Tehri hydro-electric project [Project-Page: thdc.gov.in] Thomas Langkamp, Uni HH, Inst. Geogr. 3.3.08

Introduction - Worldwide, over 45,000 large dams have been built, and nearly half the world's rivers are obstructed by a large dam. In India fewer than 300 large dams existed at the time of Independence. Until the year 2000 their number has risen to about 4,300. At this time worldwide dams generated 19 % of electricity supply and irrigated [bewässerten] over 30 % of 271 million hectares of acres. However, these dams also displaced over 40 million people, altered cropping patterns [Anbaumethoden], and significantly increased salination and waterlogging of arable land [Versalzung und Staunässe auf sonst nutzbaren Ackerflächen] [World Commission on Dams 2000a].
Water resources planning in India has largely meant irrigation development through big-dam projects. Over the years a powerful movement has emerged against such projects. There is a sharp polarization of positions. The World Commission on Dams established by the World Bank and the World Conservation Union (IUCN) wish to resolve this conflicts. A crucial question in this context would be whether there are effective alternatives to large dams for meeting the future needs of water and energy. At least there have been some very successful local initiatives in watershed [Einzugsgebiet] development and social transformation, but a major reorientation in water resource policy is needed.

Short Project Overview

Here focus on 1 main dam out of 11 dam-projects in Uttaranchal/Uttarakhand**:** The Tehri dam
Location: 200 miles northeast of Delhi at sacred "Bhagirathi Ganga river" and "Forest of Advani" in Henvalghati, region of Tehri Garhwal district in Uttaranchal/Uttarakhand – **a seismically active area** in the Central Himalayan Seismic Gap
Project-timetable: 1972 governments approval; 1978 building starts; 1985 shelved after protests; 1986 India and the Soviet Union signed an agreement under which Russian experts would assist the project and provided 416 million US$ to the construction; 1998 the project handed over to Tehri Hydro Development Corporation (THDC); Oct. 2005 first reservoir flooding (planed was 2002; delayed due to massive protests); first electricity in September 2006
Costs: 1.7 billion US$, 4 million US$ expected (Electricity of the dam sold in 2006 for Rs 3.5/kWh)
Size: 260,5 m height, 592 m length on top, worlds 8th tallest; planned 2,400 MW (1,000 MW Tehri Dam&Hydro Power Plant, 1,000 MW Tehri Pump Storage Plant, 400 MW Koteshwar Dam&Power Plant. Phase I with only 4 x 250 MW finished until 3.07); irrigation stabilization to an area of 6,000 km²; drinking water for 4 million people
Implemented by: THDC Ltd. a joint venture of Government of India and Government of UP.
[en.rian.ru/world/20060908/53657743.html and projectsmonitor.com/detailnews.asp?newsid=12883]

General Impacts - Dams usually fulfill one or more of three objectives: providing water for irrigation, generating electricity, and preventing floods. In India a significant amount of the monsoon floods cause widespread damages to lives and could be conserved in the upstream storage sites of large dams to mitigate flood intensities downstream. The storage reservoirs could augmented the dry season flows and satisfied the water needs; but often the opposite is the case and additionaly there is less new groundwater. Hydropower from storage dams could have eased energy crisis in basin areas and created more job opportunities but besides many residents are forced to resettle. A statistical study* finds, that in districts located downstream from a dam, agricultural production increases, and vulnerability to rainfall shocks declines. In contrast, agricultural production shows an insignificant increase in the district where the dam is located but its volatility [Unbeständigkeit] increases. Rural poverty declines in downstream districts but increases in the district where the dam is built, suggesting that neither markets nor state institutions have alleviated [lindern] the adverse [widrige] distributional impacts of dam construction. [*The Quarterly Journal of Economics, May 2007 mitpressjournals.org/doi/pdfplus/10.1162/qjec.122.2.601?cookieSet=1]

