Have you ever wondered how you get water from a spring like this in the middle of a forest located here?

Forests + (People & Climate Change) + Water = Uncomfortable Knowledge for Clumsy Governance of a Wicked Nexus

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Academician, Nepal Academy of Science and Technology (NAST) & Former Minister of Water Resources
IUFRO XXV, Curitiba Brazil, 5th October 2019
Some basic “uncomfortable knowledge” # 1

Climate Change was “caused” by the energy sector

But

Society is affected mainly through its impact on the water sector
Too much water

“at the wrong time, wrong place lacking proper infrastructure and/or institutional capacity to deal with these increasing surprises and stressors”

Too little water

East Nepal Kosi river embankment breach 2008

Handpump at the bottom of a 20-foot, dried out well

Mahendranagar, West Nepal Tarai
And do not forget the changes in atmospheric humidity and soil moisture (the marginalized aspects of water policy) that allows the emergence of disease vectors (for plants, animals and humans) to migrate and appear in agroclimatic zones that never had them.

Currently we have little or no prophylactics allowing us to resist this inexorable onslaught, especially when they emerge as nasty surprises.
Some basic “uncomfortable knowledge” # 2

If Climate Change is saying couple of simple thing loud and clear, it is these:

➢ that our future is going to be very different from our past
➢ that global temperatures are rising is in no doubt: however, what this is doing to precipitation is wildly uncertain

One thing it does to the water engineering profession is to throw our standard design methodology, (i.e. estimating maximum probable flood from limited data points, regression-analyzing them and designing dams and spillways accordingly with those risk probabilities in mind) out of the window
Water Scarcity: Nepal Country Snapshot:

Nepal (like much of South Asia) is a Semi Arid Region rich in Four Months (June-September) of Monsoon Floods And Eight Months (October-May) of Drought

For Policy Studies, what this means is the need for scientists to be more aggressive in stepping out of their comfort zones, and engaging with society in “myth busting”, i.e. generating uncomfortable knowledge, the real policy engagement!

NWCF Working Paper 1/2019
How?

✓ More Toad’s Eye Science without ignoring Eagle’s Eye Science
✓ Water has to move from IWRM to Water-Energy-Food Nexus which is infinitely more challenging
✓ More “nexus” at lowest units of governance and actual implementation: only broad goal-setting and monitoring at the higher levels

➢ 1986 Mohonk Conference debunking Theory of Himalayan Degradation
➢ Akin to “snowline”, there is a “firewood line” beyond which it is simply uneconomical for a villager to chop trees and try selling in the market
➢ Actual water use at village and household levels is highly gender-differentiated: during droughts, role shifts between men and women
➢ Traditional technologies can oftentimes be superior in terms of both effectiveness and equity to modern technologies: control of landslides by ponds rather than check dams
A Generalized Concept of the Water Tower in the Mid-Hills of Nepal

Monsoon rains fill the ‘water tower’ and create the buffer for the arid season that keeps rivers alive!!

Theory of Himalayan Degradation (THED) long held sway over watershed science until debunked by the Mohonk Conference. While forest and grass cover are crucial to prevent topsoil erosion, they do little to stop mass wasting in the Himalaya: that is due to geotectonic and orographic instability compounded by monsoon downpour washout, resulting in mass wasting that is many times more than top soil loss.
The results of ridgetop ponds versus check dams

Active gully 1989

Stable gully 1991

Upadhya 2009
Core message

Ponds helped reduce the peak of the monsoon hydrograph and store water/recharge groundwater for winter in the system. The following were the visible benefits

- Landslide stabilization
- Gully stabilization
- Green water preservation
- Increased maize production by 50%

**Question:** why did the development agency that supported this innovative “uncomfortable knowledge generation” itself learn nothing, did not feed it back to improve its own development programs?

