

Greening Progressive Punjab

Punjab Bhawan, Sector 3, Chandigarh
13th February 2014 (Thursday), 1:30 PM to 5:00 PM



The Energy and Resources Institute





Introduction

A state workshop on “Greening Progressive Punjab” was organized at the Punjab Bhawan in Chandigarh on 13th February 2014 under the project “Initiative on Green Growth and Development in India”. The project is being implemented by The Energy and Resources Institute (TERI) in collaboration with the Global Green Growth Institute (GGGI). The Department of Science, Technology & Environment, Government of Punjab is the nodal agency for the project.

To initiate the consultative process, Dr. R K Pachauri (Director General, TERI) gave a presentation on the relevance of green growth. Shri Rakesh Singh (Chief Secretary, Government of Punjab) made interventions followed by Smt Seema Jain (Principal Secretary, Department of Science Technology & Environment), Shri Anirudh Tewari (Principal Secretary, Power) and Shri Siddharthan Balasubramanian (India Country Head, GGGI). Dr. Prodipto Ghosh (Distinguished Fellow, TERI) chaired the three thematic presentations by the study team on sectoral overview; options in renewable energy; and natural resource management.

Natural resource management

The key challenge for Punjab in future will be to maintain a healthy soil condition and groundwater balance. Currently, about 28 lakh hectare of land is under paddy cultivation. It has been estimated that approximately 16 lakh hectares can be sustained with the current level of water availability.

Over the years following the green revolution, the state has gone for a resource intensive manner of rice and wheat cultivation. In this regard, the government has initiated policy and programmatic measures. An initial budgetary provision of INR 500 crores has been

made by the central government to encourage crop diversification in original green revolution states under the Rashtriya Krishi Vikas Yojana.

Punjab has grown rice to ensure food security needs of India. However, in the journey, Punjab has been affected by ground water level depletion and other environmental degradation. Punjab started with growing cotton, a semi-arid area crop, before moving to paddy cultivation. In order to provide self-sufficiency in the production of food grains for the country, the cropping pattern in Punjab shifted from cotton to paddy. The large-scale paddy cultivation has led to ground water depletion and soil degradation.

Alternative crops like maize and soyabean have to be promoted for sustained income generation for the farmers. There is a need to incentivize farmers to move towards alternative crop production. In order to motivate the farmers to grow other crops like maize and reduce paddy production, minimum support price on alternative crops has to be ensured so that farmers can envisage adequate income from growing these alternative crops. There is also a need to develop enterprises around agriculture sector.

In the context of crop diversification certain scenarios have to be kept in mind. For instance, maize is being thought of as an alternative crop as a part of the crop diversification strategy of Punjab. However, if there is a change in the rainfall pattern and more rainfall happens in future in Punjab owing to climatic and weather related factors, then maize production might not be sustainable: this is because maize crop cannot grow and sustain high water inputs. With high precipitation levels, it should also be seen whether the state has enough water storage capacity. Therefore a crop-specific water utilization strategy has to be devised.

While considering the issue of crop diversification, the challenge of water quality also has to be focussed upon. Government of Punjab has to address the issue of depletion





L to R: R K Pachauri (Director General, TERI); Rakesh Singh (Chief Secretary, Government of Punjab); Seema Jain (Secretary, Department of Science, Technology & Environment, Government of Punjab)

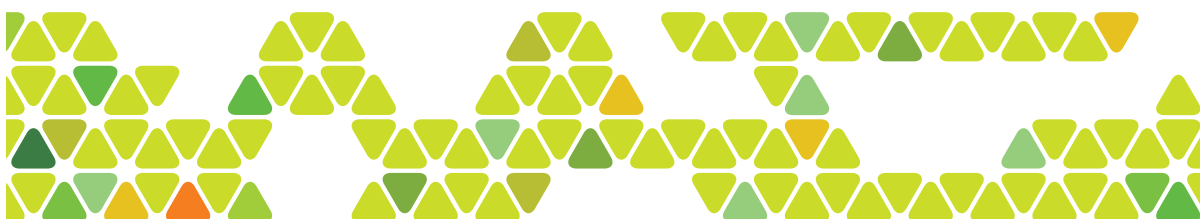
of ground water and leaching of pesticides to ground water. Maintenance of soil quality, checking of ground water depletion is some of the priority areas of the government of Punjab. This is pertinent because South Western districts of Punjab are suffering from the issue of brackish water. Punjab has been suffering from the loss of good quality water. In Bhatinda district, reverse osmosis plants have been installed to treat water at high cost. The maintenance cost of the plants is borne by the installer whereas the state government has borne the cost of initial installation.

