

## **Initiative on Green Growth and Development in India: Pointers from Study**

The Ministry of Environment, Forests and Climate Change recognizes ‘poverty eradication along with green growth’ as central to India’s sustainable development narrative. This vision also embodies the cogent definition of green growth by the Thirteenth Finance Commission of India as a narrative that enables rethinking growth strategies with regard to their impact(s) on environmental sustainability and inclusiveness. The concept of green growth assumes centrality of socio-economic inclusivity to sustainable development in India.

The project, Initiative on Green Growth and Development in India, aims at building evidence through which the Indian economy can move towards an inclusive green growth paradigm of development. The evaluation aims to combine the rigorous scientific and economic studies done at the national and state levels (Punjab and Himachal Pradesh). The study uses evidence-based analytical methods for developing policy choices and green growth opportunities. The analytical insights produced are validated against case studies from field visits, extensive government-stakeholder consultation and a comprehensive policy landscape analysis of sector-wise interventions.

The initiative was implemented by The Energy and Resources Institute (TERI) with collaboration and support from the Global Green Growth Institute (GGGI). For Himachal Pradesh, nodal support was received from the Department of Environment, Science and Technology along with facilitation from the Directorate of Energy and the Economics and Statistics Department. For Punjab, nodal support was received from the Department of Science, Technology & Environment and Punjab State Council for Science & Technology. The overall project was guided by a steering committee which was chaired by Shri. B K Chaturvedi (Former Cabinet Secretary, Government of India).

At the national level, the project uses integrated modelling framework to understand the impact of energy-related green growth interventions on future energy demand, emissions, energy access, energy security and development indicators. In addition sector background papers were developed to review of long-term sustainability challenges in India and suggests policy action and interventions.

At the state level, given that in states of Punjab and Himachal Pradesh, developmental activities are dependent on natural resources, for developing a climate-resilient green growth strategy, it becomes important to understand as to what will be the impact of climate variability on the soil and water parameters. In addition, it becomes relevant to understand developmental and socio-economic aspects through perceptions of communities. The analytical framework for the states included three models (climate modelling, Soil and Water Assessment Tool, and energy modelling), case studies from field visits and a review of sector-wise interventions in Himachal Pradesh. The policy relevance of the analysis is towards the Mission on Strategic Knowledge for Climate Change.

### **Unique features of the Initiative on Green Growth and Development in India**

- First comprehensive integrated analysis involving climate modelling, soil and water assessment, energy modelling as well as field case studies.
- First time climate data at 25 X 25 km generated and fed as inputs to a soil and water impact model.
- A unique example of engagement between government, research community and communities.

### **National component findings**

- The national level modelling assessment projects that, by 2031, development benefits as a result of green growth interventions in energy sector along can be reduced poverty as well as additional employment creation of 117 lakhs, out of which 79 lakhs can be skilled jobs.
- There are huge data gaps in areas of air pollution, water quality & quantity and waste management. Collecting and synthesizing existing and new data is needed to facilitate preparation of strategies as well as evaluation of existing policy initiatives. There is an urgent need for capacity building for data collection related to environmental sustainability.
- Climate-resilient green growth strategies need to be looked at as a cross-cutting issue that requires policy coherence and inter-departmental coordination. For further mainstreaming of environmental sustainability in decision-making processes, the government can adopt green budgeting for India wherein all departments can prepare environmental budget statements highlighting key ‘green’ activities undertaken in their respective departments.
- Financing is critical to the implementation of climate-resilient green growth interventions. In addition to public finance, private sector, banking institutions and development agencies also becomes important.

- A greater engagement between government, research and academia, non-profit organizations, and the private sector is needed to support implementation.

### Himachal Pradesh findings

- Overall warming over the State with Mean Annual Maximum temperature projected to increase by 1.1-1.9°C for 2021-2050 period relative to 1971-2000. Percentage precipitation change for monsoon months between the range of -8% to 12% for 2021-2050 period relative to 1971-2000.
- Water yield is projected to increase in sub-basins of Beas, Ravi, Chenab and Yamuna and decrease in Upper Indus and Sutlej. Apple productivity in Himachal Pradesh will decrease by 1% by 2020 and 4% by 2030.
- 11.61% of State will have catastrophic soil erosion (more than 320 tonnes/ha/year), 65.96% area will have very severe soil erosion (80-320 tonnes/ha/year) and 22.44% area will have severe soil erosion (24-80 tonnes/ha/year)
- The required investments to implement State solar plans are estimated to be more than INR 2000 crores over the Twelfth and Thirteenth Plan periods.
- The loss from forestry sector and tourism sector, for every 1 GW hydro capacity additions, is estimated to be INR 123 crores.
- From field visits, a key need as expressed by communities is that of skill training and livelihood development opportunities which will need to be strengthened in hydropower project sites. Hydropower and green growth needs to be seen within a national green growth and the role in ensuring energy security. The state has the one of the most forward looking hydropower policy in India. There needs to be a better understand of riparian rights such as drinking water, health, downstream livelihoods and entities with “incomparable value” such as biodiversity.
- The state has recognized the importance of greener growth and has been at the forefront of environmental stewardship initiatives which include the initiatives on climate change and disaster management, energy conservation program for promoting compact fluorescent lamps, enactment of a blanket ban on plastic bags, mandatory rain water harvesting in all newly constructed buildings, organic farming policy, payment for ecosystem services policy, ecotourism policy, and environment master plans.

### Punjab findings

- Annual mean temperature projected to increase by 1.2-1.4°C for 2021-2050 period relative to 1971-2000. The State will experience higher number of extreme wet days. A higher level of relative humidity is also expected in the near future.
- As a result of projected increase in temperature, an increase of 6-8% in evapotranspiration from crops is expected thereby increasing the irrigation requirement by 100 to 130 mm for a crop needing 500 mm irrigation water. In irrigation, there would be a deficit of 14.4 billion cubic metres (BCM) unless crop diversification takes place on large scale.
- Modelling exercise shows that out of total blocks analyses in Punjab, 85.5% have deficit water of which 40.4% are moderate to high deficit and 45.2% are in low deficit category. The depleting water table is a cause of grave concern as it has given rise to water availability and quality issues.
- Around 16 million tons of paddy straw and 8 million tonnes of wheat straw are burnt in fields leading to air pollution in the state and nearby areas. Farmers are, however, aware of the negative impacts of paddy straw burning and are open to accept alternate residue management practices. These need to be made cost effective for farmers.
- Lack of effective market linkages, unstable market demand and economic returns for alternate crops have failed to create conducive environment for farmers to confidently venture out of paddy and wheat and go for crop diversification. Interaction and focused group discussions of study team with farmers (in 7 villages of 4 districts – Amritsar, Faridkot, Roopnagar and Sangrur) revealed that majorly were not aware of crop diversification programmes by the government. Small farmers might not adopt agro-forestry but large farmers can adopt it when the returns are higher in comparison to crops.
- State needs to rely more on solar, biomass and co-generation route of renewable energy supply followed by small hydro and waste to fulfil the renewable purchase obligations. On the energy demand side, agriculture, industry, transport and buildings will be the three key areas where energy consumption can be reduced.
- The state has many progressive policies and can also lead in environmental stewardship. The data generated in this project will inform the State’s future climate policies. There is a need to mainstream environmental sustainability in development process such as green budgeting for which the state is first to initiate action.