of Litiguda gram panchayat, due to

mining activity in the Panchpatmali mines, the villages located on the slope like Kutudi, Jaliamba and Gadati face acute water pollution. He complained that during the rainy season, the well water becomes red due to seepage of red mine water into the groundwater. Similarly, the suspended particulate matter content of the well and tube well water is found to be quite high.

The discharge of mine water on the hill slopes especially during the monsoon leads to the contamination of surrounding streams.

Present status of conflict

The Kolab reservoir water pollution due to industrial activities continues. Affected villages and the fishermen community have no relief. The community in the vicinity is not aware and thus does not protest against the mining activities. There is an absence of any action by the Odisha state government about this issue.

Opposing stands

Claims by NALCO

The Nalco authorities claim that the following infrastructure has been put in place:

A periphery barrier around the mines of 15 m width with green cover

Garland drains and drainage control within the mines

The Company received the Indira Priyadarshini Vrikshamitra Award from the Government of India for its contribution in the field of afforestation and wasteland development

Multistage washing of red mud and its storage in a specially designed pond

Highly efficient Electrostatic Precipitators (*ESP*) at the calciners and steam generation plant

Ash pond with zero discharge and recycling of waste water

The status as studied by other organisations

Observations by the organisation Vasundhara provide a different picture of the claims made by NALCO:

There is no periphery barrier of 15 m width existing in the area.

Neither garland drains nor a drainage system exist in the mines area to check soil erosion.

Plantation has been undertaken only in and around the NALCO colony. No plantations are visible in the mining area.

The Electrostatic Precipitator (ESP) is found to be closed during night time and during the rainy season.

Ash pond with zero discharge and recycling of waste water are highly doubtful claims.

Another study undertaken by Mr. Santosh Kumar Sahoo, M. Phil (Environmental Science), shows that the leachates at the initial point are highly alkaline in nature with large amounts of ions of Iron, Aluminium, Titanium and Sodium.The pH ranges from 9 to 10 or even more. The run-off leachates of red mud stacked near the RMP are entering into the ponds with rain water. This also adds to the alkali strength of the RMP water instead of diluting it. Mr. Sahoo explained that rice plants do not grow well due to the toxic chemicals. It is found that the soil colour of the crop field has changed to violet red with high caustic smell. Mr. Sahoo confirmed the leaching of chemicals from the red mud pond of NALCO at Damanajodi, the entry of these chemicals into paddy fields of the locality and the runoff water of the dumps during the rainy season, and their possible effect on the blue-green-algae (Cyanbacterium) in the crop fields which act as a bio-fertiliser.

Some indigenous fish of the river are mahaseer, leaches, catfish, magura, singhi, chital, and lata. Experts are of the opinion that the fish growth reduced in the locality of the reservoir due to contaminated water from NALCO.

Scope for Dialogue

This issue can be resolved through dialogue between the Pollution Control Board, affected villagers, dam authorities and NALCO. However, there is a lack of dialogue between these actors. Affected villagers are complaining about these issues to the state government and NALCO authorities, but there is lack of any action from both sides.

Key institutions / persons involved

1 - FIAN International, Germany: This organisation is investigating alleged violations of the Human Right to Water in India.

2 - Vasundhara, 15, Sahid Nagar, Bhubaneswar: Its conservation and livelihood team has undertaken a fact finding study on NALCO and its impact on the peripheral ecosystem.

10

Case Study 10

THE BRAHMANI:
A polluted river, fishermen in crisis

Sisir Tripathy

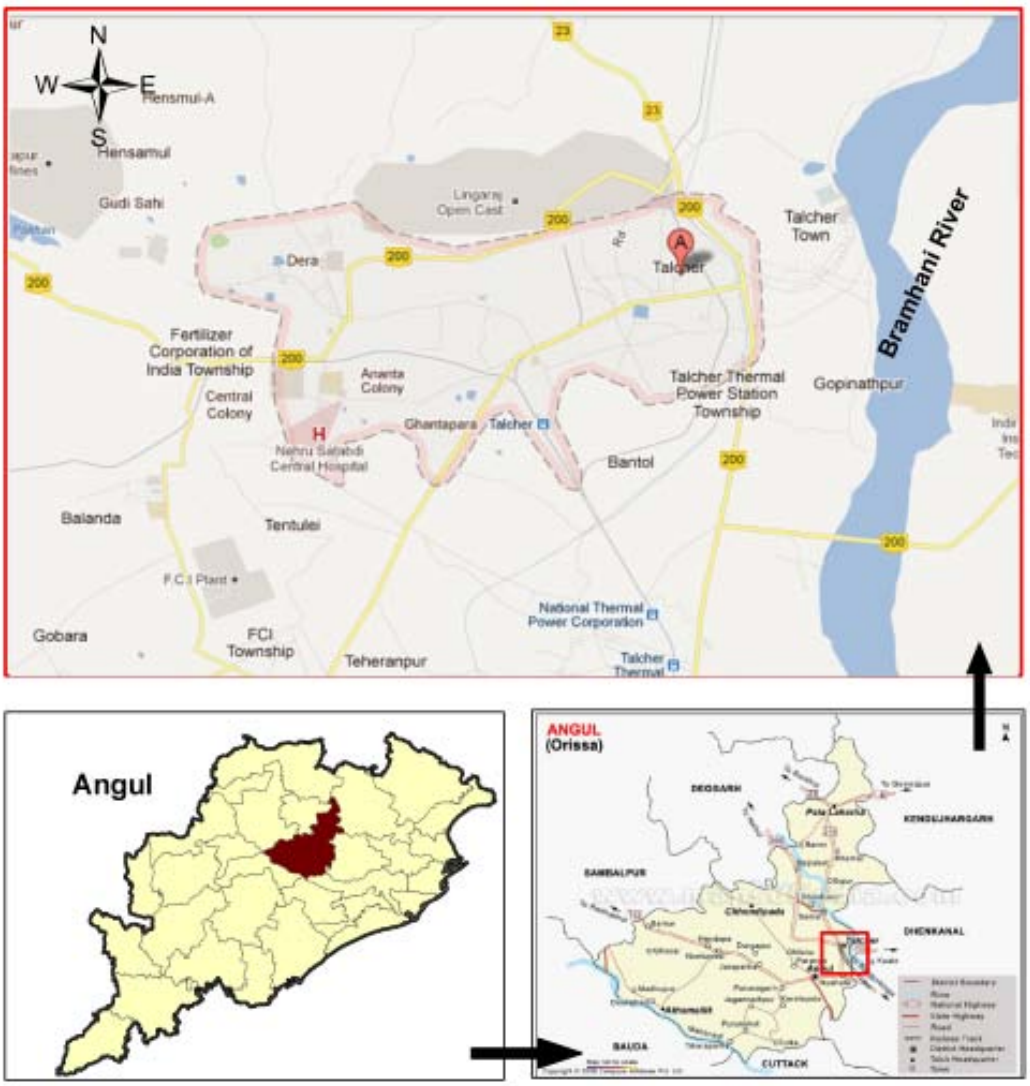


Fig. 10.1
Location of the polluted stretch of the Brahmani river

River Brahmani, the second largest river of Odisha, is one of the 14 major river systems in India. The river has the rare distinction of being one of the four perennial rivers of India. Brahmani arises from the confluence of South Koel and Sankha at Vedavyas of Sundergarh district in Odisha. It flows through the districts of Sundergarh, Deogarh, Angul, Dhenkanal, Jajpur and Kendrapara, and meets the Baitarani river at Dhamra in Bhadrak district.

The waters of the Brahmani are now polluted due to several reasons, among which industrial pollution is significant. The river which was once full of fish and

other aquatic life now faces the brunt of industrialisation and urbanisation. It is the most polluted river in the state. The Angul-Talcher stretch of the river is most contaminated owing to smoke and fly ash from industries like the Talcher Thermal Power Station (TTPS), the Heavy Water Project at Talcher, National Aluminium Company (NALCO) Smelter Plant at Angul, NALCO's Captive Power Plant (CPP) at Angul and Dhenkanal, and the National Thermal Power Corporation at Kaniha.

The pollution of the Brahmani

The Mahanadi Coalfields Limited (MCL) provides fuel in the form of coal to all these industries. These industries and mines dispose huge amounts of waste in the water, which is the major cause of water pollution. The mines and industries use more than 25 crore litres of water from the Brahmani daily. Tonnes of pollutants like fly ash, oil, grease, heavy metals, fluorides, phosphorous, ammonia, urea, ammoniacal nitrogen, sulphuric acid, chromic acid, and radioactive substances are released into the river with waste water. Almost the entire waste water is discharged either into the Brahmani or into its tributary Nandira which joins the river at village Kamalanga.

Thousands of litres of waste water contaminated with ash, oil, grease and metals like lead and chromium from the ash ponds of NALCO's CPP and TTPS alone discharge almost 475 Tonnes of ash produced every day into the Nandira. According to a study conducted in 1987 by K. C. Sahu , researcher from IIT, Mumbai, TTPS alone releases 208 kg of lead, 56 kg of zinc, 45 kg of copper, 5.1 kg of cadmium and 56.6 kg of nickel per day in the Brahmani waters impacting the quantum of fish catch[1].

Pollution in the Brahmani has destroyed the fisheries and has had a disastrous impact on the fishing communities residing on the banks of the river, including the Jhara, Girigia and Bahania communities. Due to pollution, the fish population in the river has dwindled. The fishermen have to spend hours for a meagre catch. More often than not, they return empty handed. Many have stopped turning to the Brahmani for their daily bread. Those who continue to fish have no other option.

The hundreds of thousands of fishermen earning their bread and butter from the river are now forced to search for alternative occupations. This is a painful experience for the community. Socio-culturally, most of them are not accustomed to any occupation other than fishing. When Brahmani was not polluted, the fishermen were their own masters, utilising their skills and the bounties of nature to make a living. However, they are now being compelled to look for other work. The very thought of working for somebody is a rude shock to them. Having no prior experience or skills, these fishermen fare miserably in their new ventures. Most fishermen do not have agricultural land and other assets. Agricultural labour is the only other livelihood option in their locality. With no experience in agricultural work, they are unable to work productively and often told to discontinue work by those who hire them as labourers, or end up injuring themselves during ploughing and other activities.

Starting small business ventures is also not an option because they do not have the requisite entrepreneurial skills or the seed money. Few fishermen who sell dry

[1] Sahu, K.C., 1994, Power Plant Pollution Cost of Combustion. The Hindu Survey of the Environment, (1994)

fish are somehow managing to make ends meet. However, their earnings depend on the whims of middlemen. All in all, the livelihood of the fishing community is increasingly vulnerable.

During a visit in 2008 to Damal Jhara Sahi, a tiny hamlet in the Parjang block of Dhenkanal district, this writer witnessed the hardship faced by the fishermen in feeding their families. Fourteen years ago, in 1994, the situation was different. The fishermen were living happily with plenty of fish catch from the river. Today, most families from the community are living in poverty, and have left fishing to work as manual labourers in nearby towns so that they can provide two square meals for their families. Interactions with a group of fishworkers, both men and women, at Damal revealed that as many as 60 percent of fishworkers have abandoned their profession and moved to other places in search of employment. One young fisherman, when asked how he is managing, said, "I am now earning handsomely for my family by doing other work like selling wood and articles other than fish. I have left my identity as a fisherman a long time ago. It is of no use as the polluted waters of the Brahmani have destroyed the fish." Other fishing hamlets on the banks of the river are in a similar situation. They bear a deserted look as most men and women have moved to other places in search of work. Fishing nets are not seen in their courtyards anymore. The use of chemicals for getting a good catch of fish by some unscrupulous fishermen has also worsened the condition of the river.

Fig. 10.2 A view of the polluted Brahmani at Angul

The pollution of the Brahmani has not only eroded the economic base of the fishing communities, but also created a lot of health problems for them. Those who still continue fishing are prone to skin diseases, which have become untreatable. When the doctors or vaids are able to cure these diseases with heavy dosages of medicine, they reappear again after a few months. The fishing hamlets are situated on the banks of the river, and lack tube wells or sanitary wells. The villagers are compelled to use the polluted water of the Brahmani. This causes water borne diseases like diarrhoea and dysentery. The fishermen do not have a regular source of income, and suffer from numerous health problems. This has further worsened their economic condition. Devoid of any gainful employment, and living in abject poverty, they have taken to selling of fuel wood and timber for their livelihood. They cut trees illegally from nearby forests. It is indeed ironic that most of these forests were earlier protected by the villagers. The victims of environmental degradation are compelled to degrade it further in a different manner. Such is the fate of the region, that one serious environmental problem has led to another.

Current status of the conflict

After the campaign of the District Action Group (DAG) of Angul-Dhenkanal, the fishing community formed an association and sent a memorandum to the President of the World Bank through the Institute of Policy Studies, an NGO in Washington DC, USA. Ms. Daphin Wyshem discussed the issue with the

President of the World Bank and persuaded him to ensure the livelihoods of the affected fishing community. The World Bank India office visited the area and discussed the issue with the fishermen and members of DAG, and decided to submit an action plan to restore livelihoods. However, due to some unavoidable circumstances, the action plan could not be submitted.

The State Pollution Control Board officials maintain that the Brahmani has been designated as a class C river. However, the water quality data shows that except at a few places, the river is largely of D category. Fishing communities are living in 63 villages spread across Dhenkanal Sadar, Odapada, Gondia, Parjang, Kamakhyanagar and Bhuban blocks of Dhenkanal district. Abject poverty and unemployment have compelled the fishermen, especially the younger generation, to migrate to urban centres in search of employment. These sons of the Brahmani are now rickshaw pullers, coolies and construction workers of Cuttack, Bhubaneswar and Dhenkanal. Nearly 90 percent of the fishermen live in Damal, Karnapal, Nilakanthapur, Mahulapal, Chandar, Bhusal and Chhendipada. The social fabric of the fishing community has been sundered. For these fishing communities, all development initiatives have backfired or failed. Fishermen who had taken bank loans to enhance their economic condition find themselves on the edge of bankruptcy, as the fish population in the river took a plunge in 1984 when the Rengali reservoir in the upper reaches filled up. The flow of water in the river was reduced drastically, which caused an increase in the concentration of pollutants per unit volume. Those who had taken loans to buy boats and nets were unable to repay their instalments on time. Some fishermen have also resorted to timber smuggling in the Kankadahad-Koraipal forests to make out a living. They ferry timber on the Brahmani through rafts to places like Chandikhole, Chandeidhara, Janapur and Kabatabandha.

High points of the conflict

A petition praying for suitable measures to check pollution of the Brahmani river and other water bodies in Odisha was presented to the Hon'ble Chairman, Rajya Shaba on 19th May, 2004 by Bibhudhendra Pratap Das, President of the Brahmani Anchal Suraksha Parisad. The Parliamentary Committee on Petitions presented the same in the Rajya Sabha as the 121st report of the committee.

The petitioner contended that over the last decade, because of the growth of industries on the riverside near Rourkela, Angul-Talcher and Sukinda regions, and the discharge of effluents by heavy and medium industries into the river coupled with the effluent discharge from urban centers, the entire stretch of the Brahmani river from Rourkela to the sea has been highly polluted with the result that the waters have become undrinkable and unsuitable for bathing, and aquatic life has vanished. The petitioner continued that it is imperative that the Brahmani Action Plan be formulated and implemented with other effective measures aimed at saving the river from pollution and providing water for drinking and bathing purposes to the people in the region. The petitioner also submitted that just before the boundary of the Jajpur-Dhenkanal districts, there are small perennial channels in the Sukinda region which carry effluents, heavy metal laden wastes and liquid from the mines and from habitations to the Brahmani river.

According to the petitioner, under the instructions of the Central Pollution Control Board (CPCB), the State Pollution Control Board of Odisha has identified certain key locations on riverbanks to collect and analyse data relating to water quality. The entire operation, however, is haphazard and not carried out throughout the year, and its findings are highly distorted and erroneous. Nonetheless, the findings reveal that in long stretches of the Brahmani river, the water is not fit for bathing or drinking or dangerous for both purposes. The entire river has been classified as in the D category by the State Pollution Control Board of Odisha, which means that its waters are unfit for bathing and drinking even after conventional treatment. The Central Pollution Control Board in coordination with the State Pollution Control Board decided to prepare and implement an Action Plan for cleaning up the river and restoring its water quality, but it was virtually abandoned from the very stage of preparation, much to the distress of the people.

The Ministry of Environment and Forests' response

In its comments on the petition, the Ministry of Environment and Forests, explained its position as follows:

(a) The Brahmani river has been identified as a polluted river and brought within the ambit of the National River Conservation Plan (NRCP). The activities under NRCP mainly cover interception, diversion and treatment of sewage in major towns responsible for polluting the rivers. The water quality of this river is being monitored by Odisha State Pollution Control Board;

(b) The towns of Odisha covered under the Brahmani Conservation Programme are Talcher, Dharamshala and Chandbali. In 1995, a scheme worth Rs 9.93 crore was approved by the Government of India for these three towns, and the Government of Odisha was requested to submit detailed project reports so that individual components for each of these towns were approved and funds released for implementation. In order to assist the state government in the preparation of detailed project reports, necessary financial assistance was provided. The detailed project reports received from the state government for conservation of the Brahmani river were not found in accordance with the guidelines of the Ministry, and were sent back to the state government. The modified detailed project reports for Talcher were to be submitted by the state government by the end of July 2003, and for Chandbali and Dharamshala by the end of September 2003. Once the schemes under the modified detailed project reports were implemented, operated and maintained, water quality of the Brahmani river would improve. The objective of NRCP is not to improve the water quality to drinking standards but instead to improve it such that it is designated as C class, which means that it can be used for drinking after conventional treatment and disinfection;

(c) The Angul-Talcher area has been identified as one of the problem areas and an Action Plan has been prepared by the Odisha State Pollution Control Board (OSPCB) for the restoration of environmental quality. The State Board has also carried out an environmental assessment of the area and recommended various measures to improve the environment.

(d) The Odisha State Pollution Control Board has identified nine units discharging

wastewater into the rivers. Out of these nine units, three are closed, four are complying with the standards, and two are defaulters. The Board has also directed most of the industries and mines to take measures to minimise the discharge of wastewater by adopting principles of reuse and recycling;

(e) The Ministry of Environment and Forests has undertaken a centrally sponsored scheme for enabling Small Scale Industries (SSIs) to set up Common Effluent Treatment Plants (CETPs) with a component of central subsidy to the extent of 25 percent of the total project cost; and

(f) The Carrying Capacity Study has to be taken up by the State Government of Odisha.

For minimising the pollution and its impact on aquatic ecosystems, standards have been notified from time to time for the quality of effluents before their discharge into water bodies. Based on the pollution potential, 17 categories of highly polluting industries have been identified for continuous and regular monitoring for their compliance with notified emission and effluent standards.

Scope for dialogue

Along with the intervention of the central government, the following steps should be taken to mitigate the conflict:

The Brahmani Action Plan should be planned and implemented so that the river water becomes potable and suitable for bathing for the entire stretch;

Each of the industries located in Rourkela, Talcher and Sukinda regions should be asked to take effective measures within a specified period to treat their effluents before they are discharged into the river. New industries should not be allowed to be set up or/and to operate unless they conform to the laws of the land;

The government and local bodies of the towns should adopt measures to design and set up common effluent treatment plants to treat both solid and liquid effluents before they are disposed off in the Brahmani river and other water bodies;

The carrying capacity of the area including the Rourkela, Talcher and Sukinda regions should be studied, and necessary plans prepared and updated before permitting further establishment of industries. This should be done by impartial bodies that have the necessary expertise. Further, Environment Management Plans should be chalked out to be implemented by industrial units and the government; and

A time frame for implementation may be prescribed for the above mentioned measures so that the government, local bodies and industrial units implement them according to a time schedule by involving more and more local affected people and people's voluntary organisations.

The opposing stands

According to the pollution control board officials in Angul, "The waters of the

Brahmani are not as polluted as they were a few years ago. Now, officially its rating is bathing standard." According to a recent study conducted by the Board to assess the suitability of water quality at the upstream of the Rengali for fish propagation, the prescribed parameters for Class D, i.e. pH, DO, free ammonia and carbon dioxide, were monitored. From the results, it was observed that the values of all parameters are well within the limit at all locations except marginal increase of carbon dioxide concentration at Panposh downstream location on one occasion.

However, the reality is different. A visit to the river revealed that its water is still polluted as it was a decade ago. Fishermen living all along the banks of the river complained that their fish catch is still not sufficient and they are afflicted with different skin diseases caused by bathing in the river. The industries are still using the river as their drain, and the water is not worth drinking.

Industrialisation in the Angul-Talcher area has in no way led to any direct benefit to the fishermen communities in undivided Dhenkanal district. Dwindling fish population in the river has destroyed their financial prospects. A growth in the population in the industrial region has given rise to a demand for fish, but the fish catch is not sufficient. There is no fish left in the Brahmani for fishermen to make use of this increased demand for their economic betterment.

Key institutions and people involved in the conflict:

1. Odisha State Pollution Control Board: The functions of the Board are clearly defined in the Water and Air Acts and can be broadly classified into three main categories: (i) Enforcement, (ii) Advisory and (iii) Monitoring, research, creation of public awareness and facilitation.

2. Brahmani Anchal Surksha Parisad: Seeks a legal solution for the issue.

3. The Ministry of Environment and Forests.

4. Institute of Policy Studies, Washington DC and **Ms. Daphin Wyshem**.

5. K. C. Sahu and S. Tripathy, two researchers from IIT, Mumbai, TTPS.

Case Study 11

11

UPCOMING MINING IN THE KHANDADHAR HILLS:

Emerging conflict in Sundargadh district

Himansu Sekhar Patra

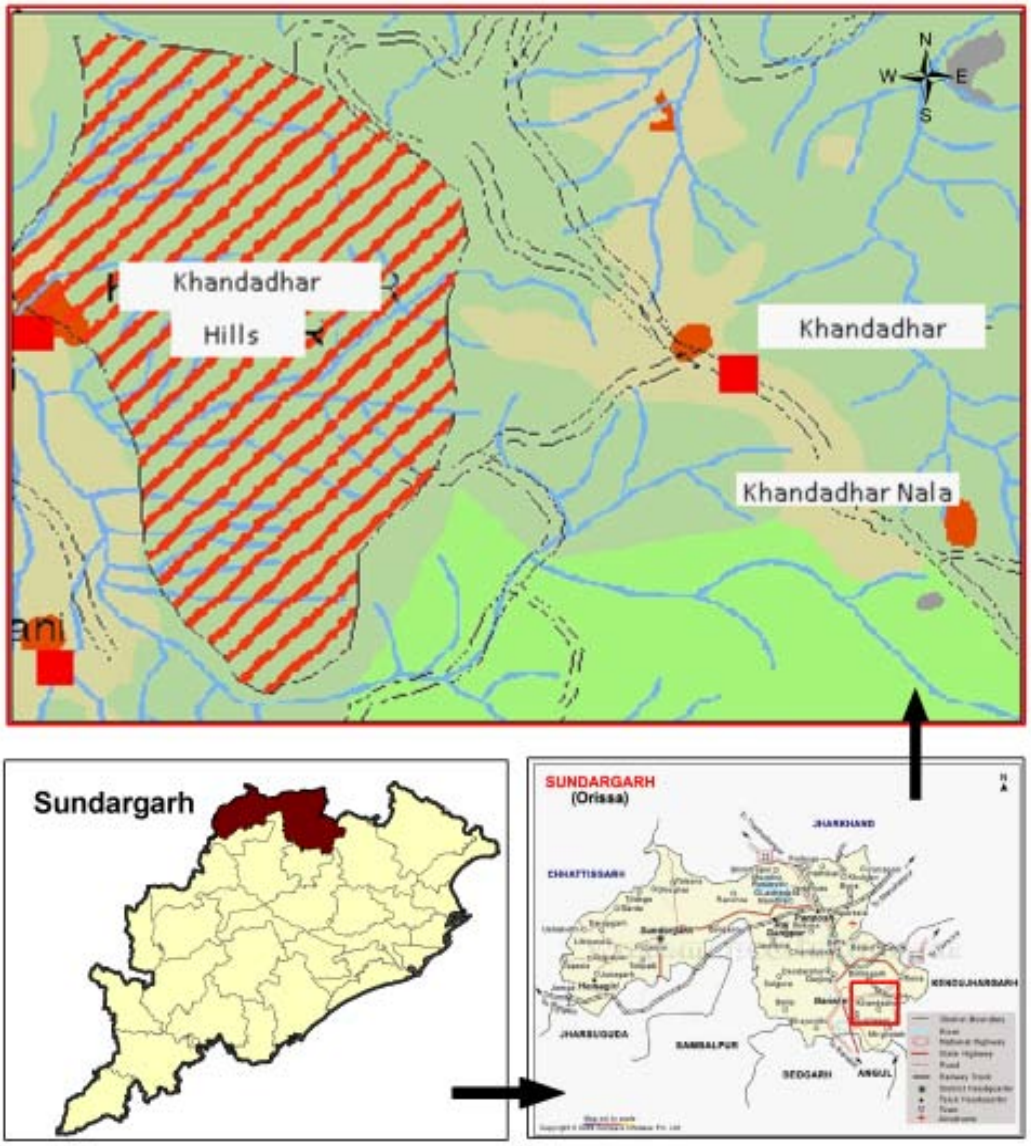


Fig 11.1
Location of the Khandadhar hills

The area under study is located in and around the Khandadhar Hill range, a part of the Eastern Ghats, in the Sundargarh district of Odisha between latitudes 21°49' N and 19°22' N, and longitudes 85°01' E and 85°09' E, and an elevation of between 150 m and 800 m above Mean Sea Level (MSL). The study site is a plain area in the Bonai block in Sundargarh district located at a distance of 10 km from Bonaigarh town in the south-east direction and surrounded by the Khandadhar

hillocks on one side and the Brahmani river on the other. The Pancherpani hills are to the northeast of the study site, while the Sahebagora and Mahulasukha hills are to its north. The Tohra reserve forest is to the northeast of the study site. Major mining areas like Barsuan are located to the northeast, while the Khandadhar reserve forest is located to the southeast of the study site. The forests are dense with vast mineral deposits like iron ore and manganese. The upcoming mining is likely to affect 52 villages around the Khandadhar hills.