Another key issue specific to the state of Punjab is the issue of paddy straw management and utilization. After harvesting paddy, farmers resort to burning paddy stubble to quickly prepare the field for another crop. Total paddy straw residue produced in the state is around 70 million tonnes and hence it becomes important to consider the scale of the problem. Given the scale of agri-residue generated, one of the best utilization of paddy residue is to incorporate the straw in the soil. The resource is not suited to be used as a cattle feed and hence management

and utilization of paddy straw needs to be promoted.

Further, burning paddy residue has also led to smoke related health and visibility issues and has contributed to the smog formation in nearby states. Several options for utilization of paddy straw are being explored by the government of Punjab which included utilization of paddy straw for production of paper boards, mulching, and growing mushrooms. For instance, machines such as balers have been subsidized so that the cost of residue collection for agri-residue based biomass power generation goes down. These have been listed in the policy document released by the state. Efforts have been initiated in the state to start R&D process for reduction of the cost of paddy straw utilization; these efforts need to be further strengthened.

The government of Punjab has also been thinking of introducing power plants with mixed fuels as an input. As a part of that, several types of agri-residues are being considered as fuel inputs. However, the challenge being faced by the technology developer is the high





silica content of paddy straw that impacts the plant operation by bringing down the plant load factor (PLF) of the paddy straw using biomass gasifier plants. Therefore, within Punjab, boiler technologies have to be developed to reduce the level of clinker formation in power plant boilers. In this regard, lab scale technology is being developed to form additives that will reduce the degree of clinkerization by reducing the formation of potassium, chlorides that leads to leaching and contributes to the silica disposition.

On the question of free electricity provision to farmers for paddy production, the state at the moment intends to continue with free power provision so as to encourage electric pump-sets over diesel pump-sets. The state is in a process of implementing feeder segregation along with the provision of automatic meter reading meters at the feeder and individual tubewell levels.

There should also be a policy of metering tubewells as currently no such policy exists to meter the 13 lakh tubewells within the state. The option of provision of cash in the bank accounts of farmers with which they buy power should be considered. If they buy less, they benefit and if they buy more than the cash given they bear the cost on their own. In this way subsidy given is not allowed to distort the incentives and does not allow the farmer to create ground water depletion from excessive paddy production. There is also regulation in the state that cross subsidization in power should not be more than twenty percent.

A key aspect is to make the farmers aware of the growing ground water depletion problem. The farmer is in a way already bearing the brunt of the depletion as every third year he is incurring an additional cost of 2-3 lakh rupees for making deep tubewells to counter the challenge of growing ground water problem.

On the point of ground water depletion, cultivation of paddy has to be done in a manner such that marginal cost of withdrawal of ground

water owing to every incremental unit of paddy production is equal to the marginal benefit from every extra unit of paddy production by the farmers. In the political economy of subsidy provision to large paddy producing agricultural farmers using free electricity for agricultural pump-sets, it has to be ensured that subsidies are given but without distorting the incentives of paddy production in a way so that the marginal costs and benefits of paddy production are equal.

Options have to be given to farmers so that they can switch to other crops and tackle the ground water depletion. Several measures have been exercised by the state government which included provision of 85% subsidy for drip irrigation that can be used for alternative crops like horticultural crops. However, these interventions have not worked and after some time, the farmers start growing paddy, wheat again. Therefore, it is important to restrict the tube-well connections and provide the farmers alternative cropping choices with remunerative returns.

In terms of natural resource management, green cover is an important aspect of green growth as the state has in place the Green Punjab Mission which sets the state an ambitious target to increase the tree cover to 15% of total geographical area in the state by 2017. The state government expected the initiative should provide technical inputs around the issues of climate change, ground water, green cover, crop diversification and natural resource management. Moreover, the results of the project should help in coming up with a strategy paper for addressing the green growth and development path of Punjab.

Power

In the current year, there is a plan to add two units of 270 MW of coal based thermal power plant by April 2014. 250 MW of coal based





L to R: Seema Jain (Secretary, Department of Science, Technology & Environment, Government of Punjab); Anirudh Tewari (Secretary, Directorate of Energy, Government of Punjab); Neelima Jerath (Executive Director, Punjab State Council for Science & Technology)