This learning from the EU-supported Bagmati Watershed Project is discussed by Upadhya, M (2009) *Ponds and landslides: water culture, food systems and the political economy of soil conservation in midhill Nepal*. Kathmandu, Nepal: Nepal Water Conservation Foundation (NWCF). (A longer Nepali version was published by NWCF and ICIMOD in 2069 BS as *Pahiro Ra Pokhari*. ) The issues behind ponds and water/soil moisture/vegetation conservation is summarized in: [http://lib.icimod.org/record/30276](http://lib.icimod.org/record/30276)
Cultural Theory to the rescue...
Why should foresters should pay heed to it? Because it comes from a synthesis of theoretical work done by social anthropologists (Mary Douglas et al) and ecologists (C. S Holling)

- Cultural Theory (or Neo-Durkheimian Theory of Plural Rationalities/New Institutionalism) gives a better understanding of what water and forest governance, which are wicked problems individually and more so jointly, should look like.

- In pluralization of organizational proclivities (bureaucratic hierarchism, market individualism and activist egalitarianism), giving each not just a voice at the policy table but also responding to their concerns and, with that multiple “problem feeding”, redefining the problems and potential solutions, lies the probable answers of sustainable governance.
Voter and Consumer Fatalism: unbound but suppressed by structure world of Donkeys

Market Individualism: unbound, unstructured networks of Hawks

Nature capricious

Nature robust

Nature fragile

Bureaucratic Hierarchism: bound, ranked and structured world of Wolves

Activist Egalitarianism: bound, unstructured world of Vultures

Risk absorbing fatalist rationality

Risk minimizing procedural rationality

Risk taking substantive rationality

Risk avoiding critical rationality

Market Individualism: unbound, unstructured

Activist Egalitarianism: bound, unstructured

Voter and Consumer Fatalism: unbound but suppressed by structure

Market Individualism: unbound, unstructured networks of Hawks

Nature capricious

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Bureaucratic Hierarchism: bound, ranked and structured world of Wolves

Activist Egalitarianism: bound, unstructured world of Vultures
Cultural Theory of Social Response to Groundwater Overdraft
Constructive Engagement of Plural Social Solidarities

➢ **Hierarchism**: Coercive Power (*Tamasik*), Strategy of Codes and Procedures
➢ **Individualism**: Persuasive Power (*Rajasik*), Strategy of Networking Freedom
➢ **Egalitarianism**: Moral Power (*Satwik*), Strategy of Critique


Market Choice:
- Diesel Pump, Donkey Cart
- Mobile Phone, Irrigated Truck

Community Choice:
- Brushwood Dam, simple labor saving devices

### Diagram:
- **Bureaucratic Hierarchism**
  - Regulatory Bent
  - Risk Managing/Controlling
- **Agency Choice**
  - Cement Dam, Modern cement technology
- **Activist Egalitarianism**
  - Cautionary Bent
  - Risk Sensitizing
- **Stable Policy Arena in a Contested Terrain**
- **Market Individualism**
  - Innovative Bent
  - Risk Taking

International Treaty

Consensus

- Environmental Activists
- Multinational Corporations
- Scientific and Professional Groups
- Non Government Social Organizations

Nation State

New Reality

Figure: 1.1 Dharma and its dynamics

Some basic “uncomfortable knowledge” # 3: 

Both forest and water folks missing the forest for the tree?

**Forest Folks:**
- move beyond focusing on forests only as carbon sinks to forest-water-people-carbon nexus
- re-conceptualize public common pool lands (more than forests!) as major water consuming entities, depending on the climatic and hydro-geological characteristics of the region

**Water Folks:** move beyond transboundary surface water to
- transcending disciplinary boundaries (water not just a civil engineering and economics subject!)
- looking more closely at atmospheric humidity, soil moisture, groundwater and increasing instances of extreme events

**Both:** move away from Public-Private Partnership to Public-Private-Civic Partnerships {Not PPP but PPCP}
Some additional references that this keynote speech draws on:

On the debunking of the Theory of Himalayan Degradation:


On “Toad’s Eye Science”:


On Water-Energy-Food Nexus and Inter/Trans-disciplinarity:


On Cultural Theory:
