Governance, Livelihoods and Gender Issues in Run-of-the-River Hydropower Project Areas in Uttarakhand, India

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Master’s in Development Practice
Setting the context

- India is currently third largest coal producer in the world; by 2050 will be largest coal consumer globally.

- Coal plants in India and globally are the top contributors to carbon dioxide emissions and to air pollution.

- 22 of the 50 world’s cities with the worst air pollution are in India.
Hydropower as an alternative to coal

- Hydropower: considered to be ‘green energy’
- Globally, smaller hydropower dams and run-of-the-river (ROR) projects offered as alternative to polluting coal-generated electricity.
  - Veracruz, Mexico (Silber-Coats 2016), Nepal (Shrestha et al 2016), NE Thailand (Sneddon & Fox 2008) and Rwanda (Pigaht & van der Plas 2009).
Hydropower in Uttarakhand, India

- In the Himalayan state of Uttarakhand, India, over 450 hydroelectric ("hydel") power schemes are proposed or are under development by state and central governments.

- These power projects are joint ventures between public and private entities or are developed by private companies (nationally and internationally based).
Multiple Actors

Stakeholders in this rapid hydropower expansion include multiple actors with often diverging sets of interests.

- The resulting governance challenges are centered on these tradeoffs:
  - electricity generation and revenue from hydropower and
  - impacts on small-scale irrigation systems, riparian-corridor ecosystem services, and other natural resource-based livelihoods, on the other.
Energy Production For Whom? At What Cost?

- Social Justice Approach
- Water-energy-food Nexus
Uttarakhand state, India

- 89% mountainous
- 70% work in agriculture, mainly subsistence agriculture
- >45% population below poverty line
Irrigation-hydropower nexus (HI-NEX) project

Objectives:

- Identify ROR system impacts on water, energy, and food systems, particularly on women.
- Identify institutional, policy and program-related opportunities, obstacles to harness irrigation-hydel nexus for livelihood resilience.

Project team:

- University of Arizona
- People’s Science Institute – Dehradun
- University of Delhi
- ICIMOD
- Integrated Mountain Initiative – New Delhi
Hydro-electric power (HEP) in Uttarakhand, India

- The 450 new hydropower projects in planning or construction phase are:
  - **Micro hydro** (plants with generating capacity up to 100 kW)
  - **Small hydro** (5-25 MW)
  - **Large hydropower** plants with large dams like the Tehri dam with a generating capacity of 2,000 MW.
ROR projects being developed in Uttarakhand to avoid social & environmental costs created by large dams

Tehri Dam-Uttarakhand
large hydropower project
2,000 MW
Study focus

- Stakeholders in this rapid hydel expansion involves diverse actors from rural and urban areas with often diverging sets of interests.

- We focussed on rural stakeholders in the glacier-fed Bhilangana river in Uttarakhand located within the Ganga (Ganges) river basin.
Livelihoods Focus

- Gender and age-differentiated livelihoods in the Bhilangana river basin dependent on water include:
  - Farming
  - Livestock
  - Wild and cultivated fodder
  - Wild plants
  - Fishing
Research Methods

• Selection of impacted and control villages for each project (impacted stretch).

• Detailed study involving use of: RRA, FGDs, HH surveys (25%; stratified sampling)

• Review of project related documents e.g. DPRs, village agreements, writ petitions, etc.
Selected Hydropower Plants-Bhilangana Basin

- 3 operational ROR HEPs
  - AgundaThati (3 MW),
  - Bhilangana I (Phalenda, 22.5 MW)
  - Bhilangana III (Ghuttu, 24 MW).
- 30 km stretch of Bhilangana River, upstream of Bhilangana and Bhagirathi rivers confluence impacted by Tehri Dam reservoir.
Run-of-the-River Hydropower

Figure 2. A small hydro, or run-of-river facility, drawing power from a mountain stream. Source: http://www.energybc.ca/profiles/runofriver.html.
A Run-of-the-river project
Run-of-the-river projects
Village Electricity Use
Women and girls - backbones of agriculture in Uttarakhand
Migration of male youth and middle-aged men
Women and animal husbandry
Women collecting wild and cultivated fodder
Collecting spring water—girls and boys

From a distance from villages

Within village
Tunnel construction
Programs to help local communities in HEP areas

**Springshed Development** to rejuvenate springs used for household water consumption

Activities: Mapping of watershed, local education, tree planting, trenches, catchdams.

These projects have been undertaken by non-profits in neighboring states and could be implemented in Uttarakhand.
Policies to help local communities benefit more from HEP

Benefits sharing in addition to compensation for damages from HEP construction so local populations gain real access to what is now often only formal policies that don’t correspond with ground realities:

• 1% of new project cost to local area development fund.

• 3% generated power to go to village government (Panchayats) for new infrastructure like schools, community centers, roads, bridges.

• Example of Nepal which is considering federally mandated 10% revenue sharing for all new HEPs (Shrestha 2016)
Micro hydro can help local communities benefit more from HEP

For isolated mountain villages/those without grid access or just for more village control: community-controlled micro hydro (generating capacity up to 100 kW)
Conclusions

- A social justice approach revealed the need to have local voices and livelihoods be taken into consideration when hydropower projects are planned.
  - Such an approach would be useful for policymakers and urban planners to avoid the following vicious cycle:
    - male migration swells urban populations increasing urban energy demand while in the rural areas, due to male migration, fewer work in agriculture translating into less food produced for the rural and urban populace.
  - The integration of centralized and decentralized power schemes requires adaptive, multilevel, and collaborative institutional arrangements that are decentralized and account for local conditions.
Conclusions

- Women, the agricultural backbone of Uttarakhand, need to be consulted from project planning to implementation stages including giving them more say in compensation and benefits sharing processes.

- Multipurpose, micro hydropower development can contribute to food and energy security in the Himalayas.

- Local watershed programs can help to revitalize spring water sources.
Thank you