The Brahmani catchment area

Being the source of a number of perennial streams, Khandadhar contributes to the Brahmani river apart from acting as a natural recharger of groundwater. Numerous small streams originating from the hillocks at higher elevations flow towards the west and southwest direction, and ultimately join the Brahmani river. The main surface water source in the study area is the Brahmani river which is 5 km away. The overall slope of the study site is from the north to the south. A total number of 36 small streams have originated from the Khandadhar and surrounding hills, and formed a number of large streams like the Khandadhar Nala, Kara Pani, Kurudi, Matuali, Tinka Nala, Jagati Nala and Kulei. These *nalas* flow into the Brahmani river. A number of small scale water-harvesting structures and small water reservoirs Minor Irrigation Projects have been developed in this area by utilising the water of the streams. A large area is irrigated all year long by this water. A number of check-dams have been built on the streams, some through private initiative and the rest by the Project Authority, Integrated Tribal Development Agency (PAITDA) at villages including Kilinda, Deogharia, Tala Bahali, and Bija Ghat to draw water for the irrigation of land, and cultivation of vegetables and fruit orchards. A number of nurseries and farms have been developed in this area by using water from the streams.

Significance of these streams

Besides contributing water to the Brahmani river, these streams also regulate the local groundwater table. Sixteen villages of this area critically depend upon this water for drinking, bathing and irrigation. A number of horticultural farms have been developed both by the people and the agricultural department by using the water from the streams. Similarly, watershed projects have been constructed on the streams for channelising water for irrigation.

Likely impact of mining

Around 52 villages surrounding the Khandadhar hill will be affected if it is mined. A satellite interpretation carried out by the organisation Vasundhara shows that in the area within 10 km from the site, a total of 10,168.24 hectares of agricultural land will be directly affected. Apart from this, the proposed project will affect hundreds of villages indirectly by impacting the water regime of the Brahmani river. According to Vasundhara, around 25,000 villagers will be directly affected by mining, whereas a much larger number of people will be impacted indirectly.

Beginning of conflict

A number of small and medium scale illegal mining activities are in operation around the study area. These activities have already impacted the water table in the region. The streams are reportedly drying up and / or have become polluted thus affecting the water seeping into the earth. Apart from mining operations impacting water bodies, mining itself is a water intensive activity using a large quantity of water. An open cast iron ore mine of the Orissa Mining Corporation (OMC) is drawing water from the upper Khandadhar waterfall resulting in a drastic reduction of water in the area. Two streams Uskula and Sasa of the Korapani dam are already being used by the OMC. Mining and transportation of minerals at Barsuan and Koida in upper Khandadhar have already had devastating impacts on the people and the villages situated in the downstream area. In 2006, the Uskula stream was contaminated by red oxide which affected their livelihood in many ways. The customary fishing activities came to a halt as fish died due to water pollution, and the water became so thick that it was difficult to catch the dead fish. Agriculture has been severely affected for a few years and more so during the last year. Agricultural land fills up with red iron deposits which are carried by rain water. As precious agricultural lands become unproductive due to water pollution, a conflict emerges.

The POSCO threat

The state government has leased the Khandadhar hill, one of the major deposits of iron ore, to a multinational South Korean company POSCO-India. It plans to mine the Khandadhar and Chhelitoka mountains. According to local people, the mining operation would severely affect more than 52 villages in the area, and disturb its natural balance. People fear that the main stream of Khandadhar will dry up due to mining. The small irrigation dam on Korapani helps the villagers in Lahunipara block, where people believe that the POSCO mining operation will draw water from the Khandadhar stream. People fear that with mining in the mountains, water sources will perish, thus impacting their socio-economic status.

The emergence of people's movements

People are anxious that the local agricultural economy will be drastically affected if mining is permitted in the catchment area. Mining activities in the Khandadhar hill will result in the death of all these streams, thus directly affecting the livelihoods of people. The indigenous tribal group, Paudi Bhuiyans, will bear the brunt of the worst impacts. The Paudi Bhuiyans live near the streams and depend upon the waters for their daily activities. Their religious and social lives are closely enmeshed with these streams. The famous *Kanta devi* of the Bonai region is said to be associated with these streams. The people fear that with the disappearance of the streams due to the proposed mining project, the local religious customs of the Paudi Bhuiyans will disappear as well. The threat of water scarcity and the possibility of affecting the religious sentiments of the local people have led to massive public unrest in the region, which has spurred the formation of a number of public movements. Cutting across party lines, almost all political parties are involved in this movement, which is currently led by three different forums affiliated

to different political parties, namely the Khandadhar Surakshya Sangram Manch, the Khandadhar Surakshya Committee and the Khandadhar Surakshya Samiti.

Current status of the conflict

The public outburst against the proposed mining of Khandadhar hill is still observed in the area. The local people are stiffly opposing the grant of the Mining Lease (ML). However, the momentum of various people's movements has reduced after the Lok Sabha elections. Most parties made the mining of Khandadhar a major election issue, as it is a sensitive issue for the local people. However, after the elections, the momentum decreased, especially after the defeat of former Member of Parliament (MP) Jual Oram who was quite vocal in opposing the mining deal. However, the issue can resurface at any moment. At present, the ML process of Khandadhar is embroiled in a legal battle after Kudremukh Iron Ore Company Limited (KIOCL) challenged the process in the High Court.

The issue regarding the granting of mining lease to POSCO will be resolved in the High Court. However, the major cause of the conflict - the probability of water scarcity due to upcoming mining operations, is not a consideration in the legal battle.

The legal battle for procuring a mining lease

KIOCL applied for a Prospecting License (PL) for the Khandadhar mines in 2002, and spent about Rs. 1.5 crores for undertaking a geological survey. Apart from this, 226 other applicants have applied for PL for this area since 1991. However, the Odisha government has decided to recommend the South Korean steel major POSCO for granting a license for iron ore mines without considering others applications. Apprehending legal problems, the state has decided to file a caveat in the Odisha High Court about the recommendation for the prospecting license. In the memorandum of understanding with POSCO, the government had promised that it would recommend a mining prospecting license free from litigation and encumbrances. A prospecting license strengthens the claims of a company to procure a mining lease. KIOCL filed a petition in the high court challenging the decision of the Odisha government on technical grounds. The Union Ministry of Mines sought some clarifications about the proposal after the Odisha government recommended POSCO's application. The desired documentation with the clarification was carried out subsequently. The state had recommended 6,204 hectares at Khandadhar, Sundargarh district, in favour of POSCO to assess actual reserves after considering 130 odd applications. KIOCL, one of the applicants, contested the government's move over preferential rights for allotment of mining lease under Section 11(1) of the Mines and Minerals Development and Regulation Act, 1957.

Action taken by the state government to solve the problem

The state government has till date taken no action to check the present water

problem in the Uskala Nala, which is being affected due to the diversion of water for the purpose of mining. Although the local people have raised this issue before the District Collector, the Sub-Collector and in various forums, no concrete action has been taken to resolve it. Similarly, the state government is determined to give the mining lease to POSCO and is not heeding the demands of the people. The government has not consulted the local people before allowing the company to mine. Even the possible threat to flora and fauna has been ignored by the government. Given this scenario, the people have come to believe that mass resistance is the only option to protect the site.

Conflicting parties

The parties and stakeholders involved in this conflict can be categorised as follows:

Directly affected parties: The communities residing within a 10 km radius of the Khandadhar mountain constitute the directly affected parties. A total of 20 villages in which around 30,000 people reside will be directly affected if mining is allowed in Khandadhar. Villages located in two blocks of Sundargarh district, namely Bonai and Lahunipada, will be directly affected in the process. It has been found that the villagers of the above villages use the water for agricultural and domestic purposes. Paudi Bhuiyan, one of the indigenous tribal groups residing in this area, will be critically affected as they depend upon the stream water for their livelihood.

Indirectly affected parties: It is apprehended that the flow and volume of water in the Brahmani river will be affected as the streams of the study area drain most of their water into this river. The perennial springs originating from the mountains not only supply water to the Brahmani river but also help in maintaining the groundwater table of this area. So mining will indirectly affect thousands of people who use the water of the Brahmani river. Depletion in the groundwater table will also affect a number of people.

High point of the conflict: The conflict began with the state government announcing a grant of the mining lease to POSCO India Ltd. At the outset, the deal between the government and the company was unknown to the people. However, it was covered adequately in all newspapers by mid-December, 2006. This led to public unrest in the region. Mass movements under different political banners soon followed. Three protest committees, namely the Khandadhar Surakshya Sangram Manch, the Khandadhar Surakshya Samiti and the Khandadhar Surakshya Committee, were formed within a few days. The Khandadhar Surakshya Samiti formed by Bhartiya Janata Party (BJP) leader Jual Oram was most vocal in opposing the deal. A number of protest meetings at the village and block level have been organised by the Samiti. Similarly the Communist Party of India (Marxist) (CPI(M)) led Khandadhar Surakshya Committee also organised a number of protest rallies and road jams in protest against the deal. A local opposition group, namely the Khandadhar Surakshya Manch, was formed at Talabahali village by involving villagers who would be directly affected.

The protest movement reached its highest point on 1 August 2007 when the

former union minister Jual Oram led a massive rally in the town of Bonai to protect the state's largest waterfall in his home district Sundargarh from mining activities to be carried out by POSCO. More than 20,000 people from all over the state took part in this rally organised under the banner of the Khandadhar Surakshya Samiti at Bonai. About a dozen members of the state legislative assembly, several leaders of the ruling Biju Janata Dal (BJD), the Congress and Left parties also attended the rally. A team led by Jual Oram also submitted a memorandum to the local Sub-Collector protesting the state government's decision. Gradually, the conflict took a significant turn when a protest meeting was called by Sri Oram at Bonai in November 2008, when he openly criticised the state government's decision. Following this meeting, a pro-mining group was formed by a direct initiative of the ruling party, with an aim to disrupt the efforts of other groups.

The people's movement stand

The stand of various people's movements is clear; they demand the cancellation of any Memorandum of Understanding (MoU) regarding exploration of minerals in Khandadhar. Their livelihood is completely dependent upon the water of various streams flowing in this area which originate from Khandadhar hill. Any mining activity in the catchment area of these springs will affect the quality and quantity of water.

The local people have already had a bitter experience of the impact of mining on water availability in their area. The vivid example before them is the pollution of the Uskula springs, where the water turned red due to iron sediments during the rainy season. The flow of the *nala* is affected over the years due to the withdrawal of water in the upper basin area for mining activities. This has not only affected agriculture, but also caused an acute water shortage in the villages from 2004 onwards. The local people are of the view that as the mining activity will be carried out at the slope and top of the mountain from where the springs originate, it will result in the premature death of the springs. Such examples are evident in the areas where mines have proliferated, like Barsuan, Kalta and Koida where numerous perennial springs had dried up due to mining activity.

People's response

The local people have organised themselves under various banners affiliated to various political parties. It seems that these organisations have a wide support base. Till date, a number of protest rallies have been organised by these groups. Moreover, they have written memorandums to the President, Governor, Chief Minister, and to other forums apprising them about the ground reality.

The present conflict is based on the understanding that the villagers have arrived at considering their past experiences. It has been found that mining activity will be carried out on the slope of the mountain. Open cast mining activity involves various activities like blasting, drilling, and movement of heavy vehicles and instruments. Similarly, mining activity will loosen the rock structure, thus altering the physical composition of the rock. The writer consulted various geologists about this process. They are also of the opinion that activities like blasting result in

deforestation, which leads to loss of the top soil, thus affecting the water catchment area. Thus, mining activity is sure to affect the flow rate of the springs. Moreover, the water of the springs will be polluted due to more suspended particulate matter.

The springs act as a life line for the surrounding areas. Because of the stream water, surrounding areas are practising agriculture with good output. Apart from this, fruits are also cultivated in the area, nurturing a sustainable economy.

At this juncture, any mining activity will disturb the regional water balance thus affecting the economic background of poor people. The water crisis will particularly assume critical dimensions during the summers.

The state government has signed an agreement with POSCO to lease out Khandadhar, and is determined to implement it under any circumstances. The socio-economic and environmental implications of the proposed project have been completely ignored by the government, which is in a hurry to begin the project yielding to pressure from the company. This has led to public unrest.

Past efforts towards resolution and their impact

No initiative has been taken by the government, local administration, village panchayat and other organisations. After strong people's protests regarding the drying up of the Uskala nala, the local administration merely issued a notice to the mining company. However, it was ignored. The company continues to draw water. The matter regarding the mining lease of Khandadhar hill is sub judice and the state government is not inclined towards withdrawing from the agreement, which prevents the involvement of other organisations including the local administration.

Suggestions

1. The government should engage the affected people in discussions with an open mind.

2. An ecological and environmental cost benefit analysis of the area should be carried out before any deal is made.

3. According to calculations, the iron ore reserve has a life span of 25 years. After this period the iron ore will be finished. However, the damage to the ecology and the water regime cannot be compensated. Therefore, the government should rethink its proposal several times.

Key institutions and people

The following organisations are involved in the ongoing movement against the proposed ML of Khandadhar hill.

1. Khandadhar Surakshya Sangram Manch: Formed with the involvement of directly affected villagers, the Sangram Manch is led by Shri Aswini Mohanta of Talabahali village. The activities of the group are confined to a certain number of villages.

2. Khandadhar Surakshya Committee: This has been formed by the CPI (M)'s Bonai Mandal. The movement is led by Shri Laxman Munda, former member of Legislative Assembly (MLA) of Bonai, and has spread throughout the Bonai region.

3. Khandadhar Surakshya Samiti: The lion's share of the agitation has been carried out by the Khandadhar Surakshya Samiti. It is formed by the district BJP unit in which the former MP Jual Oram took a lead role. The Khandadhar Surakshya Samiti has arranged a number of rallies and *padayatras* in protest against the ML and written memorandums to the Governor and the President. The Khandadhar Surakshya Samiti has played a vital role in making this movement a popular people's movement due to their strong network in the district. Shri Sundermani Pradhan is leading the movement at present.

Apart from the above people's movements, a group called the Vana Surakshya Samiti in Bonai has also been involved in the process. The group has presence in the Bonai area, particularly in the field of community protected forest initiatives.

No NGO in this area is involved in the issue because of fear of repercussions from the government. Most political parties are involved in the conflict both directly and indirectly. While parties including the BJP, CPI and CPI (M) are openly opposing the grant of the mining lease, the Congress is silent about the issue. Similarly, the ruling BJD party is trying to neutralise the movement by organising forums which will work towards creating an atmosphere conducive to mining. However, a number of people's groups working towards tribal rights are coming forward to oppose the deal.

During the study, a number of people representing various types of organisations were consulted. Their views are as follows:

1. Aswini Mohanta: Aswini is a social researcher who is leading the Vana Surakshya Samiti, Bonai. He resides in Talabahali village located 2 km from the waterfall. He is directly involved in the conflict. According to him, people have already experienced the implications of mining on the Uskala Nala. The government has taken no action against the mining company. A number of villages are already affected. At this juncture, allowing mining activity in Khandadhar, which is the source of origin of around 30 perennial springs, will lead to serious impacts. He apprehends that mining in the hill will lead to the disappearance of all the springs which will affect the economic conditions in this area as it is completely dependent on agriculture and fruit cultivation. He also mentioned that they have drawn the attention of the Governor, the Chief Minister and various other forums towards possible implications. However, no one has responded till date. Considering these developments, struggle is the only way out to preserve the ecological balance.

2. Mira Dehury: Mira Dehury is a farmer living in Bonaigarh, 12 km away from the Khandadhar hill. He is of the view that the groundwater table in the area is regulated by the numerous springs originating from the Khandadhar hill. Any mining activity in this area will lead to adverse impacts on the quality and quantity of the flow of the springs, leading to water scarcity. Moreover, the Brahmani river will be affected due to the water shortage. Therefore, he believes that mining should not be allowed in Khandadhar.

3. Jagat Behera: Jagat is a graduate from the village Ladapani. He is affected due to the water shortage in the Uskala Nala. Their agricultural activity has been affected by the water shortage. Fish die due to polluted water from the stream. The villagers therefore apprehend that large scale mining at Khandadhar will displace them as their livelihood would be severely affected.

4. Ajay Mohant: Ajay Mohant is the director of YAVARD, a leading NGO in this area. Although he feels reluctant to oppose the mining activity directly, he is of the view that any mining activity will affect the livelihood of around 10,000 people. He said that water scarcity will be a major problem if mining activity commences. Apart from this, the climate of the area will be impacted which will affect the cultivation of litchi and lac.

5. Dhanurjaya Mohanty: A journalist by profession, Dhanurjaya Mohanty described the area in brief. A number of perennial streams originate from Khandadhar waterfall. These streams play a vital role in the economy of the local area. Other than contributing water to the Brahmani river, these streams also regulate the regional groundwater table. Four perennial streams, namely Khandadhar Nala, Ashok Jharan, Katar Guan and Kalapani Nala, drain from this hill top and finally join the Brahmani. Sixteen villages of the area critically depend upon this water for drinking, bathing and irrigation purposes. The local agricultural economy will be seriously affected if mining is permitted in the water catchment area. Mining activities in the Khandadhar hill will result in the disappearance of all these streams, thus directly affecting local livelihoods. The worst impact of the upcoming project will be faced by the indigenous tribal group, Paudi Bhuiyan.

6. Sanu Nayak: Belonging to the indigenous tribal group, Paudi Bhuiyan, Sanu is working as the watchman of the guesthouse located at Khandadhar. He is of the view that the socio-economic and cultural lives of the Bhuiyan people are totally dependent upon the springs. Their deity Kanta *devi* lives in these springs. If the springs dry up, the community will perish without drinking water. Given their means of livelihood and other constraints, they cannot relocate to other areas. Therefore, the community will strongly oppose the mining lease.

7. Luthar Munda: According to Luthar Munda, a tribal daily labour of Bonai region, mining will bring work for them in the nearby area. They are travelling around 20 km to go to Barsuan for work as daily labour in mines. If mining activity begins at Khandadhar, they will not have to travel a large distance for work. He also said that he had no idea that there will be scarcity of spring water if mining begins at Khandadhar.

12

Case Study 12

DELTA REGION IN KENDRAPARA DISTRICT: Riverbank erosion causes loss of livelihood

Bijaya Kumar Kabi

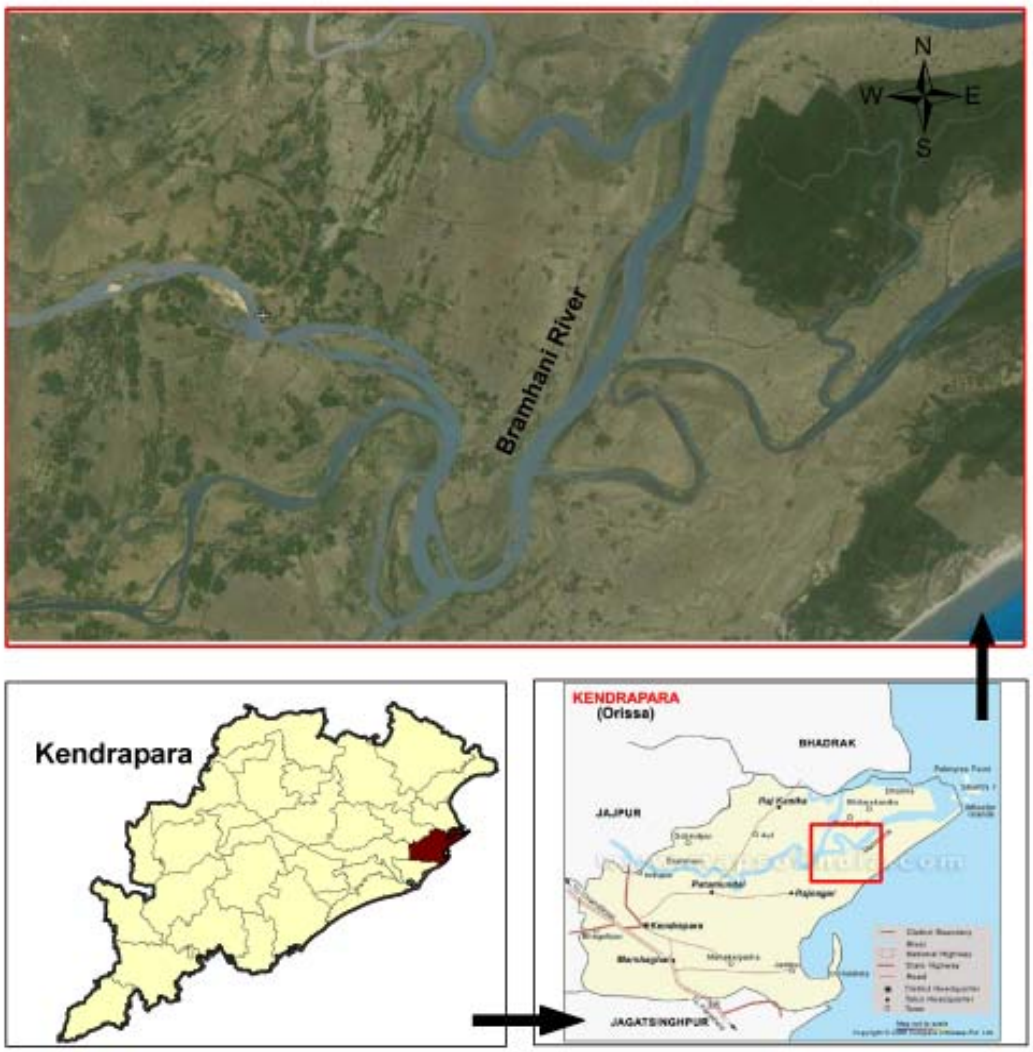


Fig. 12.1
Area in Kendrapara district affected by river bank erosion

Kendrapara district lies between 20° 20' N and 20° 37' N latitudes, and 86° 14' E and 87° 01' E longitudes. The district is located in the central coastal plain zone of Odisha and lies in the river delta formed by the Brahmani, Baitarani, and branch rivers of the Mahanadi. The Bay of Bengal lies to the east of the district. The coastline stretches 48 km from Dhamra Muhan to Batighar. According to the 2011 census, the district has a population of 1,439,891, with a population density of 545 inhabitants per square km.

The study area starts from Nilakanthapur village and extends up to the end of Bandhapada panchayat along the Brahmani river. It covers Srirampur, Damarpur, Sasan, Balabhadrapur, Nilakanthapur and Bandhapada gram panchayats which are located in the Pattamundai and Rajnagar blocks of Kendrapara district of Odisha state. The gram panchayats studied share a similar physiographic and ecological setting. They are located about 5 to 10 km away from the nearest town Pattamundai, and about 30 km from the district headquarter. The road connectivity to the site is moderate. A majority of people depend directly or indirectly on agriculture for earning a living.

Background

River erosion has been a major concern for the communities of Kendrapara district. Erosion now threatens homes, roads, agricultural fields and other surrounding infrastructure. Badly eroded river banks of the Brahmani continue to cause severe problems for people in the villages of Pattamundai and Rajnagar blocks of Kendrapara district. Some of the areas of these villages in Pattamudai block have already been devoured by the rivers, displacing about a thousand people. A majority of the villagers are poor farmers and lack basic facilities. Over the years, their crops, livestock, and houses were repeatedly swept away by floods. Consequently, floods have reduced the villagers' asset base, increasing their vulnerability every year, and put their lives at risk. The villages are in serious danger of being swept away by the swirling waters of rivers in spate.

The most significant factor causing river bank erosion is the flow of a large quantity of silt in the river. The rivers must be desilted, and the inflow of silt must be prevented on an urgent basis. The rivers are becoming shallower due to siltation, further restricting their water carrying capacity. In some places, spurs are constructed to save a particular village or area, unintentionally endangering other villages. The lifting of sand from the riverbed also abets the process of change in the course of the river. However, the single largest factor responsible for accentuating the problem of erosion is the environmental degradation in the catchment areas of rivers.

Fig. 12.2
Heavily eroded bank after the 2008 flood

Government efforts to check erosion of riverbanks include short term measures like stone patching, construction of spurs, and stacking up sand bags. However, there is no systematic effort to find a long term solution to the problem.

The Dhoyia Anchal Vikas Parishad organised a grand rally and staged a *dharna* in front of the sub-divisional office (irrigation) on 28 December 2009. Similarly, the

affected communities and villagers of Nilakanthapur protested against the government several times.

The major concern in Pattamundai, Rajnagar, Aul, Rajkanika and Mahakalpara blocks of Kendrapara district today is the erosion of riverbanks, displacing at least 100 families every year.

Presently, a large number of villages and human dwellings are under severe threat. The impact of erosion inflicts permanent irreparable loss on the people. A number of villages are in danger, and thousands of acres of agricultural land is damaged. Short-term measures implemented by the Irrigation Department to check erosion of riverbanks are not sufficient. However, such non-effective measures of bank protection continue to be practiced by the department. This has become an annual ritual benefitting some contractors.