Project Specific Impacts

On hydrology: Reduced supply of Bhagirathi water to a mere 2 ft³/s from the normal 1,000 ft³/s
On forest: Many trees have been felled to accommodate pylons that will bring electricity from the project to power-hungry citys in the plains. Back in 1978 when a few trees were auctioned prior to actual felling, activists with the Chipko resistance movement and villagers, particularly women, hugged

the trees and created enough commotion [Aufruhr] to make sure that the trees were save. But today there is not much resistance left.
On residents: After decades of struggle to prevent the Tehri dam theres not much courage left. Most of the residents of Tehri town and surrounding villages have already been relocated to a place called New Tehri. [indiatogether.org/2004/jun/env-voltage.htm] The main dam reservoir comprises an area of 42 km². This has now flooded the old Tehri town and 112 villages around it, thereby displacing 40,000 - 100,000 people, most times without a fair compensation.
On Geology: People living now near the dams reservoir are in trouble again. Villages on the slopes [Abhänge] overlooking the reservoir are threatened by increasing landslides [Erdrutsche] and those living downstream, once ousted [verdrängt] for the building of the dam and rehabilitated, are losing their new homes to an airport. *"The slides are going to supplement the sedimentation rate of the reservoir and this can drastically reduce the dam's life,"* says R. K. Mazari, a geologist with the Wadia Institute of Himalayan Geology. There is also the risk of a major earthquake, that could damage the dam. There already has been a magnitude 6.8 earthquake in October 1991, epicentred 50 km from the location of the dam and a fatal accident in one of the tunnels in August 2004, when a portion of a tunnel collapsed following heavy rains. [downtoearth.org.in/full6.asp?foldername=20070630&filename=news&sec_id=50&sid=27]

Outlook - The Dam project has created a reservoir spanning nearly 42 km², making it one of the largest artificial lakes in Asia. *"The scenic beauty of the lake has increased Uttarakhand's tourism potential immensely and demand for land in surrounding areas."* [andolan.prayaga.org/?p=360]
July 05, 2007 - After sanctioning mega projects as big as the 2,400 MW Tehri project, the Uttarakhand government is now trying to focus on small power plants. These projects would be of 0.5 to 5 MW of capacity. But till now, Uttarakhand is generating only 2,819 MW of power. At present, different projects with the capacity of generating 1,1480 MW of power are being built across the state.
[euttaranchal.com/news/2007/07/uttarakhand-shifts-focus-to-small-power-projects]

Major schemes under construction

Name	Maximum Capacity	Country	Construction started	Scheduled completion	Comments
Three Gorges Dam	22,500 MW	China	Dec. 14 1994	2009	Largest power plant in the world. First power in July 2003, with 12,600 MW installed by October 2007.
Xiluodu Dam	12,600 MW	China	December 26 2005	2015	Construction once stopped due to lack of environmental impact study.
Longtan Dam	6,300 MW	China	July 1 2001	Dec. 2009	
Xiangjiaba Dam	6,000 MW	China	November 26 2006	2015	
... 7 weitere ...	3,000-6,000 MW	China			
Boguchan Dam	3,000 MW	Russia	1980	2012	
Chapetón	3,000 MW	Argentina			
Jinanqiao Dam	2,400 MW	China	December 2006	2010	
Guandi Dam	2,400 MW	China	Nov. 11 2007	2012	
Tocoma (Manuel Piar)	2,160 MW	Venezuela	2004	2014	This new power plant would be the last development in the Low Caroni Basin totalizing six power plant in the same river, including the 10,000MW Guri Dam.
Bureya Dam	2,010 MW	Russia	1978	2009	
Ahai Dam	2,000 MW	China	July 27 2006		
Lower Subansiri Dam	**2,000 MW**	**India**	**2005**	**2009**	

List of the largest hydoelectric power stations

Country	Annual Hydroelectric Energy Production(TWh)	Installed Capacity (GW)	Load Factor
China	486.7	145.26	0.37
Canada	350.3	88.974	0.59
Brazil	349.9	69.080	0.56
USA	291.2	79.511	0.42
Russia	157.1	45.000	0.42
Norway	119.8	27.528	0.49
India	**112.4**	**33.600**	**0.43**