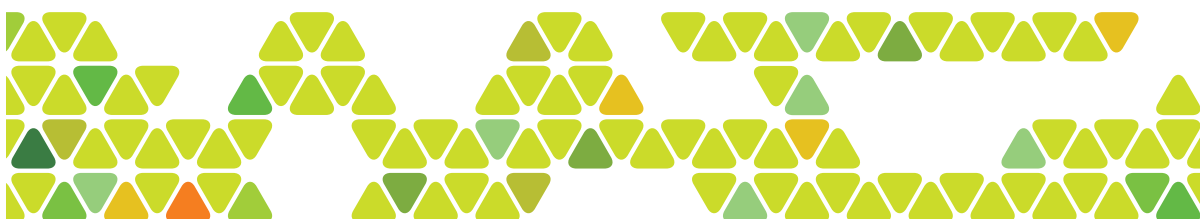
thermal power plant was added last year to meet the growing demand of power of the state. Power purchase agreement (PPA) to buy power from this installed coal based thermal power plant has been already signed. Hydropower generation has not been growing in the current scenario. The addition of new coal based thermal power plants in the state could bias the power generation mix more towards non-renewable sources of energy in the current year. The state is aware and understands the need to expand the renewable energy based power generation within Punjab. The state's policy has to respond and certain measures need to be taken to boost the renewable energy based power generation in the state.


As per the new policy measures of the state, each panchayat can lease 75% of land for environmental (which includes renewable energy) projects for 33 years. The State plans to install roof top solar PV units and also intends to upscale the RPO (Renewable Purchase Obligation) of the power producers. The challenge that has been faced by the state

government in terms of renewable energy power uptake has been the power tariff of electricity from renewable energy sources. Even at a tariff of INR 6.24 per unit, the tariff for renewable energy has been higher to create a demand for power from consumers to whom electricity has been available at a much cheaper cost (at INR 4.21/unit from coal based thermal power units).

The captive coal mines of JVK will also be providing coal supply. However, some of the captive coal mines of JVK are not able to do land acquisition and have been facing regulatory clearance delays which has hindered the supply of coal from JVK to a certain extent. The state in the long run wants to achieve 1000 MW of solar by 2022 (as per the New and Renewable Sources of Energy Policy of 2012 by Punjab Energy Development Agency) which will require availability of private investments. Therefore, it needs financial support in terms of investments from the private sector to achieve the target.

Following December 2013, owing to surplus power generation (from coal based thermal





power generation) by some private generators, the situation has been more demanding to sell costly renewable energy based power to consumers. However, the state wants to continue in its mission of adding solar energy based power generation within the state. The State is not considering any option to explore wind energy as an option to generate electricity. Punjab has already got into agreements with companies like Vedanta, JVK and CIL to supply coal for its coal based thermal power generation plants.

Another expectation that came from the workshop was to look at investment frameworks for clean energy in the state.

Other perspectives

Punjab has to address challenges that come with a transition economy. Historically, people in the rural areas of Punjab always preferred to stay at home. However, now rural-urban migration has started happening in the state.

Urbanization has increased the number of residential houses which is generating waste water. In the villages too, approximately 80%

of the household wastewater is discharged in ponds. Technologies will be required to treat this waste water. 12000-18000 villages need these technologies to maintain the village ponds.

The Punjab State Council for Science and Technology with support from the Department of Science, Technology & Environment, Government of Punjab has already initiated with TERI an exercise on developing an “Action Plan for Green Budgeting” for the state.

The government has to address environmental issues without hindering the investment for industries in the state. The state is in the process of translation to a service sector oriented economy along with the support of agriculture and industries. However, there is a need to bring in big industries to the state for generating employment.

In the path of green growth and development, the state will have to address environmental issues along with addressing of provision of employment, facilitation of industrial growth within the state. The green growth strategy of the state has to take care of structural and socioeconomic aspects.

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Workshop Agenda

Initiative on Green Growth and Development in India

State workshop – Punjab

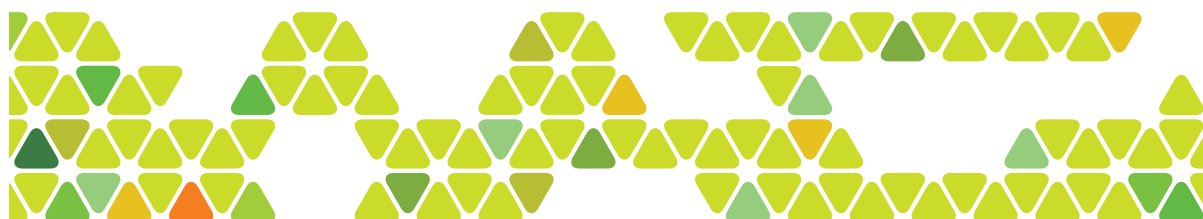
Date: 13 February 2014 (Thursday)