Villagers watch with fear as the rivers edge towards the village, flooding the banks, the agricultural fields and houses. Inch by inch, the river swallows everything. People are unable to do anything about this impending crisis. They can't move to an alternate location either. Yet, the government does not recognise the gravity of the problem. Meanwhile, the scale and intensity of riverbank erosion is continuously on the rise, which could be causing the largest displacement in Kendrapara district. This is leading to conflict and mass protests by people across the region.

Table 12.1: Chronology of events

1975	During high floods in the Brahmani, 5 large breaches occurred in the 18 km ring road.
1975	10 Spills constructed by the government.
1975	For the first time, the affected families filed a case and challenged the government.
2007	The protest was active again.
2008	Dhoyia Anchal Vikash Parishad was formed and organised a protest.
2009	A diverse representative group comprising journalists, political persons and intellectuals presented a memorandum to the state government demanding a long term solution and plan.
2010	The state government sanctioned money and work for stone packaging and spill construction around vulnerable villages.

Current status of the conflict

The river bank erosion problem and protests by the people continue. The villagers affected by erosion have voiced their anger against government apathy in formulating a mechanism to stop the rivers from washing away shores and land. Every year, the protests have been attracting huge public participation. They have submitted several memorandums of protest to the state government. However, the government has not responded to work out a permanent solution. Some political leaders, journalists, sarpanchs, zilla parishad members, intellectuals, and educationists have joined the movement. More than 500 families of Nilakanthapur and Srirampur gram panchayats have lost their properties and fertile land due to river erosion in the last half century. Now they are staying on government land.

On one hand there is loss of property, and on the other an increasing concern for rehabilitation. The river erosion victims have so far been denied their right to rehabilitation. The affected population can rightly be treated as environmental refugees, and the demand for rehabilitation cannot be called unjustified. The affected communities are demanding a compensation package and a permanent solution towards checking river erosion. The villagers are unhappy with the government's efforts to stem erosion. This is fuelling the conflict and protests by people. Instead of waiting for the imminent disaster, something must be done to save thousands of people from the danger at their doorstep. Unfortunately, even after six decades of independence, there is no master plan to reduce the distress of the afflicted community.

The high point of the conflict

On behalf of the Dhoyia Anchal Vikas Parishad, a representative group under the leadership of Mr. Jagannath Acharya, journalist, Mr. Subash Das, Sarpanch, Damarpur, Mr. Pradymna Samant Roy, Mr. Utam Khunita of Srirampur and Mr. Madhab Chandra Parida of Balabhadrapur filed a petition against the Government of Odisha.

In 1975 some erosion victims of Nilakanthapur village had filed a case against the government. The court verdict was also in their favour. The protest became active again in 2007 and continues till date. When communities are not included in the decision making processes, they are frustrated and confused. Participation by all stakeholders can only benefit all groups involved in making agreements more sustainable, beneficial and efficient.

Conflicting parties

The farmers and villagers of Nilakanthapur, Nimapur, Sasana, Malipur, Dianpur, Ninpur, Bindhasrirampur, Jagannathpur, Udyapur, Balabhadrapur, Balipatana, Damarapur, Srirampur, Palapatana, Mathasahi, Kadamadandi, Bandhapada, Khandeipada, Madhupada, Badkot etc. are the main stakeholders in the conflict. Also, more than 50 other villages of the Utikana region of Pattamundai, Rajnagar, and Mahakalpara blocks are influencing the government to formulate a mechanism to stop river erosion from washing away shores and the Utikana flood embankment, which is the lifeline of more than 20,000 people of the Pattamundai, Rajnagar and Mahakalpara blocks. Some sarpanchs, zilla parishad members, intellectuals, and educationists have also joined the movement. Local journalists are also part of it. The other stakeholder in the conflict is the state government itself.

The opposing stands

Over the years, bank erosion has sapped the backbone of many families and there is a constant fear among people about loss of precious land. The victims of erosion want rehabilitation and sustainable livelihood options. Locals have persistently made pleas for safety measures.

Fig. 12.3
Agricultural land slowly being lost to river bank erosion

However, except a few short term measures during high floods, not much has happened. The authorities concerned have not done anything to address the problem of river erosion looming over the residents of the area. Unless the rivers and their basins are managed, these human settlements may lose their geographical identity in coming years. Despite the gravity of the situation, there is no action plan to check the trend.

The limited government land was used by communities and individuals on a first-come first-served basis. The use of this land was not based on ownership, and some areas were even reserved for use by the irrigation department. However, over the years, there has been complex interaction between ownership rights and use rights. In most cases, increasing pressure on land has decreased the importance of community rights but enhanced the significance of individual ownership of land.

The erosion victims migrate to other places losing everything to the river. The skill and experience of the displaced population in agriculture help them to start a new struggle for survival. The refugees lead their life under the shadow of poverty and insecurity. Erosion and subsequent homelessness lead to a significant increase in the number of people available for agricultural labour.

Nevertheless, the affected communities continue to regard land, agriculture, field, pasture and water as God-given resources to which they should have unlimited access. Also, the total cultivable land is shrinking due to land degradation resulting from erosion. This problem has limited the land operations of the farmers and victims, leading to heightened conflict. Government welfare scheme are also not available to them, which aggravates the situation.

Earlier efforts towards resolution

The concerned department and local administration has made a plan to resolve the conflict. The administration has taken necessary steps by sanctioning 5 km stone package around the village of Srirampur. Similarly, Nilakanthpur village got two new spurs and a stone package around their villages. However this practice of constructing spurs to save a particular village or area endangers other villages. A long term solution is needed.

Scope for dialogue

When it comes to water conflict in particular, community participation is crucial. Local communities affected by river erosion need to negotiate with their local administration and the government. Stakeholder forums should bring both affected communities and vulnerable communities together, which requires careful and strategic approaches to negotiation. The restoration process needs to be devolved to empower the poor. Stakeholders should work towards the rehabilitation process and the resolution of the conflict in favour of affected groups. However, not much attention has been paid to the issue.

Way forward

To summarise, water is a precious yet vulnerable resource, which requires effective management. This study revealed that the continuous loss of fertile, high valued land rendered at least 200 families landless every year. The erosion is also a subject of conflict between land owners. There is also a considerable loss in irrigation units. River bank erosion led to a loss of biodiversity and aquatic habitat. An improvement in the condition of rivers is needed to ensure that the flood waters get released into the sea over a prolonged period. Suitable trees and shrubs for bank erosion control are suggested. The bio-engineering control methods can considerably protect the river banks from further deterioration. Another suggestion is to reduce the devastating effects of recurrent flash floods and erosion in the Brahmani river by planting local trees and grasses, deploying other land protection technologies, and encouraging the natural regeneration of vegetation. Plantations, especially of bamboo, in the breaching points of the river, will also contribute significantly towards preventing river bank erosion and flooding. This would be an environment friendly and cost-effective technology. To combat the crisis, erosion control is necessary and must be technically suitable, cost-effective, people-oriented, sustainable and environmentally safe. Sensitive management of the riverbank is therefore vital. Indeed, it must be appreciated that it can be more cost effective to work with nature rather than to fight against it. Current uncertainties over possible climate change and natural disasters point to the need to safeguard riverbanks.

Key institutions and people

The following institutions and persons are working towards the resolution process:

1. Dhovia Anchal Vikas Parishad, Nimapur Sasan, Pattamundai

2. Jagannath Acharya, reporter, The Sambad, an Oriya daily newspaper At/Po-Pattamundai, Dist-Kendrapara

3. Subas Dash, Sarpanch, Damarpur Gram Panchayat At/Po-Damarpur, Via-Pattamundai, Dist-Kendrapara

4. Birakishore Das, Ex-Sarpanch, Nilakanthapur Gram Panchayat At/Po-Govindpur, Kadaliban, Dist-Kendrapara

5. Binod Bihari Das, At/Po-Nilakanthapur, Sandhapalli, Dist-Kendrapara

The issue of river bank erosion has always played a major role in the general elections. There was a flurry of negotiations between politicians and people in the area. The 2008 and 2011 floods have added a new dimension to the situation. As elections approached, the standing member of Legislative Assembly (MLA) sought to build up his vote bank by trying to get the people to compromise. The effort failed, and in the meanwhile, the situation worsened. Political parties seem to facilitate the growth of the conflict!

Informants for the study include the octogenarian Mr. Dibakar Roy, a retired school teacher of Nilakanthapur, who informed us in detail about the issue. Mr. Nabaghan Roy from Nilakanthapur described the demography of Nilakanthapur. We also gathered information from older persons, journalists.

Case Study 13

13

KELUA BADA GENGUTI DELTA REGION:

Waterlogging causes a perennial flood like situation

Bamadev Padhi

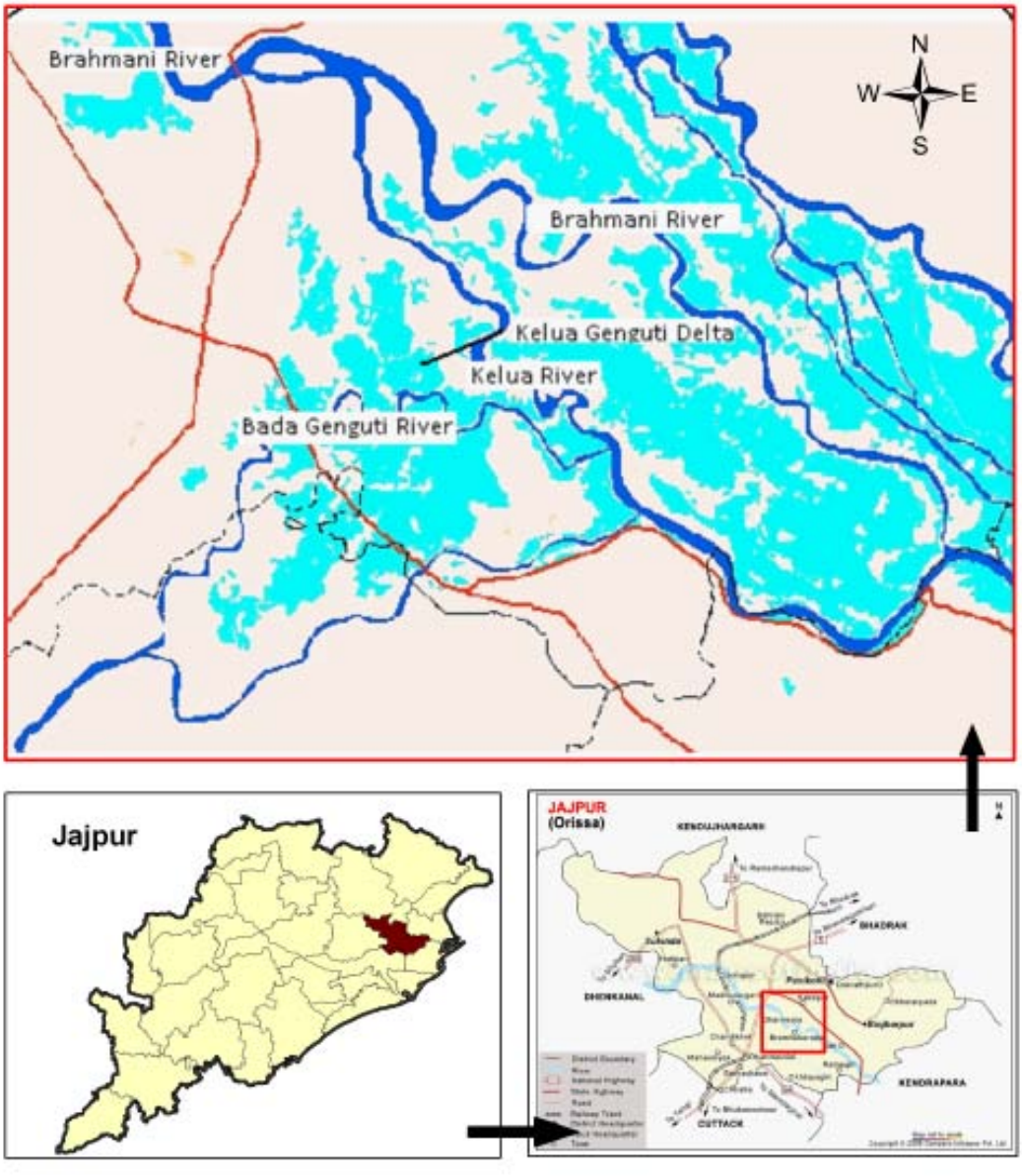


Fig. 13.1
The Kelua Bada Genguti delta region affected by waterlogging

Jajpur district lies at 20^0 43'- 21^0 N latitude and 85^0 40' - 86^0 44' E longitude. Once a part of the Cuttack district of Odisha, Jajpur has always been affected by natural calamities, mostly floods, as major rivers including the Baitarani, Kani, Kharasrota, Budha, Badagenguti, Brahmani, Kelua, and Birupa flow through the district. These floods have been a major cause of financial distress for the people of Jajpur.

Disruption of communication networks due to floods prevent the people of Jajpur from assimilating within the mainstream population. A lack of political will as well as the lack of a vision of how to mitigate the situation adds to the burden of floods. The blocks affected by floods in Jajpur are Barachana, Dharmasala, Bari, Binjharpur and Dasarathpur. Some other blocks are also partly affected. This case study relates to flood waters and the natural drainage system, waterlogging, embankment, delivery system and encroachment in Barchana and Dharmasala blocks which are often affected by floods. Kelua Bada Genguti Delta occupies a large portion of the Barchana and Dharmasala blocks.

Background

Kelua, a branch of the Brahmani river, originates from Bedpur in Dharmasala and flows eastward till it merges with Bada Genguti near Banamalipur of Barchana block. Bada Genguti, a branch of the Birupa river, originates from Triveniswar in the Mahanga block and flows in the north-east direction to merge with the Kelua. After the confluence, the river flows south-east to meet Birupa near Kharagpur of Barchana block. Thus, both rivers create a delta where people of 19 panchayats have been living in hardship. Their hardship escalates during the monsoons when these rivers flood. The panchayats which lie in this delta region are Champapur, Bada Ghumuri, Radhadeipur, Majhipara of Barchana block, Kotapur, Areikana, Kadampal, Patunia, Patapur, Mirzapur, Kantigaria, Khetrapal, Neulpur, Sundaria, Kaima, Abhayapur, Jaraka, Choramuhan and Bhuban of Dharmasala block. Around 2 lakh people and livestock are affected by waterlogging problems in this area. Internationally famous Buddhist monuments, relics, rock edicts, ancient findings and archaeological excavations are located in the area. In addition, the region is adorned by hills, rivers and natural forests which enhance its natural beauty. Farming is the main occupation. Some residents also engage in trade or service.

The conflict

The Sana Genguti, Ransala, Sagadia and other small rivulets also flow through this region. Kelua has a K-26 embankment on its right side. As a result, when the river is in flood, much of the water does not flow into the area. However, people are affected severely when the Bada Genguti river is in flood in the rainy season. There is no embankment on the left side of the river, though the right side is well protected by an embankment. As a consequence, the entire area of villages like Patania, Arikana, Kadampal, Kotpur, Kantigadia, Mirzapur, Patpur in the Dharmasala block are affected, while villages under the Badachana block are partially affected. The problem is exacerbated when the rivulets deliver their water into the Bada Genguti river. A vast stretch of land spreading over 18,000 acres is waterlogged due to the lack of a drainage and delivery system. Waterlogging has created a vast marsh and bog in the delta area which results in a loss of fertility and productivity, along with the loss of pasture. This situation creates multiple problems related to health, hygiene, agriculture, economic backwardness and communication. In spite of frequent demands for a permanent solution to this problem, the government has not made any efforts towards resolving it.

There are several instances of people coming together to protest against the lack of political will to deal with the floods and waterlogging. On 26 October 2008 a protest meeting was organised on behalf of the Genguti Sagadia Sangram Samiti to put pressure on the government to find a permanent solution to the problem. In this meeting, the Samiti resolved to protest against the indifference of the government. On 23 November 2008, another meeting was arranged by the Genguti Sagadia Sangram Samiti to raise public awareness to fight against the silence of the administration.

Old roots of the conflict

The conflicts due floods and waterlogging date back to the period of construction of an express highway (now the National Highway No. 5-A from Daitari to Paradeep) in the 1960s. Due to the construction of the highway, the problems of building a delivery system and preventing waterlogging were completely neglected. There was a demand for an extensive survey of the flood situation and the problems of waterlogging and the lack of a delivery system in the area. However, not much was done to address these issues. When the government decided to protect the Birupa Genguti island by constructing an embankment (now K-26) on the right side of the river, there was an agitation due to fear of flooding on the left side of the river. The dispute was examined by the Technical Advisory Committee (TAC), Government of Odisha which decided that in order to address the problem of the Kelua-Badagenguti delta, the flood protection embankment would be constructed on the left side of the Bada Genguti River. However, this decision was never actualised. The government has constructed patches of Test Relief Embankments (TRE) on the bank of the river which have addressed the problem. The government has also constructed sluice gates at the confluence of the Sana Genguti and the Bada Genguti near Banguru Guntha of the Barchana block, and at the confluence of the Sagadia and the Bada Genguti near Dharmasala block. However, instead of addressing the problem of the lack of a delivery system, the sluice gates are creating waterlogging problems because of technical inadequacies. Small canals which help in water delivery have been affected by encroachments, landslides and silting. These problems intensify waterlogging and floods. There is no proper maintenance of the sluice gates and other natural delivery systems. Since the problems are gradually becoming insurmountable in the rainy season, deliberate and artificial breaches are made by the flood affected people. Thus the problems of floods, waterlogging, soil erosion, tension among various villagers, loss of agricultural area, and expansion of the marsh are mounting day by day. The conflict needs to be addressed as early as possible in a planned manner.

What needs to be done

Finding a solution to the problem requires political will and strategic planning. The long standing demand of the people that an embankment should be constructed on the left side of the Bada Genguti has to be fulfilled. This will protect the Delta area from flood waters. The sluice gates have to be properly managed and improved to make the delivery system easier to implement. Parallel embankments and sluices on the rivulets flowing in the area have to be constructed. The creation of

reservoirs in these rivulets can solve the problem of scarcity of water in the summer season. Canals which have silted up should be drained. Overall, proper management of the water of the rivers and rivulets in a systematic manner can solve this long standing problem.

If the problem is properly addressed, precarious floods can be avoided. The delivery and drainage system will operate smoothly. The problem of waterlogging will also be solved. This will pave the way for sustainable agriculture in the area. It is well established that the land is highly fertile and productive because it is located in the river basin. Soil management and land utilisation will enable the farmers to grow various kinds of crops. The major crops at present are paddy and groundnut. However, these crops fail drastically each monsoon, causing a disastrous situation for farmers. When the problems of waterlogging and floods are addressed, the prospects for agriculture will substantially improve. It will create opportunities to grow vegetables, pulses, gram, spices, banana and flowers in the region, as the land is suitable for growing these crops. The water can also be properly managed for the development of pisciculture. This will enhance the living standards of the people of the region and ultimately help the economy of the state.

Kelua, Bada Genguti delta, the region described in this case study, needs the attention of all stakeholders to find a solution to the problems discussed. These problems cannot be addressed by NGOs since state funding and institutional planning is required. In other words, the conflict requires only the intervention of the state government. There are no opposing stands by various parties as the problems are of a general nature and need the attention of the government. The district administration and the Department of Water Resources, Revenue and Disaster Management are well aware of the problem. If the NGOs and the Government come together and work in tandem, the problem of the delta which is causing distress to the people of this area can certainly be redressed.

Case Study 14

14

INDRAVATI DAM

Impact of on agriculture and livelihoods in undivided Koraput district

Nrusingha Nanda Panigrahy

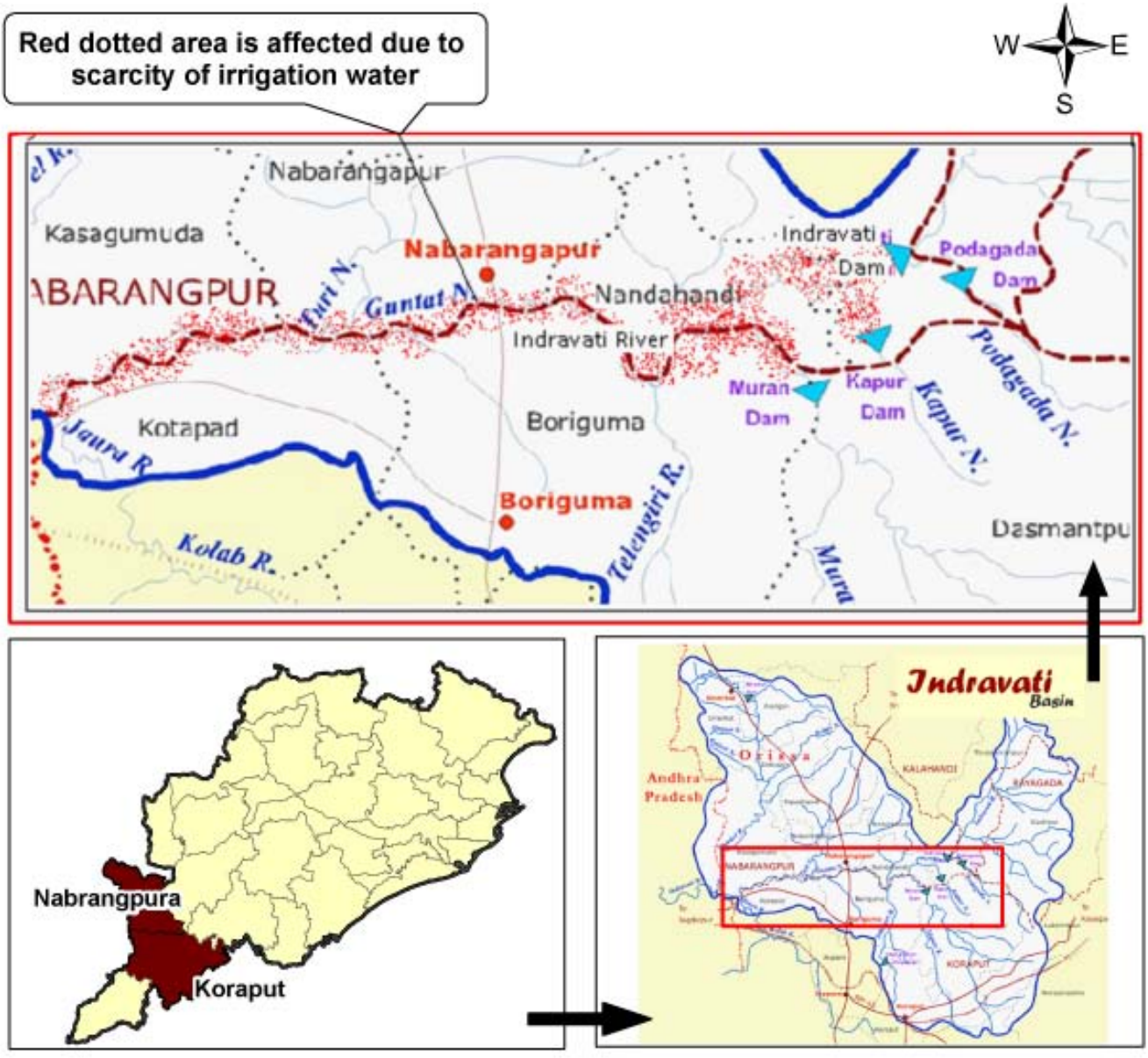


Fig. 14.1
The Indravati reservoir and the affected area

Brief description

The Upper Indravati Hydroelectric Project is a multi-purpose river dam project situated at the trijunction of Koraput, Nabarangpur and Kalahandi districts in the south-western part of Odisha state. It lies between 18^0 5'N and 20^0 0'N latitudes

and at 82^0 30'E longitude. The main purpose of this project is electricity generation and irrigation. The reservoir on the Indravati river is near Deopalli village (Khatiguda) in the Tentulikhunti block of Nabarangpur district. Three other dams are also constructed on the three tributaries of the Indravati river, i.e. Podagada, Kapur and Muran rivers. These four dams, i.e. Indravati, Podagada, Kapur and Muran, together form the reservoir. The project envisages the inter-basin transfer of water from the Godavari basin to the Mahanadi basin by way of construction of these four dams and eight dykes to form a single reservoir connected together through two high link-channels, stretching up to an area of 110 square km, and designed to irrigate 109,300 hectares (later revised to 128,000 hectares in 1994) of agricultural land and generate 600 Mega Watt (MW) of electricity.

Background of the conflict

The Maharaja of Kalahandi, Sri Pratap Keshari Deo thought of this project to increase the green cover in the drought prone district. A detailed project report was submitted in 1963. In 1964, a revised project report was submitted. A final decision could not be taken due to delay in the receipt of the Krishna-Godavari (K-G) commission report. After receipt of the K-G commission[1] report, it was sanctioned in 1978. The foundation stone was laid by the then Prime Minister of India Mr. Morarji Desai on 10th April, 1978. Though this project was approved by the Planning Commission in 1978 and had obtained an environmental clearance in 1979, full- fledged construction began only after the World Bank's assistance was obtained in 1985 (Garg, 1998). The inauguration event was attended by the then Steel and Mines Minister of India late Biju Patnaik, and the then Chief Minister of Odisha late Nilamani Routray. The Chief Minister had declared in the meeting that 3 lakh acres of land of Kalahandi district will be irrigated by the project. It was not clear whether water would be available for irrigation and drinking purposes in Koraput district, situated downstream from the Indravati reservoir. This sowed the seed of conflict.

