

**The value of natural resource management in adaptation and  
building resilience to climate change**

**By:**

**Vivek Prasad, PhD**

**(Environmental Science and Public Policy, George Mason University, USA)**

**Rajeev Ranjan**

**( Lohardaga Gram Swarajya Sansthan, Jharkhand, India)**

## Context

- Climate change will have disproportionate effects across different social groups and geographical regions
- The change may pose significant threats and elements of surprise through the occurrence of extreme events for societies dependent on natural resources for their livelihood (Thomas et al., 2005)
- The poor communities will face the highest brunt due to limited adaptive capacity and more dependent on climate sensitive resources (IPCC, 2007)

## **Concern for developing countries**

- Climate change is anticipated to have far reaching effects on the sustainable development of developing countries (UN 2007)
- India faces major challenges from the change due to its high levels of population density, poverty, stressed ecological systems, and a substantial dependence on natural resources of much of India's population (World Bank, 2011)

# Responses to climate change

**Mitigation** – the process of reducing greenhouse gas emissions and, thereby, associated climate change;

**Adaptation** – the process of adjusting in response to, or in anticipation of, climate change.

# **Natural resource management as adaptation and building resilience to climate change**

Collective action for natural resource management can be useful to enhance adaptive capacity and build resilience of the communities (Tompkins and Adger, 2003)

Natural resources constitute important aspect of livelihood for people living in rural areas of India and can be dealt with reducing the vulnerability to climate change

- 833 million people live in rural areas (Census 2011)
- over 70% of Indian agriculture being rainfed and totally dependent on monsoon (NABARD)

# Case of Jharkhand

- Carved from Bihar in 2000
- Located in central eastern part of India
- Area of 79,714 square kilometer (Census, 2011)
- Population of 32,966,238 (Census 2011)
- Tribals constitute largest ethnic group (28%)
- Represents dichotomy of development  
(Produces one third of India's mineral resources  
but lowest in poverty index)



Jharkhand may be well explained by the concept of

“Double Exposure”(O'Brien and Leichenko,2000)-

*There are many regions in the world already facing socio-economic problem due to economic disparity created by globalization (colonization and historical reasons) when they get exposed to environmental and climatic stress their vulnerability increases manifold.*

# Jharkhand – double exposure

## Climate Change related stressors

Unpredictable monsoon, water stress, high temp, drought etc



## Socio-economic stressors

Socio-economic status, Political situation, etc.





## Stresses – Non Climatic

### ❖ **Natural resource dependent livelihood**

*-80% of the population dependent on agriculture and natural resources (PRAXIS 2005)*

*-only 10% of the land under irrigation (NABARD, 2011)*

### ❖ **Poverty**

*-46% people live below poverty line (Food Security Atlas of Rural Jharkhand, 2008)*

*-Per capita income- \$514 in 2008 (Jharkhand Development Report 2009)*

### ❖ **Environmental degradation due to large scale mining**

### ❖ **Governance**

*-poor implementation of development projects and corruption (World Bank 2007)*





# Climate Change and Variability

- Increase in occurrence of extreme weather events (Wadood & Pragyana, 2010)
- Studies by Lal et al (2001) suggest increased variability in onset of monsoon
- Characterized by recurrent occurrences of drought
- Drought results in an overall income loss of about 25% in Jharkhand (Pandey et al., 2006)

# Local perception and traditional knowledge

Using Participatory Rural Appraisal method the local perception embedded in folklores was explored



## Local perception of the change

*Earlier we carried Gungu (traditional umbrella made of leaves and wooden sticks) as it rained heavily during monsoons that lasted for four months, now I see women carry umbrella to work in fields to protect themselves and children from heat, drought occurred in span of many decades but now several in a decade; what do I say as if the God has changed... (Dhukha Oraon, a 90 years old tribal from Karak village, Jharkhand).*

## Timeline of rainfall and temperature

Year	Rainfall and temperature
1966	Drought
1975	Heavy rainfall continued for 15 days
1983	Heavy rainfall and hailstorm which lasted for 3 days
1986	Extreme temperature was experienced during the summer
During 1990s	More or less normal
2000	Reduction in amount and variability of rainfall started to be felt
2002	Drought
2004	Drought
2005 onwards	Tremendous change in rainfall and temperature, unpredictable time and amount
2009	Drought
2010	Drought