Time: 1:30 PM to 5:00 PM

Venue: Punjab Bhavan, Sector 3, Chandigarh

Agenda

1:30 PM – 2:00 PM	Registration
2:00 – 2:15 PM	Welcome by Ms Shailly Kedia (TERI)
2:15 – 2:30 PM	Introduction and relevance of the project by Dr. R K Pachauri (Director General, TERI) Smt Seema Jain Mr Siddarthan Bala Mr Ajith Radhakrishnan
2:30 PM – 3:00 PM	<i>High-level vision and prospects for green growth</i> <i>Chair: Shri Rakesh Singh (Chief Secretary, Government of Punjab)</i> Dr R K Pachauri (Director General - TERI) Smt Seema Jain (Secretary - Department of Science Technology & Environment) Mr Siddarthan Bala (India Country Head, Global Green Growth Institute - GGGI)
3:00 PM – 3:15 PM	Questions from officials
	Technical presentations by TERI project team <i>(Chair: Dr. Prodipto Ghosh, Distinguished Fellow, TERI and Former Secretary, Ministry of Environment and Forests, Government of India)</i>
3:15 PM – 3:30 PM	Sector-wise overview (led by Dr Ritu Mathur)
3:30 PM – 3:45 PM	Discussion and feedback
3:45 PM – 4:00 PM	Renewable energy based technological options (led by Dr Ujjwal Kanti Bhattacharjee)
4:00 PM – 4:15 PM	Discussion and feedback
4:15 PM – 4:30 PM	Ecosystem services and natural resource management: Institutional models (led by Ms Shailly Kedia)
4:30 PM – 4:45 PM	Discussion and feedback
4:45 PM – 4:55 PM	Summary by Chair
4:55 PM – 5:00 PM	Vote of thanks by Ms Rinki Jain





List of participants

1. Mr Rakesh Singh, Chief Secretary, Government of Punjab
 2. Dr. Rajendra K. Pachauri, Director General, The Energy and Resources Institute
 3. Dr. Prodipto Ghosh, Distinguished Fellow, The Energy and Resources Institute
 4. Ms Seema Jain, Secretary, Department of Science, Technology and Environment, Government of Punjab
 5. Mr Anirudh Tewari, Secretary, Power & Non-conventional Energy, Government of Punjab
 6. Dr. Neelima Jerath, Executive Director, Punjab State Council for Science & Technology, Government of Punjab
 7. Mr Siddarthan Balasubramanian, India Country Head, Global Green Growth Institute
 8. Mr Ajith Radhakrishnan, Senior Technical Advisor – India Country Program, Global Green Growth Institute
 9. Mr Prasoon Agarwal, Senior Technical Advisor - India Country Program, Global Green Growth Institute
 10. Dr. S S Ladhar, Additional Director, Punjab State Council for Science & Technology, Government of Punjab
 11. Dr. S K Saxena, PSO (Environment), Punjab State Council for Science & Technology, Government of Punjab
 12. Dr. Balour Singh, Director, Punjab Energy Development Agency, Government of Punjab
 13. Dr. V K Verma, Head (NR&E), Punjab Remote Sensing Centre, Ludhiana
 14. Dr. B Pateriya, Director, Punjab Remote Sensing Centre, Government of Punjab
 15. Mrs Tripat Deeksha, Director, Deeksha
 16. Mr Rajnesh Chander, Joint Director, Department of Agriculture, Government of Punjab
 17. Mr M P Beri, Joint Director of Factories (PB), Labour Department, Directorate of Factories, Government of Punjab
 18. Mr G S Maur, Deputy Director, Social Security Women & Child Development, Government of Punjab
 19. Mr Ranjit Powar, Deputy Director, Department of Food & Civil Supplies, Government of Punjab
 20. Ms Shruti Shukla, Deputy Director, Punjab Energy Development Agency, Government of Punjab
 21. Ms Sapna Manchanda, Deputy Director, Punjab Tourism
 22. Mr Kanwarjit Singh, Joint Director Agriculture (HG), Department of Agriculture, Government of Punjab
 23. Mr D R Kataria, Joint Director Agriculture (Engg.), Department of Agriculture, Government of Punjab
 24. Dr. R K Setia, Scientist, Department of Planning
 25. Dr. S S Bains, Consultant, Punjab State Farmers Commission
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26. Mr Harbhajan Singh, Senior Engineer PRC-II, Rural Development and Panchayat Department, Government of Punjab
27. Mr Praveen Garg, Senior System Manager cum Senior Consultant, Department of Governance Reform, Government of Punjab
28. Mr Atul Thakur, Junior Engineer, Department of Water Supply and Sanitation, Government of Punjab
29. Dr. Anand Gupta, Subject Expert, S.I.S.E., Government of Punjab
30. Ms Neetu Minhas, Soil Conservation Officer, Department of Soil & Water Conservation, Government of Punjab
31. Mr A. K. Kansal, Chief Vigilance Officer-cum-Chief Engineer, Local Government Department, Government of Punjab
32. Mr Amarpal Singh, Officer, Punjab Energy Development Agency, Government of Punjab
33. Mr S R Aggarwal, Chief Technical Coordinator, Department of Water Supplies and Sanitation, Government of Punjab
34. Mr Baljinder Singh, Planning Officer - Soil and Water Conservation, Department of Soil & Water Conservation, Government of Punjab
35. Mr Ajay Kanwar, Chief Engineer, Local Government Department, Government of Punjab
36. Mr B R Gambar, Finance Department, Government of Punjab
37. Mr Harsimran Bhullar, Manager, Punjab Tourism
38. Dr. Ritu Mathur, Fellow, The Energy and Resources Institute
39. Ms Shailly Kedia, Fellow, The Energy and Resources Institute
40. Ms Rinki Jain, Associate Fellow, The Energy and Resources Institute
41. Mr Anandajit Goswami, Fellow, The Energy and Resources Institute
42. Ms Aparna Vashisht, Research Associate, The Energy and Resources Institute
43. Dr. Prasun Gangopadhyay, Associate Fellow, The Energy and Resources Institute
44. Dr. Prakashkiran S. Pawar, Associate Fellow, The Energy and Resources Institute
45. Mr Saurabh Bhardwaj, Associate Fellow, The Energy and Resources Institute
46. Dr. Bibhu Prasad Nayak, Fellow, The Energy and Resources Institute
47. Dr. G Mini, Fellow, The Energy and Resources Institute
48. Mr Lovedeep Mann, Research Associate, The Energy and Resources Institute
49. Dr. G. A. Vadivelu, Associate Fellow, The Energy and Resources Institute
50. Dr Ujjwal Kanti Bhattacharjee, Senior Fellow, The Energy and Resources Institute
51. Mr P D Tiwari, Senior Secretary, The Energy and Resources Institute
52. Ms Richa, Coordinator, Deeksha
53. Ms Madepeine Aziz, Intern, Deeksha
54. Ms Nardeen Milad, Intern, Deeksha
55. Ms S. Shujan, Intern, Deeksha