Environmental impact studies

Before construction of the project, an environmental impact study was carried out by the Department of Science and Technology, Government of India. According to the study, the major impacts of the project were submergence of flora and fauna, submergence of 105 villages affecting 20,000 people in undivided Koraput district, and development of pisciculture. There were no other major environmental implications highlighted.

Due to public resentment and political debate surrounding the project, as described later, the Odisha government commissioned another environmental impact study during the construction of the project in 1994, under the chairmanship of Mr. Harza. The report of the Harza Committee provides a different picture of environmental impact than the previous study. The major thrust of the study by the Harza Committee was on the downstream population. The Committee studied the probable impacts on the downstream area and reported as follows:

[1] An inter-state river water dispute commission was set up to consider the river water distribution between the states of Odisha, Andhra Pradesh, Madhya Pradesh and Maharashtra

1. After completion of the Indravati dam, the downstream area will face water scarcity.

The most affected area will be up to 35 km downstream of the Indravati dam, i.e. up to the confluence of the Telengiri and Indravati rivers.

Its effect will be slightly reduced in the next portion up to 80 km downstream, i.e. up to the confluence of the Turi and Indravati rivers.

2. Seventy lift irrigation points may have to be closed.

3. The fertile land of Nabarangpur, Kotpad and Borigumma area may not get adequate water.

4. Fish production will be affected, as also development of animal husbandry.

5. There may be drinking water problems in this area.

6. The dispute between Odisha and Chhattisgarh may increase after the release of water. Odisha may not be in a position to release the stipulated 45 Thousand Million Cubic Feet (TMC) of water.

To mitigate the adverse effects, the Harza committee had the following suggestions:

1. Release 7 cumecs of water from the Indravati and Muran dam to the downstream area throughout the year.

2. Construct all minor/medium irrigation projects, as assured by the central and state governments.

3. Dig 300 deep bore wells in the most affected areas between the Indravati and Muran rivers.

The 24th Rehabilitation Advisory Committee accordingly took the following decisions in May 1998:

1. Release of 7 cumecs of water was not accepted.

2. Construction of 5 temporary check dams would be undertaken.

3. Digging of 300 bore wells would be undertaken (however, no action has been taken till date).

The conflict

Being a tribal district where education and awareness are lacking, the people of Koraput were not adequately informed about the benefits and implications of the project. The initial impression was that any loss due to the dam will be compensated by the construction of minor/medium irrigation projects. At the time, they had no idea of large scale evacuation, displacement and loss of the precious

forest cover which shapes their livelihood in many ways. Initially, some villagers who were legal owners of their land accepted the compensation given by the government and migrated[2]. Others, particularly the tribal population, whose ownership of land was not in the government records, stayed back and occasionally resisted the construction of the project.

Tuesday, September 08, 2009

Lok Sabha Unstarred Question[4] on Upper Indravati Project

Ministry of Environment and Forest. Lok Sabha Unstarred Question No.5179 Of 11th August, 1992. Upper Indravati Multipurpose Project. 5179.

Mr. Sriballav Panigrahi, MP: Will the Minister of Environment and Forests be pleased to state :- (a) Whether environmental clearance has been accorded to the Upper Indravati Multipurpose project of Odisha; (b) If so, the conditions prescribed at the time of granting clearance and how far they have been implemented; (c) Whether any environmental impact study has been concluded recently by the this government in this regard ; (d) If so, the outcome thereof ?

Answer: The Minister of State in the Ministry of Environment and Forest. Shri Kamal Nath (a) and (b) Yes Sir, The Upper Indravati Multipurpose Project was accorded environmental clearance in January, 1979 subject to formulation and effective implementation of such action plans as Rehabilitation Master Plan, Compensatory Afforestation Scheme, Anti-Poaching Measures etc. (c) and (d) The Project authorities have taken up studies and surveys on various environmental aspects for evolving comprehensive Environmental Management Plan.

The movement gathered momentum in the early 1990s, but by then almost half of the work was complete. Under the banner of the Indravati Gana Sangharsha Parisad (IGSP), the protesters started demanding better compensation. The IGSP continued to protest in a sporadic manner in the first half of 1990s and managed to get some concessions for better rehabilitation measures from the government, but remained silent afterwards[3].

This issue also drew the attention of political parties, and the debate continued sporadically for a decade both at the central and state level.

Chronology of events

1) In 1968, the central government framed the Krishna-Godavari tribunal headed by Supreme Court Justice Mr. J. Bachawat to sort out the inter-state river disputes of Mysore, Maharashtra, Andhra Pradesh, Odisha and Madhya Pradesh. On 1st November, 1975 the then central minister late Jagjivan Ram discussed the matter with the then Chief Minister of Odisha late Nandini Satpathy and the Chief Minister of Madhya Pradesh late P.C Sathi, and signed an agreement on 9th December, 1975. As per the agreement, out of 204 TMC of water in the Indravati river, 91 TMC shall be stored in the Upper Indravati Dam for hydro-electricity production and irrigation in Kalahandi district, 45 TMC water shall be released to Madhya Pradesh, and the remaining water shall be utilised by the people residing downstream of the dam in Nawarangpur and Koraput districts.

2) The Prime Minister of India Late Morarji Desai declared on 11th April, 1978 at Koraput that a number of irrigation projects will be executed shortly, to meet irrigation needs of the downstream population in Koraput district.

3) In 1978, the Central Irrigation Minister V.C. Shukla declared in the Parliament that a number of irrigation projects will be undertaken downstream of the dam.

4) Mr. Khagapati Pradhani, sitting Member of Parliament (MP) from Nabarangpur, apprehended that the region may become drought prone due to the construction of the dam. He raised a question in the Parliament in 1992.

5) In 1994, Mr. Habibulah Khan, Member, Legislative Assembly (MLA),

[2] "Rehabilitation of Indravati Development Projects: Myths and Reality", Sun Times, 31st March 1992.

[3] Sambad, Odia Daily, 1st December 1991.

[4] In Parliamentary debate, an unstarred question is one of three types of questions asked by members and answered by a minister in the question hour for which a written answer is required.

Nabarangpur raised the issues of releasing water for the downstream population and rehabilitation in the Legislative Assembly and also in the Rehabilitation Advisory Committee.

6) Mr. Habibullah Khan also filed a public interest case on issues like displacement; environmental imbalance and water release to the downstream area in the Honourable High Court vide case No. OJC 5111/94.

Non-fulfilment of various provisions

As per the final order of the Krishna - Godavari tribunal (Clause III- iii - use and measurement), the use of domestic and municipal water supply within the basin shall be 20 percent of the quantity of water diverted or lifted from the river or any of its tributaries or from any reservoir storage or canal (i.e. the measured water as per the final order of the tribunal). As per the final order, 20 percent of 75 cumecs which is equivalent to 15 cubic metres of water per second should be released in the Indravati river. The Harza committee had suggested a continuous release of 7 cumecs of water from the Indravati and Muran dam, and also the construction of all five irrigations projects as agreed to by the state and central governments. However, these prescriptions have not been followed, and there is scarcity of water downstream of the reservoir. By stopping the flow, the downstream people are deprived from using river water, which is an infringement of their riparian rights.

As per the State Water Policy 2007, the priorities for use of water are as follows:

i) Drinking water and domestic use, i.e. for human and animal consumption

ii) Release of water in rivers for maintaining sustainability of the ecology.

iii) Irrigation, agriculture and other related activities including fisheries

The first two priorities have not been fulfilled. As per the State Water Policy 2007, inter-basin transfer of water from surplus areas to deficit areas will be planned if it is confirmed that the affected Nabarangpur and Koraput districts are water surplus areas. The preparation of the project plan has also not taken into account the ecological requirements for the flow in the river.

According to former legislator and state Congress vice-president Sadan Naik, "The State and Central governments have violated the riparian rights of people in the downstream areas of Nabarangpur district during the implementation of the Upper Indravati Project." He said that the Indravati hydro-electricity project, which was started in 1978 and completed some years back, made the downstream tribal-dominated Nabarangpur district dry. He said the water of the Indravati and its tributaries, the Padagad, Kapoor and Muran, was diverted to the Hati valley after producing 600 MW of power and irrigating 101,000 hectares in the Kalahandi district.

The diversion of all the water to the Hati valley in Kalahandi agitated the people of Nabarangpur. To cool off the frayed tempers, irrigation from the Indravati project was promised, but 30 years have passed and nothing has been done in this

regard," said Naik. "The government is planning to increase the irrigated area in Kalahandi to 128,000 hectares. This would require an additional 20 MW of power which will be generated using water of Nabarangpur district. Under these circumstances, there would be no water left for people of the district." Naik threatened an agitation if the issue is not addressed at the earliest.

Issue concerning displacement and rehabilitation

Due to the construction of the dam, 5,448 families (a total population of about 17,000) have been displaced from their homes. A total of 97 villages (44 from undivided Koraput and 53 from Kalahandi) have been affected, with 65 villages fully submerged. Of these villages, 31 are from Koraput and 34 from Kalahandi. Moreover, the project acquired 32,530.87 acres of land, i.e. 17,137.97 acres from Kalahandi and 15,388.9 acres from undivided Koraput district [5]. The details of various types of land submerged are provided in the following table:

Fig. 14.2
The Indravati reservoir.

Table 14.1 Lands submerged by the Upper Indravati Project

Land type	Submerged land (ha)	
	Kalahandi	Koraput
Private land	4,647.83	3,277.30
Forest land	362.54	1,193.28
Govt./ Revenue land	1,844.82	1,664.98
Total land	6,855.19	6,135.56

(Source: RRU, 1995)

Displacement from the 65 villages to be completely submerged started in 1989 and 10.68 percent evacuation took place in 1989, 16.85 percent in 1990, 21.68 percent in 1991, and 38.02 percent in 1992. No evacuation was planned in 1993. Nevertheless, 9 percent evacuation took place that year (RRU, 1995). Of the total 3,725 families displaced, 1,630 families are ST, 338 families are SC, and 1,557

[5] Rehabilitation and Resettlement Unit (RRU), 1995, Community Based and Family Oriented Rehabilitation Action Plan of Upper Indravati Project, Kathiguda, Department of Engineering, Odisha.

families belong to the general category (Dalua, 1993). The rehabilitation and resettlement (R&R) benefits were extended to the project displaced families in four different packages. The reservoir of this project not only caused displacement of human settlement, but also caused communication problems, and problems for a few small-scale industries (Swain, 1996). Most of the displaced are illiterate tribals living in the forests. It is worth noting that this project was initially funded by the World Bank, but after a couple of years of funding, the World Bank withdrew its funding from the project on the grounds of poor rehabilitation activities.

After seven years of the project, Mr. Akhil B. Ota had undertaken a study to examine and assess the status of rehabilitation of the project affected people, and specifically, to note whether they were restored to their pre-displaced living standards at the minimum. According to him, "The displaced families of the Upper Indravati Project have failed to restore and reconstruct their former standards of living; rather they have further become impoverished and slipped below the threshold of poverty in the post-displaced stage." (Ota, 2001) Comparative analysis of data between the pre-displacement and post-displacement stage indicates that a majority of the affected people have become relatively landless, homeless and in most cases have lost access to common property resources as well. The social fabric has been frayed and job opportunities have dwindled, marginalising the affected population.

Rehabilitation policy

For resettlement, the oustees were given the option to create their own relocation site near the submergence area. The people settled around the reservoir. 560 clusters were created and distributed over 19 blocks (RRU, 1995). The government provided the oustees 2.5 acres of non-irrigated or 1.25 acres of irrigated land. On a total of 5271.10 acres of land, 5343 families were identified for resettlement and rehabilitation in the command area (Behera & Patel, 1997). The displaced persons have chosen cash-based rehabilitation assistance, so every eligible person was given cash to purchase agricultural land, homestead land and for house construction. Further, the project-displaced families in all four phases received a monthly maintenance allowance of Rs. 500 for one year after being evacuated from villages facing submergence (Ravindran et al., 1998).

Private land owners were compensated for their houses, trees, wells, ponds, etc. in cash. For a fair assessment of the assets acquired, a particular asset was classified into different types, and the compensation was calculated on the basis of their market value. Recipients of compensation have expressed their dissatisfaction regarding the rates fixed by the project authorities, which they felt were not at par with the prevailing market rates. In fact the rates determined were actually lower than the replacement value of the acquired assets which is why most of the oustees after resettlement were not able to buy the required lands for agriculture. Therefore, the average landholding was reduced compared to the pre-displacement period. The reasons for dissatisfaction, as brought out from the focus group discussions with the displaced persons, are as follows:

(a) They were dissatisfied as the valuation of their land was based on registered sale deeds which are often less than the actual market price. Besides, in the tribal

and remote areas, sale of land is almost nonexistent. In such cases, the sale price of the land in the nearest village was taken into consideration while fixing the amount of compensation for these people. In some cases, prices were also arbitrarily fixed;

(b) Valuation of land based on the type of land recorded in *pattas* was faulty. In cases where there is no *patta*, especially in the case of tribals, it was difficult to judge the quality of land based on the revenue records;

(c) Lands were not classified properly, and the prices of houses and trees were not calculated impartially. The oustees also complained about improper surveys and measurements of houses, wells and ponds by the project authorities; and

(d) Sometimes compensation paid at old rates could not be utilised to replace the assets.

Changes in economic conditions after displacement

Most people displaced by the Upper Indravati projects were tribals. The tribal economy is closely linked with the forests. This subsistence agricultural economy has largely been supported through the collection of forest produce. In the tribal districts of Kalahandi, Nabarangpur and Koraput, the forests are an important source of food, fuel, fodder and other household items of daily use. Earlier the people bartered the produce, which is not possible in the new settlements. Collection of forest produce used to be a regular feature. Except during the rainy season, women used to regularly visit the forest for collection of fuel wood, seasonal fruits, roots and green leaves. Most of the produce collected was consumed domestically, while the surplus was sold. The establishment of projects has caused destruction and submergence of forested areas. The people are resettled in plain lands reclaimed from forests and thus they are deprived of free access to forests. The economy of tribals, which was once built on forest wealth, could no longer depend upon it. There has been a sharp decline in forest produce collection due to involuntary settlement. There is a reduction in the collection of minor forest produce from 96.48 percent to 87.20 percent and in the collection of other commercial items from 31.44 percent to 6.92 percent in case of the Upper Indravati Project (Ravindran et al., 1998).

Now they have to buy most of their essentials from the market, unlike in the past, where they could get them from the environment. Lacking a permanent source of income, and having to make do with meagre incomes, meeting their daily needs has become increasingly difficult for the affected people.

Dwindling agriculture

Damming of water of four rivers has deprived the downstream people of water for irrigation, drinking, ecology and other consumption, thereby making the region drought prone. The downstream area of the Indravati river was earlier known as the rice bowl of undivided Koraput district. However, after construction of the Upper Indravati reservoir, the water flow downstream of the river reduced substantially, and is insufficient to meet the requirements of the people.

Now, the moisture and nutrients in the agricultural land are not replenished by monsoonal inundations. Because of this, the cropping pattern has changed. Cash crops like tobacco, sugarcane, pulses and vegetables have gone out of cultivation. The water table has gone down and the tube wells and lift irrigation points in the area have become useless. The cattle population too is affected, for the rivers were their main source for drinking water and for bathing. Problems of waterlogging and salinity are causing damage to the existing crop area and creating health hazards in the proposed irrigated area, which have not been studied or assessed till now. Though the project brought some changes in the agricultural sector in the comparatively better-off plains region of Kalahandi district, the famine stricken area does not fall in the command area of the project.

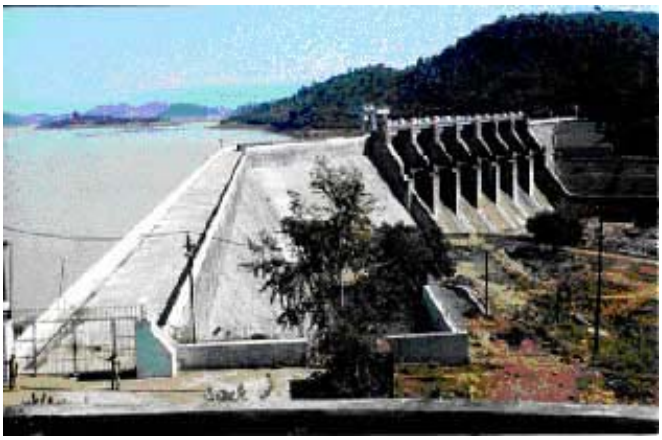


Fig. 14.3
The Indravati dam

The following development indicators point to the poor condition of the affected people:

Irrigation in four blocks, i.e. Dasamantapur block of Koraput district, and Tentulikhunti, Nandahandi and Nabarangapur blocks of Nabarangapur district is very less than the state average.

79 lift irrigation points have become defunct. The drinking water problem has increased.

1871 families of Nabarangpur and 1043 families of Koraput district have been displaced.

48 villages of undivided Koraput district have been submerged.

2983 acre forest area has been destroyed for construction of colonies and non-residential buildings. 1572 hectares forest area has been submerged.

The inter-state river dispute between Odisha and Chhattisgarh has been exacerbated.

Most affected people are tribals.

Conclusion

The construction of the Upper Indravati Project on the Indravati river and its three tributaries, which has restricted the flow of water downstream of the river, is a violation of riparian rights, the Krishna-Godavari tribunal award, the state and national water policy and the Harza Committee report. If we look at the normative concerns about the issue outlined in this study, it is not acceptable that in order to save a few people, many others have to face a disastrous situation. The forest is the natural dwelling place of tribal people, and any developmental intervention that displaces them from this natural setting is a clear breach of the principle of natural justice. In this case, injustice has already been done to thousands. Natural justice

can only be restored if the government implements suitable measures for the larger benefit of the affected people.

The government should rectify the injustice done to the people of undivided Koraput district by releasing at least 15 cumecs of water in the Indravati river, and also ensuring irrigation to the area by constructing 5 medium irrigation projects.

References

Behera, D.K. and S. Patel, 1997, Trapped in the Development Wrap: The case of the Project Affected Parjas of Indravati River Valley In Odisha, India. Journal of Social Science, 1(2): pp. 113-123.

Dalua, A.K., 1993, Environmental Impact of Large reservoir Projects on Human Settlement, New Delhi: Ashish Publishing House.

Garg, S., 1998, Resettlement in the Upper Indravati Project: A Case Study. In H.M. Mathur and David Marsden (ed.) Development Projects and Impoverishment Risk, Delhi: Oxford University Press

Ota, Akhil B., 2001, Reconstructing Livelihood of the Displaced Families in Development Projects, Causes of Failure and Room for Reconstruction, Anthro Base Home. http://www.anthrobase.com/Txt/O/Ota_A_02.htm

Ravindran, L., P.K. Panigrahi and A.K. Mohanty, 1998, Comparative Analysis of Economic status of people before and after Displacement in Odisha's Upper Indravati Project, ASCI Journal of Management, 28 (1): 80-100.

Swain, A., 1996, Connecting Social Capital with Democratic Protests: Three Popular Movements in India against Big Dams, Democracy and Social Capital in Segment Societies, Agora Project, Sweden: Uppsala University.

Swain, A., 2006, Social Capital and Popular Mobilization: Studying Environmental Protests in an Indian State, Asian Journal of Political Science, 8:133-46

Case Study 15

15

THE LOWER SUKTEL CONFLICT: Delayed R&R, and a threat of water theft by industry

Sanjaya Kumar Mishra

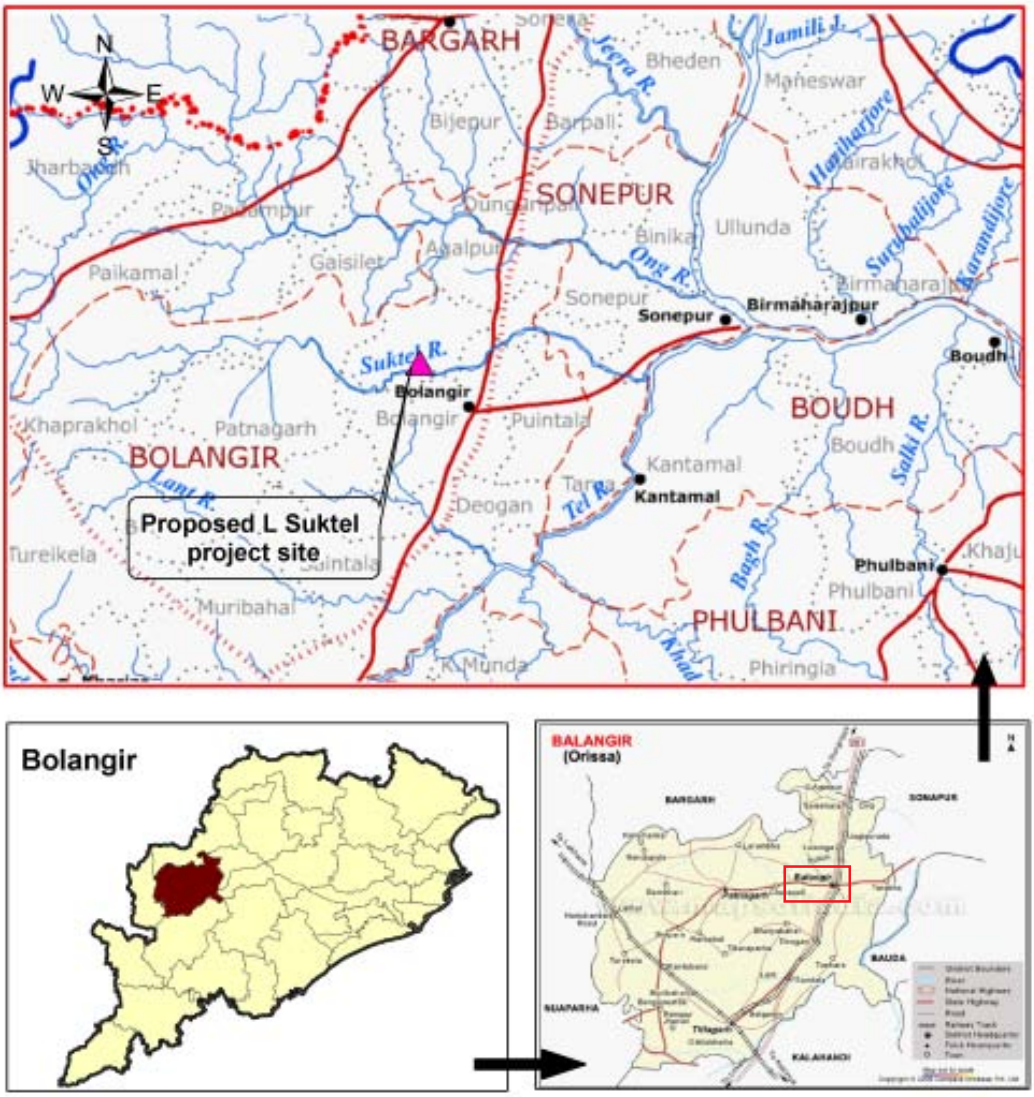


Fig. 15.1
Location of the Lower Suktel project and study area

The Lower Suktel Irrigation Project on the Lower Suktel river, planned in the late 1990s, is one of the forthcoming major irrigation projects in Odisha. It aims to provide irrigation and potable water to the drought prone district of Bolangir. The proposed dam shall be built on the Jhareidunguri hill near the village Magurbeda. A total of 9000 families will be affected by the project. It will submerge 16 villages completely and 10 villages partially, displacing 4160 families including 1222

families belonging to the scheduled tribes[1]. The progress is slow, partly due to the problems pertaining to land acquisition and the payment of compensation. In the absence of any visible resettlement effort on the ground, and fearing an adverse impact of the dam, people have turned against it. The escalating project costs are also unlikely to deliver the expected benefits. The cost estimate for the dam at 1996 prices was Rs. 217 crores. In 2004, it was revised to Rs. 584 crores, and in 2008, the estimate escalated to Rs. 934 crores. At the price levels prevailing after 2012, it would go beyond Rs. 2,000 crores. The Government of India has released Rs. 1,042.81 crores so far for this purpose. As per the present assessment by the Resettlement and Rehabilitation (R&R) division of the Water Resources Development, more than 8000 families will be fully displaced.

Objective of the project

The aim of this project is to provide irrigation to the perpetually drought prone Bolangir and Sonepur districts. The scheme envisages two main canals, the right bank main canal taking off from the right side dyke having a length of 23.84 km and the left bank main canal taking off from the left side earthen dam having a length of 29 km. The total cultivable command area (CCA) of the project is 31,830 hectares in 189 villages in Bolangir and Sonepur districts. On completion of the project, it will also supply 17.89 mcm of drinking water to Bolangir town[2].

Bolangir lies in a drought affected area falling under Kalahandi, Bolangir and Koraput (commonly known as KBK) districts of Odisha. The project intends to provide irrigation, to aid economic development and alleviate poverty. It has been assessed that 29,146 hectares in Bolangir and 2,684 hectares in Sonepur district can be brought under irrigation through the Lower Suktel irrigation project.