## Some local beliefs and prediction of rainfall:

- Turning of *Pipal* (Fig) tree leaves into deep green color indicates start of monsoon.
- Blowing of wind from south to north direction of the village suggests possibility of rainfall;
- Formation of clouds in north –west suggests rainfall would occur in any moment;
- If wind flow is from east-west direction then it suggests that there would be drizzle (*lahra paani*);
- Crying of *Rehan* bird, if it cries from the top of the tree then there is a delay in rainfall and if cries at the bottom of the tree then rainfall is expected early;
- Flat web formation of spider in paddy field suggests less chances of rainfall while slant/ bent web suggests rainfall and the direction of rainfall;

# Migration: Adaptation or Failure to Adapt?



# **Khaksi toli-case of community based natural resource management**

- A small hamlet of around 65 households in Bero block of Ranchi
- land and water management initiative in combination with forest protection was started four decades ago under the traditional leadership of Simon Oraon
- exemplifies how local natural resources can be managed by protecting entitlement and supplementing villagers' livelihoods
- Communities able to withstand stresses of recurrent drought witnessed in recent years

# December 2010- Khaksi toli



# **System of rice intensification- case of planned adaptation**

- Introduced in Lohardaga district with the support of local NGO *Lohardaga Gram Swarajya Sansthan* in 2008
- Fits well with small farmers of Jharkhand
- Aims at addressing food security and developing resilience to climate change
- Use of local varieties of seeds for enhanced growth and maintaining the genetic diversity



## Validated benefits of SRI

- Reduced seed rate (5-7 kg/ha compared to traditional nurseries of 50-75 kg/ha)
- Higher grain yield by 20-50% even more
- Reduced requirements of water by 25-50%
- Increased tolerance to climatic stresses and pest attacks
- Fewer seeds and faster time to planting give more flexibility

*Source: Africare, Oxfam America, WWF-ICRISAT Project (2010)*

# SRI in Lohardaga



## **Gaps and Challenges**

- ❖ No policy related to climate change
- ❖ No existing long term Drought action plan
- ❖ Delay in payments of crop insurance
- ❖ No registration for migrant workers

## Way Forward

- ❖ Identification of efforts and strategies adopted by the tribal people and local farmers.
- ❖ Systematic recording or streamlining these activities into adaptation plan.
- ❖ Integration of the strategies into Government's Plan and Policy
- ❖ Adaptive measures need to have a Bottom up approach rather than Top Down

# पूरा झारखंड सुखायुक्त घोषित

# हे भगवान! अब तो पानी बरसा

Hindustan, Friday, Aug 20, pg-4

मुर्कुडा में बारिश के लिए ग्रामीणों ने की सामूहिक पूजा



पूजा अर्चना करते ग्रामीण।  
विमला देवी, रंगेजी देवी,  
मोहाल्पा देवी, रेखा देवी  
जो ने भाग लिया।

फसल सुखो का जायजा लेने आइली केंद्रीय टीम

# संकट बरकरार राज्य के 16 हजार किसानों को अब तक फसल बीमा का लाभ नहीं

- कृषि विभाग ने 16 हजार किसानों को प्रीमियम राशि नहीं लौटायी
- 14 लाख किसानों को राष्ट्रीय कृषि बीमा योजना का लाभ नहीं
- मई-जून में ही बीमा राशि का वितरण हो जाना चाहिए था

बरीय संवाददाता

रांची : राज्य के किसानों पर संकट बरकरार है. सुखे से अभिशाप किसानों को सरकारों सहस्रता अब तक नहीं मिली है. पिछले वर्ष के सुखाड़ को देखते हुए आपदा प्रबंधन विभाग ने यह निर्णय लिया था कि बीमा अनायासे राज्य के 15 हजार 926 किसानों को उनकी प्रीमियम की राशि लौटा दी जाये. इसके बाद राज्य के ही कृषि निदेशालय को 31.60

Thank you for your attention

# सुखाड़ ने बढ़ाया खजुरी झारखंड छोड़ जा रहे लोग

युवाओं को रांची स्टेशन और गाँव स्टैंड पर से तात नौ मारना