Steering Committee

1. Shri B K Chaturvedi, Former Member, Planning Commission (Chair)
2. Dr R K Pachauri, Director-General, TERI
3. Mr Rakesh Singh, Chief Secretary, Government of Punjab
4. Ms Seema Jain, Principal Secretary, Department of Science, Technology, Environment, and Non- conventional Energy, Government of Punjab
5. Mr P Mitra, Chief Secretary, Government of Himachal Pradesh / Shri P Mitra, Acting Chief Secretary, Government of Himachal Pradesh
6. Mr Tarun Shridhar, Principal Secretary, Department of Environment Science & Technology, Government of Himachal Pradesh
7. Dr Mattia Romani, Deputy Director - General , GGGI
8. Ms Naina Lal Kidwai, Country Head, HSBC India and Director HSBC Asia Pacific
9. Mr Onnu Ruhl, India Country Director, The World Bank
10. Ms Lise Grande, UN Resident Coordinator, United Nations Development Programme (UNDP)
11. Mr R V Verma, Chairman and Managing Director, National Housing Bank
12. Mr Prabir Sengupta, Distinguished Fellow, TERI and Former Secretary, Ministry of Commerce and Industry
13. Dr Prodipto Ghosh, Distinguished Fellow, TERI and Former Secretary, Ministry of Environment and Forest (MoEF)
14. Mr Shri Prakash, Distinguished Fellow, TERI and Former Member, Ministry of Railways
15. Mr S Vijay Kumar, Distinguished Fellow, TERI and Former Secretary, Ministry of Rural Development





Project overview

The Initiative on Green Growth and Development in India is a collaborative project which is being undertaken by The Energy and Resources Institute (TERI) and the Global Green Growth Institute (GGGI). The Department of Science, Technology & Environment is the nodal agency for the project, for Punjab.

The analysis will evaluate options by which the Indian economy can move towards an inclusive green growth paradigm of development. To this end, the initiative will examine strategies pursued at the national level and for the two states, namely Punjab and Himachal Pradesh.

Key policy issues for Punjab to be covered under the project include

- Implications of climate change
- Soil and water assessment
- Techno-economic analysis for energy
- Natural resource management and crop diversification
- Groundwater resource management
- Increasing green cover in Punjab
- Paddy straw management and utilization
- Financing for clean energy
- Green growth roadmap



Project Coordinator

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