In 1998, the Central Water Commission (CWC), New Delhi, had given its clearance for the Lower Suktel Project (LSP). The Chief Minister of Odisha laid the foundation stone on 24 November 2001. Initially, the project works were executed by the Bolangir Irrigation Division. Lower Suktel Circle Office started functioning from 12 October 2001 with two division offices which started functioning from 1 November 2001 and 7 November 2001 respectively. Further, the Lower Suktel Dam Division and the Lower Suktel Quality Control Division started functioning from 9 November 2005, and the Magurbeda and Lower Suktel Canal Division No. II, Loisingha started functioning from 5 November 2005. The Superintending Engineer, Lower Suktel Circle, Bolangir has been re-designated as the Chief Construction Engineer[3], Lower Suktel Project, Bolangir and separated from the control of the Chief Engineer, Lower Indra and Lower Suktel, Nuapada. The Chief Construction Engineer, Lower Suktel Project, Bolangir is functioning from 27 September, 2006 and has been delegated with the power of Chief Engineer. There is also a proposal to create a design division.[4]

Of the 31,830 hectares which will receive irrigation, 29,850 hectares lies in Bolangir district and 1,980 hectares in Sonepur district. The phase II (stage II) forest permission has been sanctioned. The land acquisition work for the project is going on. It has been decided to complete the land acquisition work by the month of October 2011 and the project has been planned to be completed according to a strict time schedule by the end of 2013[5].

[1] Agnihotri, Anita. Resettlement Issues in Water Resources Development: An Empirical Study of the Lower Suktel Irrigation Project, Orissa in Social Change*: December 2008 Vol. 38. No. 4, pages 645-660.*

[2] Manual-1 (RTI), Particulars of Organization, Functions & Duties, [Section-4 (1) (b) (I)], the Department of Water Resource, Government of Odisha

[3] vide Department of Water Resources (DOWR)Order No. FE-III-NG-R&/R-10/06-16405 Dt. 20th May, 2006.

[4] Ibid

[5] Ibid

Socio-economic profile of the affected population

A study conducted by Anita Agnihotri[6], based upon a field survey and interviews of 248 sample households in five fully affected and five partly affected villages covering all sections of society highlights the following facts[7]:

- Number of project displaced families: 248
- Number of displaced persons enumerated based on R&R policy: 521
- Nearly 20 percent of displaced persons belong to the Scheduled Tribes (ST), 29 percent belong to the Scheduled Castes (SC) and 46 percent belong to Other Backward Classes (OBC).
- 88 percent of the displaced persons are in the working age groups of 18-60 years.
- Women displaced persons constitute only 9.22 percent of the total.
- 90 percent of the sample women displaced persons of the project are either illiterate or educated up to the primary level.
- 43 percent males belonging to the scheduled castes, 35 percent males belonging to the scheduled tribes and 21 percent males belonging to the other backward castes are either illiterate or barely literate.
- 50 percent of the displaced persons are cultivators, 3 percent collect forest produce, 15 percent are farm labour wage earners, only 10 percent are in service or professions and nearly 9 percent are in trade and business.
- 72 percent of SC, ST and OBC displaced persons are losing land in the range of 75 to 100 percent of their total land holding.
- Percentage of landless STs and SCs among displaced persons is going up from 78 to 87. In the post-acquisition phase, no SC, ST or OBC person will be having any land. In the land holding size category of 4-10 acres, there are nearly no SC and ST persons. Percentage of SCs and STs with land holding from 0-2 acres will also reduce considerably.
- The average annual income is perceived to decline by 40, 33 and 39 percent respectively for all SC, ST and OBC households after displacement. The annual household expenditure after displacement will come down by 26, 24 and 35 percent respectively for SC, ST and OBC households.

From the analysis of the Project Affected People (PAP) profile itself, it appears that where economic well-being and human development status of the population are already low and weaker sections account for a significant percentage of the population under survey, project displacement is going to affect them substantially by increasing landlessness, and causing decline in income and disposable expenditure.

[6] *Anita Agnihotri (Senior IAS officer and former Director, Department of Resettlement and Rehabilitation, Ministry of Water Resources, Government of Odisha)*

[7] *Op cit.*

Many kinds of conflicts

Although Bolangir has only three percent irrigated land, the project is yet to gain momentum. There is still a thick veil of uncertainty over the project with a variety of conflicts emerging from time to time.

While some people of the displaced area allege that they are not compensated properly, others are still not ready to endorse the idea of an irrigation project in the area. In the process, those opposing the project (Lower Suktel Budi Anchal Sangrami Parishad) and those in support of project (Agragami Yubak Sangha) are in conflict with an ineffective district administration. Whereas some people want irrigation through the project, the villagers who will be displaced are against it. Earlier, people of 18 villages situated near the project site were opposing the project, but now as per an official report, only those villagers whose houses are near the dam site are opposed to the project.

There is a stiff resistance from people in all villages north of the river. These include the villages of Bijapati, Podhmund, Pardhiapali, Koindapali, Banchhorpali, Dunguripali, Badtelen, Antapali, Garjan, Kumiapali, and Budabahal. Government or other officials cannot enter these villages at all, because the Budianchal Sangrami Parishad made it clear that access would be granted only when their demands are fulfilled. The office of the district collector, which is usually known for its neutrality and development interventions, could not and probably did not try hard enough to reach out to the people.

It is possible that the leaders of the agitation are not rightly informed about the intention of the government regarding disbursement of compensation and R&R assistance. They cite the instance of Hirakud oustees and other projects where project execution was prolonged to an unforeseeable time, as a reason for their lack of trust in R&R efforts. They do not trust printed literature, including excerpts from the R&R policy, which has been circulated. Not only do they have a perception of the non-implementability and non-affordability of the project in terms of its very high cost, people of the affected area are also suspicious that this is a deliberate method of iniquitous income redistribution by passing on benefits to selected families in the command area, that is, influential families which possess large holdings of land either in their own name or as *benami*. Offering and identifying encroachment free command area land to the affected families would have won people's confidence. The original R&R plan mentions command area land, but there is no detailed information on its current status and accessibility. It seems that there is no collective effort to alleviate the distrust of people or to assure them of the government's intention of sharing benefits equitably. This attitude has led to the poor progress of Land Acquisition and R&R in the Lower Suktel Irrigation Project. Obviously, this distrust could have been overcome by a comprehensive and sustained information campaign launched by the district administration and adequately supported by the Directorate of R&R in the implementing department, the Department of Water Resources.

Causes of conflict

a. No legal mechanism to protect quality of life after displacement: When a

project is announced in an area threatening to displace life and livelihood, the first and foremost reason for resistance is that people do not have any legal mechanism to ensure that their gain will compensate for their loss.

b. Perceptions of non-feasibility of the project: People are worried that the Lower Suktel Irrigation Project might not deliver at all, or that the benefits might not be commensurate with the costs. The cost estimate for the project is Rs. 217 crores at the 1996 price level. Even after 15 years, land acquisition is complete only in two villages out of 26.

c. Loss of natural resource base and of community assets: The project will submerge 1575.15 acres of forest land. It will also submerge thousands of trees which have come up in the course of several generations of settled life in the villages. As per conditions for the forest clearance, the government will have to acquire government land for afforestation, as tracks of forest land with abundant non-timber forest produce (NTFP) that sustained generations of people in many ways will be submerged. One of the major income sources contributing to the annual household income in the region is collection and sale of non-timber forest produce.

d. Perception of heightened inequality: From the analysis of the socio-economic profile of the affected people, one can see that landlessness is getting particularly exacerbated among the socially weak, that is, the SCs, STs and OBCs.

Along with these perceptions of non-affordability, the suspicion of the affected people that the allotment of command area irrigated land to the already influential few will reinforce the inequality in agricultural land holding and productivity has led to their emotional rejection of the entire project. It will be useful at this stage to initiate a separate but small study on the land area of the proposed project, its analysis in terms of size, and class/caste wise holding of land so as to clearly understand who will benefit from the project[8].

Current situation

Displacement

There are about 30 villages with a population of more than 75,000 which have been vehemently opposing the implementation of the project. On seeing such a mass agitation, the then Congress government kept the Lower Suktel Project pending. When the current chief minister Naveen Patnaik came to power, he visited Magrubeda village for laying the foundation stone for the project. However, much to his dismay, he had to face the resentment of the opposing villagers.

Road construction

Mr. Narasingha Mishra, who was Member of Legislative Assembly (MLA), Loisingha during the last term, had once warned the state government of disastrous consequences if it allows the administrative machinery to go ahead with road works for the Lower Suktel Irrigation Project prior to land acquisition and compensation. He had alleged that no steps were taken for rehabilitation of the

[8] *Ibid.*

villagers. Kutenpali villagers complained that their only road to the village was going to be blocked. Mishra during his visit however asked the person in charge of construction of the road not to close the path to villages. He specifically pointed out that a vast forest area was going to be destroyed without forest clearance.

In December 2009, villagers of four villages protested against the road construction for the project. It was estimated that around 150 acres of agricultural land of the villagers would be lost to the road. The villagers were angry because a company abruptly started the construction work of the road by digging the villagers' land without giving them any prior notice. The special road for the project running for nearly two kilometers alongside the Balangir-Kantabanji road will render the villagers landless.

In the same month, Planning and Co-ordination Minister of Odisha, Mr. A U Singhdeo expressed hope regarding progress of the project. He then asserted that the project work would resume in March 2010. He attributed the inordinate delay to his non-involvement in the previous official set up, which was in a mess. He revealed that the project cost had escalated to Rs. 1100 crores. The project was submitted for revalidation to the central government. The revised estimate was approved. While 60 percent of the total cost would be spent on rehabilitation and land acquisition, the rest would be used for constructing the dam. The project work was stalled for the last two years.

Compensation

In 2007, the displaced people gave an ultimatum to the administration that they should either be compensated or resettled as early as possible. They collectively raised their voice as they had to go through a grueling experience to avail compensation for their lands and houses. People complained that until now they had been compensated only partly, and despite meeting the officials time and again, they were not fully compensated. They alleged that measurements of lands and valuation of houses were done in their absence. Sadananda Mahala of Barapurgia said, "While we have been compensated for lands on which we are least dependant, the fertile lands have been left uncompensated. Also, we are yet to receive compensation for trees". Bharat Patel explained that resentment is brewing among the displaced people, and the district administration is not taking note of it.

At present, a socio-economic study of the affected families by Institute for Social and Economic Development, Bhubaneswar is in process in the project villages.

The Budi Anchal Sangrami Parishad held a meeting with the collector of Bolangir. The leader of the Parishad argued for better compensation comparable to POSCO. They also insisted on the declaration of eight villages under an Special Economic Zone (SEZ).

Cost escalation

Initially, in the year 1997, the Lower Suktel Project's cost was estimated at Rs. 217 crores, but as of now it has touched Rs. 937 crores. Approval of the increased

project cost is pending before the Central Water Commission, New Delhi. With the delay in clearance, as per present cost overruns, the project cost will continue to escalate at Rs. 72 crores per annum, according to official sources.

Land acquisition and R&R activities

With respect to private land acquisition, possession of only 29.83 acres of land has been taken till date, and land acquisition payment is in process for 938.38 acres of land in Khutapalli village. The acquisition process for the remaining land is stuck at various stages. No particular effort towards expediting the process was observed. This is probably because the district administration is aware that the land acquisition compensation payment has to be made in an extremely cautious manner. In view of the stiff resistance from the affected people, waiting it out appears to be the only option available to the district administration.

There is also a specific reason for choosing Khuntapalli village where the disbursement of land acquisition compensation could be initiated. Khuntapalli is a village where a large percentage of households are engaged in government jobs and in other occupations in and around Bolangir town. It is an agriculturally prosperous village. People of this village do not mind moving over to the vicinity of the town for better life prospects for their future generation. This is the only place where the LA and RRO (Land Acquisition and Rehabilitation and Resettlement officer) could actually disburse compensation payments.

In order to expedite the project work, the state government has now decided to rehabilitate the people according to the norms of the state government's Rehabilitation and Resettlement (R&R) Policy, 2006 in place of the old R&R policy of 1994. To rehabilitate 1266 families belonging to four villages, a rehabilitation colony is being developed, while the government has identified two other places to settle others.

Conflicting parties

There are two people's organisations involved in this conflict apart from politicians and the Water Resources Development Department (R & R Directorate). The Budi Anchal Sangrami Parishad is opposing the dam, whereas the Agragami Yubak Sangha is supporting the dam. The people of Bolangir town are extending their support to the pro-dam movement as they are expecting irrigation, drinking water and a better water regime from the dam.

High point of the conflict

The highest point of the conflict is the Budi Anchal Sangrami Parishad's demand for not constructing the dam. They are suggesting for small and traditional ways of water harvesting structures. Agragami Yubak Sangha which is supporting the dam argues for building the dam. According to them, since Bolangir is facing low and erratic rainfall, a big dam can fulfill irrigation needs and can save at least one crop. Besides, the water scarcity problem of Bolangir town will be sorted out if the dam is constructed.

On 11th May, 2005, the police had to resort to baton charge to contain the angry people who were protesting against the project when congress leader Narasingha Mishra on the invitation of the Odisha Construction Corporation (OCCO) went to the village to inaugurate the spillway. Among the 50 injured in the incident, two persons succumbed to injuries later. Twenty four policemen were also injured. Two years later, the Lower Suktel Budi Anchal Sangrami Parishad held a secret meeting at Gadsankar Dunguripali to chart out the future course of action to stall the project work.

The opposing stands

People are questioning large scale displacement, and demanding adequate rehabilitation and resettlement for the displaced people. Due to past instances like the Hirakud and Rengali dams, people are afraid of the consequences of displacement. Secondly, the ecological damage to the green area is a big setback. Thirdly, there is a feeling that the government is planning to set up a big industry in the Gandhamardan hill, and the Lower Suktel Project is meant to supply water to the company. The agreement between the Bharat Aluminium Company (BALCO) and the Odisha government for a proposed aluminium plant near Gandhamardan had to be shelved because of massive protests by the local people, and Vedanta has now purchased BALCO's share.

Government officials revealed that people who are in the agitation are mostly outsiders and have nothing to gain or lose from the project. The chief reasons of discontent are that people see Hirakud oustees moving about in the area, and that major projects are incomplete. Yet, many of them have a lot of hope about the positive impacts of the project. They feel that Lower Suktel will change the fate of the district, with a large command area, assured water, double cropping, innovative farming in vegetables, and rich yields of cotton and sugarcane during years of adequate rainfall. People would however like to know the exact R&R package for each displaced person, the position of irrigated land in the command area, and all compensation and R&R disbursement measures before moving out.

A majority of people in the affected villages are against major irrigation projects. Instead, the villagers, key persons and panchayat raj representatives favour the execution of lift irrigation points, check dams, and water harvesting structures. These small irrigation projects are suitable in the present scenario as they do not involve large-scale displacement of people, do not require huge funds for construction activities, can be implemented through rural development programmes of the central or state government, have shorter gestation periods, can be operated and managed easily through pani panchayats, are easier to maintain, and require a limited number of project staff during the post-project period.

Scope for dialogue

Several people are interested in monetary benefits, and their demand is that the latest R&R policy of 2006, which has a higher rate of compensation, should be implemented. There are also complaints about irregularities in land acquisition.

People want a fresh survey in some areas where the authorities have evaluated lands in a hurry. While people on one side of the river want the project at any cost, the displaced people of the other side of the river oppose it. The block chairman maintained that people are cynical about the project, so officers need to be more cooperative and transparent. There is a wide divide between the administration and the people, as a result of which every step taken by the administration is viewed with suspicion. At this juncture, a serious and rigorous dialogue with the Budianchal Sangram Parishad can resolve the matter to a great extent.

Key institutions and people

The Budi Anchal Sangrami Parishad is the key institution which has assumed a lead role in opposing the dam. The Agragami Yubak Sangha is supporting the dam.

Leaders

1 Ghunu Sahu

2 Udaya Singh Thakur

3 Charman Dharua, Barpita

4 Dibakara Bariha, Kankara

Some NGOs such as Action Aid, Adhar (based at Loisingha) and the International Funding Agency are also playing vital roles in opposing the proposed dam. They are providing moral and monetary support to the protestors. The ex-minister Narasingha Mishra, local leader Gopalji Panigrahi, and Minister AU Singh Deo are the other influential parties.

Information was provided by:

Dr. B N Srikant, the team leader of the socio economic study team.

Ghunu Sahu, President, Budi Anchal Sangrami Parishad

Bijaya Pradhan, Gad Shankar Dunguripali Pali

Sadananda Mahala of Barapurgia

Past efforts towards resolution

Then Revenue Divisional Commissioner M. S. Padhi had admitted that there was a procedural error in disbursing the compensation package to people. After the R&R policy of 2006 was followed, officials faced some systemic problems. He also stated that the project will be completed in 2011. In 2008, the chairman of the Assembly Standing Committee, Titilagarh MLA Jogendra Behera paid a visit to the area and assured the people that the committee will look into the implementation of the project, and will draw the attention of the speaker towards the compensation as per the norms of the Rehabilitation and Resettlement (R&R) policy, 2006.

Way forward

The project is prima-facie unjustifiable on the grounds of direct and indirect cost considerations, and its adverse impact on already unequal socio-economic relationships. However, we are aware that development projects are often not matters of techno-economic consideration, but results of political decision-making which also includes administrative compulsions.

As per the situation, following steps appear to be extremely essential for satisfactory project implementation:

- Minimising displacement by reducing submergence if possible by recalculating the dam height

- Effecting redistribution by reserving command area land for displaced persons and project affected persons of the project

- Planning land acquisition and R&R activities strictly along with project construction

- Prioritising R&R by putting in place a structure and mechanism at the district level

- Involving DOWR, R&R Directorate, the government and all sections of civil society in the district in an open dialogue with people about the rehabilitation package

- Paying special attention to SC, ST, landless and marginal farmers, migrant labourers and informal workers among the displaced persons and PAPs

- Paying special attention to the population that will be substantially affected, as well as partially affected families in non-submerged villages

- Guaranteeing a minimum time gap between land acquisition and displacement on the one hand, and no delay between displacement and R&R on the other.

- Ensuring complete accountability of government officials at all levels with respect to the R&R policy adopted.

Case Study 16

16

RAJABANDHA TANK:

A local conflict turns into an inter-state conflict

Bikash Kumar Pati

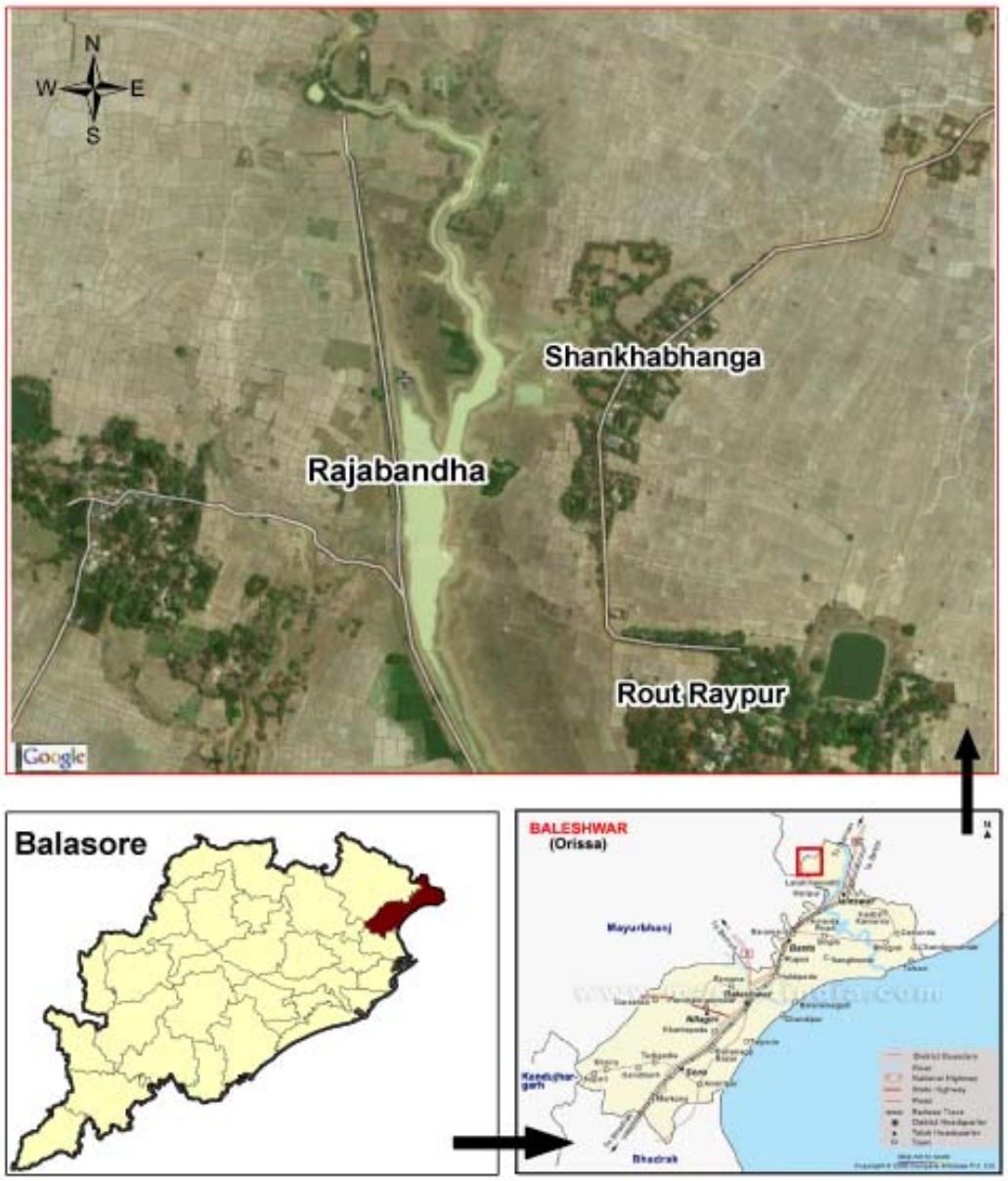


Fig. 16.1
The location of the Rajabandha

Raibania (the region in which the conflict took place) is situated at the border of Odisha and West Bengal. Once a powerful fort under the rule of the Moghuls, Raibania is now a socially and economically backward region. Some historians argue that Raibania was the fort of the fabled king Virata in the *Mahabharat*. It is

also depicted in the popular novel *Lachhma* of Vyaskabi Fakir Mohan Senapati, and finds a mention in Odisha *Itihasa* by Dr. Harekrushna Mahtab, both great writers of their time. The region is bordered by Medinipur of West Bengal to the north and east, and Mayurbhanj district of Odisha to the west and north-west. Raibania is 75 km from Balasore district in northern Odisha.

During the monarchy of the Bhanja dynasty of Mayurbhanj, the king had built a tank on the waters of the Gahirakhal *nullah* to make the best use of stream water for irrigation. The tank was named 'Raja Bandha', or the tank of the king. Some are of the opinion that during the British rule, Purna Chandra Bhanja Deo, the king, had built the tank on the canal originally dug by the British government. The land (water spread area) was bought by the king Purna Chandra Bhanja Deo from the then king of West Bengal. The total land area was 21 acres and 22 decimals. According to land settlement in 1982, the king holds a title over the land. After the tank was transferred to the Minor Irrigation Department, there were irregularities in the payment of taxes by the government. This invited encroachment of land in the vicinity, including the area surrounding the water as well as the water-spread area, and conflict over the boundary of West Bengal and Odisha. People across the border in West Bengal argue that the land, that is, the area surrounding the water, is barren and that everyone holds a title over it since it is not anyone's private property. During the demarcation of the boundary between Odisha and West Bengal, approximately 62 acres including the Rajabandha area was recorded as belonging to West Bengal. This dispute continues till date and has been the cause of much social unrest in the area.

Fig. 16.2
A view of the Gohirakhal MIP

Area, people and dependency

Rajabandha is now under the political jurisdiction of Sardarbandh Gram Panchayat (GP) of Jaleswar block in Balasore district. Three villages border the tank, namely, Shankhabhanga, Rout Raypur and Palashbani. It is one of the largest minor irrigation projects (MIP) in the district. In 1944, a branch canal and four drains were constructed for the purpose of irrigation. This canal is locally called *Bada* canal. There is an additional pit to drain the surplus water from the MIP. The MIP irrigates nearly 1,500 acres of farmland in Olmara, Makidia, Kaliko, Khudia, and Majhisahi Gram Panchayats. People of 19 villages of Odisha and the 5 Gram Panchayats mentioned above directly depend on the MIP for various purposes. Farmers of

Jhadabuni and nearby villages in West Bengal depend on the project as well. No doubt, Rajabandha is vital to the social and economic development of the region.

Rajabandha is recharged by the waters of a stream named Meenakhal, which is also known as Gohirakhal in the downstream. There are additional tanks constructed on the nullah in the upstream. During heavy rains, when the tanks in the upstream cannot check the run-off, Rajabandha has been withstanding the flood waters. It is part of an interdependent system of tanks and projects on the stream. As the water from the tank feeds Hatigarh project in the downstream, more people depend on the tank indirectly.

Table 16.1 Particulars of the Gohirakhal MIP

Project	Gohirakhal MIP (Res)
Village	Rout Raypur
Block	Jaleswar
Topo Sheet No.	73.0/1
Latitude	21 58' 0' N
Longitude	87-10'-0' E
Catchment Area	25.60 square km
Maximum Flood Discharge	169.80 Cumecs
Head Works:	
Length of the Dam	2.414 km
Length of Surplus Escape	33.50 m
Dead Storage Level	26.55 hectare m
Live Storage Capacity	48.14 hectare m
Tank Bund Level (TBL)	33.50 m
Minimum Water Level (MWL)	32.30 m
Full Reservoir Level (FRL)	31.40 m
Dead Storage Level (DSL)	30.50 m
Canal:	
Main Canal Length	3.468 km
Distributary No. 1	3.138 km
Distributary No. 2	0.938 km
Distributary No. 3	1.661 km
Ayacut:	
Designed Ayacut	Kharif- 833.00 hectare/ Rabi- Nil
Certified Ayacut	Kharif- 767.97 hectare/ Rabi- Nil
Additional Ayacut	55.03 hectare Kharif
Submergence Area	48.14 hectare m

Conflicting interests

The farmers who own land in Sardarbandh GP in Odisha and Jhadabuni village of West Bengal disagree about the demarcation between the two states. Farmers of both states have land areas on both sides of the border. The major dispute over Rajabandha did not begin due to the issue of irrigation for field crops. Prior to the conflict, in 1999, farmers of both Odisha and West Bengal were getting sufficient water from the tank for their fields. (Now the water supply from the MIP has reduced). Also, there are other surface water bodies (locally named as 'chuan') to meet emergency requirements. Only random instances of minor conflicts were experienced by the locals in the past. For example, before the major conflict, the local people of Sardarbandh GP complain that the people of the neighbouring villages in West Bengal had stolen the brass key of the gate which dates back to the times of the monarchy.

The major conflict started over fishing in the tank. In 1996-97, the Olamara, Makidia and Sardarbandh Gram Panchayats of Odisha jointly called for a lease of the tank for fishing. The Minor Irrigation Department had helped them in this endeavour. The local fishermen's union had taken the tank on lease and started fish farming in Rajabandha. "We needed 40 pieces of net for catching fish. For each catch, we had to pay Rs. 25 per piece," the local fishermen explain. After a handsome catch of nearly one quintal of fish, a conflict started between the fishermen of Jhadabuni village and Sardarbandh GP. During the time of lease too, people of Jhadabuni used to catch fish in the tank. It was when those who took the tank on lease put fish seeds worth Rs. 10,000 in the tank and restricted others from catching fish, that the conflict became more serious. As fishing was a prime source of their livelihoods, fishermen of Jhadabuni opposed the leasing of the tank considering the prospects of profits from fishing. They argued that because they live on the same land, they had every right to catch fish in the tank. Therefore, they prevented the fishermen of Sardarbandh from catching fish in the vicinity.

Table 16.2: Chronology of events

Sl	Year	Major Events
1	1996-97	The Olamara, Makidia and Sardarbandh Gram Panchayats jointly called for a lease of the tank for fishing
2	1999-2000	People of Jhadabuni and nearby villages of West Bengal made an arbitrary demarcation around Rajabandha with stones (*Seema Pathar*) and cut the existing embankment
3	2001	An embankment on Rajabandha was built in the presence of the police

Fig. 16.3 A view of the Rajabandha waterspread

Troubled waters

On 23rd June 1999, people of Jhadabuni attacked the fishermen of Sardarbandh and looted nets while they were catching fish. They also kidnapped four people including the government staff who were present at the site for some repair work. Some people of Jhadabuni and nearby villages of West Bengal were also kidnapped by the people of Sardarbandh. Amulya Mahanto, a local villager of Shankhabhanga village was seriously wounded in the fight. Being informed by the *Khalasi* (the person responsible for opening gates of the MIP), the Junior Engineer of the MIP lodged a First Information Report (FIR) with the police. According to Adikanda Jena, a government employee who was kidnapped by the people of Jhadabuni village and the nearby villages of West Bengal, the kidnappers released them the same day. Persons kidnapped by local villagers of Sardarbandh in Odisha and surrounding villages were also released. However, the matter did not end peacefully despite the intervention of the police from both

states. In any case, it was decided that the MIP will not be leased again and that fishermen of both states could catch fish in their respective areas henceforth.

In 1999, people of Jhadabuni village breached the embankment of the tank and resisted efforts to repair it. They wanted to stop flood water from entering their fields which lie within the project area. (The high lands inside the MIP are used for cultivation and in case of heavy runoff from upstream, these lands submerge. So the cultivators of such high lands breach the embankment to drain the flood water). As the embankment was not repaired, the water supply to the fields of the people across the border was reduced. Taking the gravity of the problem into consideration, the then District Collector of Balasore asked the District Collector of Medinipur, West Bengal for a peaceful way out. But the meeting of the collectors did not yield any result. After repeated complaints of damage to the embankment, and owing to the resulting social unrest, a new construction of a stone embankment was taken up with the help of the police of Odisha. For this, the Government of Odisha had sanctioned Rs. 6,22,000 from the MP lad funds. During the construction, the state police kept a constant vigil on the area for as long as three months to maintain law and order.

Present state of affairs

Till date, there are breaches in the embankment in the areas claimed by the people of the local villages of West Bengal. The resistance is led by their Anchal Pradhan, Ajay Kumar Maiti. According to him, the local villages of West Bengal controlled Rajabandha from the beginning, and they would continue to do so. The Khalasi of the project, Tapan Behera, says that the Minor Irrigation Department is facing resistance from the people of neighbouring villages in West Bengal for repairing the breaches. This is seriously affecting the irrigation potential of the MIP. However, the Department is still hoping for a peaceful way out through negotiations. Tapan Behera suggests that a surplus pit can be constructed at the breach so that a minimum water level can be maintained and the surplus flood water can be drained. However, to achieve this, the hearts of the local people of Odisha and West Bengal need to be united.

Dillip Samal, Sarpanch of the Sardarbandh Gram Panchayat says that the water of the tank is still diverted by the farmers of West Bengal through a canal to their fields. During floods, they close this mouth of the canal due to which some lands of the local farmers of West Bengal which are located in the middle of the tank are drowned. This also results in conflict among the local farmers of West Bengal themselves.

In the past, many small and large streams from the hilly region of West Bengal were feeding the tank. However, due to encroachment and various other reasons, they cannot meet the demand at present. In Amjam, Kendubani and Bedhajaal areas of West Bengal, small dams are built on the streams for irrigation purposes, which have prevented the stream water from flowing to the tank. Within a mere 5 km, there are three projects in the upstream, namely Kendubani, Bedhajaal and Kukudasola. As a result, the major source of water in the tank is rainfall. In years of drought, farmers whose fields are located at the lower reaches of the canal face a severe water crisis.

Opposing stands

Fishermen vs. fishermen

At present, local fishermen of both Odisha and West Bengal catch fish in Rajabandha and claim that the water belongs to them. There is still no boundary for fishing. According to Mr. Ajay Maiti, a fisherman of the Jhadabuni village of West Bengal, they will not allow fishermen from Odisha to put up nets on their land. On the one hand, local fishermen of West Bengal argue that as they have been fishing in the tank for a long time and no one in particular holds a title to the land, they have a right to the waters of Rajabandha. On the other hand, local fishermen of Odisha claim that as the tank belongs to the Minor Irrigation division of Odisha, they have a right to lease the tank for fishing.

Fishermen vs. farmers

The dispute regarding boundaries allowed the fishermen the freedom to fish. However, it has prevented any development work to increase the storage capacity of the tank. In addition, there is no proper distribution mechanism for irrigation. These factors have heightened the woes of the farmers. On the one hand, the local fishermen of West Bengal disagree about the boundaries and resist the construction of embankments. On the other hand, the farmers demand construction of embankments and a surplus pit in the tank to hold water.

Farmers vs. farmers

In times of flood, the local farmers of West Bengal who have agricultural lands located at levels lower than that of the tank close the flood exits to save their fields. As a result, agricultural lands of some farmers located within the area of Rajabandha get submerged. In the absence of a mechanism for the proper distribution of water for irrigation, trivial disputes are often experienced by local farmers of both states.

Other influencing parties

Social conflicts often lead to political ones. The political interests of local leaders of West Bengal and Odisha in the present conflict are obvious. However, this conflict was triggered by community and personal interests, not political ones. Therefore, the conflict cannot be resolved without the involvement of the local community. Several civil society organisations working in the region are not familiar with the issue. Apart from a few media reports, this conflict was not covered by a comprehensive study.

Views of local authorities

Mahendra Kumar Behera, Assistant Executive Engineer of the Minor Irrigation Sub division says that the government has plans for the development of the Rajabandha Minor Irrigation Project. However, this cannot be achieved without a consensus among the people, and dialogue among the parties involved in the

conflict. Mr. Behera is hopeful about such a dialogue.

Scope for dialogue

Rajabandha is dying. Farmers, fishermen and people dependant on the waters of Rajabandha should realise this before it is too late. The only way out is an amicable settlement by people of both the neighbouring states. Boundaries must be set for fishing according to a consensus reached between the local people from Odisha and West Bengal. Proper rules and regulations must be made for the distribution of waters from the tank. A surplus pit can be constructed for the drainage of flood waters. The Anchal Pradhan of the neighbouring villages in West Bengal, the Sarpanch of the neighbouring Gram Panchayats in Odisha and government officials should come forward to find a solution to the problem.

Fig. 16.4
The Gohirakhal water release gate

Boundaries are demarcated for water bodies to protect community rights over it. In matters of interstate water disputes, Government bodies and many committees have framed rules and regulations from time to time. However, it is often seen that such disputes continue even after the formulation of such policies. Where an amicable settlement is not arrived at, the administration maintains a silence about the issue. The Rajabandha issue is a fine example of what happens when the traditional users of a resource come in conflict with the administrative boundaries. Due to negligence on the part of the administration, and in the absence of development work, Rajabandha is shrinking day by day, and the conflict over its waters continues to impact the local population.

Key persons

- Mahendra Kumar Behera, Assistant Engineer, Minor Irrigation Sub Division, Balasore, Odisha, Contact number- 9437137837
- Tapan Behera, Khalasi, Rajabandha
- Dillip Samal, Sarpanch, Sardarbandh Gram Panchayat
- Ajay Kumar Maiti, Fisherman, Jhadabuni, West Bengal

17

Case Study 17

CONFLICT OVER THE MAHENDRA TANAYA: Barrage causes an inter-state conflict

Bighneswar Sahoo

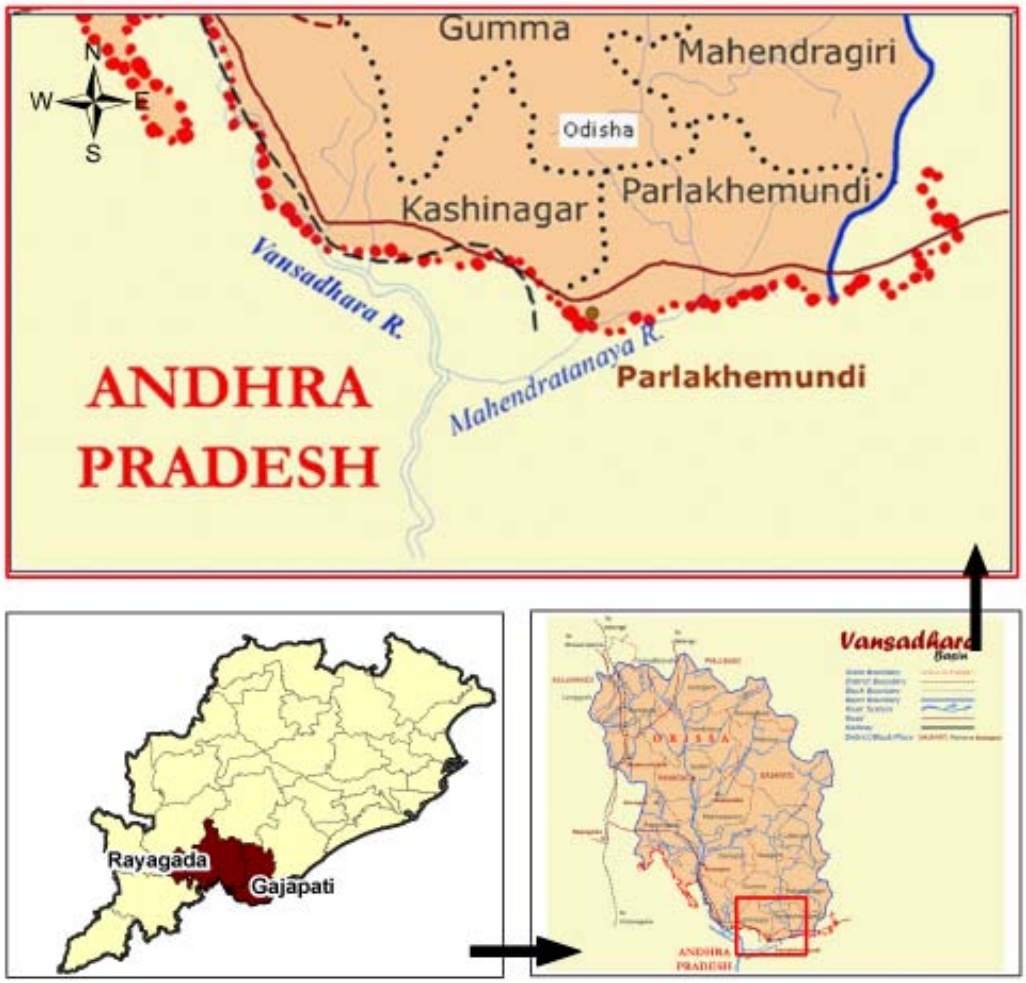


Fig. 17.1
Location of the Mahendra Tanaya and the proposed barrage in Andhra

The Mahendra Tanaya river is a tributary of the Vanshadhara river. It originates in the Mahendragiri mountain range located in the Gajapati district of Odisha. It is situated at an altitude of 1,525 m above sea level amid ever green forests. Its archeological significance makes it a favourite spot for scholars, as the mountain is associated with mythological stories from the *Ramayana* and the *Mahabharata*, and finds a special mention in the poetic works of Kalidasa.

The Mahendra Tanaya river flows below the Mahendragiri hills, and is 56 km long. Four-fifth of the river traverses through the Gajapati and Rayagada districts, according to a report of the Odisha Government. After originating in the

Tuparasingi village in Gajapati district, it flows for around 35 km in Odisha before entering into the neighbouring state of Andhra Pradesh (AP), following which it reenters Odisha. Finally, it reunites with the Vanshadhara located at Gulumuru near the Gotta barrage in Andhra Pradesh, and later joins the sea.

The conflict

Though four-fifth of the river flows in its state of origin, Odisha, whereas only one-fifth of it flows through Andhra Pradesh, both states share its waters according to a 1962 bilateral agreement. It was agreed then that any disputes between the states would be discussed and resolved through bilateral talks.

However, the agreement was violated when the people of Gajapati district learnt about a project near Chapara in Andhra Pradesh to use the waters of the Mahendra Tanaya through a canal to irrigate agricultural lands.

Fig. 17.2
A view of the river Mahendra Tanaya at Rayagada in Odisha

High points of the conflict

According to Srikant Padhi, convener of the Mahendra Tanaya Bachao Andolan, the then Andhra Pradesh Chief Minister Y. S. Rajasekhara Reddy (YSR) had intended to appease the farmers and the people of the region dominated by the Telugu Desham Party (TDP) led by Chandra Babu Naidu. Padhi stated that YSR was eyeing the vote bank of the region located along the border, and intended to wrest political power over the area from TDP dominance. With this end in view and strong political will, YSR had approved the canal irrigation project near Chapara in violation of the 1962 agreement.

When the intentions of Andhra Pradesh politicians came to the limelight, the local people of Gajapati district formed an organisation called the Mahendra Tanaya Bachao Andolan (MTBA) to spearhead a campaign opposing the project, narrates Padhi. The MTBA wrote letters to concerned authorities about the matter. However, they received no response, and nothing was done by the Odisha government. Next, the MTBA agitated in front of the office of the Revenue Divisional Commissioner of the southern division to attract the attention of the authorities and the people of the state.

The MTBA and the Rashtriya Oriya Yuvak Pratishthan (ROYP) under the leadership of Sitakant Padhi also launched a hunger strike in front of the Odisha Legislative Assembly while the session was in progress on 17th November, 2007.

At that point, officials of the irrigation department assured them that a committee headed by the irrigation secretary would visit his counterpart in Andhra Pradesh on the same day. MTBA and ROYP handed over a memorandum to the Chief Minister of Odisha Mr. Naveen Patnaik. MTBA convener Padhi then withdrew the hunger strike after the secretary of the Water Resources Department assured him that appropriate steps would be taken and asked for two months time.

The MTBA also launched an agitation in front of the Gajapati District Collector's office at Paralakhemundi and called for a Bandh in Paralakhemundi which received a good response from the local people.

The public reaction was quite sharp as the neighbouring state was planning to build a project ignoring the bilateral agreement of 1962, and the Odisha government was silent about the issue concerning lakhs of people in Gajapati and Rayagada districts of the state.

Andhra Pradesh had designed the project with a view to irrigate 24,600 acres of land located on the border. The Andhra Pradesh government had already earmarked Rs.124 crores for the project.

As many as 30 villages in Odisha would be impacted by the project, affecting more than 8,000 families in the area. Moreover, 1,100 acres of agricultural land would be submerged and Gajapati district would be severely hit. The farmers of Odisha would be deprived of water for irrigation.

The Andhra Pradesh government had not sought the permission of the Central Water Commission (CWC) for this project. Being an inter-state matter, the issue should have been settled through bilateral talks between the states. Members of the Odisha Legislative Assembly had a meeting in 2008 following the public reaction and expressed concern over the plan of the neighbouring state in breach of the earlier agreement. The Odisha Chief Minister Naveen Patnaik then wrote a letter on March 17, 2008 to the Andhra Pradesh Chief Minister on the offshore irrigation project and requested the AP government not to go ahead with the project until a 'technical committee' of both states examined it and submitted its report.

Fig. 17.3 Foundation stone of the Odisha Mahendra Tanaya Project laid in 2008 by the Odisha Chief Minister

Despite the objections of the Odisha Chief Minister, YSR laid the foundation stone for the irrigation project to be constructed on a lower stream of the Mahendra Tanaya River on April 4th, 2008. Annoyed by this move, the Odisha government announced its plan to construct a dam and other irrigation projects upstream of the river.

"We will start construction of the irrigation project upstream of river Mahendra Tanaya as soon as possible," the then Revenue Minister of Odisha stated in the Assembly. The Government of Odisha had already made a decision and the technical advisory committee of the Water Resources Department headed by the Chief Minister had given the green signal for the construction of two barrages upstream of the river. It was a 'tit for tat' policy by the Government of Odisha.

The Mahendra Tanaya irrigation project was proposed to provide immediate irrigation facilities to Gumma, Gosani and Rayagada blocks of Gajapati district, and to cater to the domestic needs of Paralakhemundi, the district headquarter town of Gajapati. It was also proposed that two diversions across the rivers Jalanga and Mahendra Tanaya in the upstream would be constructed, to provide irrigation to 3,050 hectares immediately.

The Jalanga diversion weir, to be constructed across Jalanga which is a tributary of the Mahendra Tanaya near Champapur village, is expected to provide irrigation facilities to an area of 2,040 hectares on the right side of the Mahendra Tanaya river. The design flood of the Jalanga river corresponding to a catchment area of 260.86 square km has been calculated and as per unit hydrograph, it is 1,789 cumecs.

The Mahendra Tanaya diversion weir is to be constructed at Dambapur village across the river to create irrigation potential for 1,010 hectares on the left side of Mahendra Tanaya. The design flood corresponding to 128.87 square km catchment area has been calculated and as per the unit hydrograph, it is 879 cumecs.

The population of Paralakhemundi town is estimated to be about two lakhs in the year 2051. Considering the requirement of water at an average 100 litre/capita/ day, the total requirement will be of the order of 0.99 cumecs or 3.49 cusecs.

The cost of the Mahendra Tanaya irrigation project is estimated at around Rs.38 crores. The right side of the area of about 2040 hectares will be irrigated through a canal network of about 34 km. The proposed main canal's length will be 17 km and the minor and sub-minor canals will be 17 km long. The left side area of about 1,010 hectare will be irrigated through a distribution network of 21 km.

On 30 April 2008, the Chief Minister (CM) of Odisha Naveen Patnaik laid the foundation stone for the Mahendra Tanaya project.

An exchange of letters between the Chief Ministers of Odisha and Andhra Pradesh has also aggravated the situation as the AP Chief Minister Y.S. Rajasekhara Reddy had denied the inter-state agreement claimed by the Odisha Chief Minister Naveen Patnaik.

The AP Chief Minister Y.S. Rajasekhara Reddy, in a letter to the Odisha Chief Minister, had mentioned that there was no 'inter-state agreement' on sharing of water either at Damidigam check dam or on the Mahendra Tanaya river. However, wrote YSR, the ayacut of 1,000 acres located in the villages of Kosamala, Vasundhara, Nadasandra and Rattani of Malyaputti Mandal was being irrigated since time immemorial. The Odisha government should not close the existing vents unilaterally which would disrupt the supply of water to the existing age old ayacut thus undermining the lower riparian rights of farmers. Y.S. Rajasekhara Reddy further requested the Odisha Chief Minister to personally intervene in the matter and issue suitable instructions to the officials to restore the vents to supply water to the existing ayacut in Vasundhara, Nadasandra, Kosamala and Rattani villages of Malyaputti Mandal of Srikakulam district in Andhra Pradesh.

At this point, the former Chief Minister and leader of the opposition Janaki Ballav

Patnaik also came down heavily on the irrigation project of Odisha. Janaki Patnaik called the laying of the foundation of the Mahendra Tanaya irrigation project a 'gimmick'. According to the former Odisha CM J.B. Patnaik, the project would not serve the purpose of controlling flood water. It would also have no impact on the irrigation project of Andhra Pradesh downstream of the Mahendra Tanaya river.

Moreover, former CM J.B. Patnaik also revealed that the Mahendra Tanaya irrigation project approved by the Central Government since 2002-03 had been kept in cold storage. Suggesting a better option, J.B. Patnaik had asked the Government of Odisha to construct Kaithapadar dam so that water could be stored at Mahendra Tanaya through a tunnel. It would help irrigate around 90,000 acres of land and 40,000 acres of Rabi crops in Gajapati district, suggested J.B. Patnaik, urging the state government to execute the Kaithapadar project at once instead of laying the foundation stone for barrages.

Meanwhile, three years have already passed since the laying of foundation stones by both the Chief Ministers of Odisha and Andhra Pradesh. Y.S. Reddy had laid the foundation stone for their offshore project on 4 April, 2008 while Naveen Patnaik had laid the foundation for two barrages on 30 April, 2008.

Table 17.1 Chronology of events

1981	To oppose the AP government's work on river Vanshadhara, the naxal leader D.B.M. Patnaik sat on a hunger strike in Gunpur.
1984	Revolutionary leader Nagabhushan Patnaik also sat on a hunger strike to oppose construction work by the AP government on the river.
1990	The opposition Congress strike in Gunpur
1993	The locals of Gunpur along with the sitting Member of Legislative Assembly (MLA) Rammurti Gamango joined the strike.
2000	The then Water Resource Minister Bijaya Mohapatra led a strike in Gunpur against the construction of a barrage in Naredi.
2005	All the political leaders of South Odisha came under one umbrella which was made possible by the President of the South Odisha Development Council, Engineer Dayanidhi Sahu.
2007	The ROYP local unit with media friends of Paralakhemundi, Gajapati District on 17 November 2007 started an agitation against the project at the southern divisional commissioner's office at Berhampur, and handed over a memorandum to Satyabrata Sahu, the Revenue Divisional Commissioner (RDC) of the southern division.
2011	On 17 May 2011, activists of the ROYP and MTBA began a 27-hour hunger strike in front of the office of the Revenue Divisional Commissioner (RDC), southern division, in the city against the alleged delay of irrigation projects in Ganjam and Gajapati districts.

Current status of the conflict

Though the issue had led to bitterness between the neighbouring states, the situation at present is quite different. While Andhra Pradesh has gone ahead with the construction of the offshore project, the Odisha Government has yet to start the construction of the two barrages for which the foundation had been laid.

Ruing the inactiveness of the Odisha Government, the convener of the MTBA Srikant Padhi stated that the AP government had already completed more than 80 percent of the construction work on the offshore project. However, the Odisha Government has yet to start the construction work and has not moved even an inch towards the proposed barrage construction. It was sad that the Odisha Government is citing the naxal menace as a hurdle for construction, said Srikant, adding that the MTBA had proposed that the construction work be handed over to the Military Engineering Service Department.

The MTBA convener also lamented that the Odisha Government was roaring in Parliament over the Polavaram issue, instead of going ahead with the Mahendra Tanaya project. “Chief Minister Naveen Patnaik himself holds the Water Resources department”, says Padhi. “Yet, the project has not started. However, Members of Parliament belonging to Naveen Patnaik’s Biju Janata Dal are opposing the Polavaram project.”

Fig 17.4 Demonstration staged by ROYP and MTBA on 17 May 2011

Social thinker and Gajapati District Secretary Purna Chandra Mohapatra of Utkal Sammilani, who played a prominent role in the formation of the separate province of Odisha, is also of the view that the Odisha Government should complete the barrage construction for the benefit of the people of Gajapati district in general and farmers in particular. “Otherwise, we will launch an agitation after the rainy season if the Odisha government fails to fulfill the demand”, stated Mohapatra, who is also one of the conveners of the MTBA.

Key Institutions Involved:

1. Mahendra Tanaya Bachao Andolan (MTBA)

2. Rashtriya Oriya Yuvak Pratishthan (ROYP)

3. Government of Odisha

4. Government of Andhra Pradesh

Past efforts towards resolution

1961- Ex-Chief Minister of Odisha . Biju Patnaik had a discussion with his Andhra Pradesh counterpart the then Chief Minister Neelam Sanjiva Reddy over construction of the Neredi barrage.

1972- Discussion between Ms. Nandini Satpathi, the Ex-Chief Minister of Odisha, and J. Bhengal Rao, the Ex-Chief Minister of AP

1987- Discussions between Janaki Balav Patnaik and Bijay Bhashakar Reddy

1992- Discussion between Biju Patnaik and Janardana Reddy

1994- Discussion between Biju Patnaik and N. T. Rama Rao

2000- Chief Minister Naveen Patnaik wrote a letter to the Andhra Pradesh CM to ask that construction be stopped in Naredi.

2003- The construction of spur over the river Vanshadhara was closed down.

2005- Naveen Patnaik wrote a letter to the Andhra Pradesh CM YSR to stop the illegal construction of canals.

2008- With the construction of a dam over the Mahendra Tanaya river by Andhra Pradesh in the news, in February 2008, Naveen Patnaik wrote to YSR again, but Andhra Pradesh went ahead and laid the foundation on 4th April, 2008 at Rugudipadu village of Meliputi Mandalam.

Suggestions for a possible solution

The Central Water Commission (CWC) had approved Odisha's project proposal in 2002 to build a dam on the river at Kaithapadar. A barrage can be built downstream just before the river enters Andhra. This barrage can provide irrigation in areas around Parlakhemundi and meet the drinking water requirement as well as requirement of industries of the area. Through the dam at Kaithapadar and the barrage, around 20000 hectares of land can be irrigated during Kharif and 10000 hectares during the *Rabi* season. After obtaining approval for the dam at Kaithapadar, the government should immediately implement the project. The Odisha Chief Minister has, after six years of inaction over the river, now taken a 'decisive step' by laying the foundation stone for two small barrages at Champapur and Dambapur which would utilise only a fraction of the total share of the water of the river and irrigate a small area of 2000 hectares at a cost of Rs. 37 crores. This step appears bold to some, but people are not at all impressed. After building the dam at Kaithapadar, these barrages would be submerged. Andhra Pradesh is planning to dig a channel off the river as wide as the Mahendra Tanaya river when it enters AP, and channelise river water for irrigation. When the government of Odisha was inactive for years and did not utilise its share of water, others would have thought that it would be justified for them to use the water. The government of Odisha appears to be indifferent to the needs of its people and is definitely facilitating the move of the Andhra Pradesh government to go ahead with its plan to utilise its share of the water.

However, another possible way out is that if the Government of Odisha cannot build a big dam at Kaithapadar immediately, it should explore the possibility of building a series of barrages / check dams across Mahendra Tanaya and other tributaries, for achieving optimum storage capacity, with least submergence, and avoiding road blocks owing to the submergence of forest cover, cultivable land, hamlets, etc. displacement of people should be avoided as far as possible.

Case Study 18

18

INTER-STATE CONFLICT OVER THE JOURA: River or *nallah*?

Nrusingha Nanda Panigrahy

Fig. 18.1
Location of the Joura river

The Koraput district of Odisha has two river basins, Kolab and Indravati. Both the rivers are tributaries of the Godavari river. Machhkunda is also a major tributary of the Kolab river in Koraput. There are a number of tributaries of these rivers. The Joura river is a tributary of the Indravati river, and flows near Kotapad of Koraput district, originating from the Indravati river and joining the Kolab. This river is

peculiar in that it connects the Indravati and Kolab rivers. During heavy floods in the Kolab river, water flows from the Kolab to the Indravati.

Indravati and Kolab are interstate rivers. Since the Joura river originates from the Indravati, it is also considered an interstate river. The Indravati river is briefly described below to facilitate a better understanding of the water disputes.

The Indravati river basin is surrounded by the Mahanadi, the Nagavali and the Kolab river basins. It originates from the Eastern Ghats near Thuamul-Rampur of Kalahandi district, and later flows into Koraput district. About 20 km from Kotpad, it enters Chhattisgarh state, and finally joins the Godavari river in Andhra Pradesh. Before joining the Godavari, it also passes through Maharashtra for a few kilometres. The total catchment area of the Indravati river is spread over 41,700 square km, out of which 7400 square km is in Odisha. The Indravati basin covers about 4.5 percent of the total geographical area of the state of Odisha.

The catchment area of the Joura river is 1,078 square km. The people residing on the bank of this river depend on its water for drinking and irrigation. There are a number of lift irrigation systems on the riverbank.

Conflict

The dispute over the Joura river arose only after the dam on the upper Indravati was constructed and became fully operational from 2001. After construction of the dam on the Indravati river, the downstream flow reduced considerably, affecting the livelihoods of the people living in the river basin. The Joura riverbed is about 0.4 metres below the Indravati riverbed. Due to this natural gradient, water drains from the Indravati into the Joura. As a result, the flow in the downstream areas of the Indravati in Chhattisgarh is reduced, which aggravates the situation. People in Chhattisgarh are demanding that the flow in the Joura should be stopped by constructing a bund over it. However, the people on the Joura riverbank oppose such a move. The flow of water from the Indravati into the Joura is the point of conflict. At times, people from Chhattisgarh enter Odisha and construct bunds on the Joura to stop the flow of water from the Indravati. During summers, when there is less water in the river, people construct bunds on the Joura more frequently.

The Bachawat tribunal

The Indian government set up a tribunal known as the Krishna-Godavari tribunal headed by the Supreme Court Justice J. Bachawat. As per the direction of the tribunal, agreements were arrived at by different states on interstate river disputes, before the final award by the Krishna-Godavari tribunal. Agreements were made between Odisha and Madhya Pradesh on 11 July 1979, and between Andhra Pradesh and Odisha on 15 December 1978.

As per the agreement between Odisha and Madhya Pradesh:

1. From this catchment there will be some natural flow across the Joura *Nallah* to Saberi (Kolab) river.

2. The yield of Indravati river basin in Odisha has been estimated 204 thousand million cubic feet (TMC) of water. The distribution of this 204 TMC water, shall be-

a) Upper Indravati Project: 91 TMC

b) Flow of water between Upper Indravati Project and Odisha border: 68 TMC

c) Flow of water in Indravati river in Odisha - Madhya Pradesh border: 45 TMC

d) **Total: 204 TMC**

In case of any reduction in 91 TMC of water (inflow to Upper Indravati Dam) the release of water to Madhya Pradesh (now Chhattisgarh) i.e. 45 TMC shall be reduced proportionately.

However, the water between the downstream area of the Upper Indravati dam and the Odisha border (which is supposed to be 113 TMC) is found to be much less than the anticipated yield. This has resulted in a conflict because Madhya Pradesh (now Chhattisgarh) which is not getting 45 TMC of water, even though the Upper Indravati Project is getting an inflow of more than 91 TMC of water.

Current status

The contending states are Odisha and Chhattisgarh, as people of both states are affected by the conflict. The present disputes are as follows:

Points of Contention for Chhattisgarh

a) Odisha is not releasing 45TMC water to Chhattisgarh as per the agreement.

b) Water flow to the Joura *nallah* should be completely stopped, or water release should be regulated.

c) Joura *nallah* is not a river but a man-made *nallah*, because the agreement between Odisha and Madhya Pradesh clearly states that Joura is a *nallah*. (This is a mistake on part of the Odisha government.)

d) In the Krishna-Godavari tribunal report, rivers and tributaries of the Godavari river basin are listed, but there is no mention of the Joura river in the list.

e) The difference in altitude between the Indravati riverbed and the Joura riverbed is 0.4 metres. The Joura *nallah* is at a lower level. By releasing water into the Joura *nallah*, the course of the Indravati river may change, and the entire Indravati river may join the Saberi (i.e. downstream of Kolab).

f) Due to water shortage from February to May, water available at Jagadalpur town in Chhattisgarh is very less. This is affecting tourist activities in Chitrakote, as well as the steel plant and power plant at Jagadalpur. Therefore, Odisha should ensure 45 TMC water at the Odisha border during the non-monsoon period.

Points of Contention for Odisha

a) After construction of the Upper Indravati dam, Odisha is not getting 113 TMC of

water. So it is not possible to release 45 TMC of water for Chhattisgarh during the non-monsoon period.

b) Since there is an acute scarcity of water in the downstream of the Upper Indravati dam, especially in the non-monsoon period, it is not possible to release 45 TMC of water to Chhattisgarh, which is further downstream.

c) The allocation of 68 TMC of water to Odisha (113 TMC - 45 TMC) by the Bachawat commission is not utilised by Odisha at present. However, after the construction of Bhaskel, Turi, Bangri and Telengiri projects, Odisha can utilise its full quota, i.e. 68 TMC of water. In such a situation, the release of water to Chhattisgarh will be reduced further.

d) Joura is a river, not a *nallah* as erroneously stated in the agreement. After the dispute arose, the matter was referred to the Indian government by the Odisha government. A team of the Central Water Commission headed by Dr. B.V. Theraja, Chief Engineer, visited the site on 22nd April, 2003, and submitted a report that the Joura is a river, not a man-made *nallah* as stated by the Chhattisgarh government. The stand of the Chhattisgarh government is incorrect.

e) About 50 lift irrigation systems (by the Odisha Lift Irrigation Corporation and private parties) are installed on the Joura river for irrigating about 50 villages. The villages depend on the river for drinking water and irrigation.

f) The villagers of Shadarang, Chandili, Dhamanahandi, Murtahandi, Insuli, Chatrala Panchayat, etc. will be deprived of drinking water and irrigation facilities if the Joura river water is stopped.

g) The people residing on the riverbank have the riparian right to utilise its water for drinking and animal husbandry.

(h) As per the National Water Policy, 2002 and the state water policy of 2007, the use of water for drinking, the ecology, and irrigation / agriculture must be prioritised. Stopping the flow of water into the Joura river will violate the policy.

High points of the conflict

As stated earlier, there was no conflict between Odisha and Chhattisgarh on the flow of water into the Joura river from the Indravati River. This conflict arose after the construction of the Upper Indravati dam.

The highest point of the conflict is during the non-monsoon period (i.e. from February to May) every year, after the construction of the Upper Indravati Project. As there is very little water at the Odisha - Chhattisgarh border, the Chitrakote waterfall, a major tourist attraction and religious centre, is losing its natural splendour. Steel and power plant officials at Jagadalpur are also complaining about the lack of water. As mentioned earlier, at times, people from Chhattisgarh have tried to stop the flow of water into the Joura so that water will flow in Indravati in the Chhattisgarh area. The conflict in the non-monsoon period between people in the Kotapad area in Odisha and Jagadalpur in Chhattisgarh has given rise to law and order problems.

The sufferers due to the disputes are people of the Kotapad area of Odisha and the Jagadalpur area of Chhattisgarh. About 5,000 people of 5 panchayats residing on the bank of the Joura are entirely dependent on the river for drinking water and irrigation.

The dispute has also affected people of the Jagadalpur area in Chhattisgarh. Due to construction of the Upper Indravati dam, the ecology and economy of the people on the riverbanks is affected in both states.

The lowest point of the conflict is naturally in the monsoon period. During the monsoon period, as plenty of water is available, there is no conflict across the border.

Possible solution

The following steps are suggested to resolve the water conflict between the two states:

a) Both states should discuss and work out a solution to resolve the Joura river dispute to avoid conflict in the area.

b) The release of water to Chhattisgarh should be revised considering the actual flow of the last 12 years.

c) Meetings should be organised periodically to sort out the interstate water disputes.

d) The Odisha government should release at least 15 cumecs of water from the Upper Indravati dam for the people living downstream to solve the present problem.

e) One barrage should be constructed on the Joura river by the Odisha government to regulate water flow to the river. (The Odisha government has taken action in this matter.)

People who have worked on the issue

a) Water Resources Departments of both states has data about the Joura river water.

b) The gauging station, set up by Central Water Commission near Jagadalpur, has data about rainfall, inflow, yield of water in the basin area, etc.

c) Some NGOs are also working on the issue.

Past efforts towards resolution

So far no effective steps have been taken by either state government to sort out the problems, other than the agreement between Odisha and Madhya Pradesh in 1979. After this agreement, no bilateral discussions have been attempted by the state governments to address the Indravati river water disputes, particularly concerning the Joura river.

19

Case Study 19

GROUNDWATER MARKET IN BALASORE:

Opportunities for the rich, marginalisation of the poor

Bikash Kumar Pati

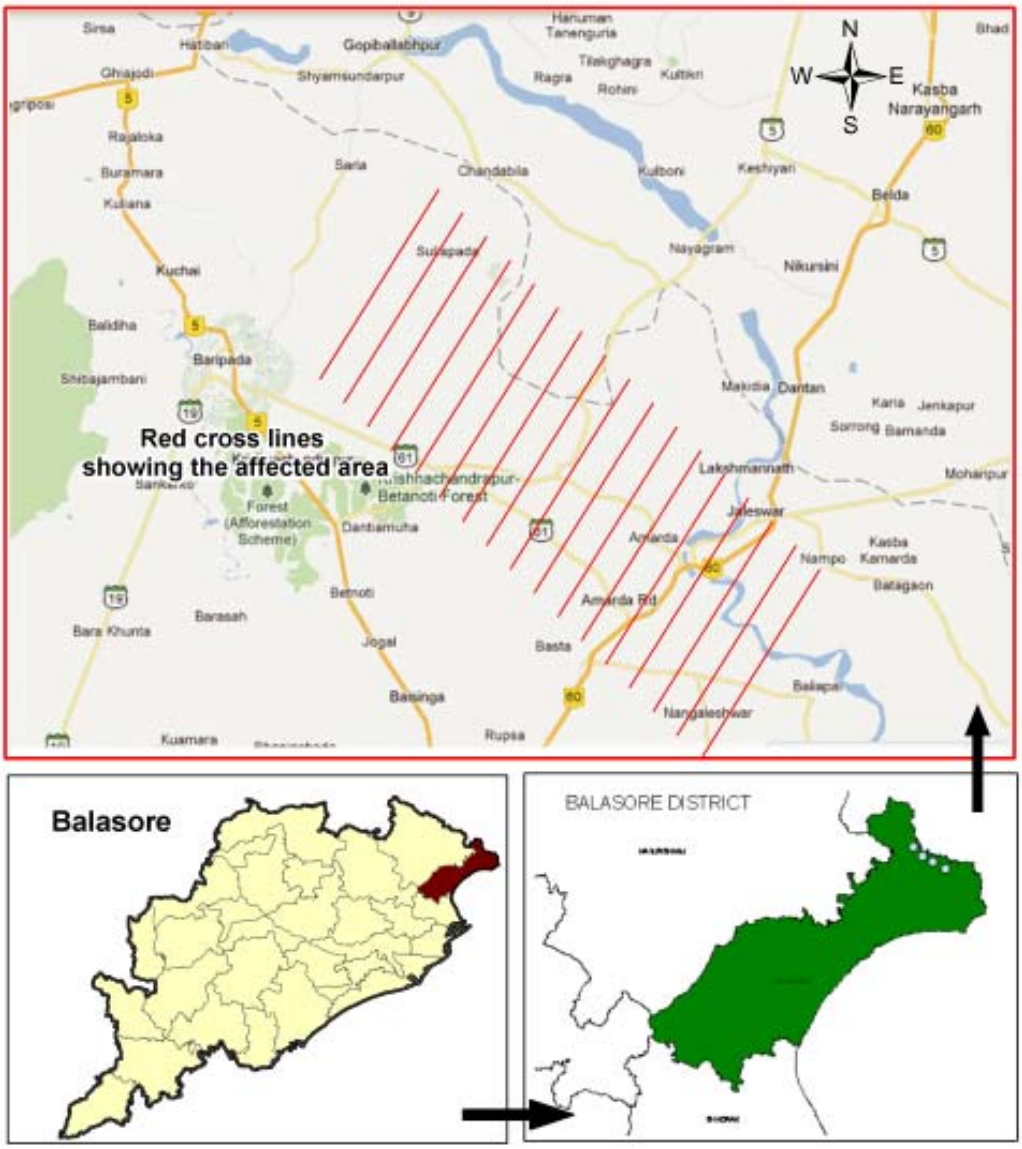


Fig. 19.1
Location of the coastal study region in Balasore district

Balasore is one of the coastal districts of Odisha. It is situated between longitudes 86^0 20' E to 87^0 29' E and latitudes 21^0 03' N to 21^0 59' N in the eastern coastal belt of the state, and shares a border with West Bengal. The district ranks second in the state in terms of the literacy rate. Balasore has 2 Sub-Divisions, 7 Tehsils, 12 Community Development (CD) Blocks, 289 Gram Panchayats, 2952 villages, 1 Municipality and 3 Notified Area Councils (NAC). It has a total geographical area

of 3806 square km (District Statistical Handbook, 2005). The total population of the district is 20,24,000 (2001 census). The density of the population per square km is 532, and the proportion of the land area of the district in the state is 2.44 percent. The population of Scheduled Castes and Scheduled Tribes is 3,81,000 (18.82 percent) and 2,28,000 (11.26 percent) respectively. The sex ratio in the district is 953 females per 1000 males.

The district receives a rainfall of 1,568.4 mm annually, and the rainy days per year are 73.4. Because of its geographical features and its location near the sea, Balasore is crisscrossed by perennial rivers like the Budhabalanga and the Subarnarekha. Smaller rivers also flow through the area. Endowed with such voluminous water resources, the people of Balasore depend upon agriculture as their major source of livelihood, paddy being the dominant crop. As per the 2001 census, the total number of cultivators in Balasore was 2,20,000, and the total number of agricultural labourers in the district was 2,13,000. Being a coastal district, the total land under cultivation in Balasore is quite high - nearly 40 percent of the district's area. In 2004-05, the total production of paddy (with husk) in the district was 55,70,225 quintals, with a yield rate of 23.66 quintals per hectare. Apart from paddy, Balasore leads the state in mustard production, and ranks second in the state in jute production.

Background

In the past, people in Balasore mostly practiced rain-fed agriculture. Many places of the district are devoid of canal irrigation. In the district, Baliapala, Balasore, Remuna, Basta, Oupada, Soro, Bahanaga and Jaleswar blocks have irrigation coverage of less than 35 percent, and that too is not managed well. The recent changes in the rainfall pattern have become a bane for the local farmers, as they pose a threat to rain-fed agriculture which is the backbone of the economy of the district. Due to erratic precipitation, people have lost faith in rain water as well as in the availability of surface water for agricultural purposes. As a result, people are extracting precious groundwater for agriculture. This practice is also encouraged by the government through subsidies. Shallow tube wells and bore wells were developed in Balasore under government schemes and loans from National Bank for Agriculture and Rural Development (NABARD). To sustain their livelihoods, the local people are relying on cultivating high yielding varieties of crops which require more groundwater. Currently, the area under high yielding crops in Balasore is nearly 80 percent of the total cultivated area.

Private irrigation sources are installed in Odisha with financial assistance from NABARD under Rural Infrastructure Development Fund (RIDF) and funds available under the central scheme. The number of shallow tube wells, bore wells and surface lifts installed during the last few years are as follows in Table 19.1.

Both in the case of high rainfall over a shorter period and low rainfall over a longer period, the groundwater is recharged less. Erratic rainfall in Balasore has resulted in a sharp depletion in groundwater over the years. The problem of groundwater depletion is aggravated by the intensive exploitation of groundwater for producing high yielding varieties of crops. As a result, the groundwater is no longer the most dependable source for irrigation in the district. This situation is also disastrous for

the drinking water security of the people as the tube wells are experiencing seasonal dysfunction due to draw down of groundwater. Summer draw down is experienced mainly in blocks like Bhograi, Nilgiri, Basta, Oupada, and the Raibania patch of Jaleswar. Chemical farming, untreated agricultural and non agricultural effluents, salt water intrusion and a high concentration of nitrate are further worsening the situation of depleting water resources in terms of quality contamination.

Table 19.1 The number of shallow tube wells, bore wells and surface lifts installed during the last few years

	Achievements from 1996-97	2000-01	01-02	02-03	03-04	04-05	05-06	06-07	Total
Shallow tube well	17297	3646	5531	2372	8553	12897	4589	6866	61751
Bore well	1668	93	753	727	533	1628	755	609	6766
Surface lift	643	13	44	187	----		----	----	887
Total	19608	3752	6328	3286	9086	14525	5344	7475	69404

Source: Department of Agriculture, Government of Odisha

Fig. 19.2
A farmer drawing his share of paid water

The conflict

About five years back, sub-surface water was available in abundance in this region. Extracting groundwater was not a costly affair as it was available at a depth of 15 - 20 feet. The earlier lower shallow tube wells with 40 - 50 feet depth were functioning well for this easy access to sub-surface water. However, due to the erratic nature of rainfall and the overuse of groundwater, sub-surface water too has become an unreliable source. People are now using groundwater which requires high costs which are out of reach for small and marginal farmers. People who have enough money, mostly large landholders, are able to dig their bore wells or shallow tube wells deeper. Small farmers, though, have less resources to dig deep bore wells and secure their livelihoods. Again, water exploitation by these shallow tube wells with greater depths, say 200 - 300 feet, is obstructing the output of those bore wells which have lesser depths. This highlights issues of inequity and raises questions about the rights of small farmers. As there are no

regulatory frameworks for utilisation of groundwater, and the rights of small farmers are also vaguely defined, this situation leads to conflict.

Case Study 19

Groundwater market in Balasore: Opportunities for the rich, marginalisation of the poor

Better access to water enjoyed by some groups has paved the way for a groundwater market and the wholesaling of groundwater which is dominated by rich farmers. Water extracted through shallow tube wells is provided to poor farmers at a high price which is unaffordable for marginal and small scale farmers. Privatisation of groundwater is proving disastrous for these marginalised farmers, and the depletion of groundwater has brought about a conflict between the livelihoods of small-scale farmers and large-scale farmers.

Fig. 19.3
Water from a bore well being distributed

Chhamauj is a village which comes under the political jurisdiction of Gopimohanpur Panchayat in Jaleswar block of Balasore district. Nearly three decades ago, the villagers of Chhamauj used to practice only rain-fed agriculture. During the early seventies, the government had provided a shallow tube well of 300 feet depth and a motor of 10 horsepower (hp). Two decades ago, two farmers of Chhamauj, Purna Chandra Dey and Shiva Nayak, installed upper shallows of 40 feet depth in their fields. This was not only intended to irrigate the *Rabi* crop, but also to help with the irrigation of the *Kharif* crop. Villagers narrate that a high yield variety of crop was cultivated during those times, and that the cultivation was insufficient. Though the crop used to fetch more profits, it also needed more water. The shallow tube well brought hope to the farmers.

Table 19.2 Chronology of events

No	Date	Description
1	1970s	The government took initiatives for lift irrigation in the area
2	1990s	The government installed a deep tube well in the village
3	Late 1990s	Few farmers of the village bought shallow tube wells
4	2005	Sub-surface water level showed a sharp decline leading to dysfunction of tube wells
		Shuvendu Patra and Shiva Nayak of Chhamauj village installed deep bore wells in their fields and leased out water
5	2009	Groundwater showed a sharp decline in the vicinity

During the last five years, the groundwater in the vicinity showed a sharp decline. The shallow tube wells as well as the drinking water sources of the village experienced a draw down. While some farmers like Purna Chandra Dey and Shiva Nayak faced seasonal draw down, the shallow tube well of Sashibhusan Pradhan

became completely defunct. Farmers who managed to irrigate 10 acres of farmland earlier found it difficult to irrigate even 2 - 3 acres.

Regular instances of disputes about the distribution of water from the tube wells were experienced by the farmers in the village. The conflicts occurred mostly among the small-scale farmers who were dependent on the government tube well. The farmers who had private shallow tube wells also faced the scarcity of water due to draw down. Irregularities and other problems with the government tube well, and the dysfunction of shallow tube wells, provided an apposite platform to the rich farmers of the village to wholesale the provision of groundwater to irrigate fields.

Purendra Patra of the village brought the first deep shallow tube well at 200 feet which is now irrigating 15 acres of farmland. Earlier he had an upper shallow tube well which could irrigate 5 acres with a 1.5 hp motor. Other farmers who have land areas adjacent to the farmland of Purendra pay him Rs. 1,500 per acre annually for using water from his shallow tube well. According to Shuvendu Patra, son of Purendra Patra, the excavation of a shallow tube well costs Rs. 80,000 to Rs. 1,00,000. The pump costs around Rs. 20,000. The electricity bill for using the shallow tube well comes to around Rs. 5,000- 7,000 in a year. The life of such a pump is 30- 35 years which again depends on the water level and the capacity of the pump installed. So the price of Rs. 1500 falls short of covering the expenditure. Now as the groundwater is depleting fast and the maintenance charges are rising, Shuvendu is finding it difficult to provide water to his neighbour farmers at the agreed price and in the agreed quantity.

In the surrounding villages like Sarsida, Kalyanpur, Mainshamunda, Hadda, Kharida, Aruha, Salikotha etc., this practice of selling water to small-scale farmers is commonly seen as well. Water is becoming costlier for the small-scale farmers and their livelihood is at stake. In the district, this practice is proving beneficial for another trade, the business of poly pipes which are used to carry water from the source to the agricultural lands. This business being a private one, poor farmers are vulnerable to any hike in the price of water used for agriculture. They also cannot take any legal action if water is not supplied to their fields. In many cases, instances of pipe cutting, theft of water from other agricultural fields, etc. are observed. This is another matter of concern which results in social unrest. Indeed, groundwater depletion has not only resulted in a loss of livelihood for both large-scale as well as small-scale farmers, it is also leading to privatisation of groundwater which is creating opportunities for the former and leading to the marginalisation of the latter.

Addressing the unrest

The issues of groundwater scarcity and neighbourhood conflicts in water distribution have been put forth in village meetings and Panchayat level meetings. However, as the conflicts were private disputes, the interests of small scale farmers were not entirely taken into consideration, and the solution was entrusted to the mutual understanding of the conflicting parties.

Opposing stands

Small-scale farmers vs. small-scale farmers

The sudden depletion of groundwater in the vicinity has led to conflicts among the small-scale farmers who depend upon common sources of irrigation, for example, a government bore well. Farmers who used to partly depend upon such sources and partly on their private sources of irrigation are now fully dependant upon the common resources. This has increased the demand driven pressure on the existing sources, and regular conflicts are experienced among the small-scale farmers for distribution of water from these sources. The farmers at the tail end argue that the water should reach their fields first, while the farmers who have agricultural lands near the tube wells stick to their right of first use.

Small-scale farmers vs. large-scale farmers

The large-scale farmers are in a position of advantage as they can afford the means to use groundwater which the small-scale farmers cannot. Incessant withdrawal of water has resulted in the dysfunction of shallow tube wells and common government tube wells upon which the small scale farmers are mostly dependant. This privatisation of groundwater has also increased the water tariff and financial burden on the small-scale farmers. The small-scale farmers resist the over exploitation of groundwater. The rich and large scale farmers assert that the deep bore wells are on their own land, and claim that they have every right to use groundwater as no one holds a title to it.

Fig. 19.4
A shallow tube well in the area

Government vs. farmers

While the above issues reflect the conflict between private parties at a smaller level, the stand of the government has brought on a larger crisis. The Water Resources Department is providing subsidies to farmers to exploit the groundwater, instead of encouraging them to use surface storages. This not only poses a larger threat to the groundwater reserves in the vicinity, but also poses a major risk to the sustainability of drinking water sources in the area. The approach of the government seldom takes into account the plight of small-scale farmers who do not have the resources for deep tube wells. In the long run, this approach will also affect large-scale farmers due to the rapid depletion in the groundwater level.

However, the Minor Irrigation division is of the opinion that as the groundwater has already shown a decline in the region, deep bore wells are the only alternative to save livelihoods. Besides, in their opinion, the farmers install deep bore wells in their own fields, so the government cannot intervene if they sell their water to other farmers. The small-scale farmers demand proper groundwater regulation by the government.

Pump traders vs. small-scale farmers

Pump traders also play a significant role in causing and aggravating the conflict. With prospects of a bright future through a potentially flourishing business, they promote the use of deep tube wells. Simultaneously, the wholesaling of groundwater has also increased the sale of poly pipes which are used to carry water from the tube well to the distant fields. While the small-scale farmers complain that the traders are promoting the use of deep tube wells and poly pipes, traders argue that it is the farmers who come to them. They do not go to the farmers to sell the pump set and poly pipes, they emphasise.

Fig. 19.5
A make-shift assembly of a lift and surface distribution system

Scope for dialogue

There is an urgent need for intervention by the concerned government department through regulation of groundwater. In 2009, considering the precarious groundwater situation in the district of Balasore and the scanty rainfall, the District Collector had ordered a stay in subsidies for excavation of deep tube wells, and thus discouraged the exploitation of groundwater for irrigation. However, exploitation continues till date. Surface water storages should be encouraged in the region. The conflict among small-scale farmers can be resolved through a healthy dialogue. Proper distribution mechanisms must be established with active participation of the farmers. Simultaneously, if large-scale farmers extract groundwater only for their own needs, a dialogue can be entered into by both the large-scale farmer group and the small-scale farmer group. The small-scale farmers can be grouped to pool their resources and agree upon a distribution mechanism.

Other influencing parties

Apart from the farmers and concerned government departments, the traders of poly pipes and pump sets also influence the groundwater market in Balasore district. Traders promote the use of poly pipes and pump sets and thus accelerate the privatisation process.

Past efforts towards resolution of the conflict

Though the problem has already had an impact, it has scarcely been addressed in any public forum. No visible steps towards the resolution of the conflict have been taken. The District Collector had ordered in 2009 that the exploitation of groundwater must stop. However, this order was never respected. Also, there is no collective action by the farmers themselves. However, as mentioned earlier, the issues of water scarcity and neighbourhood conflict in water distribution were discussed in the village level and Panchayat level meetings.

Feedback from informants

Padmalochan Karan, a small-scale farmer from the village Chhamauj explains that it can be assumed from the depletion rate of the groundwater that the deep bore wells are also not going to sustain for a long term. In the absence of proper rainfall, the farmers are facing a serious water crisis. Padmalochan is of the opinion that the situation can be tackled by renovating the tanks in the vicinity of the village. According to Shuvendu Nayak, a rich farmer of the same village, the deep bore well is also unable to meet the demand for irrigation and the electricity expenses are constantly rising. The government should cover the crop loss and insure the farmers against such losses. He asserts that the problem can be solved by the farmers themselves by coming together and sharing the water in a more judicious way.

Key institutions and people

- Purendra Patra, Farmer, Chhamauj
- Purna Chandra Dey, Farmer, Chhamauj
- Shuvendu Nayak, Farmer, Chhamauj
- Padmalochan Karan, Farmer, Chhamauj
- Rabindra Jena, Ex *Sarpanch*, Gopimohanpur
- Trilochan Giri, Director, LIFE NGO
- Mahendra Kumar Behera, Assistant Engineer, Minor Irrigation Sub Division, Balasore

About Contributors

Aditeswar Mishra

Aditeswar Mishra is a special correspondent to Dharitri, an Odia daily for Kantamal area of Boudh district. He is also a prolific fiction writer and his Odia works include Gochina, Nila Kadambini, Dhanujatra Paschima, Suare Luhare etc. He has received the Advaita Katha Sanman, Ashok Chandan Sanman, Book Fair Award, and Mahasweta Sahitya Sanman.

Contact:
Aditeswar Mishra
Dolphin Courier Service
Hospital Road
Sonepur, Odisha 762104
Mob: 9437706983
Email: adityasnp@rediffmail.com

Ashis Kumar Das

Ashis Kumar Das has been working in Odisha on various water related issues such as rain water conservation, pollution, political economy of water and state water policy. He coordinated the rooftop rain water harvesting campaign in the Odisha. At present he works as Programme Head, Water Unit, Agragamee. He is also a facilitator for the activities of the Odisha Water Forum. As a moderator of the Water Rights Odisha e-group, he created an e-platform for sharing and learning on water among academicians, the Government, activists, environmentalist, NGOs and CBOs. He is also a sub editor of Agragamee's feature news letter "Pani Samastank Paeen"-(Water for all) and other water related publications.

Contact:
Ashis Kumar Das
AGRAGAMEE
ND-8, VIP Area, IRC village, Nayapalli,
Bhubaneswar, Odisha 751015
Tel: 0674-2551123, *Mob*: 94373-84019
Email: ashisdas@agragamee.org, ashis.das@rediffmail.com

Bamadev Padhi

Bamadev Padhi is a leading social activist from the Dharmasala and Badachana region of Jajpur district, Odisha. He has a long association with developmental organisations like Agragameme and Odisha Water Forum. At present he is the President of the Genguti-Sagadia Sangram Samiti and Secretary of Krushi Sansar. Through this Samiti he works to try and influence government policy for a permanent solution for flood affected Bada-Genguti Delta region. He has organised many awareness campaigns and protest movements on this issue.

Contact:
Bamadev Padhi
Secretary Krushi Sansar
President Genguti Sagadia Sangram Samiti
At P.O. - Kotapur
Dist: Jajpur, Odisha 755008
Mob: 9937105964

Bhupesh C. Sahoo

Bhupesh C. Sahoo works as a Documentation Officer at the Odisha State Centre of the Forum for Policy Dialogue on Water Conflicts in India. He holds a Ph.D. in human rights from Utkal University. He has worked as a Senior Research Associate in the Department of Elementary Education and DEME, NCERT, New Delhi on Sarvashiksha Abhiyan, a project of the Government of India and later as a Trainer in the Government of Odisha sponsored project on PRI Capacity Building. His work on human rights has been published in different national and state journals.

Contact:
Bhupesh C. Sahoo
Shristi, Ground Floor
C/O: Late Gokulananda Mohapatra
Plot No: 63, Unit - VIII
(In front of Unit - 8 Boy's High School)
Bhubaneswar, Odisha 751 003
Mob: 8763039252
Email: bhupesh.sahoo@gmail.com

Bighneswar Sahoo

Bighneswar Sahoo is a journalist and has been reporting since 1990. He has worked with many publishing companies and media houses like Dalton Publication in Chennai, Anupam Bharat, The Sambad and Darshan. At present he is the Associate Editor of Samadrusti. He writes on issues like water, RTI, child labour etc. He has conducted a one year research project on the Water Scenario in Ganjam district of Odisha for the Regional Centre for Development Cooperation.

Contact:
Bighneswar Sahoo
c/o- S. K. Patanaik
HIG 78, Phase 7
Saileshree Bihar
Bhubaneswar, Odisha 751021
Mob: 94379 20447
E-mail: bighneswarsahu@gmail.com, bighneswarsahu@hotmail.com

Bijaya Kumar Kabi

Bijaya Kumar Kabi is the founder Director of APOWA (Action for Protection of Wild Animals) formed in 1999. APOWA works to preserve the plants and animals that represent the diversity of life on earth by protecting the land and water they need to survive. As the director of APOWA, he has been observing and monitoring the water related issues in Kendrapara district since 2000.

Contact:
Bijaya Kumar Kabi
Action for Protection of Wild Animals (APOWA)
At Hatapatana, P.O. Kadaliban
Dist: Kendrapara, Odisha 754222
Tel: 06729-221908, *Mob:* 9437439946
Email: bijayakabi@apowa.org

Bikash Kumar Pati

Bikash Kumar Pati has been associated with the water sector in Odisha for more than a decade. After completing his Masters in Political Science, he joined the development sector. His initial activities focussed on water and sanitation but later on, he concentrated on the water sector in Odisha as a whole. He was associated for seven years with Regional Centre for Development Cooperation (RCDC), Bhubaneswar, a leading organisation in Odisha working on Natural Resource Management. Currently he is Programme Officer, at WaterAid (UK) - India Liaison Office.

Contact:
Bikash Kumar Pati
WaterAid India (Additional Liaison Office East)
1266, Bhoi Nagar, Unit-IX,
Bhubaneswar, Odisha 751022
Tel: 0674-2531266/267 (O),*Mob:* 9937410666
E-mail: BikashPati@wateraid.org
Web: www.wateraid.org

Bimal Prasad Pandia

Bimal Prasad Pandia has been a student leader, youth political leader, a lawyer and a development practitioner. He writes on development, mainly agriculture, water management and governance in mainstream newspapers and development magazines. He has documented a number of water issues at the grassroots and analysed policy issues and has been following water conflicts around the Hirakud reservoir and mining areas which are emerging as important issues.
At present he is project manager and leads the water programme of the Regional Centre for Development Cooperation (RCDC). He has also been Co-ordinator, Water Initiatives Odisha -- a state level network of NGO, academicians, activist, media and community leaders.

Contact:
Bimal Prasad Pandia
Regional Centre for Development Cooperation (RCDC)
A-68 (First Floor), Sahid Nagar,
Bhubaneswar, Odisha 751007
Tel: 0674-2545250 (O), *Mob:* 9438488563
E-mail: bimalpandia@gmail.com
Web: www.rcdcindia.org

Himansu Sekhar Patra

Himansu Sekhar Patra has done environmental management and environmental economics and has been working on development related issues in Odisha for the last seven years and has worked with Vasundhara, an environmental NGO in Odisha. He has prepared a number of research reports for various international funding agencies, and conducted EIA and EMP studies as well as environmental, hydrological and ecological studies for various projects. He is presently, Deputy Project Manager, HSE of TCIL (a Government of India enterprise) and is also pursuing his Ph.D. on use of GIS in mining planning.

Contact:
Himansu Sekhar Patra
Vasundhara, Plot no-1526,
Laxmisagar, P.O. Budheswari,
Bhubaneswar, Odisha 751006
Mob: 9437980120
Email: himansupat@gmail.com

Jinda Sandbhor

Jinda Sandbhor is Research Associate at the Odisha State Centre of the Forum for Policy Dialogue on Water Conflicts in India based at Baitarani Initiative, Shristi. He is involved in the action research project on the Hirakud water conflict. Jinda holds a Masters in Social Work from Tilak Maharashtra University, Pune and has donewith an Internship on People Centred Advocacy inwith National Centre for Advocacy Studies (NCAS), Pune. He has worked with the Anti SEZ Movement and the Right to Food Campaign in Maharashtra.

Contact:
Jinda Sandbhor
Shristi, Ground Floor
c/o: Late Gokulananda Mohapatra
Plot No: 63, Unit - VIII
(In front of Unit - 8 Boy's High School)
Bhubaneswar, Odisha 751 003
Mob: 8018264980
Email: jindadost@gmail.com

K. J. Joy

K. J. Joy has a Master's degree in Social Work from the Tata Institute of Social Sciences, Mumbai. He has been an activist-researcher for more than 25 years and has a special interest in people's institutions for natural resource management both at the grassroots and policy levels. His other areas of interests include drought and drought proofing, participatory irrigation management, river basin management and multi-stakeholder processes, watershed based development, water conflicts and people's movements. He was a Visiting Fellow with Centre for Interdisciplinary Studies in Environment and Development (CISED), Bangalore for a year and was a Fulbright Fellow with University of California at Berkeley. Joy has been He is the coordinator of the Forum for Policy Dialogue on Water Conflicts in India.

Contact:
K.J.Joy
Society for Promoting Participative Ecosystem Management
(SOPPECOM), 16, Kale Park, Someshwarwadi Road,
Pashan, Pune 411 008, Maharashtra
Tel: 020-2588 0786/6542
Fax: 020-2588 6542
Mob: 9422505473
Email: joykjjoy2@gmail.com
URL: http://soppecom.org

K. Sudhakar Patnaik

K. Sudhakar Patnaik started as a school teacher in one of the English medium schools and later joined as a correspondent for the undivided Koraput and Kalahandi districts of Odisha for "News of the World" the sole English news paper published from Cuttack. He has also worked from 1985 to 1996 as correspondent for undivided Koraput, Kalahandi and Bolangir districts in Odisha for The Indian Express, Vizianagaram edition. He was instrumental in exposing the story of starvation deaths in Kashipur during 1986. He worked from 1996-2001as a Senior Correspondent for A.G.A. Publications Private Ltd., Hyderabad, for the entire State of Odisha. At present he is a freelance journalist.

Contact:
K Sudhakar Patnaik
S-30, DNK Colony
Koraput, Odisha 764020
Mob: 9438135767
Email: ksp_pat@yahoo.com

Kiran Sankar Sahu

Kiran Sankar Sahu is a graduate of IIT Kharagpur with a Post Graduation in Aero-Space Engineering from Indian Institute of Science, Bangalore. He served as Aero-Space engineer in Research and Development Wing of the Indian Air Force for 25 years. After retirement in 1989, he is involved in various social development activities in his native place of Keonjhar district. Presently he is President, Kendujhar Citizen Forum which is a body engaged in lobbying and advocacy on various government programmes for the all round development of the people in Keonjhar.

Contact:
Kiran Sankar Sahu
President, Kendujhar Citizens' Forum
Shahid Sadan, Circuit House Road
Near State Bank of India
Kendujhargarh, Odisha 758001
Tel: 06766-254239, *Mob:* 9437254239
Email: kssahu@rediffmail.com

Mehboob Mehtab

Mehboob Mehtab is the district correspondent for Dharitri, an Odia Daily from Sundergarh district in Odisha. He is a graduate from Sambalpur University and has done a Certificate Course in Television News from Indian Institute of Mass communication (IMC), Dhenkenal. He was district correspondent for the Samaj, an Odia daily newspaper from Jharsuguda District from 1997 to 2005. He is associated with Manav Seva Samiti, a civil society organisation from Jharsuguda. He writes on issues related to pollution, drinking water, mining, groundwater depletion, displacement and water conflicts. He writes for a number of regional and national magazines.

Contact:
Meheboob Mehtab
Quarter no-C 45
Sector- 03
Rourkela, Odisha 769003
Mob: 9437256577
Email: mehboob_mahtab@rediffmail.com, mehboobjsg2009@gmail.com

Nrusigha Nanda Panigrahy

Nrusingha Nanda Panigrahy retired as Chief Engineer after 36 years with the Irrigation and Water Resources Department of the Govt of Odisha. He has handled various Hydro Electric Projects from construction to operation and has also worked in Aero Engine Factory Project, Sunabeda. After his retirement he has been associated with Tribal Cultural Research Centre (TCRC) Koraput as honorary Head, Research and Liaisoning. He is also a fellow of the Institute of Engineers, India.

Contact:
Nrusingha Nanda Panigrahy
Former Chief Engineer
Research Liaisoning Head
Tribal Cultural Research Centre (TCRC)
Koraput, Odisha 764020
Mob: 9437339696
Email: nn.panigrahy@gmail.com

Pranab R. Choudhury

Pranab R. Choudhury coordinates the Odisha State Centre of the Forum for Policy Dialogue on Water Conflicts in India at Baitarani Initiative and is one of the conveners of Odisha Water Forum. He has been active in the water sector since 2006, when he led a Civil Society initiative on Integrated River Basin Management in Odisha. He works as a researcher and consultant in the areas of natural resources management and governance around inter-disciplinary issues on forest, water, land livelihoods in different parts of India and South Asia. A post-graduate in Forestry, Pranab was a member of the (Indian) Agriculture Research Service and has worked for more than 7 years with Indian Council of Agriculture Research as a Scientist (Forestry). He has published /presented more than 50 papers/ abstracts in peer reviewed Journals and International and National Conferences.

Contact:
Pranab R. Choudhury
Shristi, Ground Floor
c/o Late Gokulananda Mohapatra
Plot No: 63, Unit - VIII
(In front of Unit - 8 Boy's High School)
Bhubaneswar, Odisha 751 003
Tel: 0674-6450323
Email: oridev@gmail.com

Priyabrata Satapathy

Priyabrata Satapathy did his Master's in History and Law. He worked for 5 years with LIFE, a New Delhi based Legal firm. Later he joined Odisha State Centre of Forum for Policy Dialogue on Water Conflicts in India as Senior Research Associate and was instrumental in the documentation work of the Centre in its early phases through meetings and workshops, both at state and district level. At present he is working with the RCDC led Paribartan project on Global Warming and Climate Change which is funded by European Union.

Contact:
Priyabrata Satapathy
RCDC-FC
By-pass Road
P.O. Rajnagar
Dist- Kendrapara, Odisha 754225
Mob: 9438286393
Email: priyalife@gmail.com

Sanjaya Kumar Mishra

Sanjaya Kumar Mishra is a development consultant and a freelance writer. For the last 14 years he has been working on Poverty and Migration in Western Odisha. He has published more that 50 articles pertaining to socio-cultural and migration issues in various Odia dailies and magazines. He was associated with the proposed Lower-Suktel Irrigation project as he belongs to Bolangir town. The proposed dam is about 15 km away; he has been regularly interacting with the people of the proposed submerged area.

Contact:
Sanjaya Kumar Mishra
Freelance Development Researcher
Bramhin para, Bolangir, Odisha 767001
Mob: 9437124197
Email: sanjaya_mish@yahoo.co.in

Santosh Kumar Mohanty

Santosh Kumar Mohanty has a PG Diploma in Journalism and Mass Communication and is pursuing a career in journalism since 1980s. He has worked with The Sun Time, The Eastern Times, The Telegraph, The Indian Express, India First and The Sunday Indian. In 2007 he had launched an English news portal, www.Odishaexclusive.com from Angul, his home district. Green Journalism has been his area of pursuit and he writes on environmental issues in Angul-Talcher Industrial belt of Odisha. At present he is Senior Sub-Editor, Odisha Post from Bhubaneswar.

Contact:
Santosh Kumar Mohanty
P.O. Bantala, District Angul,
Odisha 759129
Tel: 06764-286110
Mob: 9937890255
Email: journalistsantosh@rediffmail.com

Shruti Vispute

Shruti Vispute is a graduate in Political Science from Fergusson College, Pune and has a Masters in Environmental Politics from School of Politics, International Relations and Environment at University of Keele, England and M. Phil. in Political Science from University of Pune, Pune. Her research areas are water conflicts in India, gender issues in the water sector, development politics, and environmental activism especially around water issues. She has written for the popular press on contemporary socio-political issues including feminist and women's issues and movements. She has been associated with SOPPECOM since 2005 and is presently consultant to the Forum for Policy Dialogue on Water Conflicts in India.

Contact:
Shruti Vispute
Forum for Policy Dialogue on Water Conflicts in India
Society for Promoting Participative Ecosystem Management
(SOPPECOM), 16, Kale Park, Someshwarwadi Road,
Pashan, Pune, Maharashtra 411 008
Tel: 020-2588 0786/6542
Fax: 020-2588 6542
Email: waterconflictforum@gmail.com, vispute.shruti@gmail.com
URL: http://conflicts.indiawaterportal.org

Sisir Tripathy

Sisir Tripathy is a social activist associated with water movements in Talcher and Brahmani basins. He is convener of District Action Group Forum, an NGO working against industrial pollution in Angul district. He is a prominent member of Brahmani Bachao Andolana and associated with Odisha Environment Society. He has also conducted a research study on Impact of Mining on Tribals in Odisha, covering dolomite and limestone mining areas of Sundergarh district. He has also been associated with development organisations like RCDC and Action Aid.

Contact
Sisir Tripathy
P.O. Phulpara , Via Hindol,
District: Angul, Odisha 759029
Mob: 9937558629
Email : ssisirtripathy@yahoo.com

Suhas Paranjape

Suhas Paranjape has a B.Tech from Indian Institute of Technology, Bombay. He has actively participated in different movements like People's Science Movement, Adivasi agricultural labourers' movement, etc. and participated as a core team member and consultant in many action research studies and pilot projects undertaken by Centre for Applied Systems Analysis in Development (CASAD) and Society for Promoting People's Participation in Ecosystem Management (SOPPECOM), Pune in the areas of participatory management of natural resources specially in the field of participatory irrigation management. For three years from 1996 to 1999 worked as a core team member of the Bharat Gyan Vigyan Samiti (BGVS) in its watershed development project across the country. He was a Visiting Fellow with CISED, Bangalore for a year.

Contact:
Suhas Paranjape
Society for Promoting Participative Ecosystem Management
(SOPPECOM), 16, Kale Park, Someshwarwadi Road,
Pashan, Pune 411 008, Maharashtra
Tel: 020-2588 0786/6542
Fax: 020-2588 6542
Mob: 9987070792
Email: suhas.paranjape@gmail.com
URL: http://soppecom.org

Tapan Padhi

Tapan Padhi is Director of National Institute for Ddevelopment, Bhubaneswar. He is associated with water related conflicts since the last 20 years. He is an important spokesperson on water in Odisha.

Contact:
Tapan Padhi
Executive Director
National Institute for Development (NID)
Plot 322, Sahidnagar, Bhubaneswar, Odisha 751007
Mob: 9337433054
Email: nidOdisha@gmail.com, tapankpadhi@gmail.com

Review Committee Members

K. J. Joy

See note on contributors.

Pranab R. Choudhury

See note on contributors.

R. M. Mallick

Prof R. M. Mallick is a former professor of economics at the Natakrishna Chaudhury Centre for Development Studies, Bhubaneswar, Odisha. His research areas of interest are, land economics, agrarian studies, forest resources management, livelihood and food security, poverty, irrigation development and water conflicts. He was awarded the Shastri Indo Canadian Fellowship at the University of British Columbia, Canada and Society for the Promotion of Science (JSPS) fellowship at the Kyarhu University, Fukuoka, Japan. He was a visiting professor at Jawaharlal Nehru University, New Delhi. He was awarded a Senior Research Fellowship by Indian Council of Social Science Research, New Delhi.

Email: rmallik2004@yahoo.co.in

S. Janakarajan

Prof. S. Janakarajan, an Economist, is currently Professor at the Madras Institute of Development Studies (MIDS), Chennai. His areas of interest are climate change and adaptation, rural development and agrarian institutions, disaster management, water management and traditional irrigation institutions, conflicts and conflict resolution, environment, urban and peri-urban issues, and markets. He is currently engaged in a project on Sustaining ecology around Chennai funded by DST, Govt. of India. He has published several books and many papers in national and international journals. He is the anchor of the 'Cauvery Family', an initiative which he started in 2003 that has brought together farmers of Karnataka and Tamil Nadu to resolve the most vexed inter-state water dispute in the history of contemporary India through farmer to farmer dialogue.

Email: janak@mids.ac.in

Shripad Dharmadhikary

Shripad Dharmadhikary completed his graduation in 1985 with a Bachelor of Technology (B.Tech) degree from the Indian Institute of Technology (IIT) Bombay. He worked for a couple of years with industry, and then for a year with a research institute studying development policy issues. He was a full time activist of the Narmada Bachao Andolan for 12 years, before setting up the Manthan Adhyayan Kendra (Manthan) in 2001to research, monitor and analyse water and energy issues which he coordinates. (www.manthan-india.org) His publications include Unravelling Bhakra, based on a three year study of the Bhakra Nangal project that he led. He writes regularly on the issues of water, energy and development.

Email: manthan.shripad@gmail.com

Smita Mishra Panda

Prof. Smita Mishra Panda is Professor of Development Studies with the Human Development Foundation, Bhubaneswar, Odisha. She is also adjunct research fellow with the Monash Asia Institute of Monash University, Melbourne. She has taught at the Institute of Rural Management, Anand (IRMA), Gujarat for eight years, has worked as a researcher at the Gender and Development Studies of the Asian Institute of Technology, Bangkok, Thailand and also with the United Nations Centre for Regional Development, Japan. Her current areas of interest are gender and governance, gender and sustainable water management, rural development, NGOs and livelihood institutional concerns with a focus on Odisha. She has also been co-ordinator CapNet India focusing primarily on gender and institutional concerns.

Email: smitafem@gmail.com

Suhas Paranjpe

See note on contributors.

Tapan Padhi

See note on contributors.